EMISSION TESTING AT COALINGA COGENERATION PLANT

January 29 and 30, 1991

Prepared for

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SECTION 1

INTRODUCTION

At the request of Shell Western Exploration & Production, Inc., Steiner Environmental, Inc. conducted a series of emission tests on the effluent of two gas turbines at the cogeneration plant located north of Coalinga, California. The tests were conducted on January 29 and 30, 1991 to determine compliance with Fresno County Air Pollution Control District rules and regulations when burning the maximum amount of natural gas fuel.

Duplicate particulate, sulfate and SO_2 tests were conducted on the effluent of each HRSG serving each gas turbine (101A and 101B) using EPA Method 5/8. Duplicate NO_x, CO, CO_2 and O_2 tests were conducted using EPA Method 20. Duplicate hydrocarbon tests were conducted using EPA Method 18. A sample of the PUC natural gas fired in each turbine was collected and analyzed for CHNOS, specific gravity, moisture and Btu using ASTM Methods. Finally, a single test for H_2S in the fuel gas was conducted using EPA Method 11.

Section 2 of the report summarizes the test matrix for this program.

SECTION 2

TEST PROGRAM

Table 2-1 summarizes the tests performed on each unit. Extended sampling times were used to maximize the amount of particulate and SO_2 for subsequent analysis.

An upset occurred during the test program (HRSG 101-B, Test 2) and the data may not be representative of emissions from this plant.

Section 3 summarizes the results of these tests.

TABLE 2-1. COALINGA COGENERATION PLANT TEST MATRIX

Date	Unit #	Test #	Test Parameter	Test Time
01/29/91	101A	1	Particulates/Sulfates/SO_2/HC	4:40 am - 7:41 am
			NO_x/CO/CO_2/O_2	4:40 am - 7:16 am
	"	2	Particulates/Sulfates/SO_2/HC	8:40 am - 11:23 am
			NO_x/CO/CO_2/O_2	8:30 am - 11:00 am
01/30/91	101B	1	Particulates/Sulfates/SO_2/HC	4:46 am - 6:59 am
			NO_x/CO/CO_2/O_2	4:40 am - 7:00 am
	"	2	Particulates/Sulfates/SO_2/HC	7:52 am - 10:03 am
			NO_x/CO/CO_2/O_2	7:35 am - 9:43 am
01/29/91	101A	1	H_2S	5:57 am - 9:01 am
01/30/91	101B	1	H_2S	8:10 am - 11:40 am

SECTION 3

TEST RESULTS

Tables 3-1 and 3-2 summarize the results of the tests performed on Units 101A and 101B. All data are reported at 60°F and 29.92 inches Hg.

Both tests on HRSG 101-A were conducted at stable turbine operating conditions. Test 1 on HRSG 101-B was conducted at stable turbine operating conditions. At 8:10 am, during Test 2 on HRSG 101-B, the CO increased sharply and went off scale (>20 ppm) twice during the remainder of this test. Internal and external calibrations of the Steiner Environmental monitoring system were performed to determine if the system was still in calibration. All checks were positive and the system was in calibration. The CO remained high and erratic during the remainder of Test 2. The cause of this problem was not found prior to the end of this test, so this result is not indicative of emissions under normal operating conditions.

The moisture content of the stack gas increased from 7.87% to 8.30% from Test 1 to Test 2, suggesting that more water was injected into the turbine for NO_x control. NO_x at 15% O_2 did decrease slightly from Test 1 to Test 2 (38.09 to 37.45) and CO at 15% O_2 increased from Test 1 to Test 2 (4.08 to 11.52) which is consistent with the suggestion of a change in water injection rate.

The plant operating data does not show an increase in water injection rate (see Appendix B). As per SWEPI'S representative, Mr. K. D. Kirkpatrick, the cause of the problem was determined to be, that when the evaporative cooler came on and the inlet filters being saturated with moisture gave the same results as an increase in water injection. After the evaporative cooler was shut off, CO decreased and NO_x increased, but, due to low ambient air temperature, it would take a long time to dry the filters and stabilize to normal operating conditions.

Although H_2S was present in the PUC gas fired in the turbine, the H_2S was less than the detection limit (<0.10 ppm) on both test days.

TABLE 3-1. SUMMARY OF SOURCE EMISSION TEST DATA (60°F)

Unit Tested: SWEPI Coalinga Cogen Plant HRSG Unit 101A

Date: January 29, 1991

Test Number	1	2	Average
Test Condition	Gas 100%	Gas 100%	
Barometric Pressure (in. Hg)	28.81	28.91	28.86
Stack Pressure (in. Hg)	28.80	28.90	28.85
Stack Area (ft^2)	15.67	15.67	15.67
Elapsed Sampling Time (min.)	140.00	140.00	140.00
Volume Gas Sampled (dscf)	114.716	114.885	114.801
F-Factor	8474.21	8474.21	8474.21
GAS DATA			
Average Gas Velocity (fps)	42.20	41.42	41.81
Average Gas Temperature (°F)	242.71	240.18	241.45
Gas Flowrate	25,984	25,744	25,864
Gas Analysis (Volume %)			
Carbon Dioxide, dry	3.49	3.48	3.49
Oxygen, dry	14.90	15.04	14.97
Water	8.05	7.83	7.94
EMISSION CONCENTRATION			
Filterable Particulate (gr/dscf)	0.0014	0.0009	0.0012
Total Particulate (gr/dscf)	0.0022	0.0016	0.0019
Total Sulfate	0.0001	0.0001	0.0001
CO (ppm)	4.15	4.38	4.27
SO_2 (ppm)	0.08	0.09	0.08
NO_x (ppm)	38.44	38.61	38.53
$>C_1$ HC (ppm)	<1.00	2.00	<1.50
EMISSION RATE - lb/hr			
Filterable Particulate	0.32	0.20	0.26
Total Particulate	0.48	0.36	0.42
Total Sulfate	0.01	0.03	0.02
CO	0.48	0.50	0.49
SO_2	0.02	0.02	0.02
NO_x	7.27	7.23	7.25
$>C_1$ HC	<0.07	0.13	<0.10
EMISSION FACTOR - lb/MMBtu			
Filterable Particulate	0.0060	0.0039	0.0050
Total Particulate	0.0091	0.0070	0.0080
Total Sulfate	0.0002	0.0005	0.0004
CO	0.0090	0.0098	0.0094
SO_2	0.0004	0.0005	0.0004
NO_x	0.1376	0.1416	0.1396
$>C_1$ HC	<0.0013	0.0025	<0.0019

TABLE 3-2. SUMMARY OF SOURCE EMISSION TEST DATA (60°F)

Unit Tested: SWEPI Coalinga Cogen Plant HRSG Unit 101B

Date: January 30, 1991

Test Number	1	2	Average
Test Condition	Gas 100%	Gas 100%	
Barometric Pressure (in. Hg)	28.92	29.00	28.96
Stack Pressure (in. Hg)	28.91	28.98	28.94
Stack Area (ft^2)	15.67	15.67	15.67
Elapsed Sampling Time (min.)	120.00	120.00	120.00
Volume Gas Sampled (dscf)	97.748	99.623	98.685
F-Factor	8473.94	8473.94	8473.94
GAS DATA			
Average Gas Velocity (fps)	41.53	41.76	41.65
Average Gas Temperature (°F)	238.33	237.04	237.69
Gas Flowrate	25,879	26,015	25,947
Gas Analysis (Volume %)			
Carbon Dioxide, dry	4.02	3.42	3.72
Oxygen, dry	15.20	14.95	15.08
Water	7.87	8.30	8.08
EMISSION CONCENTRATION			
Filterable Particulate (gr/dscf)	0.0008	0.0010	0.0009
Total Particulate (gr/dscf)	0.0016	0.0024	0.0020
Total Sulfate	0.0001	0.0001	0.0001
CO (ppm)	3.94	11.62	7.78
SO_2 (ppm)	0.10	0.09	0.10
NO_x (ppm)	36.80	38.27	37.54
$>C_1$ HC (ppm)	1.00	1.00	1.00
EMISSION RATE - lb/hr			
Filterable Particulate	0.17	0.23	0.20
Total Particulate	0.36	0.54	0.45
Total Sulfate	0.02	0.03	0.03
CO	0.45	1.34	0.89
SO_2	0.03	0.02	0.03
NO_x	6.93	7.24	7.08
$>C_1$ HC	0.07	0.07	0.07
EMISSION FACTOR - lb/MMBtu			
Filterable Particulate	0.0034	0.0044	0.0039
Total Particulate	0.0071	0.0103	0.0087
Total Sulfate	0.0005	0.0005	0.0005
CO	0.0090	0.0255	0.0173
SO_2	0.0005	0.0005	0.0005
NO_x	0.1387	0.1382	0.1384
$>C_1$ HC	0.0013	0.0013	0.0013

SECTION 4

SAMPLING EQUIPMENT AND PROCEDURES

This section of the report describes the equipment and procedures used to conduct the particulate and gaseous tests on this program.

4.1 PRELIMINARY MEASUREMENTS

Before conducting the stack tests a series of preliminary measurements were made to determine:

- The location of the sampling site and the number and location of the sampling points to be used (EPA Method 1)
- The velocity, temperature and pressure of the gases in the stack (EPA Method 2)
- The composition of the stack gases (EPA Method 3)
- The moisture content of the stack gases (EPA Method 4)

Using the results of these preliminary measurements and the calibration constants for the sampling train, a series of calculations were made to determine the value of K, a constant, and N_d, ideal nozzle diameter, required to run an isokinetic test according to the equation:

$$\Delta H = \left\{ \frac{60^2 \pi^2 K_p^2 C_p^2 (1 - B_{wo})^2 P_s MW_d}{576^2 K_o^2 MW_s P_m} \right\} (N_d^4) \left(\frac{T_m}{T_s} \right) (\Delta P)$$

where

$$K = \left\{ \frac{60^2 \pi^2 K_p^2 C_p^2 (1 - B_{wo})^2 P_s MW_d}{576^2 K_o^2 MW_s P_m} \right\}$$

An actual nozzle, whose diameter was as close as possible to the ideal nozzle diameter, was selected for the test. Isokinetic sampling rates for each sampling point in the stack were computed using the equation:

$$\Delta H = (K)(N_d^4)\left(\frac{T_m}{T_s}\right)(\Delta P)$$

Since K and N_d are known, and remain constant during a test, the only variables are the meter temperatures, the stack gas temperature and the velocity pressure for each sampling point.

4.2 PREPARATION OF THE PARTICULATE-SO_x SAMPLING TRAIN

All sampling train components were cleaned in the laboratory (soap and water, tap water rinse, distilled water rinse, and IPA rinse) to eliminate previous contamination. The sampling train components were sealed and transported to the sampling site in a mobile lab. The EPA Method 5/8 equipment used to measure particulates (filterable and total) and SO_x consisted of:

- A calibrated 316 stainless steel nozzle for isokinetic sampling
- A heated Pyres glass sampling probe (6 feet long) equipped with an S-type pitot tube and a thermocouple to measure stack velocity pressure and temperature

- A heated Pyrex glass filter holder containing a weighed 100-mm Whatman 934 AH glass fiber filter
- A Pyrex glass impinger train in an icebath (impinger 1 contained 100 ml 80-percent IPA; a Pyrex glass filter holder containing a 47-mm Whatman 934 AH filter; bubbler 2 and impinger 3 each contained 100 ml of 3-percent H_2O_2; bubbler 4 contained a weighed amount of silica gel)
- An umbilical to connect the probe and sample box to the control module
- A control module containing a vacuum pump, a calibrated dry gas meter and a calibrated orifice meter to measure the pressure, temperature and flowrate throughout the train.

The sampling train was charged in the mobile lab using freshly prepared reagents. Each impinger and its contents was weighed to the nearest 0.1 gm on a calibrated electronic balance. Blanks of all filters and reagents were retained for subsequent analysis. The sampling point locations were marked on the probe using a high-temperature marker. The sampling train was completely assembled and lifted to the sampling site.

4.3 SAMPLING PROCEDURES FOR PARTICULATE-SO_x SAMPLING TRAIN

Prior to a test, the sampling train was heated and leak-checked at 15-inches Mercury to insure leakage was less than 0.02 or 4% of the average sampling rate. The S-type pitot tube was also leak-checked. The sampling train was installed on the unirail and the probe was inserted into the stack at the farthest point. An isokinetic sampling rate was calculated using an HP-41CV calculator for each sampling point on the traverse (4 points per traverse; 7 traverses for 101A and 6 points per

traverse; 4 traverses for 101B). Each point was sampled for an equal period of time (5.0 minutes) and all pertinent data was recorded on the data sheet for each point. The probe and sample box were maintained at 250°F throughout the traverse. The gases leaving the impinger train were maintained at <68°F. At the end of a traverse, the probe was withdrawn from the stack and the entire sampling train was transferred intact to the next sampling port. Another traverse of the stack was completed and the sampling train was withdrawn for the final leak check. This leak check was performed at 15-inches Mercury or at the highest vacuum achieved during the test. The S-type pitot tube was also checked at this time. The sampling train was then purged with ambient air for 15-minutes using the highest ΔH measured during the test. After the train was purged, the filter holder and impinger train were sealed with aluminum foil and lowered to the mobile lab for sample recovery.

4.4 SAMPLE RECOVERY PROCEDURES FOR PARTICULATE-SO_x SAMPLING TRAIN

Sample recovery for the nozzle and probe occurred on the stack. The nozzle and probe were brushed and rinsed three times using ACS reagent grade acetone into a polyethylene sample bottle. Sample recovery for the filter holder and impinger train occurred in the mobile lab. The 100-mm filter was removed from the 4-inch filter holder and sealed in its petri dish. The glass fibers stuck to the gasket were scraped off and put into the petri dish. The front half of the 4-inch glass filter holder was brushed and rinsed with acetone. Each impinger was removed from the icebath, wiped dry and weighed to the nearest 0.1 gm. The contents of impinger 1 were transferred to a polyethylene sample bottle. The back half of the 4-inch glass filter holder, the glass connectors,

impinger 1, and the front half of the 2-inch filter holder were rinsed with 80-percent IPA and the rinsings were transferred to this same bottle. The 47-mm filter from the 2-inch filter holder was sealed in its petri dish. The contents of bubbler 2 and impinger 3 were transferred to a polyethylene sample bottle. Distilled water rinsings of the back half of the 2-inch filter holder, bubbler 2, the connector, and impinger 3 were transferred to this same bottle. All sample bottles and petri dishes were marked and labeled. A chain-of-custody log was completed and the field data sheet was also labeled with the sample ID numbers. The sampling train was then recharged in preparation for the next test.

4.5 SAMPLING PROCEDURES FOR CONTINUOUS MONITORING

The continuous monitors used in the Steiner Environmental Mobile Monitoring Lab are shown in Table 4-1. Figure 4-1 is a schematic of the continuous monitoring system. The procedures used to continuously monitor stack gases for NO_x, CO, CO_2, and O_2 strictly follow EPA Method 20.

Sample was taken from the stack (at 2 points) using a 316 stainless steel probe. A heated Balston filter holder and fiberglass filter (99.9999 percent efficiency retention of 0.6 micron particles) was connected to the outlet of the probe. Sample gas was transported through heated Teflon sample line (maintained at >250°F) by a Teflon-lined diaphragm pump to a 316 stainless steel refrigeration type conditioner (Hankison Model E-4G-SS). The sample gas was passed through the conditioner two separate times under vacuum before entering the pump, then two additional times under pressure. The clean, dry sample gas (~35°F) was then transported to the continuous analyzer system through an unheated Teflon line. A series of flowmeters, valves and regulators maintain constant flow through the system at a constant pressure.

TABLE 4-1 CONTINUOUS MONITORING LAB - TRAILERS 1, 2 AND 4

NO_X CHEMILUMINESCENT ANALYZER – THERMO ELECTRON MODEL 10

Response Time (0-90%)	1.5 sec -- NO mode; 1.7 sec -- NO_X mode
Zero Drift	Negligible after 1/2 hour warmup
Linearity	±1% of full scale
Accuracy	Derived from the NO or NO_2 calibration gas, ±1% of full scale
Output	0-10 V
Operating Ranges	0-2, 5, 10, 25, 100, 250, 1000, 2500 and 10,000 ppm

O_2 ANALYZER, FUEL TYPE – TELEDYNE MODEL 326

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
Output	0-1 V
Operating Ranges	0-5%, 10%, 25% O_2

CO_2/CO INFRARED ANALYZER – ANARAD MODEL AR-600

Response Time (0-90%)	5 seconds
Zero Drift	±1%
Span Drift	±1%
Linearity	1%
Resolution	Less than 1% of full scale
Output	0-1 V
Operating Ranges	0-20% CO_2/0-10,000 ppm CO

CO GAS FILTER CORRELATION – THERMO ELECTRON MODEL 48

Response Time (0-95%)	1 minute
Zero Drift	±0.2 ppm CO
Span Drift	Less than 1% full scale in 24 hours
Linearity	±1% full scale, all ranges
Accuracy	±0.1 ppm CO
Output	0-10 V
Operating Ranges	1, 2, 5, 10, 20, 50, 100, 200, 500, 1000 ppm

SO_2 UV ANALYZER – DUPONT MODEL 400

Response Time (0-90%)	Less than 1 second
Zero Drift	Less than 1% full scale in 24 hours
Linearity	±1% full scale
Accuracy	±2% full scale
Output	0-5 V
Operating Ranges	0-100 ppm, 1-1000 ppm

STRIP CHART RECORDERS (3) – MOLYTEK MODEL 2800

Pen Response	0.75 seconds Full Scale
Input Spans	10, 20, 50, 100 MV; 1, 5, 10 VDC
Zero Set	LH standard, adjustable to 100% of Full Scale
Accuracy	±0.25% of Span
Dead Band	±0.15% of Span
Linearity	±0.25% of Span
Chart Speed	0.5, 1, 2, 3, 6, 12 inches/hour; 0.5, 1, 2, 4, 10, inches/minute
Recording Pen	Fiber tip cartridge
Chart Width	10 inches

SCOTSMAN TRAILER

Fully Insulated	Air Conditioned -- 8 feet x 14 feet x 11 feet

1. Filter 0.6 μ, 99.9999 percent efficient
2. Duct
3. 316 stainless steel probe
4. 3/8-inch, heated (250°F) Teflon
5. Four-pass conditioner-dryer, 316 stainless steel internals
6. 3/8-inch, unheated Teflon
7. Teflon-lined sample pump
8. 3/8-inch unheated Teflon
9. Rotameter
10. 1/4-inch Teflon tubing
11. Calibration gas manifold
12. Calibration gas selector valve
13. Calibration gas cylinders
14. Backpressure regulator
15. Auxiliary analysis port

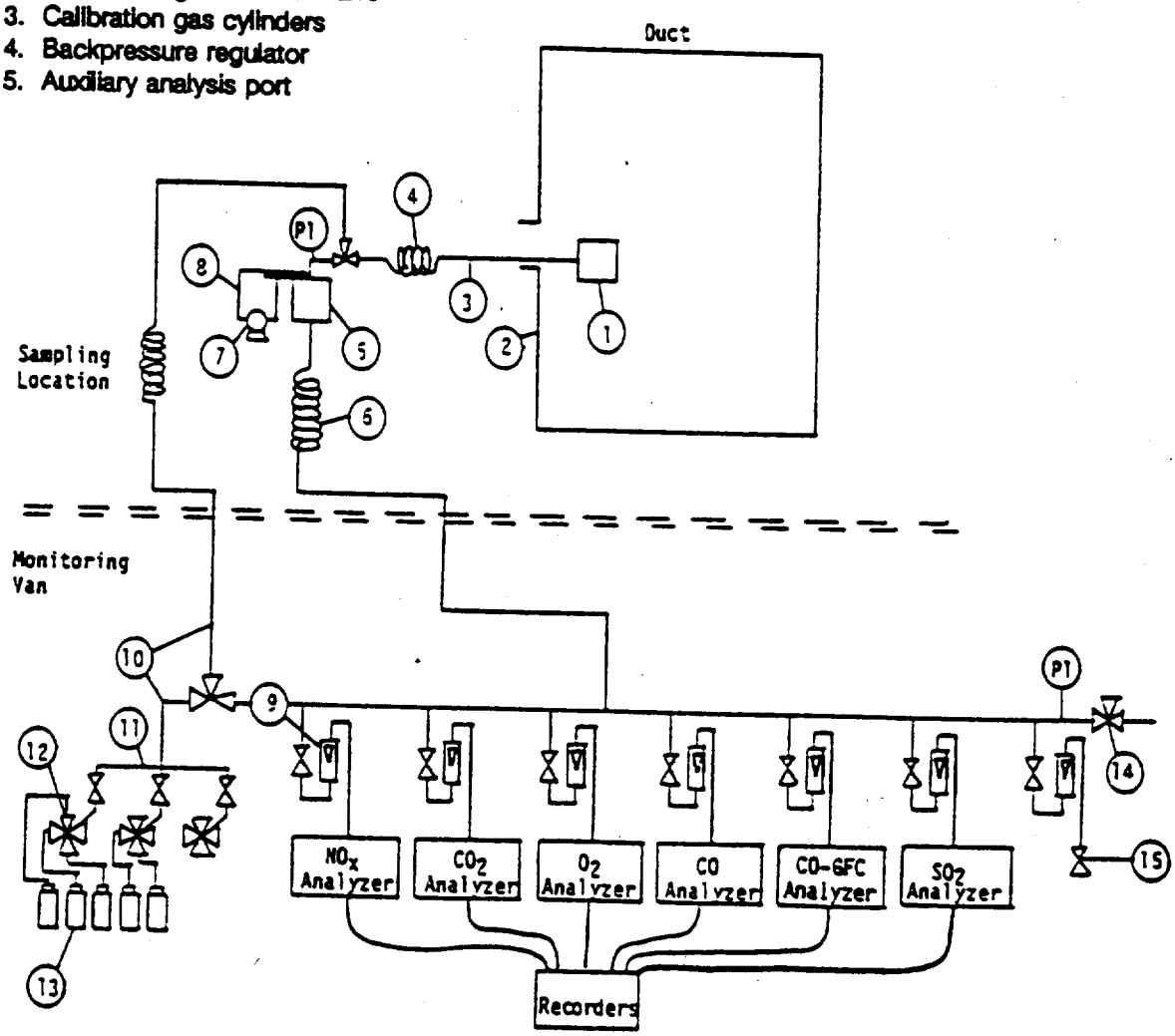


FIGURE 4-1. SCHEMATIC OF CONTINUOUS MONITORING SYSTEM

Calibrations of the continuous analyzers were performed using EPA Protocol 1 calibration gases (±1%) for NO_x and NBS certified calibration gases (±1%) for CO, CO_2 and O_2. Copies of the gas certifications are included in the Appendix of this report. All pertinent data (date, time, test locations, analyzer range, cal gas value) were recorded on both the field data sheets and continuous analyzer strip charts in the field.

At the start of a test day, a leak-check was performed. The sample probe was removed from the stack and the end was sealed. A leak-check was successful only if pressure at the analyzer system and flow through the rotameters to the individual analyzers all dropped to zero. A mandatory leak-check was performed at the completion of each test day.

An initial calibration was performed at the start of a test period by introducing zero and span gases for each analyzer and making the necessary adjustments. A multipoint linearity check was performed on each analyzer to insure all points were within ±2% of full scale. An NO_2 to NO converter check was performed to insure converter efficience was greater than 90%. And, finally, the upscale and downscale response time of the sampling system was measured to insure the sampling time per point could be set at 1-minute plus the system response time. Calibration gas values were recorded on the continuous monitor strip charts and field data sheets. A calibration check was completed at the end of a test and adjustments (if necessary) to the analyzers were made in preparation for another test.

An external calibration of the sampling system was performed at the start of a test day. EPA Protocol 1 gas was flowed through the entire sampling system from the probe tip. The response of the analyzers

had to be within ±5% of the certified tank value before testing could proceed. An external calibration was also performed at the end of each test day.

Test data was collected by recording 10-minute averages from the strip chart recordings onto the field data sheets. Data collected over the test period was averaged and reported. A fuel analysis was used to calculate the F-factor, dscf/MMBtu corrected to zero percent O_2 (standard conditions 60°F, 29.92 inches Mercury), as described in 40 CFR 60.45. The pollutant concentration and the F-factor were used to calculate an emission factor in lb/MMBtu.

4.6 SAMPLING PROCEDURES FOR HYDROCARBONS

The sampling train for hydrocarbons consisted of a probe (short piece of stainless steel), a Tygon sample line, a Tedlar bag and a hand pump. The entire train was purged with stack gas three times before collecting a sample. An integrated grab sample of the stack gases was collected over the test period. After sample collection, the Tedlar bag was lowered to the mobile lab for subsequent analysis. Duplicate grab samples were collected during the test series.

4.7 PREPARATION OF H_2S SAMPLING TRAIN

All sampling train components were cleaned in the laboratory (soap and water, tap water rinse, distilled water rinse, and IPA rinse) to eliminate previous contamination.

EPA Method 11, with cadmium sulfate as the absorbing solution, was used to collect H_2S. Samples were collected from the gas stream using the following sampling train:

- A Teflon sample line (3 feet long) to connect the impinger train to the duct
- An impinger train consisting of five midget impingers with glass connections (impinger 1 contained 15 mls of 3-percent H_2O_2; impingers 2, 3, and 4 each contained 15 mls of the 3 M cadmium sulfate absorbing solution; and, impinger 5 contained approximately 20 grams of silica gel)
- A control module containing a pump, control valves, gas meter, orifice meter, dual inclined manometer and temperature indicator with selector switch
- An umbilical cord to connect the control module and the sample train

4.8 SAMPLING PROCEDURES FOR H_2S

Tests were conducted in strict accordance with EPA Method 11. The entire sample train was assembled at the test site. An initial leak-check was performed at 5-inches Mercury vacuum to insure leakage was less than 0.002 cfm. After completing the leak-check, sample was drawn through the midget impinger train at approximately 0.13 cfm for 4 hours. A final leak-check was performed after completing each test. The impinger train was transported to the mobile lab for sample recovery.

4.9 SAMPLE RECOVERY PROCEDURES FOR H_2S

Recovery of the EPA Method 11 sample train was performed in the mobile lab. The contents of the hydrogen peroxide impinger were discarded. The contents of impingers 2, 3, and 4 were quantitatively transferred to a labelled polyethylene sample bottle.

SECTION 5

ANALYSIS PROCEDURES

This section of the report describes the procedures used to analyze the samples collected during the test program. The fuel gas and hydrocarbon samples were sent to Pacific Gas Technology for analysis. All other analyses were performed in the Steiner Environmental laboratory in Bakersfield.

5.1 ANALYSIS OF PARTICULATE-SO_x SAMPLES

5.1.1 Nozzle, Probe, Filter Holder Wash

The volume of the acetone washings was measured and the washings were transferred to clean, tared, aluminum weighing dishes. The dishes were placed on temperature-controlled water bath under a fume hood and gently heated to dryness (100°F). The dishes with the dry residue were desiccated and weighed repeatedly at 6-hour intervals until a constant weight was achieved (to the nearest 0.01 mg with a tolerance of <0.1 mg between weighings). The ACS reagent grade acetone blank was treated in the same manner.

5.1.2 Filter

The 100-mm filter was removed from its petri dish and transferred to an oven where it was heated for 2 hours at 105°C. The filter was then desiccated and weighed repeatedly at 6-hour intervals until a constant weight was achieved (to nearest 0.01 mg with a tolerance of <0.1 mg

between weighings). An unused, tared blank filter was treated in the same manner.

5.1.3 Filterable Particulate Sulfate

The acetone washings residue and the 100-mm filter were combined and then leached with distilled water to remove sulfate and the leachate was diluted to 100 ml. An aliquot was passed through ion exchange resin and titrated against 0.01N $BaCl_2$ (which was previously standardized against 0.0100N H_2SO_4) using the barium-thorin titration procedure specified in EPA Method 8. The acetone blank and 100-mm filter blank were treated in an identical manner.

5.1.4 Condensible Particulate, Sulfate, and SO_3

The 47-mm glass fiber filter was leached with distilled water and the leachate was added to the contents and washings from impinger 1. The volume was measured and the entire volume was transferred to a clean, tared glass evaporating dish. The dish was placed on a temperature-controlled hot plate under a fume hood and gently heated to dryness (150°F). The dish with the dry residue was desiccated and weighed repeatedly at 6-hour intervals until a constant weight was achieved (to nearest 0.01 mg with a tolerance of <0.1 mg between weighings). The dry residue was dissolved in distilled water and diluted to 100 ml using distilled water and analyzed for sulfate using the barium-thorin titration procedure. A blank 47-mm filter and 80-percent IPA solution were treated in the same manner.

5.1.5 SO_2

The volume of contents and washings from bubbler 2 and impinger 3was measured and an aliquot was analyzed for sulfate using the barium-thorin procedure. A 3-percent H_2O_2 blank was treated in the same manner.

5.2 ANALYSIS OF HYDROCARBON SAMPLES

The grab sample of hydrocarbons was analyzed using a Carle Model 211 AGC-FID. After purging the sample loop three times, a 1-ml sample was extracted from the Tedlar sample bag and injected onto a 6-foot long, 1/8-inch stainless steel column containing 80/100 mesh PoraPac Q, maintained at 150°C. The C_1 hydrocarbon was separated and the greater than C_1 hydrocarbons were backflushed to the detector for quantitation as a single peak. An HP Model 3390A reporting integrator was used to record and integrate the signal from the GC. A ±1 percent certified calibration gas (C_1-C_6 HC in N_2) was used to calibrate the GC before and after sample analysis to quantitate the C_1 and greater than C_1 hydrocarbons. The beginning and end calibrations must agree within ±5% for the data to be acceptable.

5.3 ANALYSIS PROCEDURES FOR H_2S

In the laboratory, the contents of the sample bottle were transferred to an iodine flask along with the water rinsings. A known amount of iodine was added to the sample and acidified with 3 M HCl. The iodine flask was immediately stoppered and shaken. The flask was placed in the dark for 30-minutes. Standard 0.01 N sodium thiosulfate was used to standardize the iodine solution used each day of testing. Samples were titrated with the same sodium thiosulfate solution to an iodine/starch blue endpoint. The blank and standard solutions were handled in exactly the same manner.

5.4 FUEL ANALYSIS

A sample of the fuel gas fired during this test program was collected and sent to Pacific Gas Technology (PGT) for analysis. Analysis was performed by PGT in accordance with EPA Title 40 Section 60.45. The specific procedures are itemized in Table 5-1. The results appear at the end of this section.

TABLE 5-1. FUEL ANALYSIS METHODS

LABORATORY TEST PROCEDURES FOR FUEL OILS AND FUEL GASES

Reference: EPA Title 40, Section 60.45

FUEL OIL TESTS:	
Sediment and Water, Vol. %	ASTM D4007-81
Gravity by Hydrometer (API)	ASTM D1298-80
API Gravity Corrected to 60°F	ASTM Table 5A
Gross Calorific Value (Btu/lb)	ASTM D2015-77
Ultimate Analysis (C, H, O, N, S, wt. %)	
Carbon, Hydrogen	ASTM D3178-73
Nitrogen (chemiluminescence detector)	ASTM D3431-80
Sulfur	ASTM D2622-82
Ash	ASTM D482
Oxygen	ASTM D3176-74
GASEOUS FUELS BY GAS-LIQUID CHROMATOGRAPHY:	
Gas Analysis	ASTM D1945-81
Sulfur Analysis	CPA B16
Calculation of Gross Calorific Value	ASTM D3588-81
Component Weight %, F-factor calculations	EPA 40:60.45
PROCEDURES FOR SCRUBBER LIQUOR ANALYSIS:	
Specific Gravity	ASTM D1429
Chlorides	ASTM D512-67

PACIFIC GAS TECHNOLOGY

4200 Easton Drive - Suite 5
Bakersfield, California 93309
805/324-1317
Fax: 805/324-2746

GAS ANALYSIS BY CHROMATOGRAPH

PAPE & STEINER ENVIRONMENTAL SERVICES
5801 Norris Road
Bakersfield, CA 93308

Attention: Jim Steiner

SAMPLED: JANUARY 29, 1991
SUBMITTED: JANUARY 31, 1991
REPORTED: JANUARY 31, 1991

LAB # 3315-1

Sample ID : SWEPI/COALINGA
NATURAL GAS
TEST #1

P&S ID # : 22263

ANALYZED GAS

	MOLE %	WT %
OXYGEN	0.03	0.06
NITROGEN	1.09	1.77
CARBON DIOXIDE	1.65	4.20
HYDROGEN	ND	0.00
CARBON MONOXIDE	ND	0.00
HYDROGEN SULFIDE	ND	0.00
METHANE	93.78	87.10
ETHANE	2.77	4.82
PROPANE	0.50	1.28
iso-BUTANE	0.04	0.13
n-BUTANE	0.06	0.20
iso-PENTANE	0.02	0.08
n-PENTANE	0.01	0.04
HEXANE +	0.05	0.31

CHONS WT %	
CARBON	71.90
HYDROGEN	23.22
OXYGEN	3.11
NITROGEN	1.77
SULFUR	0.00

SPECIFIC GRAVITY * : 0.596

SPECIFIC VOLUME : 22.07 cu ft/lb

HYDROGEN SULFIDE (Draeger) : ppm

TOTAL * BTU/cu ft DRY : 1018
WET : 1000

NET * BTU/cu ft DRY : 918
WET : 902

BTU/lb : 22470

BTU/lb : 20258

* CALCULATED ACCORDING TO : ASTM D-3588

PACIFIC GAS TECHNOLOGY

RECEIVED
FEB 01 1991
Ans'd.....

4200 Easton Drive - Suite 5
Bakersfield, California 93309
805/324-1317
Fax: 805/324-2746

GAS ANALYSIS BY CHROMATOGRAPH

PAPE & STEINER ENVIRONMENTAL SERVICES
5801 Norris Road
Bakersfield, CA 93308

Attention: Jim Steiner

SAMPLED: JANUARY 30, 1991
SUBMITTED: JANUARY 31, 1991
REPORTED: JANUARY 31, 1991

LAB # 3315-2

Sample ID : SWEPI/COALINGA
NATURAL GAS
TEST #1

P&S ID # : 25861

ANALYZED GAS

	MOLE %	WT %	CHONS WT %	
OXYGEN	0.02	0.04	CARBON	72.00
NITROGEN	1.03	1.67	HYDROGEN	23.28
CARBON DIOXIDE	1.62	4.14	OXYGEN	3.04
HYDROGEN	ND	0.00	NITROGEN	1.67
CARBON MONOXIDE	ND	0.00	SULFUR	0.00
HYDROGEN SULFIDE	ND	0.00		
METHANE	93.79	87.30		
ETHANE	2.94	5.13		
PROPANE	0.45	1.15		
iso-BUTANE	0.04	0.13		
n-BUTANE	0.06	0.20		
iso-PENTANE	0.02	0.08		
n-PENTANE	0.01	0.04		
HEXANE +	0.02	0.11		

SPECIFIC GRAVITY * : 0.595

SPECIFIC VOLUME : 22.12 cu ft/lb

HYDROGEN SULFIDE (Draeger) : ppm

TOTAL * BTU/cu ft DRY : 1018
WET : 1000

NET * BTU/cu ft DRY : 917
WET : 901

BTU/lb : 22516

BTU/lb : 20292

* CALCULATED ACCORDING TO : ASTM D-3588

SECTION 6

QUALITY ASSURANCE

This section of the report describes the QA/QC procedures employed on the test program.

6.1 PARTICULATE/SO_x SAMPLING EQUIPMENT

A detailed record of repair and maintenance to each sampling train is kept. Preventative maintenance to each system is performed periodically to avoid complete component breakdown during a field test.

A detailed record of sampling system calibrations is also kept. Calibration data for the sampling nozzles, pitot tubes, dry gas meters and orifice meters are available for review. Results of the EPA Quality Assurance Branch biannual audits of the dry gas meter and orifice meter combinations are also logged and verify our in-house calibration data. The calibration data for the equipment used on this program can be found in the Appendix of this report.

6.2 LAB ANALYSIS

All field samples are assigned a label and an ID number. This ID is also affixed to a chain-of-custody log and to the field data sheet to eliminate any chance of sample mixup.

Prior to analysis, all glassware is thoroughly cleaned (soap and water, tap water rinse, distilled water rinse, IPA rinse) to eliminate any contamination. The evaporating dishes used to evaporate the washings

are treated the same as a sample (dried in an oven, desiccated and weighed repeatedly at 6-hour intervals until a constant weight is achieved). The glassware used to measure volumes and make transfers and dilutions are all NBS Class A to insure accurate measurements. All weighings are carried out on a Sartorius Research Model R160P electronic semi-micro balance supported by a marble table in a separate room from the main analytical laboratory. The balance is calibrated regularly against an NBS Class S-1 weight.

All reagents used in the field and in the laboratory are ACS reagent grade and blanks of these reagents are evaluated for every set of tests. Blanks are taken in the field from the squeeze bottles and not the original container. Records are kept on these blanks to insure consistent quality of the reagents. Prior to use, the IPA is also analyzed to insure no peroxides are present which could lead to high SO_3 and low SO_2 values.

A quality control program consisting of duplicate analyses (to measure precision), spikes (to measure recovery efficiency) or analysis of blind standards supplied by EPA's Quality Assurance Branch (to measure accuracy) is implemented for each test program. Table 6-1 summarizes the results of the QC checks on this program. Records of our lab's participation in the EPA bi-annual audits for SO_2 are kept on file and verify our in-house QA/QC effort.

6.3 QUALITY ASSURANCE OF HYDROCARBON ANALYSES

Each sample container was purged in the field with sample prior to the actual tests. A certified gas was used to calibrate the gas chromatograph used to measure the hydrocarbons. The calibration certificate

for the gas used appears at the end of this section. Duplicate analyses of some samples were conducted. The results of these quality assurance checks are included in Table 6-1.

6.4 CONTINUOUS MONITORS QUALITY ASSURANCE

The NO_x analyzer is calibrated before and after each test using an EPA Protocol 1 gas (±1%) traceable to NBS. The CO, CO_2 and O_2 analyzer are calibrated before and after each test using a NBS certified gas mixture (±1%). Copies of the calibration gas certificates appear in the Appendix of this report.

A sampling system check was performed at the beginning and end of each test day. This was done by introducing an EPA Protocol 1 gas at the sampling probe and measuring the system response. The purpose of this was to check the system for leaks and sample loss.

Multipoint calibration linearity checks of the continuous analyzers were performed on May 15 and 16, 1990. These results were well within CARB limitations of ±2% of full scale. Tables 6-2 through 6-7 list the results of these checks.

All of the EPA Method 20 QA/QC checks (e.g., linearity, interference, response time, converter efficiency, etc.) were performed on the continuous monitoring system and the system passed these requirements.

TABLE 6-1. QA/QC RESULTS

Unit #	Test #	Test Parameter	Dupl. (%)	Rec (%)
101A	1	Filterable Sulfate	107.1	
	2	Filterable Sulfate		99.6
		EPA SO_2 0882 6XXX		99.9
101A	1	Condensible Sulfate	83.3	
	2	Condensible Sulfate	99.5	
		EPA SO_2 0882 6XXX		99.9
101B	1	Filterable Sulfate	100.0	
	2	Filterable Sulfate		99.5
101B	1	Condensible Sulfate	100.0	
	2	Condensible Sulfate	99.6	

Steiner Environmental, Inc.

TABLE 6-2 NO_x CALIBRATION SUMMARY

1. Monitoring Trailer 1
2. Calibration by JP 5/16/90
3. Analyzer TECO
   Model 10 AR
   S/N 14751-150
4. Calibrator
   Manufacturer Environics
   Model 201-1520
   S/N 1122
5. NO_x Standard ALM2355/ALM2882
   Concentration 8805, 2973 ppm
   Cylinder Pressure 1700, 1200

NO_x CALIBRATION AND LINEARITY CHECKS

Range 0 - 10.000 ppm

Calibration Points	Flow, Dil. cc/min	Flow, Std. cc/min	(NO_x) out ppm	Chart ppm	% Difference +2% Full Scale
Zero	1012	—	0	0	0
80% URL	104.8	918.8	7904	7904	0
1	327	690.5	5975	6020	+ .45
2	554.4	462.6	4005	4110	+1.05
3	781.7	230.4	2004	2100	+ .96

Range 0 - 1.000 ppm

Calibration Points	Flow, Dil. cc/min	Flow, Std. cc/min	(NO_x) out ppm	Chart ppm	% Difference +2% Full Scale
Zero	6007.5	—	0	0	0
80% URL	5465.5	547.6	802	802	0
1	5595.3	410.3	601.5	608	+ .65
2	5732.7	274.0	401.6	412	+1.04
3	5867.6	137.7	202	215	+1.3

Form MULTI-2.(6/90)

TABLE 6-2. NO_x CALIBRATION AND LINEARITY CHECKS (Concluded)

Range 0 - 100 ppm

Calibration Points	Flow, Dil. cc/min	Flow, Std. cc/min	(NO_x) out ppm	Chart ppm	% Difference +2% Full Scale
Zero	9500	—	0	0	0
80% URL	9244.9	257.1	80.5	80.5	0
1	9307.3	193.2	60.5	61.3	+ .8
2	9372.3	129.3	40.5	42	+1.5
3	9437.2	65.1	20.4	21.5	+1.1

Steiner Environmental, Inc.

TABLE 6-3 CO CALIBRATION SUMMARY

1. Monitoring Trailer 1
2. Calibration by JP 5/16/90
3. Analyzer TECO CO
   Model 48
   S/N 21130-195
4. Calibrator
   Manufacturer Environics
   Model
   S/N
5. CO Standard AAL5660/AAL114/ALM12660
   Concentration 9942 ppm/1003 ppm/199.6 ppm
   Cylinder Pressure 1550/1400/1750

CO CALIBRATION AND LINEARITY CHECKS

Range 0 - 1,000 ppm

Calibration Points	Flow, Dil. cc/min	Flow, Std. cc/min	(CO) out ppm	Chart ppm	% Difference +2% Full Scale
Zero	9500	—	0	0	0
80% URL	8730.3	764.1	800.0	800.0	0
1	8925.2	573.3	600.1	600.0	+ .01
2	9112.5	382.8	401	405	+ .5
3	9304.8	192	201	210	+1.0

Range 0 - 100 ppm

Calibration Points	Flow, Dil. cc/min	Flow, Std. cc/min	(CO) out ppm	Chart ppm	% Difference +2% Full Scale
Zero	9500	—	0	0	0
80% URL	8740	757.7	80.0	80.0	0
1	8927.7	568.6	60.0	59.6	-.4
2	9115	379.3	40.0	40.0	0
3	9304.8	190	20.0	20.0	0

Form MULTI-1.(6/90)

TABLE 6-3 CO CALIBRATION AND LINEARITY CHECKS (Concluded)

Range 0 - 20 ppm

Calibration Points	Flow, Dil. cc/min	Flow, Std. cc/min	(CO) out ppm	Chart ppm	% Difference +2% Full Scale
Zero	9500	—	0	0	0
80% URL	8735	762	16.01	16.01	0
1	8925.2	571.5	12.01	12.00	- .01
2	9120	381.5	8.02	8.00	- .02
3	9304.8	191.3	4.02	4.1	+ .4

Steiner Environmental, Inc.

TABLE 6-4 SO_2 CALIBRATION SUMMARY

1. Monitoring Trailer 1
2. Calibration by JP 5/17/90
3. Analyzer Dupont
   Model 400
   S/N 6329
4. Calibration Manufacturer Environics
   Model 201-1520
   S/N 1122
5. CO Standard AAL-9414
   Concentration 972 ppm
   Cylinder Pressure 1800

SO_2 CALIBRATION AND LINEARITY CHECKS

Range 0 - 1.000 ppm

Calibration Points	Flow, Dil. cc/min	Flow, Std. cc/min	(SO_2) out ppm	Chart ppm	% Difference +2% Full Scale
Zero	1000	—	0	0	0
80% URL	167.3	845.7	812	812	0
1	377.1	629.6	608	620	+1.2
2	1166.4	835	406	421	+1.5
3	3182.3	824.6	200	210	+1.0

Range 0 - 100 ppm

Calibration Points	Flow, Dil. cc/min	Flow, Std. cc/min	(SO_2) out ppm	Chart ppm	% Difference +2% Full Scale
Zero	9000	—	0	0	0
80% URL	8263.2	743.3	80.2	80.2	0
1	8450.5	557.5	60.2	61.0	+ .8
2	8635.4	372.4	40.2	41.1	+ .9
3	8817.7	186.8	20.2	21.2	+1.0

Form MULTI-3.(6/90)

Steiner Environmental, Inc.

TABLE 6-5 CO CALIBRATION SUMMARY

1. Monitoring Trailer 1
2. Calibration by JP 5/16/90
3. Analyzer ANARAD
   Model AR 602
   S/N 1482
4. Calibrator
   Manufacturer Environics
   Model 201-1520
   S/N 1122
5. CO Standard AAL5660
   Concentration 9942
   Cylinder Pressure 1550

CO CALIBRATION AND LINEARITY CHECKS

Range 0 - 10.000 ppm

Calibration Points	Flow, Dil. cc/min	Flow, Std. cc/min	(CO) out ppm	Chart ppm	% Difference +2% Full Scale
Zero	1000	---	0	0	0
80% URL	187.2	815.4	8065	8065	0
1	392.0	609.3	6050	6050	0
2	594.4	406.1	4045	4180	+1.35
3	791.7	203.1	2030	2220	+1.9

Form MULTI-4.(6/90)

Steiner Environmental, Inc.

TABLE 6-6 O_2 CALIBRATION SUMMARY

1. Monitoring Trailer 1
2. Calibration by JP 5/17/90
3. Analyzer Teledyne
   Model 326A
   S/N 36423
4. Calibrator
   Manufacturer Environics
   Model 201-1520
   S/N 1122
5. O_2 Standard A14762
   Concentration 45%
   Cylinder Pressure

O_2 CALIBRATION AND LINEARITY CHECKS

Range 0 - 25 %

Calibration Points	Flow, Dil. cc/min	Flow, Std. cc/min	(O_2) out %	Chart %	% Difference +2% Full Scale
Zero	2000	—	0	0	0
80% URL	116.5	890.9	19.97	19.97	0
1	1338.8	668.3	14.98	15.05	+ .28
2	1561.1	445.9	10.00	10.05	+ .2
3	1783.4	223.6	5.01	5.30	+1.16

Range 0 - 10 %

Calibration Points	Flow, Dil. cc/min	Flow, Std. cc/min	(O_2) out %	Chart %	% Difference +2% Full Scale
Zero	2000	—	0	0	0
80% URL	1648.5	357.1	8.00	8.00	0
1	1738.5	268.2	6.00	6.12	+1.20
2	1828.4	179.0	4.01	4.20	+1.9
3	1918.3	90.4	2.03	2.2	+1.7

Form MULTI-5.(6/90)

TABLE 6-6 O_2 CALIBRATION AND LINEARITY CHECKS (Concluded)

Range 0 - 5 %

Calibration Points	Flow, Dil. cc/min	Flow, Std. cc/min	(O_2) out %	Chart %	% Difference +2% Full Scale
Zero	7000	—	0	0	0
80% URL	6379.7	623.3	4.00	4.00	0
1	6534.6	467.7	3.00	3.05	+1.0
2	6689.5	312.0	2.00	2.05	+1.0
3	6844.3	156.8	1.00	1.09	+1.8

Steiner Environmental, Inc.

TABLE 6-7 CO_2 CALIBRATION SUMMARY

1. Monitoring Trailer 1
2. Calibration by JP 5/16/90
3. Analyzer ANARAD CO_2
   Model AR602
   S/N 1482
4. Calibrator
   Manufacturer Environics
   Model 201-1520
   S/N 1122
5. CO_2 Standard AAL799
   Concentration 20%
   Cylinder Pressure 950

CO_2 CALIBRATION AND LINEARITY CHECKS

Range 0 - 20 %

Calibration Points	Flow, Dil. cc/min	Flow, Std. cc/min	(CO_2) out %	Chart %	% Difference +2% Full Scale
Zero	1015	—	0	0	0
80% URL	204.7	800.9	15.9	15.9	0
1	399.5	601	12.01	12.01	- .25
2	599.4	400.9	8.02	7.98	- .20
3	794.2	201	4.03	3.92	- .55

Form MULTI-6.(6/90)

APPENDIX A

STEINER ENVIRONMENTAL RAW DATA

Steiner Environmental, Inc.

SAMPLING POINT LOCATION DATA SHEET

Plant SWEPI COALINGA

Date 1-28-91

Test Location HRSG 101A

Upstream Dist./Dia. 48" / 1.0 ø

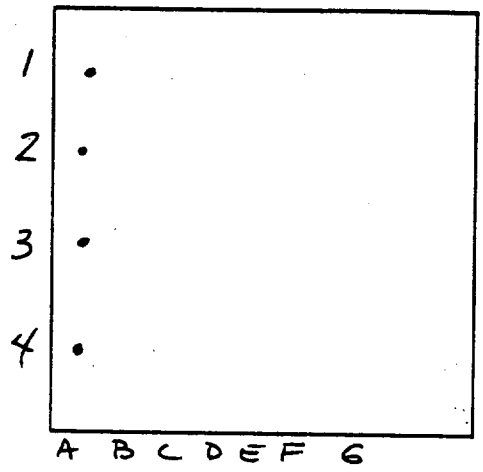
Downstream Dist./Dia. 96" / 2.0 ø

No. of Sampling Points 28

Stack Dimension 47.5 x 47.5

Coupling Length 7"

7 - 4 -inch (MPT)/FPT/Flang



4 chains 100' power
4 adapters 75' rope

Future tests use A, C, E, G 24 points see 101-8

XEQ PNT

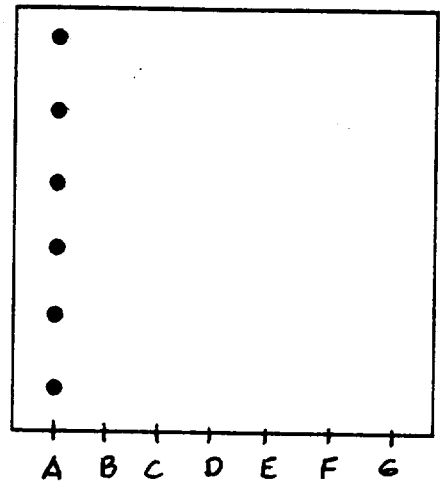
Sample Point	Dist	Sample Point	Dist	Sample Point	Dist	Sample Point	Dist
1	12.9						
2	24.8						
3	36.7						
4	48.6						

SAMPLING POINT RELOCATION: NONE

Steiner Environmental, Inc.

SAMPLING POINT LOCATION DATA SHEET

Plant SWEPI Coalinga
Date 1/30/91
Test Location HRSG 101B
Upstream Dist./Dia. 48" / 1.0 ϕ
Downstream Dist./Dia. 96" / 2.0 ϕ
No. of Sampling Points 24
Stack Dimension 47.5 x 47.5
Coupling Length 7
7, 4 -inch MPT/FPT/Flang



4 chains 100' power
4 adaptors 75' rope

Future tests use A, C, E, G 24 points total

XEQ PNT

Sample Point	Dist	Sample Point	Dist	Sample Point	Dist	Sample Point	Dist
1	10.4						
2	17.2						
3	24.0						
4	30.8						
5	37.5						
6	44.3						

SAMPLING POINT RELOCATION: none

Pape & Steiner Environmental Services

PLANT SWEPI Coalinga TEST TYPE M5/8 FIELD TEST DATA SHEET (Page 1 of 3)

Date 1/29/91
Test Location HRSG Out
Run Number 101A-1
Stack Diameter 47.5×47.5
Operator JB
Filter No. 234

Barometric Pressure 28.81
Static in. wg. -0.11
Probe Type/Length G/6'
Pitot Coefficient 0.84
Meter Box No./γ 779/1.0002
Nozzle No./Size 270/1.3020

Impinger Volumes/Weights			
Contents	Final	Initial	Net
80% IPA	626.0	536.3	89.7
3% H2O2	609.2	568.8	40.4
3% H2O2	574.3	550.7	23.6
S.G.	854.5	791.5	63.0
		Total	216.7

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial	0.018	15
Final	0.012	8.5

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F: Stack	Probe	Oven	Imp.	Gas Meter In	Gas Meter Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
G 1	4:40 0	0.40	2.26	19.812	283	230	254	42	52	50	5.5	0.632	pitot ok
2	5	0.435	2.45	23.810	281	225	263	42	53	45	6.5	0.660	HG-1 22265
3	10	0.425	2.46	27.973	266	254	257	41	58	46	6.5	0.652	NG-1 22263
4	15	0.350	2.10	32.164	244	261	251	41	62	48	6.0	0.592	H2S-1 22262
	20			36.138									DHW-1 22256
E 1	5:05 0	0.420	2.51	36.138	245	275	242	40	54	51	6.5	0.648	ITA-1 22255
2	5	0.425	2.57	40.338	245	270	270	38	67	53	7.0	0.652	AMF-1 22254
3	10	0.425	2.63	44.670	231	261	265	39	68	54	7.5	0.652	MF-1 22253
4	15	0.385	2.40	49.062	227	225	262	39	69	55	7.0	0.620	FHW-1 22252
	20			53.307									
C 1	5:28 0	0.435	2.63	53.307	243	244	258	40	60	55	8.0	0.660	
2	5	0.435	2.65	57.655	244	249	267	41	69	57	8.5	0.660	
3	10	0.410	2.58	62.105	223	246	250	44	70	58	7.5	0.640	
4	15	0.265	1.59	66.450	228	237	230	44	70	57	5.0	0.505	

Steiner Environmental, Inc.

PLANT SWEPI Coalinga TEST TYPE M5/B FIELD TEST DATA SHEET (Page 2 of 3)
DATE 1/29/91 RUN NO. 1
TEST LOCATION 101-A Out OPERATOR JS

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft³	TEMPERATURE °F						Pump Vacuum in.Hg	√ΔP	Comments
					Stack	Probe	Oven	Imp.	Gas Meter In	Gas Meter Out			
20	20			70.133									
A 1	5152 0	0.435	2.53	70.133	270	253	225	40	59	56	6.5	0.660	
2	5	0.415	2.50	74.330	254	248	225	41	70	59	7.0	0.644	
3	10	0.385	2.39	78.619	234	226	225	42	70	58	6.5	0.620	
4	15	0.300	1.84	82.815	236	226	250	40	66	55	5.5	0.548	
	20			86.640									
F 1	6135 0	0.420	2.50	86.640	249	268	267	39	55	54	6.0	0.648	
2	6	0.430	2.61	90.880	249	258	270	40	69	57	7.0	0.656	
3	10	0.409	2.49	95.240	240	254	265	40	69	57	7.0	0.636	
4	15	0.355	2.21	99.535	230	249	263	47	70	58	6.0	0.596	
	20			103.677									
D 1	6168 0	0.425	2.59	103.677	239	257	239	41	60	56	7.0	0.652	
2	5	0.415	2.53	108.045	244	238	263	44	69	58	7.0	0.644	
3	10	0.415	2.61	112.345	224	247	238	43	69	57	7.0	0.644	
4	15	0.375	2.36	116.698	223	230	261	42	69	58	6.5	0.612	
	20			120.903									

Steiner Environmental, Inc.

PLANT SWEPI Coalinga TEST TYPE 175/B FIELD TEST DATA SHEET (Page 3 of 3)
DATE 1/29/91 RUN NO. 1
TEST LOCATION 101-A Out OPERATOR JS

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft³	TEMPERATURE °F						Pump Vacuum in.Hg	√ΔP	Comments
					Stack	Probe	Oven	Imp.	Gas Meter In	Gas Meter Out			
B 1	7:21 0	0.445	2.69	120.903	243	240	225	38	59	56	7.0	0.667	
2	5	0.425	2.59	125.299	246	237	260	42	69	57	7.0	0.652	
3	10	0.415	2.61	129.645	225	255	271	44	72	69	7.5	0.644	
4	15	0.375	2.35	133.999	230	260	273	44	72	59	6.5	0.612	
	20			138.197									
													pitot ok
	140		2.44	118.375	242.71				60.00			0.6324	purge for 15

Forms 1B: Fielddat.frm 1/91

Steiner Environmental, Inc. PLANT SWEPI Coalinga TEST TYPE M5/8 FIELD TEST DATA SHEET (Page 1 of 3)

Date 1/29/91 Barometric Pressure 28.91
Test Location 101-A Out Static in.wg. -0.16
Run Number 2 Probe Type/Length 6/6'
Stack Diameter 47.5 x 47.5 Pitot Coefficient 0.84
Operator JS Meter Box No./γ 779/1.0002
Filter No. 234 Nozzle No./Size 270/.3020

IMPINGER VOLUMES/WEIGHTS				GAS COMPOSITION			
Contents	Final	Initial	Net	Time	CO_2	O_2	CO
80% IPA	619.7	541.1	78.6				
3% H_2O_2	595.5	541.9	53.6				
3% H_2O_2	550.0	530.1	19.9				
				Leakrate			"Hg
S.G.	817.5	759.0	58.5	Initial	0.003		15
		TOTAL	210.6	Final	0.016		8

Sample Point		Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	TEMPERATURE °F						Pump Vacuum in.Hg	√ΔP	Comments
						Stack	Probe	Oven	Imp.	Gas Meter In	Gas Meter Out			
B	1	8:40 0	0.435	2.63	151.885	242	244	268	40	57	57	6.0	0.660	pitot ok
	2	5	0.425	2.58	156.266	244	227	263	37	62	57	6.0	0.652	(SWW-2) 22261
	3	10	0.410	2.59	160.662	220	226	275	38	67	57	6.0	0.640	(TPA-2) 22260
	4	15	0.355	2.22	165.028	227	226	256	41	70	58	5.5	0.596	(AMF-2) 22259
		20			169.188									
D	1	9:05 0	0.410	2.54	169.188	234	225	249	43	64	61	6.0	0.640	(MF-2) 22258
	2	5	0.405	2.54	173.568	236	225	275	46	77	64	6.5	0.636	
	3	10	0.405	2.60	177.959	218	226	250	49	76	63	6.5	0.636	(FHW-2) 22257
	4	15	0.375	2.41	182.500	218	226	259	49	77	65	6.0	0.612	(KF-2) 22264
		20			186.867									
F	1	9:24 0	0.410	2.52	186.867	246	228	273	46	70	66	6.0	0.640	
	2	5	0.400	2.49	191.280	242	230	245	45	78	68	6.0	0.632	
	3	10	0.385	2.43	195.730	233	232	274	45	78	68	6.0	0.620	

Steiner Environmental, Inc.

PLANT SWEPI Coalinga TEST TYPE M5/8 FIELD TEST DATA SHEET (Page 2 of 3)
DATE 11/29/91 RUN NO. 2
TEST LOCATION 101A - Out OPERATOR JB

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft³	TEMPERATURE °F						Pump Vacuum in.Hg	√ΔP	Comments
					Stack	Probe	Oven	Imp.	Gas Meter In	Gas Meter Out			
4	15	0.365	2.34	200.087	223	227	256	47	79	68	5.5	0.604	
	20			204.347									
A 1	9:54 0	0.420	2.51	204.347	267	228	260	49	71	68	6.0	0.648	
2	5	0.400	2.39	208.450	273	229	269	50	78	69	6.5	0.632	
3	10	0.390	2.47	212.788	233	229	265	50	80	69	6.5	0.624	
4	15	0.285	1.79	217.220	240	227	275	51	80	69	5.0	0.534	
	20			221.121									
C 1	10:17 0	0.410	2.56	221.121	237	223	249	46	72	68	6.5	0.640	
2	5	0.400	2.51	225.293	241	231	234	50	80	70	8.0	0.632	
3	10	0.400	2.59	229.765	219	230	225	52	80	70	6.5	0.632	
4	15	0.225	1.45	234.251	222	228	247	50	80	70	4.0	0.474	
	20			237.794									
E 1	10:39 0	0.415	2.57	237.794	244	232	253	48	73	70	6.5	0.644	
2	5	0.415	2.58	242.282	245	230	242	46	78	70	6.5	0.644	
3	10	0.415	2.65	246.900	227	230	230	47	79	70	7.0	0.644	
4	15	0.380	2.45	251.315	223	228	241	46	81	70	6.5	0.616	
	20			255.630									

Steiner Environmental, Inc.

PLANT SWEPI Coalinga TEST TYPE M5/8 FIELD TEST DATA SHEET (Page 3 of 3)
DATE 1/29/91 RUN NO. 2
TEST LOCATION 101A - Out OPERATOR JB

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	TEMPERATURE °F						Pump Vacuum in.Hg	$\sqrt{\Delta P}$	Comments
					Stack	Probe	Oven	Imp.	Gas Meter In	Gas Meter Out			
6 1	11:03 0	0.395	2.35	255.630	275	227	229	50	74	71	6.0	0.628	
2	5	0.435	2.59	259.654	282	224	253	53	82	72	7.5	0.660	
3	10	0.415	2.52	264.035	268	224	246	51	84	72	6.5	0.644	
4	15	0.335	2.10	268.440	246	226	235	51	86	73	6.0	0.579	
	20			272.570									
													pitot ok
	140		2.43	120.685	240.18				71.18			0.6232	purge for 15

A-9

Steiner Environmental, Inc. PLANT SWEPI Coalinga TEST TYPE METHOD 5/8 FIELD TEST DATA SHEET (Page 1 of 2)

Date 1/30/91 Barometric Pressure 28.92
Test Location HRSG-101B Static in.wg. -.20
Run Number 1 Probe Type/Length 6/6'
Stack Diameter 47.5x47.5 Pitot Coefficient 0.84
Operator JB Meter Box No./γ 729/1.0002
Filter No. 243 Nozzle No./Size 270/.3020

IMPINGER VOLUMES/WEIGHTS				GAS COMPOSITION			
Contents	Final	Initial	Net	Time	CO_2	O_2	CO
80% IPA	590.5	533.0	57.50				
3% H_2O_2	597.5	554.3	43.20				
3% H_2O_2	591.7	566.8	24.90				
				Leakrate			"Hg
S.G.	817.5	763.1	54.40	Initial	0.010		15
		TOTAL	180.0	Final	0.006		6

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	TEMPERATURE °F						Pump Vacuum in.Hg	√ΔP	Comments
					Stack	Probe	Oven	Imp.	Gas Meter In	Gas Meter Out			
	4:46												
A 1	0	0.415	2.41	280.729	258	225	235	39	48	47	4.5	0.644	pitot ok
2	5	0.415	2.43	284.830	268	225	234	37	57	48	5.0	0.644	FHW-1 22268 101-B
3	10	0.430	2.63	288.974	~~283~~	226	234	36	62	49	5.5	0.656	MF-1
4	15	0.420	2.64	293.300	220	227	250	39	67	52	5.5	0.648	22267 101-B
5	20	0.385	2.40	297.580	229	227	225	38	70	54	5.0	0.620	MC-1
6	25	0.340	2.04	301.770	259	229	234	38	73	56	4.5	0.583	22266 101-B
	30			305.660									
	6120												
C 1	0	0.430	2.57	305.660	265	229	275	43	62	57	5.0	0.656	HPA-1 25864
2	5	0.440	2.66	309.925	259	230	275	44	76	61	5.5	0.663	BHW1 25863
3	10	0.425	2.66	314.273	233	229	267	46	76	61	5.5	0.652	AMF-1
4	15	0.425	2.72	318.675	219	230	226	49	76	62	6.0	0.652	25862
5	20	0.340	2.18	323.132	219	230	225	52	76	62	5.0	0.583	FO-1
6	26	0.235	1.46	327.179	239	230	225	52	77	63	4.0	0.485	25861
	30			330.647									

Steiner Environmental, Inc.

PLANT SWEPI Coalinga TEST TYPE M5/8 FIELD TEST DATA SHEET (Page 2 of 2)
DATE 11/30/91 RUN NO. 1
TEST LOCATION 1018 - Out OPERATOR JS

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft³	TEMPERATURE °F						Pump Vacuum in.Hg	√ΔP	Comments
					Stack	Probe	Oven	Imp.	Gas Meter In	Gas Meter Out			
	5:54												
E 1	0	0.425	2.64	330.647	232	227	260	48	65	60	5.0	0.652	
2	5	0.420	2.64	335.050	233	231	260	48	77	64	5.5	0.648	
3	10	0.410	2.62	339.422	220	233	263	51	77	63	5.5	0.640	
4	15	0.415	2.67	343.825	219	235	275	50	78	64	5.5	0.644	
5	20	0.370	2.39	348.283	216	235	273	50	79	64	5.0	0.608	
6	25	0.305	1.94	352.542	227	235	272	50	80	65	4.5	0.552	
	30			356.453									
G 1	6:29 0	0.380	2.30	356.453	252	237	262	47	67	63	4.5	0.616	
2	5	0.395	2.38	360.612	265	240	267	49	79	66	5.0	0.628	
3	10	0.420	2.58	364.855	254	240	260	49	80	66	5.5	0.648	
4	15	0.425	2.65	369.239	242	247	258	49	80	66	5.5	0.652	
5	20	0.430	2.70	373.670	236	247	242	51	79	66	5.5	0656	
6	25	0.370	2.30	378.170	243	245	240	51	79	66	5.0	0.608	
	30			382.440									
													pitot ok
	120		2.44	101.711	238.33				66.	35		0.6267	purge for 15

Forms 1B: Fielddat.frm 1/91

Steiner Environmental, Inc. PLANT SWEPI Coalinga TEST TYPE M5/8 FIELD TEST DATA SHEET (Page 1 of 2)

Date 1/30/91 Barometric Pressure 29.00
Test Location 101B-Out Static in.wg. -0.21
Run Number 2 - 101-B Probe Type/Length 6/6'
Stack Diameter 47.5x47.5 Pitot Coefficient 0.84
Operator JS Meter Box No./γ 779 / 1.0002
Filter No. 236 Nozzle No./Size 270 / .3020

IMPINGER VOLUMES/WEIGHTS				GAS COMPOSITION			
Contents	Final	Initial	Net	Time	CO_2	O_2	CO
80% IPA	575.3	539.7	55.6				
3% H_2O_2	596.6	543.3	53.3				
3% H_2O_2	555.3	531.5	23.8				
				Leakrate			"Hg
S.G.	866.8	805.0	61.8	Initial	0.015		15
		TOTAL	194.5	Final	0.005		6

Sample Point		Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	TEMPERATURE °F						Pump Vacuum in.Hg	√ΔP	Comments
						Stack	Probe	Oven	Imp.	Gas Meter In	Gas Meter Out			
		7:52												
A	1	0	0.400	2.39	394.925	263	230	225	64	66	65	5.0	0.632	pitot ok
	2		0.420	2.52	399.093	258	235	243	54	70	60	5.5	0.648	FHW-2 25856
	3	10	0.420	2.64	403.370	230	240	252	52	76	62	6.0	0.648	
	4		0.415	2.67	407.715	220	241	267	52	79	65	6.0	0.644	IPA-2 25860
	5	20	0.385	2.47	412.117	226	240	269	53	83	67	5.5	0.620	
	6		0.315	1.95	416.445	253	242	267	53	84	70	4.5	0.561	BHW-1 25859
		30			420.409									
C	1	8:23 0	0.435	2.67	420.409	252	250	275	61	75	71	5.5	0.660	AMF-1 25858
	2		0.465	2.88	424.810	254	246	276	59	83	72	6.0	0.682	IHC-2 25857
	3	10	0.435	2.77	429.390	233	251	275	57	83	72	6.0	0.660	
	4		0.435	2.84	433.980	218	260	268	59	83	73	6.0	0.660	MF-2 25855
	5	20	0.365	2.37	438.610	219	242	264	59	82	72	5.5	0.604	
	6		0.250	1.58	442.950	237	247	261	59	82	72	4.0	0.500	BHW-ALL 23752
		30			447.116									EPA-ALL 23751

BHW-ALL 23747 FHW-ALL 23748 MF-ALL 23749 AMF-ALL 23750

Steiner Environmental, Inc.

PLANT SWEPI Coalinga TEST TYPE M5/8 FIELD TEST DATA SHEET (Page 2 of 2)
DATE 1/30/91 RUN NO. 2
TEST LOCATION 101B - Out OPERATOR JS

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft³	TEMPERATURE °F						Pump Vacuum in.Hg	√ΔP	Comments
					Stack	Probe	Oven	Imp.	Gas Meter In	Gas Meter Out			
	9:00												
E 1	0	0.425	2.67	447.116	232	251	262	54	71	69	5.5	0.652	
2		0.435	2.78	451.533	230	249	263	49	82	71	6.0	0.660	
3	10	0.435	2.82	456.091	219	240	259	50	82	71	6.0	0.660	
4		0.420	2.74	460.730	216	243	266	48	82	72	6.0	0.648	
5	20	0.420	2.74	465.310	215	251	267	48	82	71	6.0	0.648	
6		0.345	2.22	469.865	227	249	269	48	83	72	5.0	0.587	
	30			474.071									
	9:33												
G 1	0	0.370	2.26	474.071	257	252	271	49	75	71	5.0	0.608	
2		0.385	2.34	478.287	264	260	273	47	82	71	5.0	0.620	
3	10	0.425	2.64	482.500	251	257	273	46	83	72	5.5	0.652	
4		0.420	2.65	486.945	242	251	274	47	85	74	5.5	0.648	
5	20	0.415	2.65	491.420	233	259	271	46	84	73	5.5	0.644	
6		0.325	2.05	495.925	240	258	260	46	84	73	4.5	0.570	
	30			499.991									
													pitot ok
	120		2.51	105.066	237.04				75.04			0.6299	purge for 15

Pape & Steiner Environmental Services

PLANT SWEPI TEST TYPE METHOD-11 FIELD TEST DATA SHEET (Page 1 of 1)

Date 1-29-91
Test Location Fuel Gas Supply
Run Number 1
Stack Diameter N/A
Operator SM/SC
Filter No. N/A

Barometric Pressure 28.81
Static in. wg. N/A
Probe Type/Length SS-3'
Pitot Coefficient N/A
Meter Box No./γ DGT/.9875
Nozzle No./Size STRAIGHT

Impinger Volumes/Weights			
Contents	Final	Initial	Net
3% H2O2		95.9	
CdSO4		106.3	
CdSO4		109.1	
S.G.		105.4	
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial	.003	MAX
Final	.004	MAX

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F						Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
					Stack	Probe	Oven	Imp.	Gas Meter In	Gas Meter Out			
	0557	N/A	N/A	050.263	N/A	N/A	N/A	56	41	41	N/A	N/A	
	0612			058.820				40	43	41			
	0627			063.520				39	44	41			
	0646			068.960				37	44	41			
	0701			072.940				36	43	40			
	0716			077.010				37	44	41			BNW-2 25846
	0732			083.490				37	45	42			
	0747			088.260				39	47	45			
	0825			093.430				42	49	49			
	0845			097.140				44	54	54			
	0901			099.805				46	56	56			
T/A				49.542					45	50			

Pape & Steiner Environmental Services

PLANT Swepi Conlay A TEST TYPE M-11 FIELD TEST DATA SHEET (Page 1 of ( )

Date 1-30-91
Test Location Fuel Gas Supply
Run Number 2
Stack Diameter N/A
Operator SM/SC
Filter No. N/A

Barometric Pressure 28.92
Static in. wg. N/A
Probe Type/Length SS-3'
Pitot Coefficient N/A
Meter Box No./γ Port 1.985
Nozzle No./Size STRAIGHT

Impinger Volumes/Weights			
Contents	Final	Initial	Net
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial	.003	MAX
Final	.003	MAX

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F						Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
					Stack	Probe	Oven	Imp.	Gas Meter In	Gas Meter Out			
	0810	N/A	N/A	105.550	N/A	N/A	N/A	66	56	53	N/A	N/A	
	0837			107.037				55	62	60			
	0905			108.255				59	62	60			
	0928			108.795				61	62	64			
	0948			109.850				62	63	68			
	1025			111.045				65	67	71			INCREASE FLOW THRU IMP.
	1039			113.305				58	66	72			
	1054			115.373				58	66	72			
	1110			119.460				59	65	70			
	1125			123.675				57	65	70			
	1140			126.554				57	65	70			
T/A				21.004					65.16				

Steiner Environmental, Inc.

CONTINUOUS MONITOR DATA SHEET

Plant SJWEPT COALINGA
Date 1-29-91 Run No. INT CAL 1
Test Location HRSG 101A OUT
Operator DM
Fuel Type NAT GAS Trailer No. 1

APCD Witness/Number /
Client Rep REN KIRKPATRICK
Generator Type
Burner Type N/A
O_2 Controller Type N/A

Time	Sample Point	Dry Uncorrected O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
0315		14.58	8.02	15.75			81.5	High Span Gas Values
		7.32	4.92	8.21			50.9	Mid
		0.0	0.0	0.0			0.0	Zero
		14.58	8.02	15.75			81.5	Linearity ✓ High
		7.25	4.75	8.04			50.4	Mid
		0.0	0.0	0.0			0.0	Zero
		0.0	0.0	0.0			0.0	INTERFERENCE ✓
		14.25	4.79	8.05			50.4	EXT SPAN
		.15	—	—			—	EXT ZERO
0440		14.82	3.55	4.00			38.1	Run #1 101A
0450		14.87	3.57	4.00			38.0	
0500		15.00	3.50	4.15			38.0	
0510		15.00	3.20	4.05			38.1	
0520		15.00	3.10	4.07			38.2	
0530		15.00	3.30	4.07			38.0	
0540		0.0	.05	.05			-.3	ZERO
		14.45	4.64	8.20			50.2	SPAN

Miscellaneous Information

CALIBRATION GASES
NO_x 94437, 7201, conv. = 2062
SO_2 N/A
CO 8602360
$CO/CO_2/O_2$ 68762, 60916, 65300

Wet Bulb: _____ Dry Bulb: _____
Barometric Press: _____

RESPONSE TIME
Upscale: 32.0 Downscale: 34.7
Upscale: 37.4 Downscale: 35.3
Upscale: 37.5 Downscale: 34.4

PROCESS DATA
Fuel Flow: _____
Steam Flow: _____
Rating: _____

CONVERTER GAS

	Cal Gas Values	Actual Values
NO	34.51	40.1
NO_2	17.0	18.1

Conv. Efficiency: 93.92%

Steiner Environmental, Inc.

CONTINUOUS MONITOR DATA SHEET

Plant SWEPI COALINGA
Date 1-29-91 Run No. 2 & 3
Test Location HRSG - OUT 101-A
Operator SM/SC
Fuel Type NAT GAS Trailer No. 1

APCD Witness/Number
Client Rep KEN KIRKPATRICK
Generator Type ALLISON CTG "501" KB5
Burner Type N/A
O_2 Controller Type N/A

Time	Sample Point	Dry Uncorrected O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
		14.58	4.92	8.21			50.9	SPAN GAS VALUES
		0.0	0.0	0.0			0.0	ZERO
0616		14.62	3.56	4.26			38.5	RUN # 2 101-A
0626		14.62	3.54	4.26			38.5	
0636		14.62	3.54	4.14			38.5	
0646		14.62	3.56	4.32			38.5	
0656		14.62	3.56	4.24			38.2	
0706		14.62	3.56	4.24			38.1	
0716		0.0	0.0	0.0			0.0	ZERO
		14.27	5.00	8.21			50.6	SPAN
0830		14.95	3.44	4.20			39.0	RUN # 3 101-A
0840		14.95	3.44	4.10			40.1	
0850		14.95	3.44	4.40			40.3	
0900		14.95	3.44	4.20			40.9	
0910		14.95	3.44	4.44			40.9	
0920		14.95	3.44	4.20			40.9	
0930		0.0	0.0	0.0			1.50	ZERO
		14.40	5.00	8.18			52.7	SPAN

Miscellaneous Information

CALIBRATION GASES
NO_x SAME AS PG-1
SO_2
CO
$CO/CO_2/O_2$

Wet Bulb: _____ Dry Bulb: _____
Barometric Press: _____

RESPONSE TIME
Upscale: _____ Downscale: _____
Upscale: _____ Downscale: _____
Upscale: _____ Downscale: _____

PROCESS DATA
Fuel Flow:
Steam Flow:
Rating:

CONVERTER GAS

	Cal Gas Values	Actual Values
NO		
NO_2		

Conv. Efficiency:

Steiner Environmental, Inc.

CONTINUOUS MONITOR DATA SHEET

Plant SWEPI COALINGA
Date 1-29-91 Run No. 4
Test Location HRSG OUT
Operator SM / SC
Fuel Type NAT. GAS Trailer No. 1

APCD Witness/Number
Client Rep KEN KIRKPATRICK
Generator Type ALLISON CTG "501" KB5
Burner Type N/A
O_2 Controller Type N/A

		Dry Uncorrected							
Time	Sample Point	O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments	Miscellaneous Information
		14.58	4.92	8.21			50.9	SPAN GAS VALUES	CALIBRATION GASES
		0.0	0.0	0.0			0.0	ZERO	NO_x SAME AS PG. # 1
									SO_2
1000		14.92	3.46	4.60			39.0	RUN # 4 101-A	CO
1010		15.00	3.46	4.40			38.0		$CO/CO_2/O_2$
1020		15.00	3.48	4.42			38.0		
1030		15.00	3.60	4.40			38.0		Wet Bulb: Dry Bulb:
1040		15.00	3.48	4.20			38.1		Barometric Press:
1050		15.00	3.50	4.60			38.0		
									RESPONSE TIME
1100		0.32	0.03	0.0			1.50	ZERO	Upscale: Downscale:
		14.50	4.80	8.06			51.6	SPAN	Upscale: Downscale:
		14.37	4.92	8.20			51.3	EXT. SPAN	Upscale: Downscale:
		0.25	—	—			—	EXT ZERO	
									PROCESS DATA
									Fuel Flow:
									Steam Flow:
									Rating:
									CONVERTER GAS
									Cal Gas Values | Actual Values
									NO
									NO_2
									Conv. Efficiency:

Steiner Environmental, Inc.

CONTINUOUS MONITOR DATA SHEET

Plant SWEPI COALINGA
Date 1-30-91 Run No. INT CAL 1
Test Location HRSG-OUT 101 B
Operator SM / SC
Fuel Type Nat Gas Trailer No. 1

APCD Witness/Number /
Client Rep KEN KIRKPATRICK
Generator Type ALLISON CTG "501" KB5
Burner Type N/A
O_2 Controller Type N/A

Time	Sample Point	Dry Uncorrected O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
		14.58	4.92	8.21			50.9	SPAN Gas Values
		0.0	0.0	0.0			0.0	ZERO
		14.58	4.50	7.99			50.3	EXT SPAN
		.15	—	—			—	EXT ZERO
0440		15.22	4.60	3.30			35.5	RUN #1 101 B
0450		15.25	4.66	3.28			36.0	
0500		15.25	4.64	3.28			36.1	
0510		15.25	4.68	3.26			36.3	
0520		15.25	4.60	3.26			36.4	
0530		15.27	4.54	3.26			36.3	
0540		0.0	0.05	0.0			-0.6	ZERO
		14.58	4.74	8.17			50.0	SPAN
0600		15.00	3.20	4.66			36.5	RUN #2 101-B
0610		15.07	3.22	4.64			36.8	
0620		15.07	3.24	4.70			36.9	
0630		15.07	3.26	4.56			37.0	
0640		15.12	3.26	4.56			37.0	
0650		15.17	3.26	4.50			37.0	
0700		0.0	-0.25	0.08			0.0	ZERO
		14.45	4.80	8.20			50.30	SPAN

Miscellaneous Information

CALIBRATION GASES
NO_x Same as Pg 1
SO_2
CO
$CO/CO_2/O_2$

Wet Bulb: _____ Dry Bulb: _____
Barometric Press: _____

RESPONSE TIME
Upscale: _____ Downscale: _____
Upscale: _____ Downscale: _____
Upscale: _____ Downscale: _____

PROCESS DATA
Fuel Flow:
Steam Flow:
Rating:

CONVERTER GAS

	Cal Gas Values	Actual Values
NO	34.91	44.5
NO_2	17.0	17.7

Conv. Efficiency:

Steiner Environmental, Inc.

CONTINUOUS MONITOR DATA SHEET

Plant SWEPI COALINGA
Date 1-30-91 Run No. 3
Test Location HRSG - OUT 101-B
Operator SC/SM
Fuel Type NAT. GAS Trailer No. 1

APCD Witness/Number /
Client Rep KEN KIRKPATRICK
Generator Type ALLISON CTG "501" KB5
Burner Type N/A
O_2 Controller Type N/A

[Dry Uncorrected]

Time	Sample Point	O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
		14.58	4.92	8.21			50.9	SPAN GAS VALUES
								ZERO
0735		14.90	3.18	4.86			40.20	RUN #3 101-B
0745		14.90	3.18	4.82			40.20	
0755		14.90	3.18	4.98			40.30	
0805		14.90	3.18	11.20			39.80	
0815		14.90	3.18	17.00			38.00	
0825		14.88	3.19	13.90			38.30	
0835		0.0	0.0	-.10			1.0	ZERO
		14.25	4.43	8.10			51.9	SPAN
		14.25	4.30	8.22			51.5	EXT SPAN
		.35	—	—			—	EXT ZERO
0903		14.75	3.57	15.40			36.7	Run #4
0913		14.75	3.58	16.00			35.9	
0923		14.78	3.59	12.30			35.6	
0933		14.79	3.64	11.20			36.0	
0943		0.0	.05	-.05			-1.8	Zero
		14.45	5.20	8.20			48.8	Span

Miscellaneous Information

CALIBRATION GASES
NO_x Same as Pg 1
SO_2 _____
CO _____
$CO/CO_2/O_2$ _____

Wet Bulb: _____ Dry Bulb: _____
Barometric Press: _____

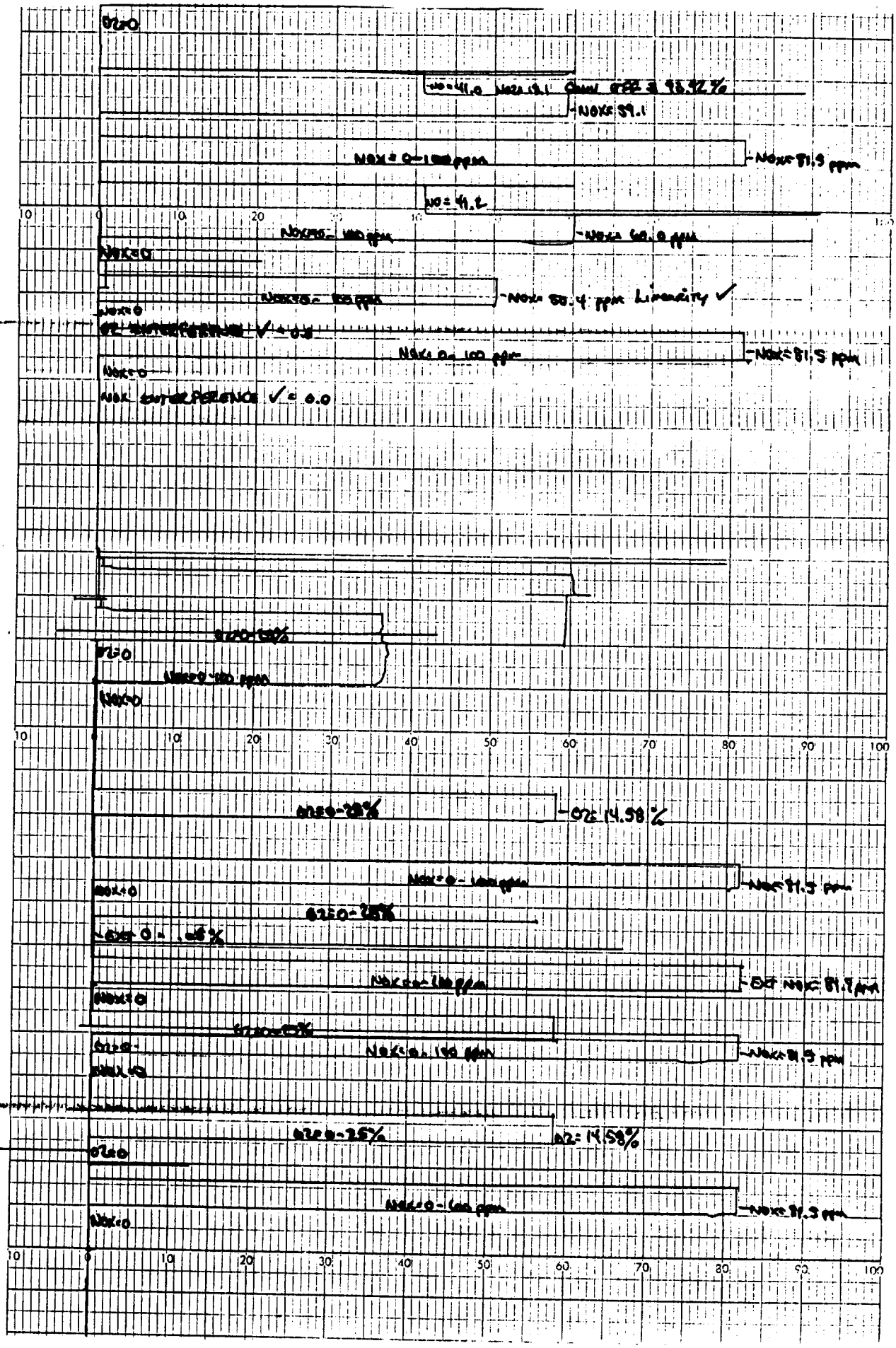
RESPONSE TIME
Upscale: _____ Downscale: _____
Upscale: _____ Downscale: _____
Upscale: _____ Downscale: _____

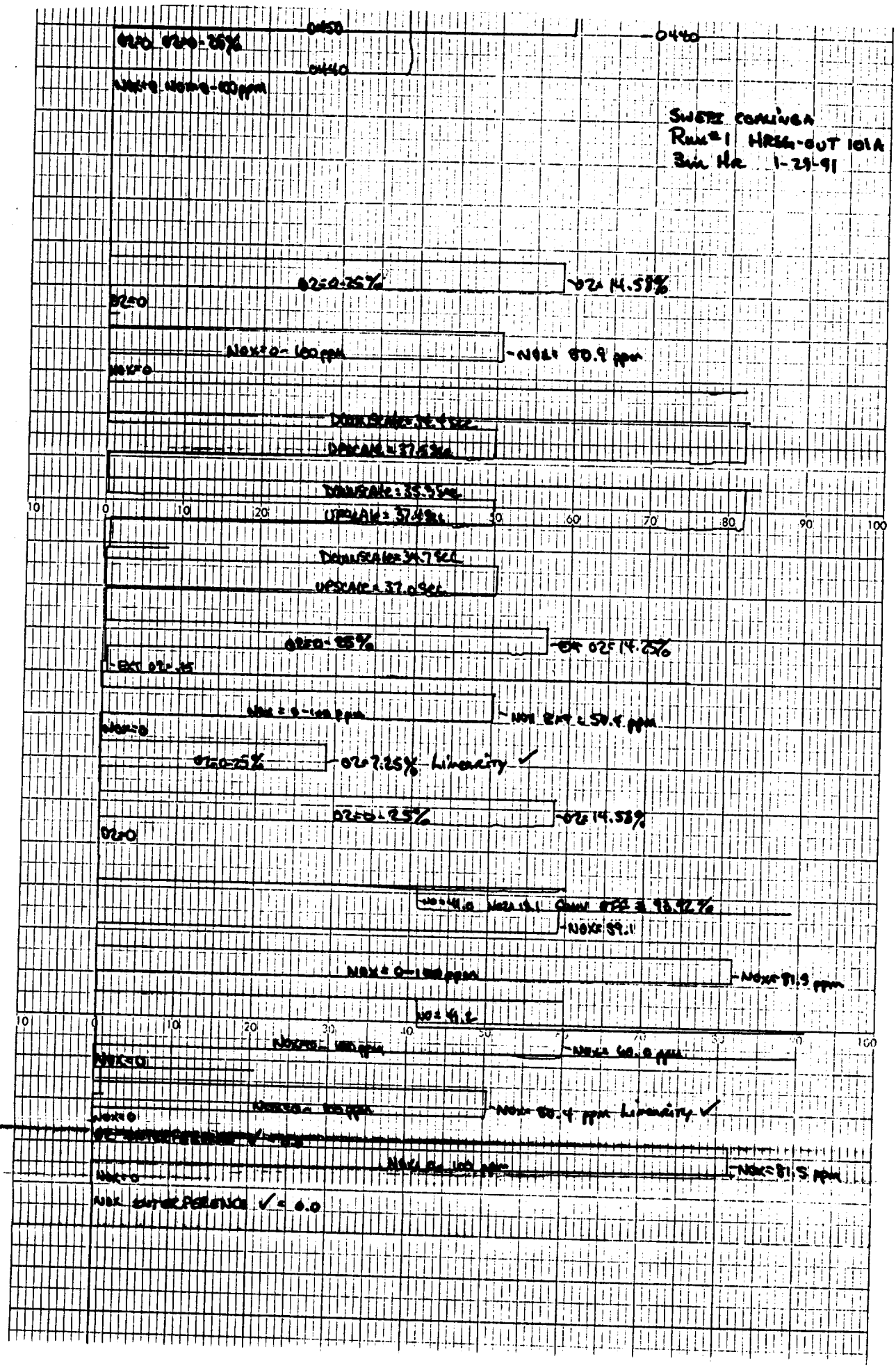
PROCESS DATA
Fuel Flow: _____
Steam Flow: _____
Rating: _____

CONVERTER GAS

	Cal Gas Values	Actual Values
NO		
NO_2		

Conv. Efficiency: _____


Charts Inc
CHART NO. 414044
(1327)
Charts Inc


0450
0440
SWEEP COMBINED
Run #1 HRSG-OUT 101A
3min Hr 1-29-91
02=0.25%
02= 14.58%
NOx=0- 100 ppm
NOx= 60.9 ppm
02=0
NOx=0
02=0.25%
02= 14.25%
NOx=0-100 ppm
NOx EXT = 59.4 ppm
02=0-25%
02= 7.25% Linearity ✓
02=0
NOx=0
NOx= 59.4 ppm Linearity ✓
NOx=0
NOx= 81.5 ppm
NOx SYSTEM PERFORMANCE ✓ < 6.0
CHART NO. 41404
(1527)
Charts-Inc

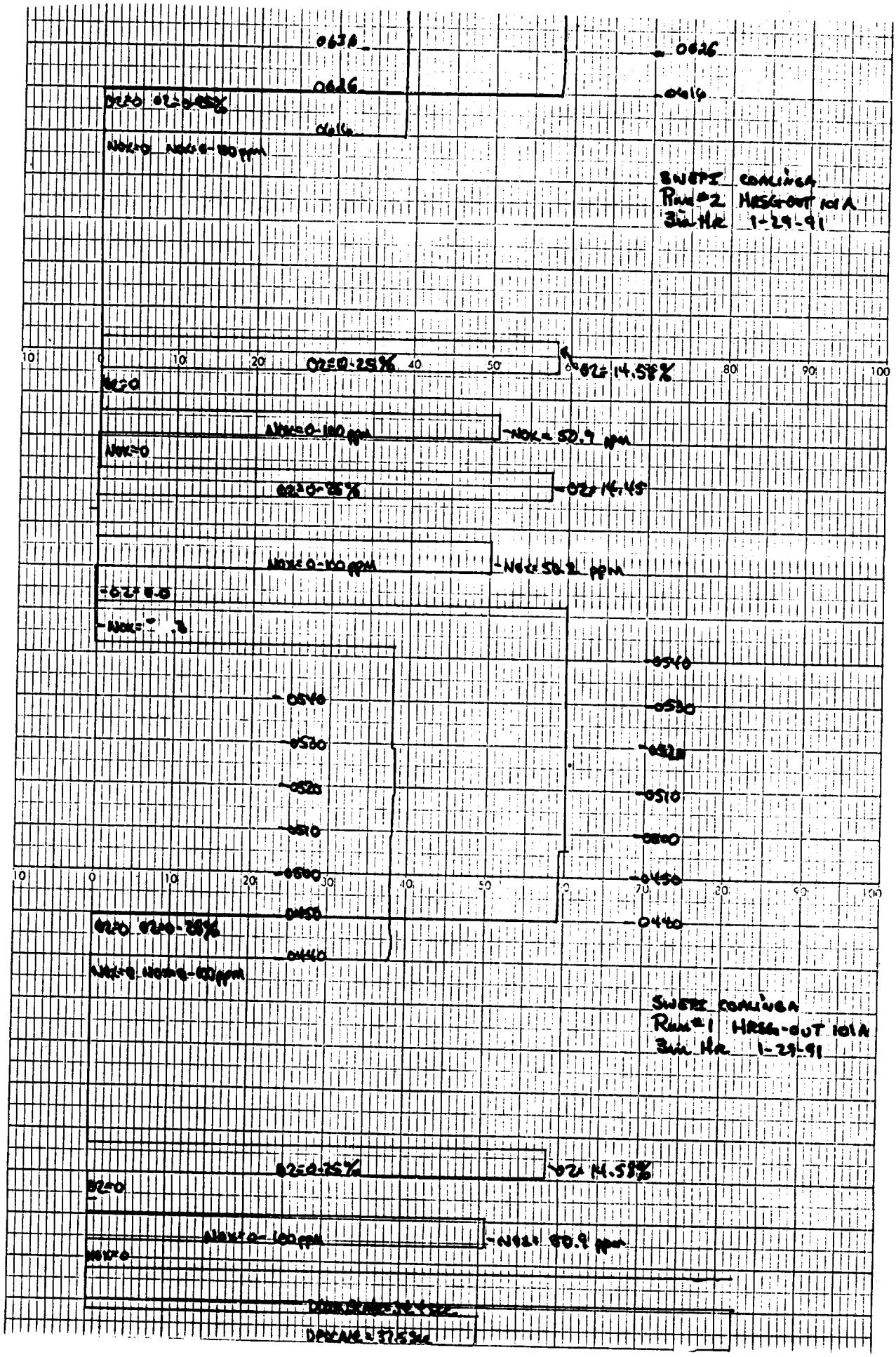


CHART NO. 414044 (1527)

Charts-Inc

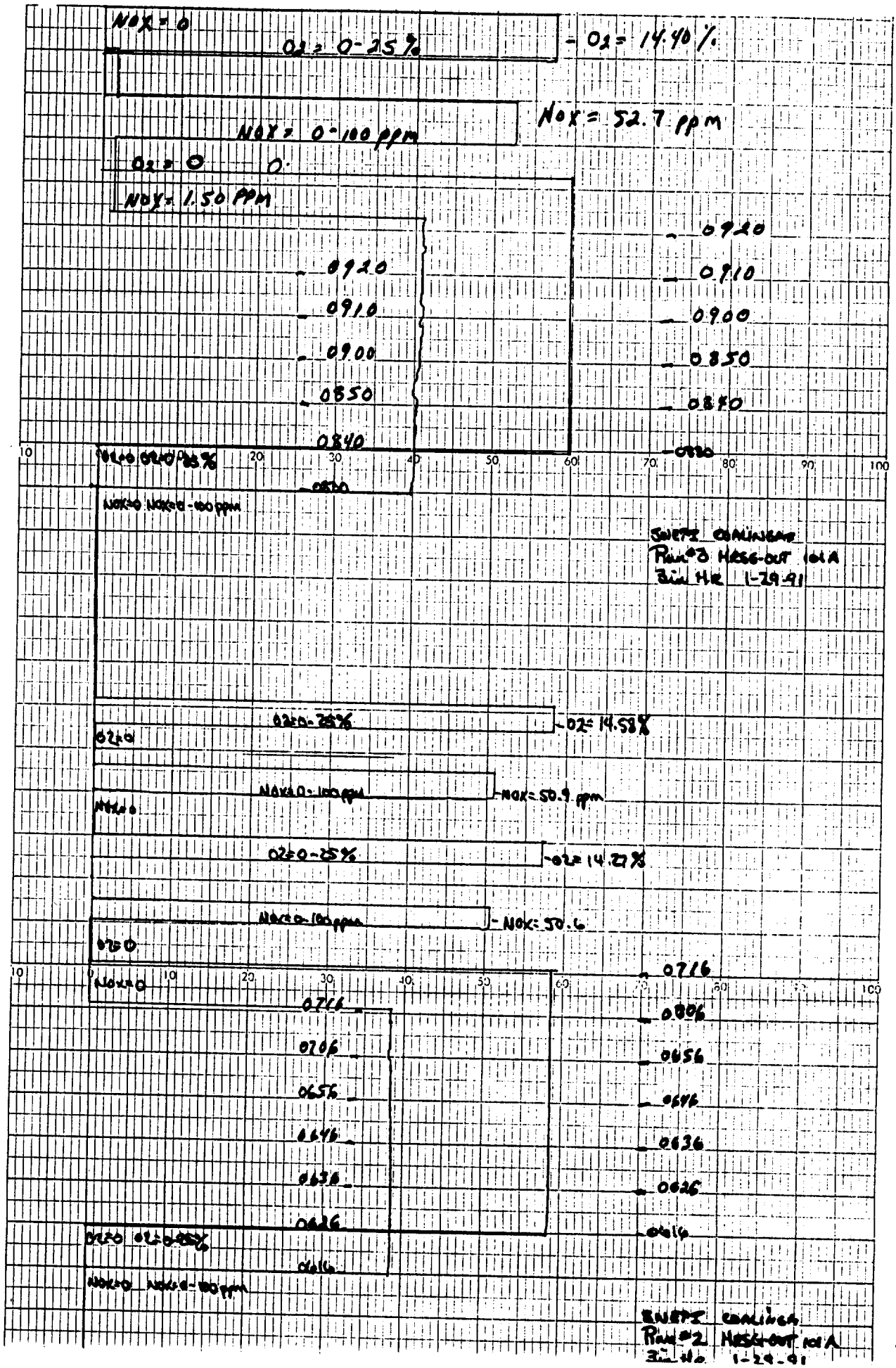
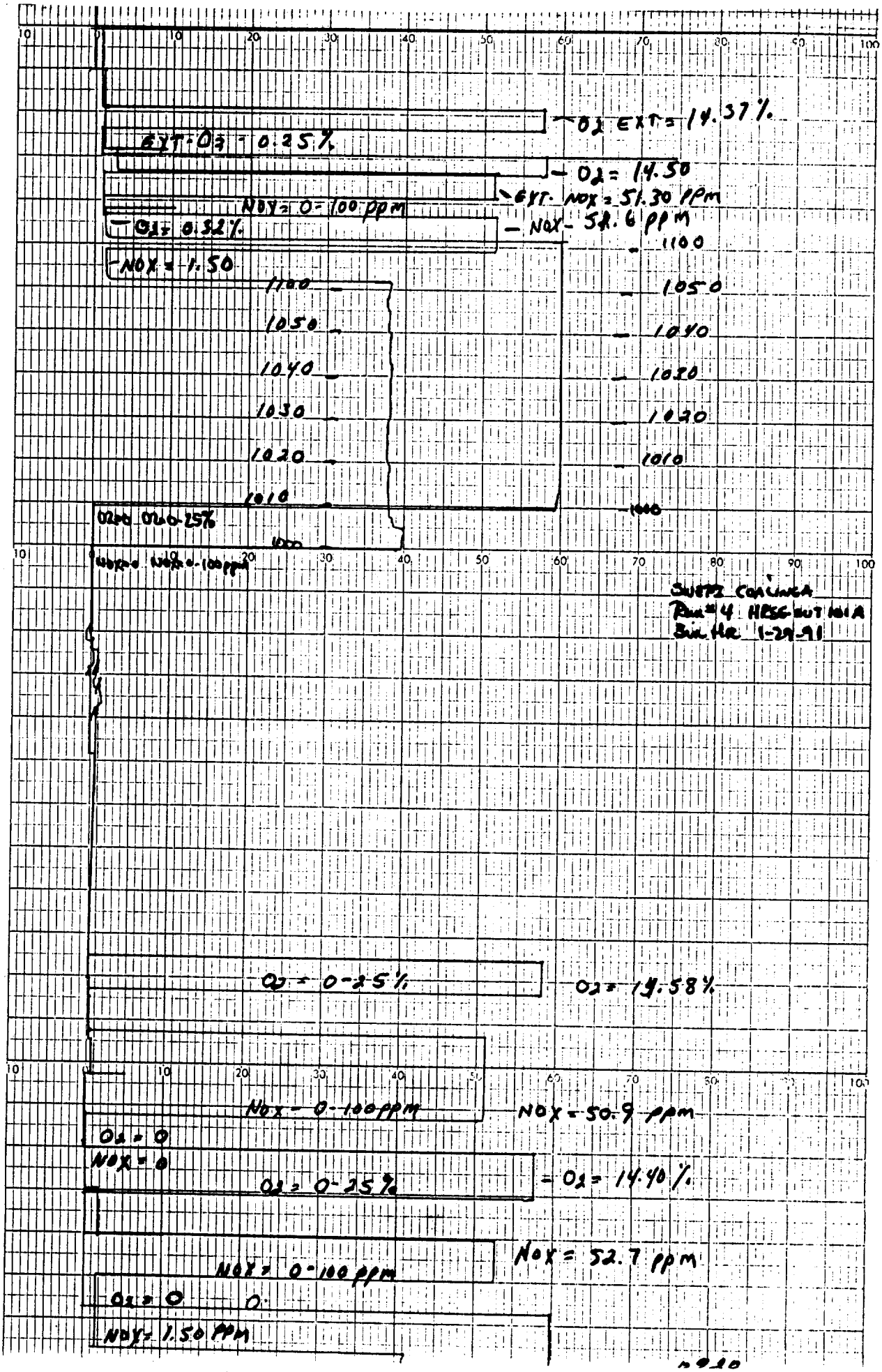


CHART NO. 414044 (1527)

Charts-Inc



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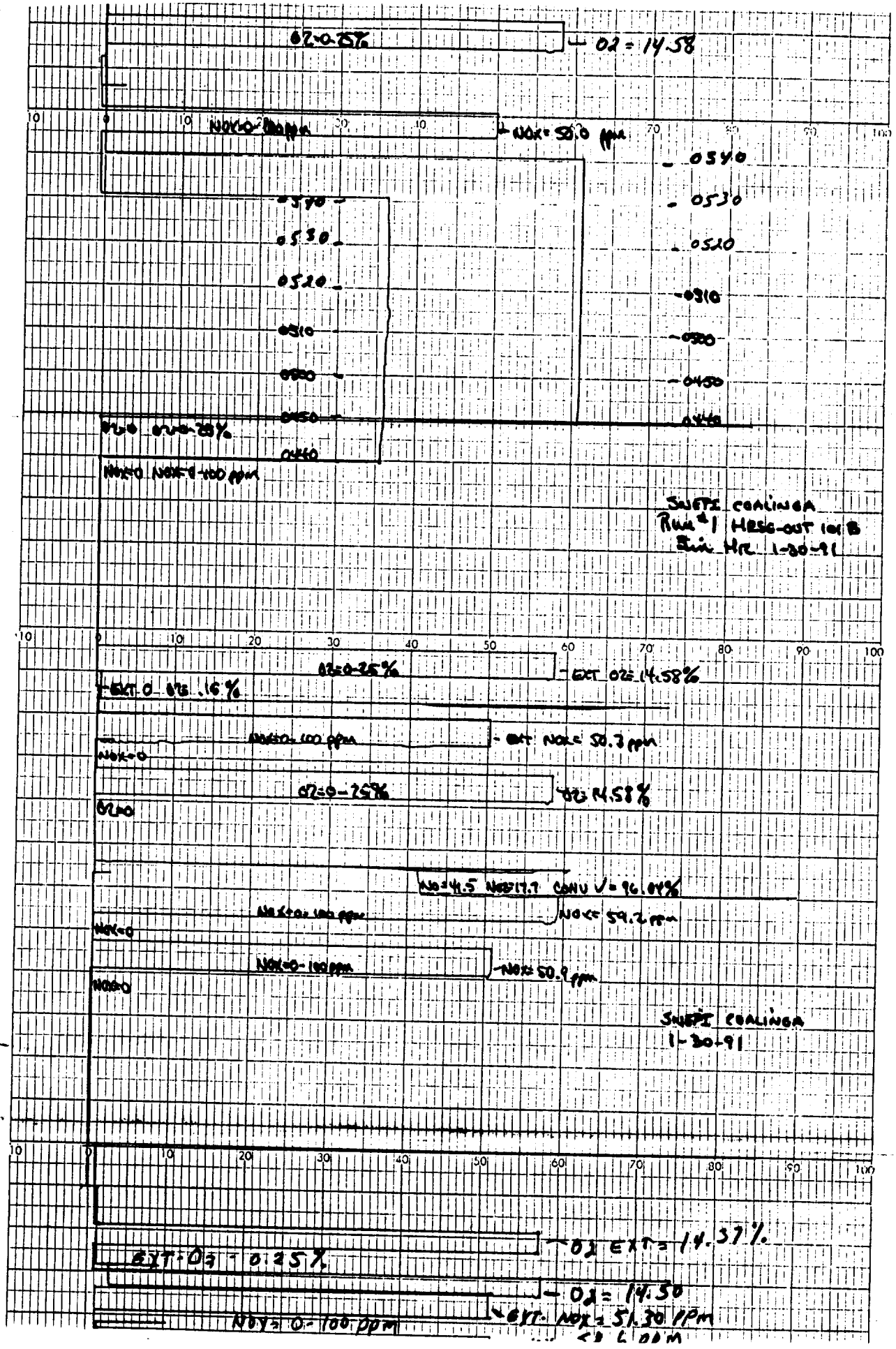
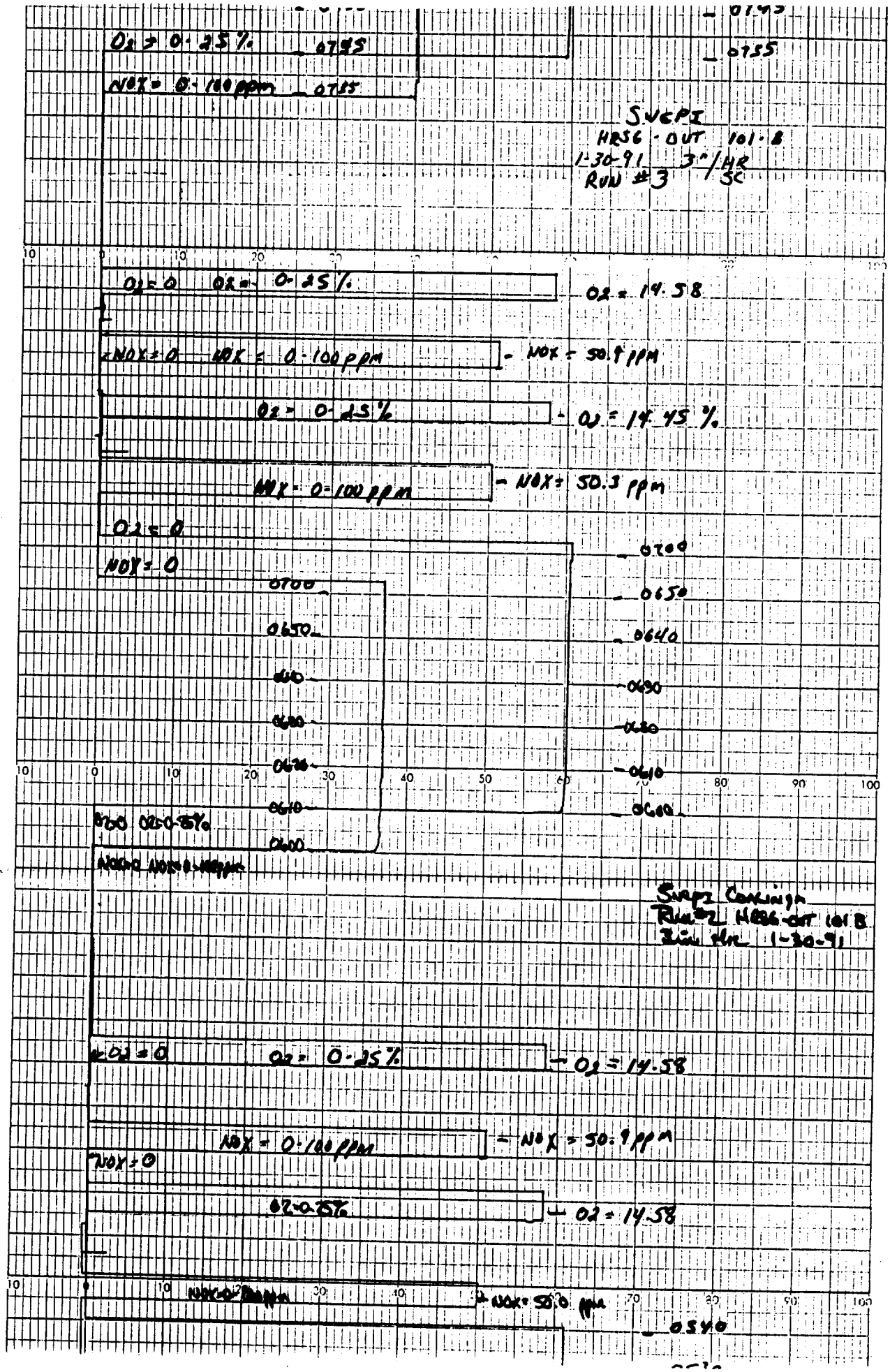
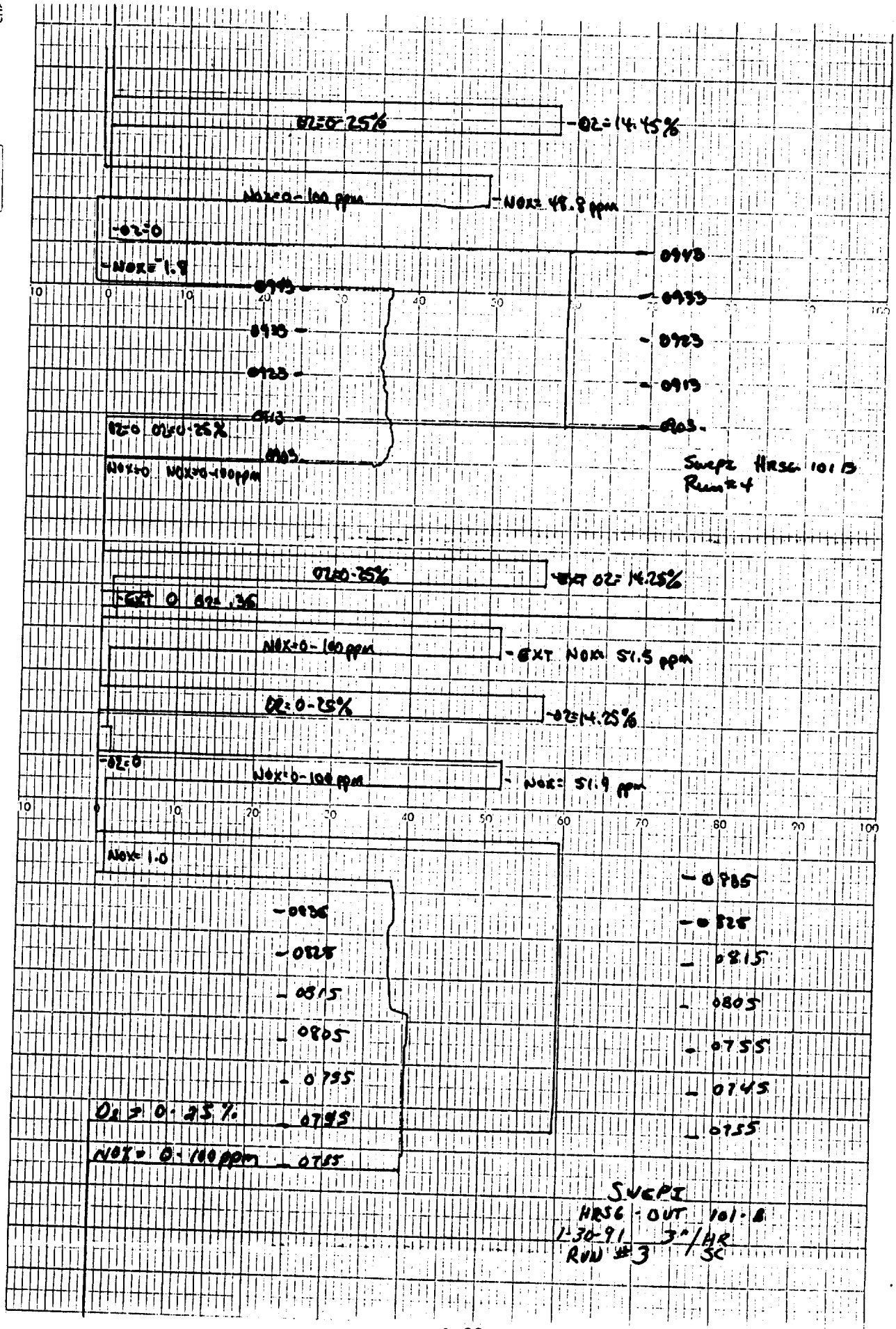
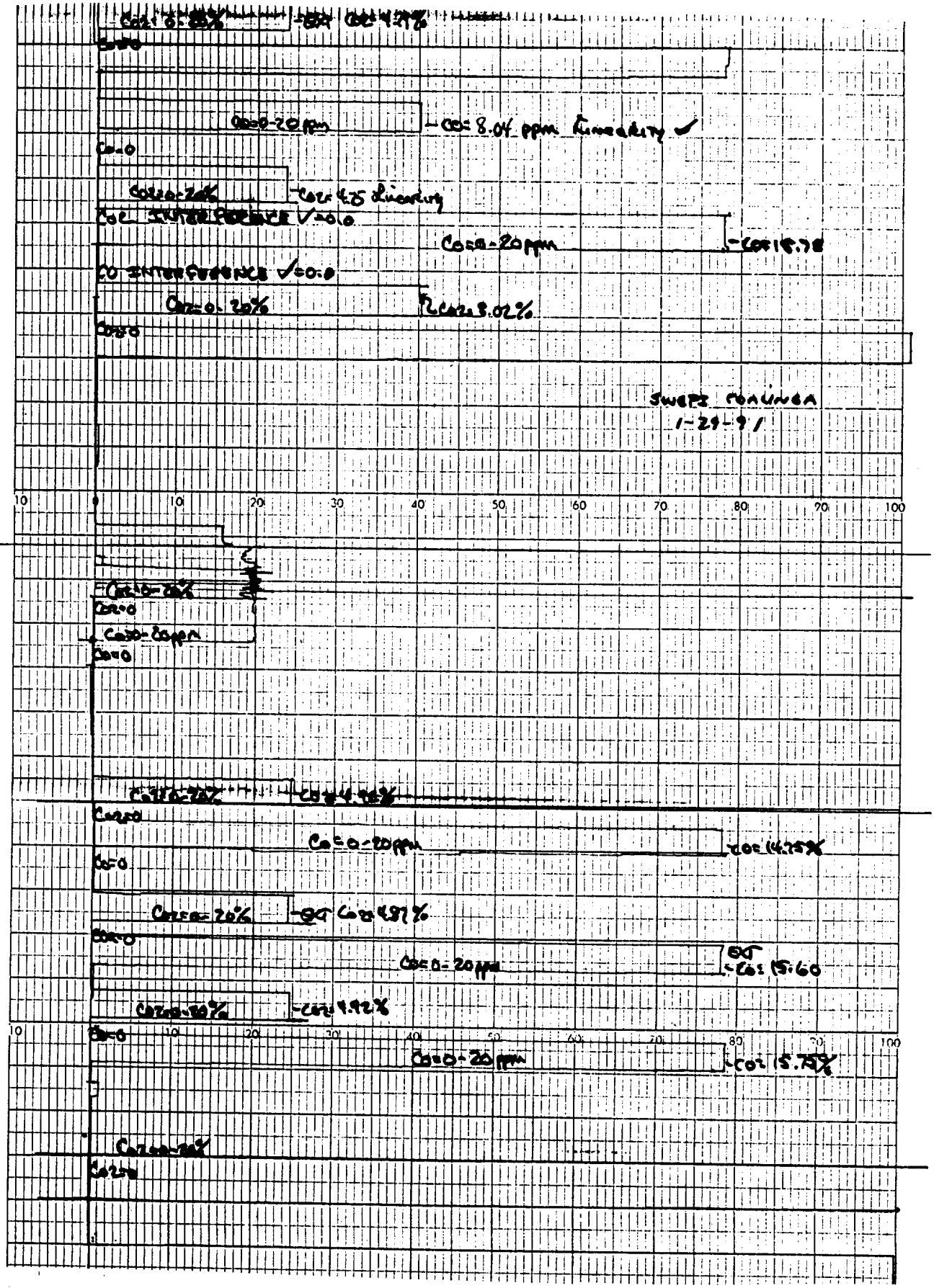
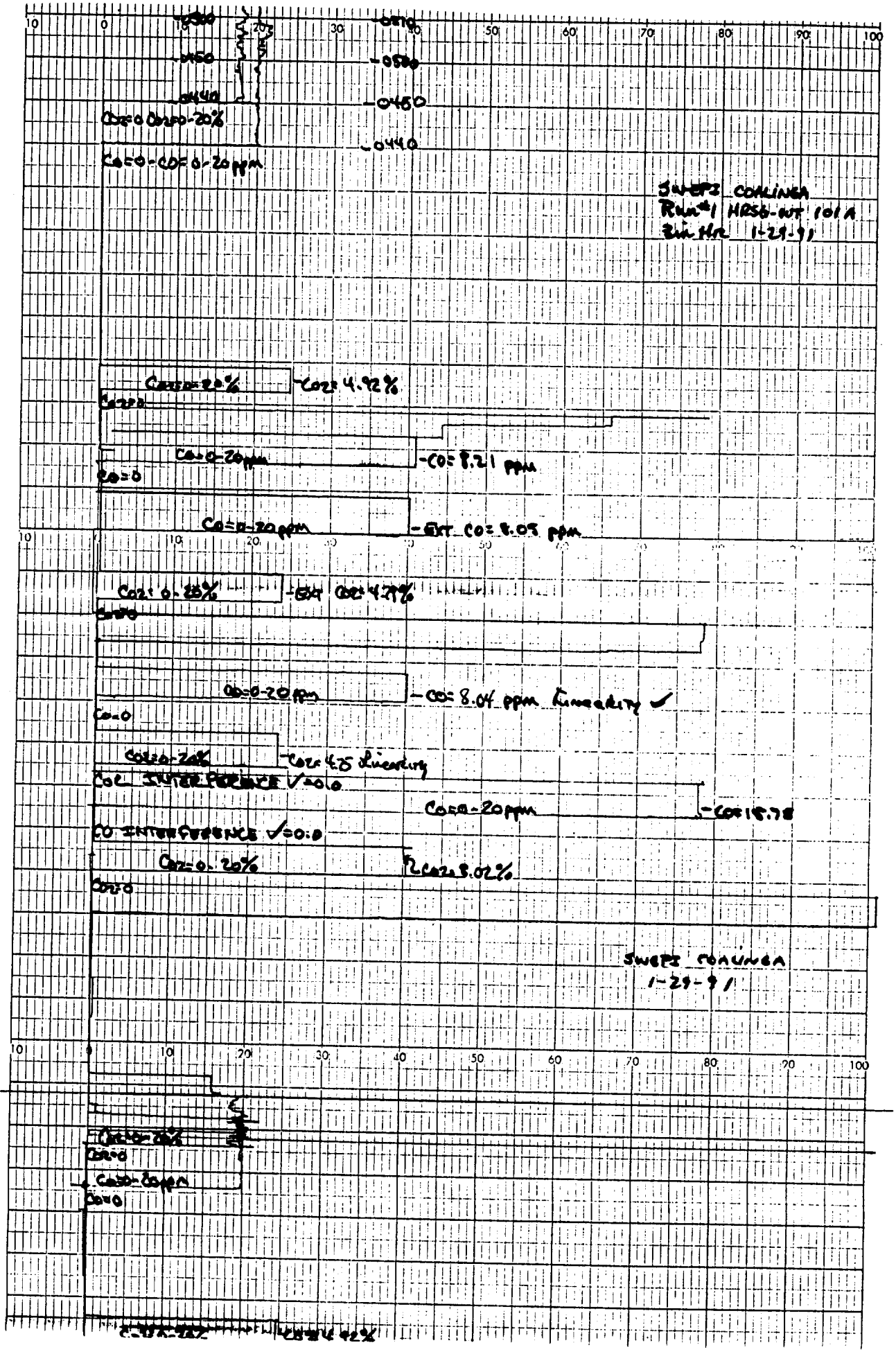
Charts Inc

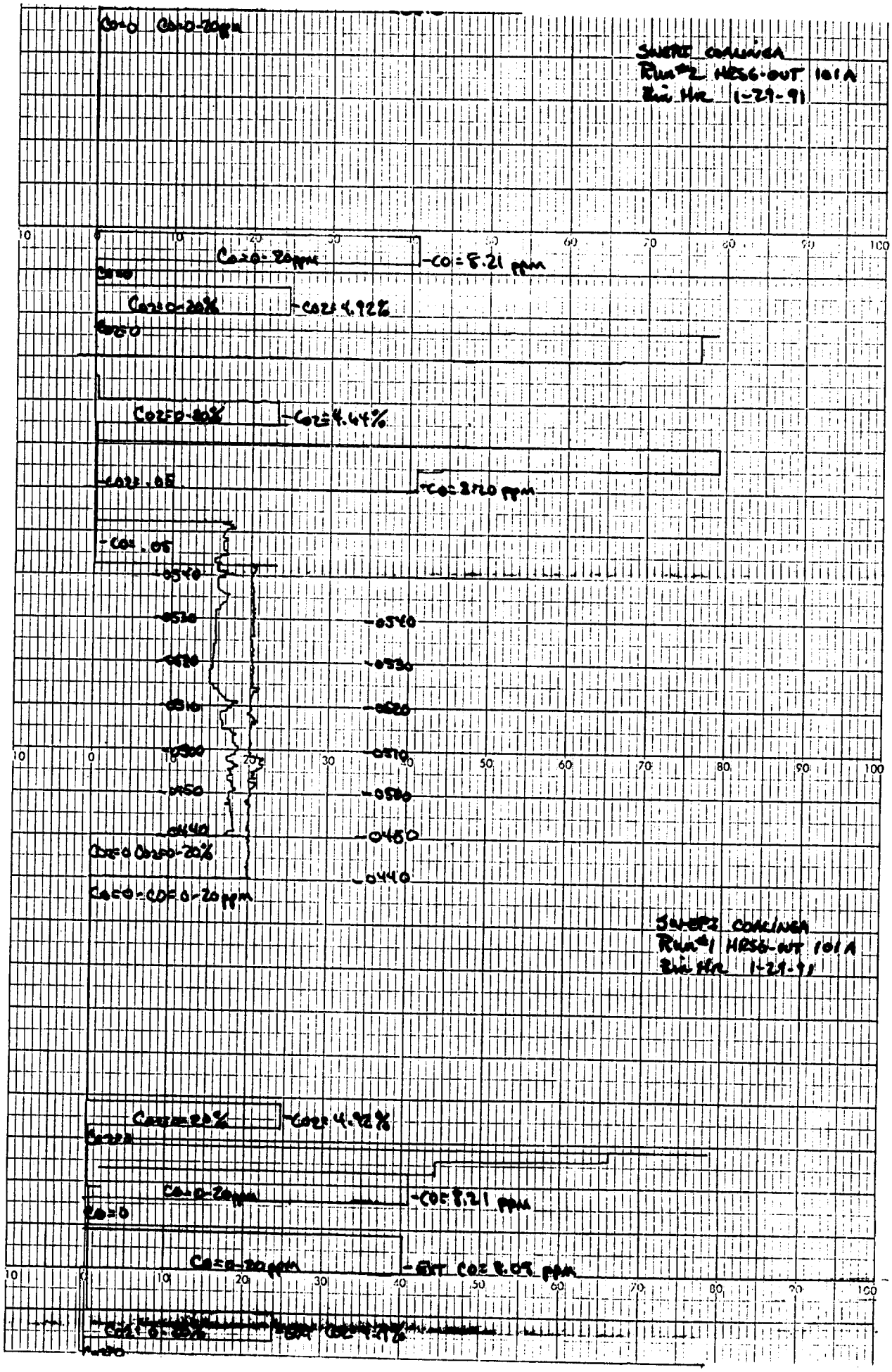

O2=0-25%
O2 = 14.58
NOX=0-100ppm
NOx= 50.0 ppm
0540
0530
0520
0510
0500
0450
0440
SWEPI COALINGA
RUN #1 HRSG-OUT 10 B
Stn HR 1-30-91
EXT. O2=14.58%
EXT NOx= 50.3 ppm
NO= 41.5 NO2=7.7 CONV = 96.04%
NOx= 59.2 ppm
NOx= 50.9 ppm
SWEPI COALINGA
1-30-91
O2 EXT = 14.37%
EXT. O2 = 0.25%
O2 = 14.50
EXT. NOx = 51.30 PPM

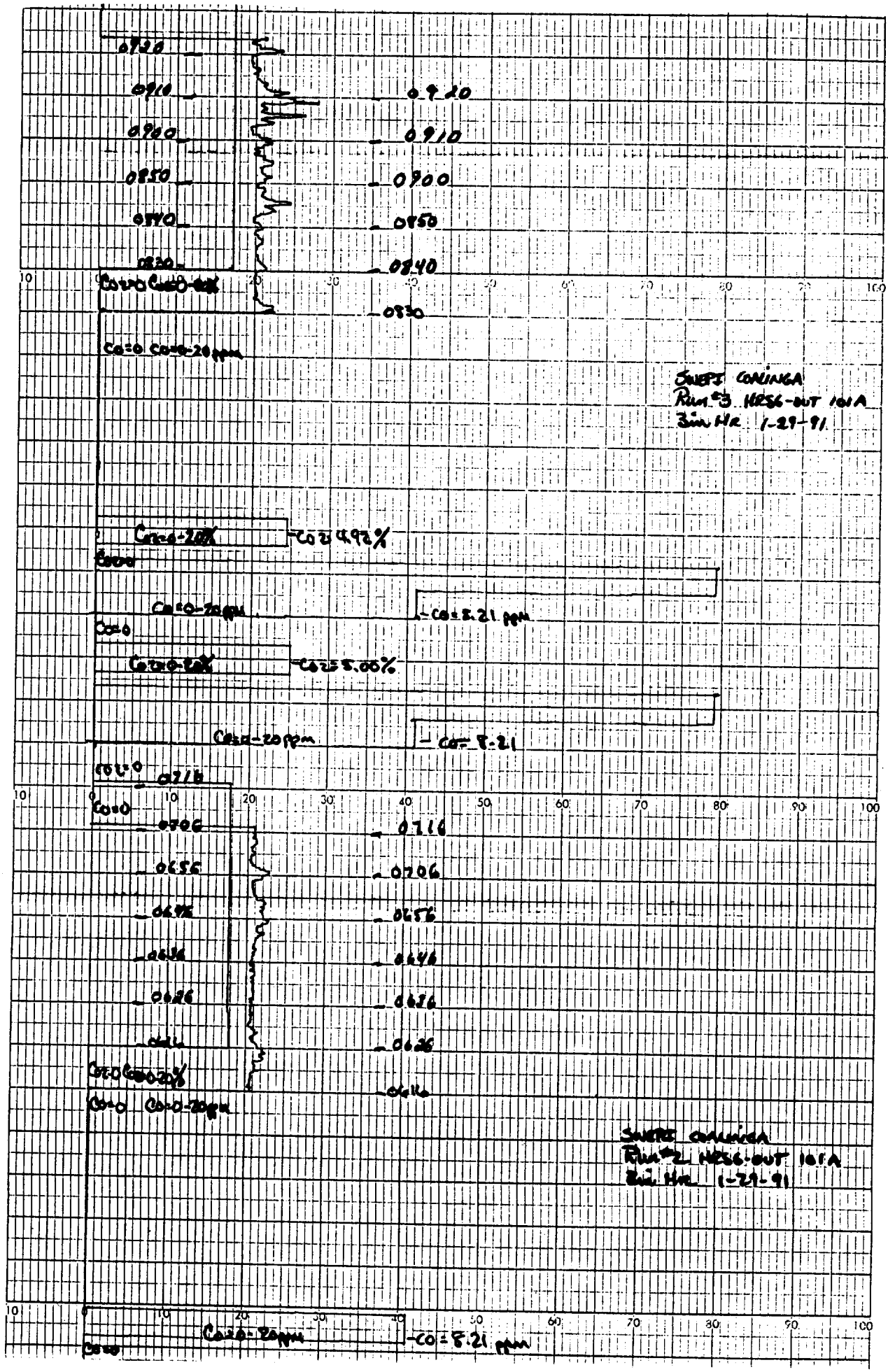

SVCPI
HRSG - OUT 101-B
1-30-91 3"/HR SC
RUN #3
O2 = 0-25%
NOX = 0-100 ppm
O2 = 14.58
NOX = 50.9 ppm
O2 = 14.45 %
NOX = 50.3 ppm
0700
0650
0640
0630
0610
0600
SVCPI Combined
Run #2 HRSG-OUT 101B
Jan thru 1-30-91
O2 = 14.58
NOX = 50.9 ppm
O2 = 14.58
NOX = 50.0 ppm
0540
Charts-Inc
CHART NO. 41404
(1527)

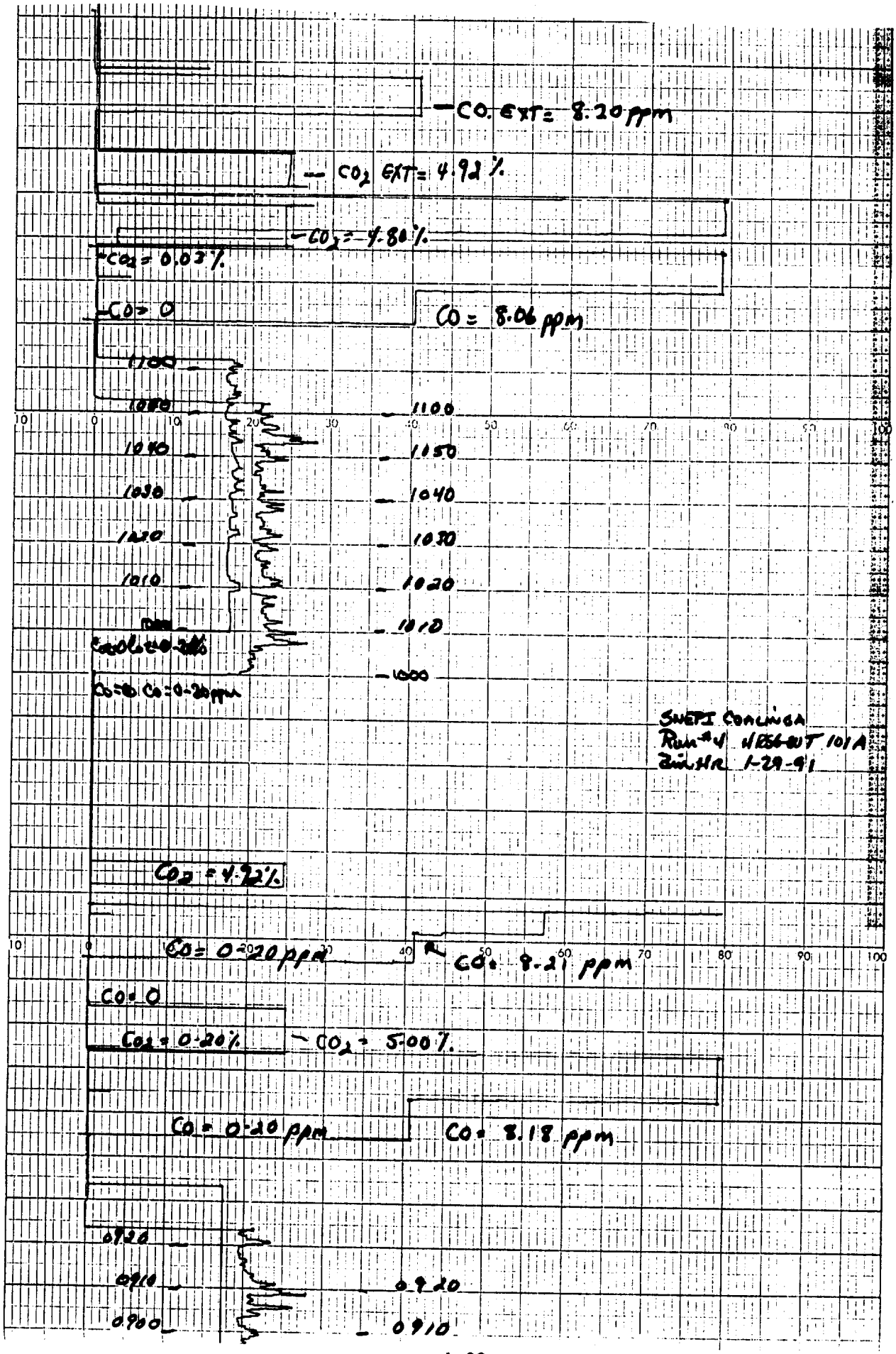

O2=0.25%
-O2=14.45%
NOx=0-100 ppm
-NOx= 48.9 ppm
-O2=0
-NOx= 1.9
0945
0935
0925
0913
0903
Sweep HRSG 101B
Run #4
O2=0 0.25%
NOx=0 NOx=0-100ppm
0780-25%
-EXT O2= 14.25%
-EXT O 02=.36
NOX=0-100 ppm
-EXT NOx 51.5 ppm
O2=0-25%
-O2=14.25%
-O2=0
NOx=0-100 ppm
-NOx= 51.9 ppm
NOx= 1.0
0935
0925
0915
0905
0755
O2 = 0.25%
0745
NOx = 0-100 ppm
0755
0905
0825
0815
0805
0755
0745
0755
SWEPI
HRSG - OUT 101-B
1-30-91 3"/HR
RUN #3
SC

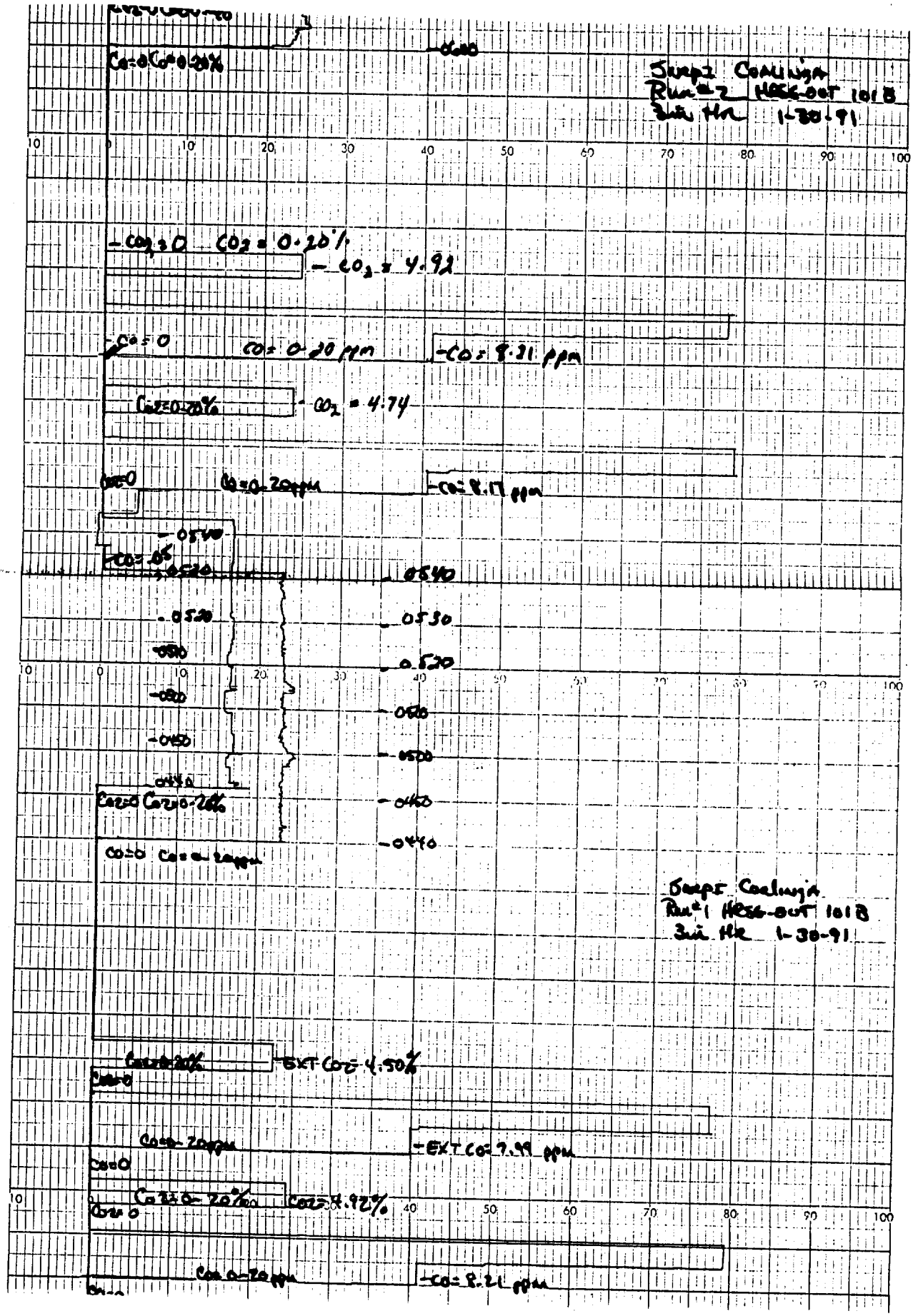

SWEPT CONFINED
1-29-91
CHART NO. 41404
Charts-Inc

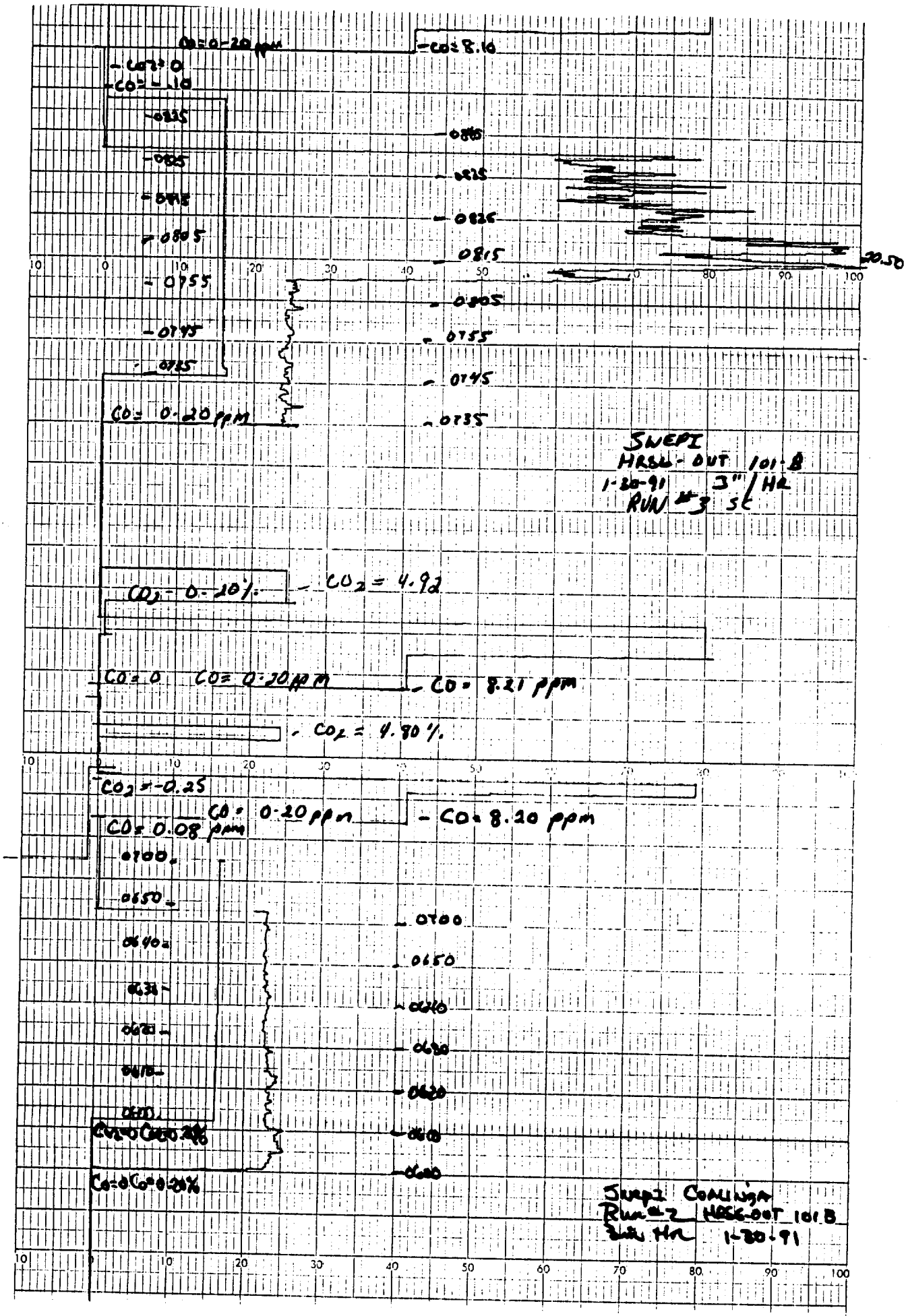

SWEPT COALINGA
Run #1 HRSG-OUT 101A
Run Hr 1-29-91
CO2=0 CO=50-20%
CO=0-CO=0-20 ppm
CO2=20%
CO2= 4.92%
CO=0-20ppm
-CO= 8.21 ppm
CO=0
CO=0-20 ppm
-EXT CO= 8.03 ppm
CO2= 0-20%
-EXT CO2=4.79%
CO=0-20 ppm
-CO= 8.04 ppm Linearity ✓
CO=0
CO2=0-20%
-CO2= 4.75 Linearity
CO2 INTERFERENCE ✓=0.0
CO=0-20ppm
-CO=8.78
CO INTERFERENCE ✓=0.0
CO2=0-20%
-CO2=8.02%
CO=0
SWEPT COALINGA
1-29-91
CO=0
CO=0-20ppm
CO=0

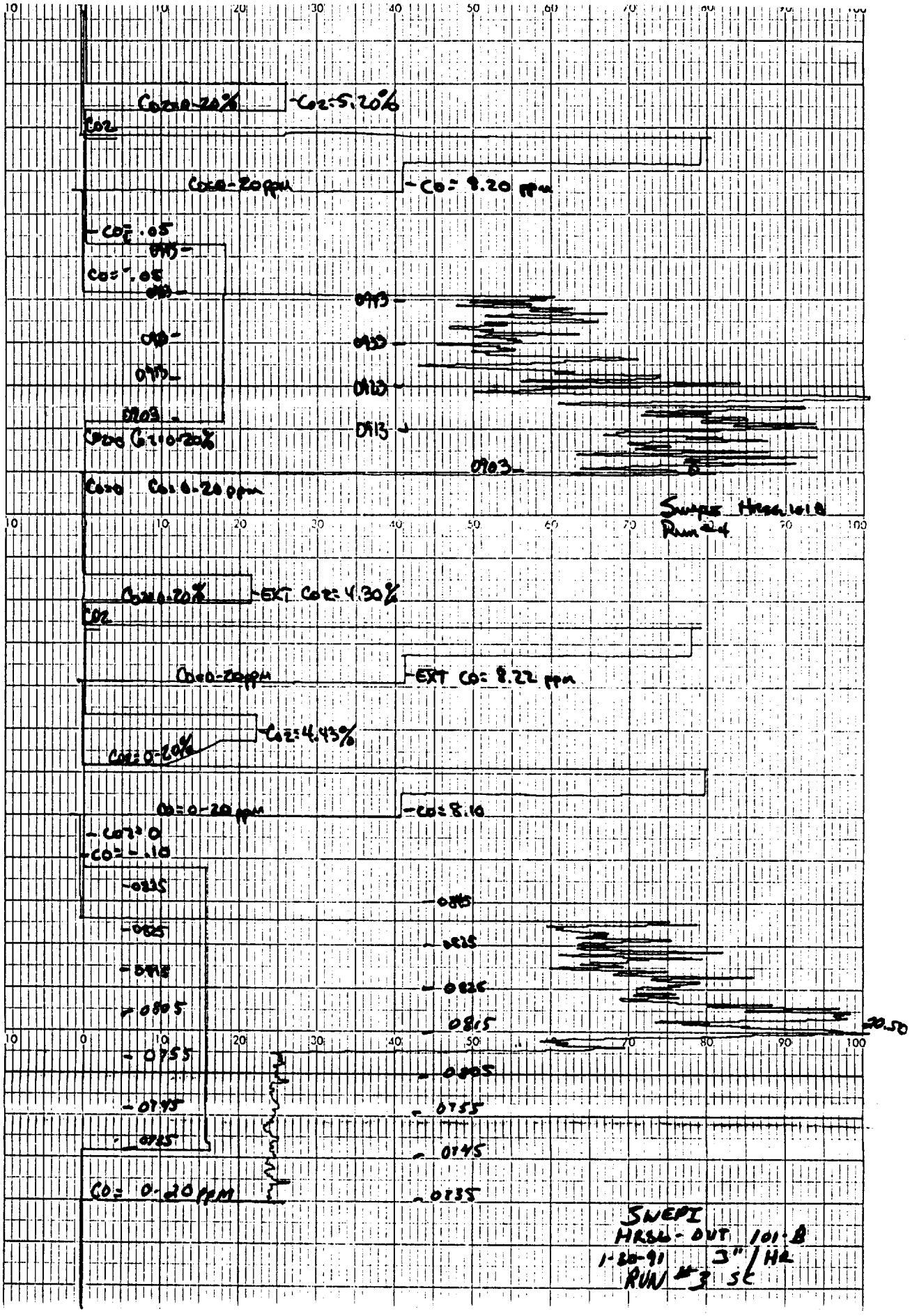

Charts-Inc
CHART NO. 41404
(1527)
Charts-Inc
SUNTEC COALINGER
Run #2 HRSG-OUT 101A
Run #1 HRSG-OUT 101A
-CO=8.21 ppm
-CO2=4.92%
-CO2=4.44%
-CO=8.21 ppm
-CO2=4.92%


SWEPI CONLINCA
Run #3 HRSG-OUT 10FA
3rd HR 1-29-91
SWEPI CONLINCA
Run #2 HRSG-OUT 10FA
2nd HR 1-29-91


CO. EXT = 8.20 ppm
CO2 EXT = 4.92 %.
CO2 = 4.80 %.
CO2 = 0.03 %.
CO = 0
CO = 8.06 ppm
1100
1090
1080
1070
1060
1050
1040
1030
1020
1010
1000
SNEPI CONLINCA
RUN #4 HRSG-OUT 101A
2nd HR 1-29-91
CO2 = 4.92%
CO = 0-20 ppm
CO = 8.21 ppm
CO = 0
CO2 = 0-20 %
CO2 = 5.00 %
CO = 0-20 ppm
CO = 8.18 ppm
0920
0910
0900
0920
0910
CHART NO. 414044
Charts-Inc
(1527)
CHART NO. 414044




CO=0-20 ppm
-CO=8.16
-CO2=0
-CO=-.10
-0825
-0805
-0795
-0755
-0745
-0735
CO= 0-20 ppm
SWEPI
HRSG-OUT 101-B
1-30-91 3"/HR
RUN #3 SL
CO2= 0-10%
-CO2 = 4.92
CO=0 CO=0-20 ppm
-CO= 8.21 ppm
-CO2 = 4.80 %
CO2=-0.25
CO= 0.08 ppm
CO= 0-20 ppm
-CO= 8.20 ppm
0700
0650
0640
0630
0620
0610
0600
CO2=0 CO2=0-20%
CO=0 CO=0-20%
SWEPI COMLINGA
Run #2 HRSG-OUT 101B
1-30-91
CHART NO. 414044
Charts-Inc
(1527)


CO2=5.20%
CO=9.20 ppm
CO2=.05
CO=-.05
0903
0913
0923
0933
CO2=0-20%
CO=0-20 ppm
SWEPT HRSG. 101B
RUN #4
EXT CO2=4.30%
EXT CO=8.22 ppm
CO2=4.43%
CO2=0-20%
CO=0-20 ppm
CO=8.10
CO2=0
CO=-.10
0825
0835
0845
0815
0805
0755
0745
0735
CO=0-20 ppm
20.50
SWEPT
HRSG-OUT 101-B
1-20-91
3"/HG
RUN #3
SC
CHART NO. 41044
Charts-Inc
(1527)

A. CALIBRATION AND CORRECTION DATA

Company : SWEPI COALINGA
Station : HRSG 101-A
Date : 1/29/91
Test Run : 1
Test Condition: GAS 100%

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
Point #	A	B	A	B	A	B	A	B	A	B
1	14.82	14.83	3.55	3.57	4.00	4.00			38.10	38.15
2	14.87	14.90	3.57	3.62	4.00	3.99			38.00	38.15
3	15.00	15.06	3.50	3.58	4.15	4.14			38.00	38.25
4	15.00	15.08	3.20	3.30	4.05	4.04			38.10	38.45
5	15.00	15.10	3.10	3.22	4.07	4.05			38.20	38.65
6	15.00	15.12	3.30	3.47	4.07	4.05			38.00	38.55
MEAN		15.02		3.46		4.05				38.37

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.05	0.05		-0.30
Span Check	14.45	4.64	8.20		50.20
Cal. Gas	14.58	4.92	8.21		50.90
Scf	-0.00149	-0.01118	-0.00122		-0.00131
Zcf	0.00000	0.00833	0.00833		-0.05000

Scf, Span Drift Correction Factor = (% Drift / 100) / # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift / # of Readings
Cz, Zero Corr. Concentration = measured value - [Zcf x (Point # - 0.5)]
B, Corrected Concentration = Cz / [1 + (Scf x (Point # - 0.5))]

A. CALIBRATION AND CORRECTION DATA

Company : SWEPI COALINGA
Station : HRSG 101-A
Date : 1/29/91
Test Run : 2
Test Condition: GAS 100%

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
	A	B	A	B	A	B	A	B	A	B
Point #										
1	14.62	14.65	3.56	3.56	4.26				38.50	38.52
2	14.62	14.70	3.54	3.53	4.26				38.50	38.56
3	14.62	14.75	3.54	3.52	4.14				38.50	38.59
4	14.62	14.80	3.56	3.53	4.32				38.50	38.63
5	14.62	14.86	3.56	3.52	4.24				38.20	38.37
6	14.62	14.91	3.56	3.51	4.24				38.10	38.31
MEAN		14.78		3.52	4.24					38.50

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.00	0.00		0.00
Span Check	14.27	5.00	8.21		50.60
Cal. Gas	14.58	4.92	8.21		50.90
Scf	-0.00354	0.00271			-0.00098
Zcf	0.00000	0.00000			0.00000

Scf, Span Drift Correction Factor = (% Drift / 100) / # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift / # of Readings
Cz, Zero Corr. Concentration = measured value - [Zcf x (Point # - 0.5)]
B, Corrected Concentration = Cz / [1 + (Scf x (Point # - 0.5))]

A. CALIBRATION AND CORRECTION DATA

Company : SWEPI COALINGA
Station : HRSG 101-A
Date : 1/29/91
Test Run : 3
Test Condition: GAS 100%

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
	A	B	A	B	A	B	A	B	A	B
Point #										
1	14.95	14.97	3.44	3.44	4.20	4.20			39.00	38.86
2	14.95	15.00	3.44	3.43	4.10	4.10			40.10	39.67
3	14.95	15.03	3.44	3.42	4.46	4.47			40.30	39.58
4	14.95	15.06	3.44	3.41	4.20	4.21			40.90	39.89
5	14.95	15.09	3.44	3.40	4.44	4.45			40.90	39.60
6	14.95	15.12	3.44	3.39	4.20	4.21			40.90	39.31
MEAN		15.04		3.41		4.27				39.48

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.00	0.00		1.50
Span Check	14.40	5.00	8.18		52.70
Cal. Gas	14.58	4.92	8.21		50.90
Scf	-0.00206	0.00271	-0.00061		0.00098
Zcf	0.00000	0.00000	0.00000		0.25000

Scf, Span Drift Correction Factor = (% Drift / 100) / # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift / # of Readings
Cz, Zero Corr. Concentration = measured value - [Zcf x (Point # - 0.5)]
B, Corrected Concentration = Cz / [1 + (Scf x (Point # - 0.5))]

A. CALIBRATION AND CORRECTION DATA

Company : SWEPI COALINGA
Station : HRSG 101-A
Date : 1/29/91
Test Run : 4
Test Condition: GAS 100%

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
	A	B	A	B	A	B	A	B	A	B
Point #										
1	14.97	14.98	3.46	3.47	4.60	4.61			39.00	38.93
2	15.00	15.02	3.46	3.48	4.40	4.42			38.00	37.77
3	15.00	15.04	3.48	3.51	4.42	4.45			38.00	37.62
4	15.00	15.05	3.60	3.65	4.40	4.45			38.00	37.47
5	15.00	15.07	3.48	3.54	4.20	4.26			38.10	37.42
6	15.00	15.09	3.50	3.57	4.60	4.68			38.00	37.16
MEAN		15.04		3.54		4.48				37.73

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.32	0.03	0.00		1.50
Span Check	14.50	4.80	8.06		51.60
Cal. Gas	14.58	4.92	8.21		50.90
Scf	-0.00457	-0.00508	-0.00305		-0.00262
Zcf	0.05333	0.00500	0.00000		0.25000

Scf, Span Drift Correction Factor = (% Drift / 100) / # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift / # of Readings
Cz, Zero Corr. Concentration = measured value - [Zcf x (Point # - 0.5)]
B, Corrected Concentration = Cz / [1 + (Scf x (Point # - 0.5))]

A. CALIBRATION AND CORRECTION DATA

Company : SWEPI COALINGA
Station : HRSG 101-B
Date : 1/30/91
Test Run : 1
Test Condition: GAS 100%

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
	A	B	A	B	A	B	A	B	A	B
Point #										
1	15.22		4.60	4.61	3.30	3.30			35.50	35.57
2	15.25		4.66	4.70	3.28	3.28			36.00	36.20
3	15.25		4.64	4.71	3.28	3.29			36.10	36.44
4	15.25		4.68	4.78	3.26	3.27			36.30	36.78
5	15.25		4.60	4.73	3.26	3.27			36.40	37.01
6	15.27		4.54	4.70	3.26	3.27			36.30	37.05
MEAN	15.25			4.71		3.28				36.51

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.05	0.00		-0.60
Span Check	14.58	4.74	8.17		50.00
Cal. Gas	14.58	4.92	8.21		50.90
Scf		-0.00779	-0.00081		-0.00098
Zcf		0.00833	0.00000		-0.10000

Scf, Span Drift Correction Factor = (% Drift / 100) / # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift / # of Readings
Cz, Zero Corr. Concentration = measured value - [Zcf x (Point # - 0.5)]
B, Corrected Concentration = Cz / [1 + (Scf x (Point # - 0.5))]

A. CALIBRATION AND CORRECTION DATA

Company : SWEPI COALINGA
Station : HRSG 101-B
Date : 1/30/91
Test Run : 2
Test Condition: GAS 100%

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
	A	B	A	B	A	B	A	B	A	B
Point #										
1	15.00	15.01	3.20	3.21	4.66	4.66			36.50	36.54
2	15.07	15.10	3.22	3.26	4.64	4.63			36.80	36.91
3	15.07	15.13	3.24	3.31	4.70	4.69			36.90	37.08
4	15.07	15.15	3.26	3.35	4.56	4.54			37.00	37.26
5	15.12	15.22	3.26	3.38	4.56	4.54			37.00	37.33
6	15.17	15.30	3.26	3.41	4.50	4.47			37.00	37.40
MEAN		15.15		3.32		4.59				37.09

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	-0.25	0.08		0.00
Span Check	14.45	4.80	8.20		50.30
Cal. Gas	14.58	4.92	8.21		50.90
Scf	-0.00149	0.00440	-0.00183		-0.00196
Zcf	0.00000	-0.04167	0.01333		0.00000

Scf, Span Drift Correction Factor = (% Drift / 100) / # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift / # of Readings
Cz, Zero Corr. Concentration = measured value - [Zcf x (Point # - 0.5)]
B, Corrected Concentration = Cz / [1 + (Scf x (Point # - 0.5))]

A. CALIBRATION AND CORRECTION DATA

Company : SWEPI COALINGA
Station : HRSG 101-B

Date : 1/30/91
Test Run : 3
Test Condition: GAS 100%

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
	A	B	A	B	A	B	A	B	A	B
Point #										
1	14.90	14.93	3.18	3.21	4.86	4.87			40.20	
2	14.90	14.98	3.18	3.26	4.82	4.85			40.20	
3	14.90	15.04	3.18	3.32	4.98	5.02			40.30	
4	14.90	15.10	3.18	3.38	11.20	11.27			39.80	
5	14.90	15.16	3.18	3.44	17.00	17.09			38.00	
6	14.88	15.20	3.19	3.51	13.90	14.01			38.30	
MEAN		15.07		3.35		9.52			39.47	

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.00	-0.10		1.00
Span Check	14.25	4.43	8.10		51.90
Cal. Gas	14.58	4.92	8.21		50.90
Scf	-0.00377	-0.01660	-0.00020		
Zcf	0.00000	0.00000	-0.01667		

Scf, Span Drift Correction Factor = (% Drift / 100) / # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift / # of Readings
Cz, Zero Corr. Concentration = measured value - [Zcf x (Point # - 0.5)]
B, Corrected Concentration = Cz / [1 + (Scf x (Point # - 0.5))]

A. CALIBRATION AND CORRECTION DATA

Company : SWEPI COALINGA
Station : HRSG 101-B
Date : 1/30/91
Test Run : 4
Test Condition: GAS 100%

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
	A	B	A	B	A	B	A	B	A	B
Point #										
1	14.75	14.77	3.57	3.54	15.40	15.40			36.70	36.95
2	14.75	14.80	3.58	3.50	16.00	15.99			35.90	36.66
3	14.78	14.86	3.59	3.46	12.30	12.29			35.60	36.86
4	14.79	14.91	3.64	3.45	11.20	11.20			36.00	37.77
MEAN		14.83		3.49		13.72				37.06

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.05	-0.05		-1.80
Span Check	14.45	5.20	8.20		48.80
Cal. Gas	14.58	4.92	8.21		50.90
Scf	-0.00223	0.01169	0.00122		-0.00147
Zcf	0.00000	0.01250	-0.01250		-0.45000

Scf, Span Drift Correction Factor = (% Drift / 100) / # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift / # of Readings
Cz, Zero Corr. Concentration = measured value - [Zcf x (Point # - 0.5)]
B, Corrected Concentration = Cz / [1 + (Scf x (Point # - 0.5))]

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : SWEPI COALINGA Date : 1/29/91

Station : HRSG 101-A

Run 1	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	14.58	4.92	8.21		50.90
Measured Span	14.45	4.64	8.20		50.20
Zero Drift	0.00	0.05	0.05		-0.30
Final, Actual Span	14.45	4.59	8.15		50.50
Percent Drift	-0.9	-6.7	-0.7		-0.8

Run 2	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	14.58	4.92	8.21		50.90
Measured Span	14.27	5.00	8.21		50.60
Zero Drift	0.00	0.00	0.00		0.00
Final, Actual Span	14.27	5.00	8.21		50.60
Percent Drift	-2.1	1.6	0.0		-0.6

Run	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span					
Measured Span					
Zero Drift					
Final, Actual Span					
Percent Drift					

Final, Actual Span = Measured Span - Zero Drift

Percent Drift = (Final, Actual Span - Initial Span) / Initial Span x 100

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : SWEPI COALINGA Date : 1/29/91

Station : HRSG 101-A

Run 3	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	14.58	4.92	8.21		50.90
Measured Span	14.40	5.00	8.18		52.70
Zero Drift	0.00	0.00	0.00		1.50
Final, Actual Span	14.40	5.00	8.18		51.20
Percent Drift	-1.2	1.6	-0.4		0.6

Run 4	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	14.58	4.92	8.21		50.90
Measured Span	14.50	4.80	8.06		51.60
Zero Drift	0.32	0.03	0.00		1.50
Final, Actual Span	14.18	4.77	8.06		50.10
Percent Drift	-2.7	-3.0	-1.8		-1.6

Run	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span					
Measured Span					
Zero Drift					
Final, Actual Span					
Percent Drift					

Final, Actual Span = Measured Span - Zero Drift

Percent Drift = (Final, Actual Span - Initial Span) / Initial Span x 100

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : SWEPI COALINGA Date : 1/30/91

Station : HRSG 101-B

Run 1	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	14.58	4.92	8.21		50.90
Measured Span	14.58	4.74	8.17		50.00
Zero Drift	0.00	0.05	0.00		-0.60
Final, Actual Span	14.58	4.69	8.17		50.60
Percent Drift	0.0	-4.7	-0.5		-0.6

Run 2	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	14.58	4.92	8.21		50.90
Measured Span	14.45	4.80	8.20		50.30
Zero Drift	0.00	-0.25	0.08		0.00
Final, Actual Span	14.45	5.05	8.12		50.30
Percent Drift	-0.9	2.6	-1.1		-1.2

Run	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span					
Measured Span					
Zero Drift					
Final, Actual Span					
Percent Drift					

Final, Actual Span = Measured Span - Zero Drift

Percent Drift = (Final, Actual Span - Initial Span) / Initial Span x 100

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : SWEPI COALINGA Date : 1/30/91

Station : HRSG 101-B

Run 3	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	14.58	4.92	8.21		50.90
Measured Span	14.25	4.43	8.10		51.90
Zero Drift	0.00	0.00	-0.10		1.00
Final, Actual Span	14.25	4.43	8.20		50.90
Percent Drift	-2.3	-10.0	-0.1		0.0

Run 4	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	14.58	4.92	8.21		50.90
Measured Span	14.45	5.20	8.20		48.80
Zero Drift	0.00	0.05	-0.05		-1.80
Final, Actual Span	14.45	5.15	8.25		50.60
Percent Drift	-0.9	4.7	0.5		-0.6

Run	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span					
Measured Span					
Zero Drift					
Final, Actual Span					
Percent Drift					

Final, Actual Span = Measured Span - Zero Drift

Percent Drift = (Final, Actual Span - Initial Span) / Initial Span x 100

Steiner Environmental, Inc.

SAMPLE HANDLING/LOG-IN

Date 1-29-91 Test Location SWEPI-COALINGA HRSG-OUT

	Sample Type	Volume	Comments
1.	22252 5/8 (Meth) F+W (Sample) 1 (Test)		101 A
2.	22253 5/8 (Meth) MF (Sample) 1 (Test)		101 A
3.	22254 5/8 (Meth) AMF (Sample) 1 (Test)		101 A
4.	22255 5/8 (Meth) IPA (Sample) 1 (Test)		101 A
5.	22256 5/8 (Meth) B+W (Sample) 1 (Test)		101 A
6.	22257 5/8 (Meth) F+W (Sample) 2 (Test)		101 A
7.	22258 5/8 (Meth) MF (Sample) 2 (Test)		101 A
8.	22259 5/8 (Meth) AMF (Sample) 2 (Test)		101 A
9.	22260 5/8 (Meth) IPA (Sample) 2 (Test)		101 A
10.	22261 5/8 (Meth) B+W (Sample) 2 (Test)		101 A

CHAIN OF CUSTODY

Signature	Date/Time	Signature	Date/Time
Scott R McCo	1-29-91		
W Hamilton	1-31-91		
DM	2/9/91		

Steiner Environmental, Inc.

SAMPLE HANDLING/LOG-IN

Date 1-30-91 Test Location SWEPI COALINGA HRS - OUT

	Sample Type	Volume	Comments
1.	22266 GC (Meth) HC (Sample) 1 (Test)		HC - SAMPLE 101 B-1 101-B
2.	25860 5-8 (Meth) IPA (Sample) 2 (Test)		101-B
3.	25859 5-8 (Meth) BHW (Sample) 2 (Test)		101-B
4.	25858 5-8 (Meth) AMF (Sample) 2 (Test)		101-B
5.	25857 GC (Meth) HC (Sample) 2 (Test)		HC - SAMPLE 101-B TEST 2
6.	25856 5-8 (Meth) FHW (Sample) 2 (Test)		101-B
7.	25855 5-8 (Meth) MF (Sample) 2 (Test)		101-B
8.	23752 5/8 (Meth) BHW (Sample) ALL (Test)		BLANK
9.	23751 5/8 (Meth) IPA (Sample) ALL (Test)		BLANK
10.	23750 5/8 (Meth) AMF (Sample) ALL (Test)		BLANK

CHAIN OF CUSTODY

Signature	Date/Time	Signature	Date/Time
S. Coughlan	1-30-91		
Walter Kendall	1-31-91		
WM	2/9/91		

Steiner Environmental, Inc.

SAMPLE HANDLING/LOG-IN

Date 1-29, 30, 1991 Test Location SWEPI-COALINGA · HRSG-OUT

	Sample Type	Volume	Comments
1.	22262 11 (Meth) B/W (Sample) 1 (Test)		H_2S M-11
2.	22263 ASTM (Meth) N.G. (Sample) 1 (Test)		Fuel Gas Sample 101 A
3.	22265 GC (Meth) HC (Sample) 1 (Test)		HC SAMPLE 101 A-1
4.	22264 GC (Meth) HC (Sample) 2 (Test)		HC SAMPLE 101 A-2
5.	25864 5-8 (Meth) EPA (Sample) 11 (Test)		101-B TEST-1
6.	25863 5-8 (Meth) B/+W (Sample) 1 (Test)		101-B
7.	25862 5-8 (Meth) AMF (Sample) 1 (Test)		101-B
8.	25861 ASTM (Meth) F6 (Sample) 1 (Test)		101-B
9.	22268 5-8 (Meth) FHW (Sample) 1 (Test)		101-B
10.	22267 5-8 (Meth) M-F (Sample) 1 (Test)		101-B

CHAIN OF CUSTODY

Signature	Date/Time	Signature	Date/Time
S. Coghan	1-30-91		
W Schenker	1-31-91		
LM	2/9/91		

Steiner Environmental, Inc.

SAMPLE HANDLING/LOG-IN

Date 1-30 91 Test Location SWEPI COALINGA - HRSG OUT

	Sample Type	Volume	Comments
1.	23748 5/8 (Meth) FHW (Sample) ALL (Test)		BLANK
2.	23747 11 (Meth) BHW (Sample) ALL (Test)		BLANK
3.	23749 5/8 (Meth) MF (Sample) ALL (Test)		BLANK
4.	25846 11 (Meth) BHW (Sample) 2 (Test)		
5.			
6.			
7.			
8.			
9.			
10.			

CHAIN OF CUSTODY

Signature	Date/Time	Signature	Date/Time
S. Coghan	1-30-91		
W Bahnke	1-31-91		
DM	2/9/91		

PACIFIC GAS TECHNOLOGY

4200 Easton Drive - Suite 5
Bakersfield, California 93309
805/324-1317
Fax: 805/324-2746

RECEIVED
FEB 01 1991
Ans'd.....

STEINER ENVIRONMENTAL, INC.
4930 BOYLAN STREET
BAKERSFIELD, CA 93308

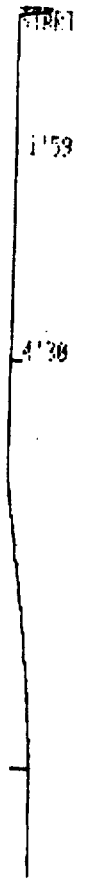
Attention: Mr. Jim Steiner

SAMPLED: 1-(29-30)-91
SUBMITTED: JANUARY 31, 1991
REPORTED: JANUARY 31, 1991
LAB # 3315

HYDROCARBONS ANALYSIS

SWEPI/COALINGA

COMPONENT : reported as ppm	1-29-91 22264 HC 101A TEST # 2	1-29-91 22265 HC 101A TEST # 1	1-30-91 22266 HC 101B TEST # 1	1-30-91 25857 HC 101B TEST # 2
METHANE (C1)	4	4	4	5
ETHANE (C2)	ND < 1	ND < 1	ND < 1	ND < 1
PROPANE (C3)	2	ND < 1	1	1
BUTANE (C4)	ND < 1	ND < 1	ND < 1	ND < 1
PENTANE (C5)	ND < 1	ND < 1	ND < 1	ND < 1
HEXANE+ (C6+)	ND < 1	ND < 1	ND < 1	ND < 1

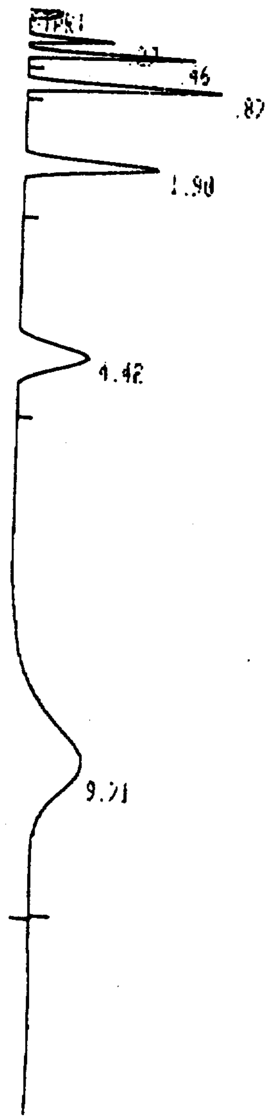


LAB BLANK
/

STOP

RUN # 54
NO RUN PEAKS STORED

15 ppm STANDARD



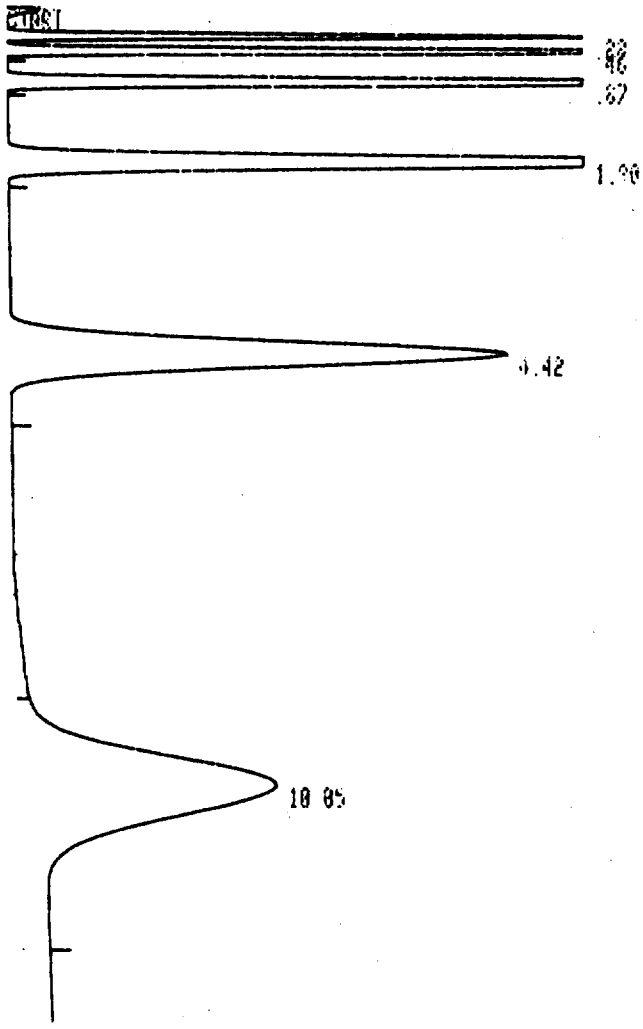
RUN # 55

AREA%

RT	AREA	TYPE	AR/HT	AREA%
0.27	5578	D BV	0.068	4.142
0.46	10569	D VB	0.068	7.848
0.87	15833	D PB	0.089	11.756
1.90	21127	BB	0.170	15.687
4.42	25809	BB	0.387	19.163
9.71	55764	PB	1.075	41.405

TOTAL AREA= 134680
MUL FACTOR= 1 [illegible]

100 ppm Standard



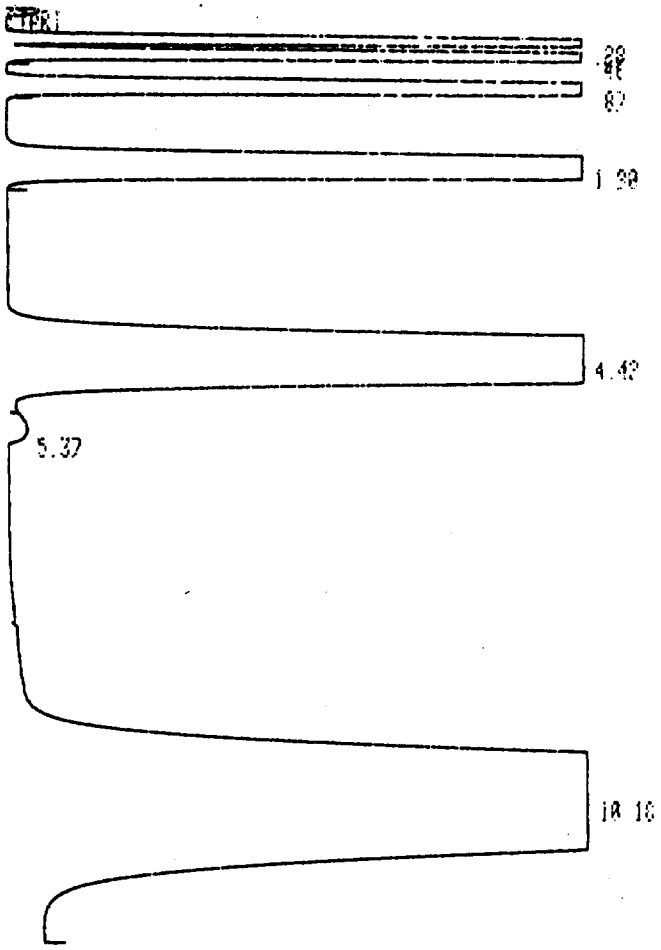
RUN # 57

AREA%

RT	AREA	TYPE	AR/HT	AREA%
0.23	35866	D PV	0.065	4.955
0.46	70718	D VB	0.068	9.769
0.87	105580	D PB	0.089	14.585
1.90	140410	PB	0.169	19.395
4.42	171660	PB	0.386	23.713
10.05	199680	BB	0.926	27.583

TOTAL AREA= 723910

1000 ppm STANDARD



STOP

RUN # 58

AREA%

RT	AREA	TYPE	AR/HT	AREA%
0.28	353340	D PV	0.065	4.803
0.46	689210	D VB	0.068	9.368
0.87	1003200	D PB	0.089	13.636
1.90	1399100	PB	0.163	19.017
4.42	1764900	BV	0.388	23.989
5.37	8707	VB	0.398	0.118
10.18	2138600	PB	0.927	29.069

TOTAL AREA= 7357100
MIN FACTOR= 1.000000E+00

BLANK

qaw
1000ppm
Standard

RUN # 59

YS 22264

SWEPT / COATING A
HC 101A
TEST 2

RUN # 65

AREA%

RT	AREA	TYPE	AR/HT	AREA%
0.26	1415	PV	0.186	44.246
0.64	1783	D VB	0.105	55.754

TOTAL AREA= 3198

#22246

SWEPI/Coalinga
101B
TEST #1

STOP

RUN # 67

AREA% RT	AREA	TYPE	AR/HT	AREA%
0.29	1494	PB	0.118	56.784
0.64	1137	D BB	0.085	43.216

TOTAL AREA= 2631

.ps 25857

SWEDI/CAMLINGA
101 B
TEST #2

RUN # 68

AREA% RT	AREA TYPE	AR/HT	AREA%
0.29	1985 D BV	0.090	57.007
0.64	1497 D VB	0.090	42.993

TOTAL AREA= 3482

PS 22265

SWEPI/Cooling A
101A
Test 1

STOP

RUN # 69

AREA%

RT	AREA	TYPE	AR/HT	AREA%
0.25	1600	PV	0.201	100.000

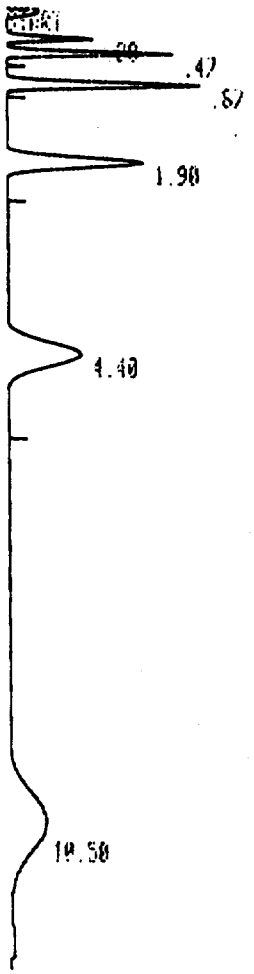
TOTAL AREA= 1600

Blank

STOP

RUN # 66

15 PPM STANDARD



STOP

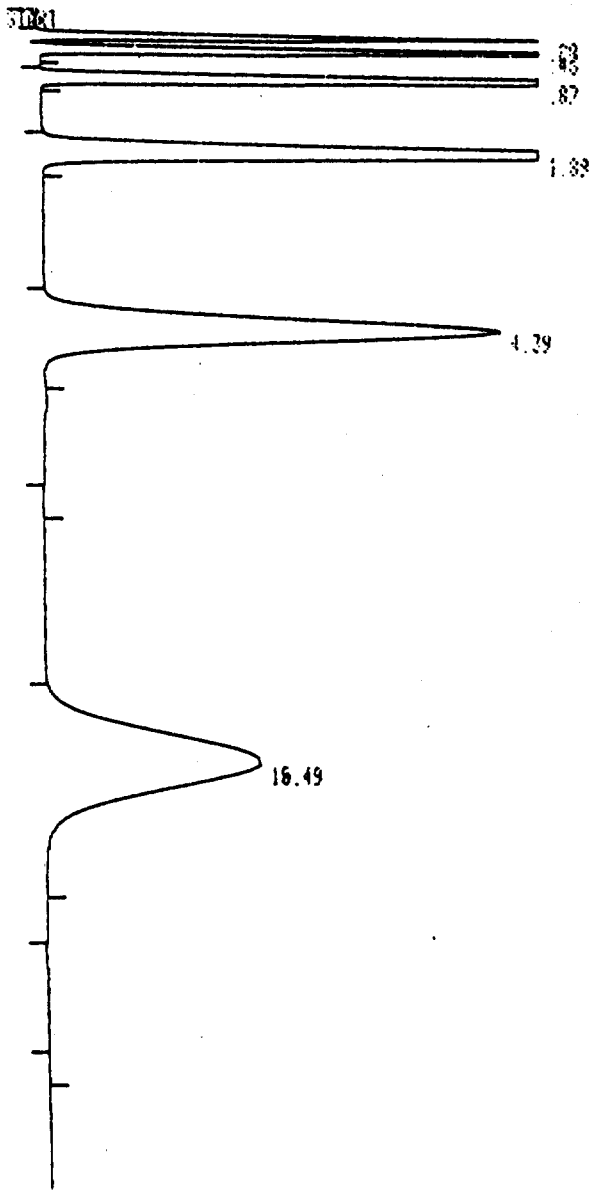
RUN # 76

AREA%

RT	AREA	TYPE	AR/HT	AREA%
0.28	5459	D BV	0.068	5.084
0.47	10222	D VB	0 063	9.520
0.87	15396	D PB	0.089	14.339
1.90	20643	BB	0.168	19.228
4.40	25467	PB	0.380	23.719
10.50	30181	PB	0.911	28.109

TOTAL AREA= 107370
MUL FACTOR= 1.0000E+00

100 ppm STANDARD

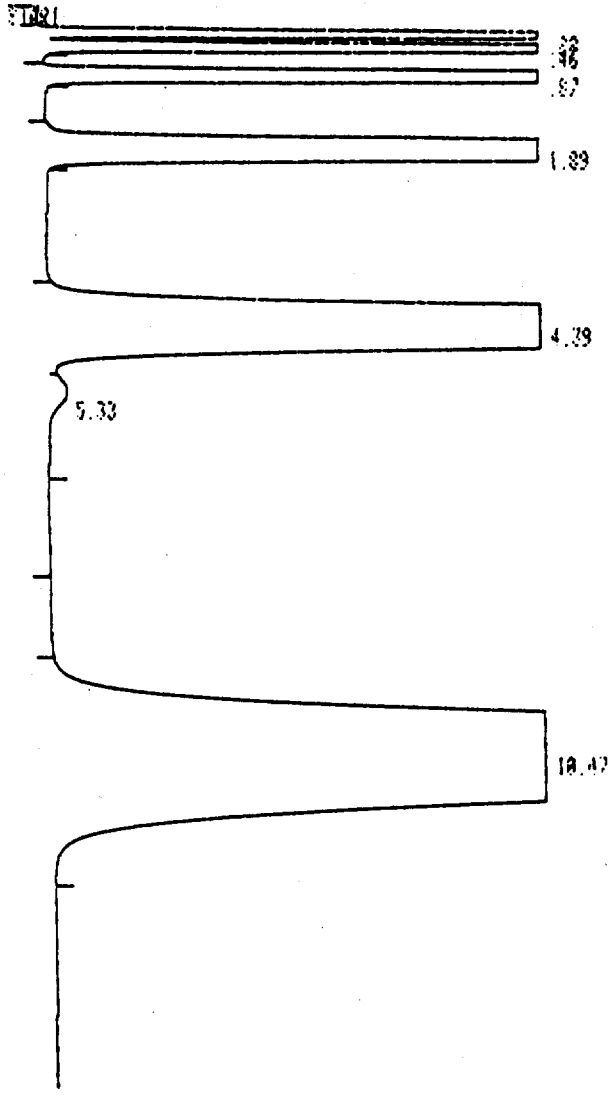


RUN # 77

AREA%

RT	AREA	TYPE	AR/HT	AREA%
0.28	34986	D BV	0.066	5.004
0.46	68648	D VB	0.069	9.819
0.87	103190	D PB	0.089	14.760
1.39	137510	BB	0.167	19.669
4.39	167410	PB	0.382	23.945
16.49	187390	BB	0.908	26.803

1000 ppm STANDARD



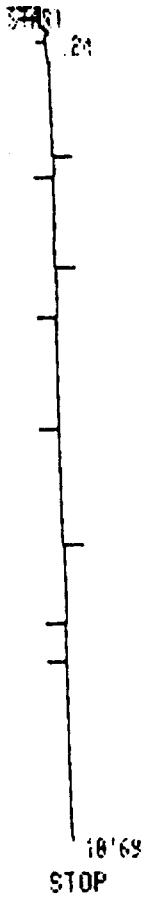
RUN # 78

AREA%

RT	AREA	TYPE	AR/HT	AREA%
0.28	346410	D PV	0.065	4.813
0.46	674970	D VB	0.068	9.377
0.87	989440	D PB	0.089	13.746
1.89	1373800	PB	0.167	19.086
4.39	1729900	BV	0.380	24.034
5.33	8731	VB	0.453	0.121
10.47	2074500	BB	0.897	28.822

TOTAL AREA= 7197800

BLANK



STOP

RUN # 29

AREA% RT	AREA	TYPE	AR/HT	AREA%
0.24	643	PV	0.096	100.000

TOTAL AREA= 643
MUL FACTOR= 1.0000E+00

Steiner Environmental, Inc.

ANALYTICAL REPORT

SAMPLE TYPE Front Half Wash DATE 2/9/91

SAMPLE COMPONENT Acetone ANALYST WH, MC, LEM

REQUESTED BY SWEPI Coalinga: HRSG Out 1/29-30/91

ANALYTICAL METHOD Gravimetric (gm)

Sample ID No.	Test No.	Sample Volume	Sample Aliquot	Titer mls or (absorbance)	Analytical Result (total sample)	
					Uncorrected	Corrected
22252	101-A1	150	150	N/A	0.01117	0.01056
22257	101-A2	125	125		0.00686	0.00635
22268	101-B1	134	134		0.00536	0.00481
25856	101-B2	142	142		0.00491	0.00433
23748	B1	100	100		0.00041	N/A

Forms: Analytic (Rev. 1/91)

Steiner Environmental, Inc.

ANALYTICAL REPORT

SAMPLE TYPE Filtecable Particulate DATE 2/9/91

SAMPLE COMPONENT 100 mm Filter ANALYST WH, MC, DM

REQUESTED BY SWEPI Cooling : HRSG Out 1/29-30/91

ANALYTICAL METHOD Gravimetric (gm)

Sample ID No.	Test No.	Sample Volume	Sample Aliquot	Titer mls or (absorbance)	Analytical Result (total sample)	
					Uncorrected	Corrected
22253	101-A1	N/A	N/A	N/A	-0.00017	-0.00007 *
22258	101-A2	↓	↓	↓	+0.00033	0.00043 *
22267	101-B1				-0.00123	-0.00113 *
22855	101-B2				+0.00223	0.00233 *
23749	Bl				-0.00010 *	N/A

Forms: Analytic (Rev. 1/91)

*All test filters had lots of loose pieces.

Steiner Environmental, Inc.

ANALYTICAL REPORT

SAMPLE TYPE Condensible Particulate — DATE 2/9/91

SAMPLE COMPONENT 80% IPA + Amf — ANALYST WH, MC, JM

REQUESTED BY SWEPI Coalinga: HRSG Out 1/29-30/91

ANALYTICAL METHOD Gravimetric (gm)

Sample ID No.	Test No.	Sample Volume	Sample Aliquot	Titer mls or (absorbance)	Analytical Result (total sample)	
					Uncorrected	Corrected
22255	101-A1	320	N/A	N/A	0.00506	0.00549
22260	101-A2	310			0.00486	0.00528
25864	101-B1	290			0.00497	0.00536
25860	101-B2	260			0.00865	0.00899
23751	IPA B1	100			−0.00015	N/A
	Amf B1	100			0.00077	0.00005
	Di B1	100			0.00072	N/A

Forms: Analytic (Rev. 1/91)

Steiner Environmental, Inc.

ANALYTICAL REPORT

SAMPLE TYPE Filterable SO_4 DATE 2/9/91

SAMPLE COMPONENT FH#1 + MF ANALYST MC, dm

REQUESTED BY SWEP1 Cooling: HRSGOut 1/29-30/91

ANALYTICAL METHOD $BaCl_2$ titration (mg H_2SO_4)

Sample ID No.	Test No.	Sample Volume	Sample Aliquot	Titer mls or (absorbance)	Analytical Result (total sample)	
					Uncorrected	Corrected
N/A	101-A1	100	10	0.15	N/A	0.41 (107.1% dup)
	101-A2			0.14		0.36 (99.6% rec)
	101-B1			0.17		0.50 (100.0% dup)
	101-B2			0.20		0.64 (99.5% rec)
	B1			0.06	0.27	N/A

$N_{H_2SO_4}$ = 0.0092936

EPA SO_2 QC
0982 6XXX =
20.95/20.98 = 99.9% conf.

Forms: Analytic (Rev. 1/91)

Steiner Environmental, Inc.

ANALYTICAL REPORT

SAMPLE TYPE Condensible SO_4 DATE 2/9/91

SAMPLE COMPONENT BtlW + Amf ANALYST mc, dm

REQUESTED BY SWEPI Coalinga: HRSG out 1/29-30/91

ANALYTICAL METHOD $BaCl_2$ titration (mg H_2SO_4)

Sample ID No.	Test No.	Sample Volume (ml)	Sample Aliquot (ml)	Titer mls or (absorbance)	Analytical Result (total sample)	
					Uncorrected	Corrected
22255	101-A1	100	10	0.06	N/A	-0.05 (83.3% dup)
22260	101-A2	↓	↓	0.18	↓	0.50 (99.5% dup)
25864	101-B1			0.11		0.18 (100.0% dup)
25860	101-B2			0.11		0.18 (99.6% dup)
23751	IPA Bl			0.07	0.32	N/A
N/A	Amf Bl			0.06	N/A	0.00
↓	DI H_2O Bl	↓	↓	0.06	0.27	N/A

$N_{H_2SO_4}$ = 0.0092936
EPA SO_2 QC 0882 6xxx:
20.95/20.98 = 99.9% conf.

Forms: Analytic (Rev. 1/91)

Steiner Environmental, Inc.

ANALYTICAL REPORT

SAMPLE TYPE SO_2 DATE 2/9/91

SAMPLE COMPONENT 3% H_2O_2 ANALYST MC, WM

REQUESTED BY SWEPI Cogen: HRSG Out 1/29-30/91

ANALYTICAL METHOD $BaCl_2$ titration (mg H_2SO_4)

Sample ID No.	Test No.	Sample Volume	Sample Aliquot	Titer mls or (absorbance)	Analytical Result (total sample)	
					Uncorrected	Corrected
22256	101-A1	400	10	0.06	N/A	1.09
22261	101-A2	375		0.07		1.19
25863	101-B1	370		0.07		1.17
25859	101-B2	390		0.06		1.06
23752	Bl	100		0.00	0.00	N/A

$N_{H_2SO_4} = 0.0092336$

EPA SO_2 QC
C882 6XXY :
20.95/20.98 = 99.9 % conf.

Forms: Analytic (Rev. 1/91)

Steiner Environmental, Inc.

ANALYTICAL REPORT

SAMPLE TYPE Method 11 H_2S DATE 2/1/91

SAMPLE COMPONENT Cadmium Sulfate Abs. Soln. ANALYST MC

REQUESTED BY SWEPI/Coalinga 1/29-30/91

ANALYTICAL METHOD Iodometric

Sample ID No.	Test No.	Sample Volume	ml I_2 Added	Titer mls	Sample Color	Normality of Iodine
22262	1	60	10	9.10	extremely pale yellow	$N_{I_2} = 0.008974 =$
25846	2	110	10	9.07	clear	$\frac{(0.01\,N\ Na_2S_2O_3)(22.435\,m\ell\ Na_2S_2O_3)}{(25\ m\ell)}$
23747	Bl	60	10	8.83	clear	

Forms: Analyt-6.frm (rev. 1/91)

SOURCE TEST CALCULATIONS

PLANT : SWEPI COALINGA
HRSG 101-A

RUN NO.: 1
DATE : JAN 29,1991

STANDARD TEMP.: 60 DEG. F

METER TEMP.	=	60 DEG. F	STATIC PRESS.	=	-0.11 in. H2O
STACK TEMP.	=	242.71 DEG. F	Cp	=	0.840
SQ.RT. dP	=	0.6324 in. H2O	STACK I.D.	=	inch
METER ORIFICE	=	2.44 in. H2O	DUCT LENGTH	=	47.5 inch
METER VOLUME	=	118.375 Cu.Ft.	DUCT WIDTH	=	47.5 inch
METER Y	=	1.0002	STACK AREA	=	15.668 Sq.Ft.
BAR. PRESSURE	=	28.81 in.Hg	TEST TIME	=	140.00 min.
COND.(Vlc)	=	216.7 ml	NOZZLE DIA.	=	0.3020 inch

GAS ANALYSIS = 14.90 % O2 0.00 % CO
3.49 % CO2 81.61 % N2

****

Vm(std) = [T(std) + 460 / 29.92] x Vm x Y x (Pb + (dH / 13.6)) / (Tm + 460)..... = 114.716 dscf

Vw(std) =(8.9148 x 10e-5) x (Tstd + 460) x Vic = 10.046 scf

Bws = Vw(std) / (Vm(std) + Vw(std))..... = 0.081 | Lower Bws value used.

Bws @ Saturated Conditions = Vapor Press. of H2O @ Dew Point Temp. / (Ps, in.Hg.) ..... = 1.000

%EA =(%O2 - 0.5%CO)/(0.264%N2 - (%O2-0.5%CO)) x 100 = 224.23

Md =(.44 x %CO2)+(.32 x %O2)+[.28 x (%N2 + %CO)] = 29.15

Ms = (Md x (1-Bws)) + (18.0 x Bws)..... = 28.26

P(stack) = Pbar + [Pstatic / 13.6] ..... = 28.80 in. Hg

vs = 85.49 x CP x (Sq.Rt.dP) x [Sq.Rt.(Ts + 460) / (Ms x Ps)] ..... = 42.20 ft/sec

Qs = vs x As x 60 ..... = 39,672 acf/min

Qs(std) = Qs x (1-Bws)x((Tstd + 460)/(Ts + 460)) x (Ps/29.92) ..... = 25,984 dscf/min

I = (Ts+460) x [(0.002669 x Vlc) + (Vm(std)/(Tstd + 460)/ 29.92] x 100 / (Time x Ps x An x vs x 60) = 99.33 %

SOURCE TEST CALCULATIONS

PLANT : SWEPI COALINGA
HRSG 101-A

RUN NO.: 2
DATE : JAN 29,1991

STANDARD TEMP.: 60 DEG. F

METER TEMP.	=	71.18 DEG. F	STATIC PRESS.	=	-0.16 in. H2O
STACK TEMP.	=	240.18 DEG. F	Cp	=	0.840
SQ.RT. dP	=	0.6232 in. H2O	STACK I.D.	=	inch
METER ORIFICE	=	2.43 in. H2O	DUCT LENGTH	=	47.5 inch
METER VOLUME	=	120.685 Cu.Ft.	DUCT WIDTH	=	47.5 inch
METER Y	=	1.0002	STACK AREA	=	15.668 Sq.Ft.
BAR. PRESSURE	=	28.91 in.Hg	TEST TIME	=	140.00 min.
COND.(Vlc)	=	210.6 ml	NOZZLE DIA.	=	0.3020 inch

GAS ANALYSIS : 15.04 % O2 0.00 % CO
3.48 % CO2 81.48 % N2

****

Vm(std) = [T(std) + 460 / 29.92] x Vm x Y x (Pb + (dH / 13.6)) / (Tm + 460)..... = 114.885 dscf

Vw(std) =(8.9148 x 10e-5) x (Tstd + 460) x Vic = 9.763 scf

Bws = Vw(std) / (Vm(std) + Vw(std))..... = 0.078 | Lower Bws value used.

Bws @ Saturated Conditions = Vapor Press. of H2O @ Dew Point Temp. / (Ps, in.Hg.) ..... = 1.000

%EA =(%O2 - 0.5%CO)/(0.264%N2 - (%O2-0.5%CO)) x 100 = 232.43

Md =(.44 x %CO2)+(.32 x %O2)+[.28 x (%N2 + %CO)] = 29.16

Ms = (Md x (1-Bws)) + (18.0 x Bws)..... = 28.28

P(stack) = Pbar + [Pstatic / 13.6] ..... = 28.90 in. Hg

vs = 85.49 x CP x (Sq.Rt.dP) x [Sq.Rt.(Ts + 460) / (Ms x Ps)] ..... = 41.42 ft/sec

Qs = vs x As x 60 ..... = 38,940 acf/min

Qs(std) = Qs x (1-Bws)x((Tstd + 460)/(Ts + 460)) x (Ps/29.92) ..... = 25,744 dscf/min

I = (Ts+460) x [(0.002669 x Vlc) + (Vm(std)/(Tstd + 460)/ 29.92] x 100 / (Time x Ps x An x vs x 60) = 100.41 %

SOURCE TEST CALCULATIONS

PLANT : SWEPI COALINGA
HRSG 101-B

RUN NO.: 1
DATE : JAN 30,1991

STANDARD TEMP.: 60 DEG. F

METER TEMP.	=	66.35 DEG. F	STATIC PRESS.	=	-0.20 in. H2O
STACK TEMP.	=	238.33 DEG. F	Cp	=	0.840
SQ.RT. dP	=	0.6267 in. H2O	STACK I.D.	=	inch
METER ORIFICE	=	2.44 in. H2O	DUCT LENGTH	=	47.5 inch
METER VOLUME	=	101.711 Cu.Ft.	DUCT WIDTH	=	47.5 inch
METER Y	=	1.0002	STACK AREA	=	15.668 Sq.Ft.
BAR. PRESSURE	=	28.92 in.Hg	TEST TIME	=	120.00 min.
COND.(Vlc)	=	180.0 ml	NOZZLE DIA.	=	0.3020 inch

GAS ANALYSIS	=	15.20 % O2	0.00 % CO	
		4.02 % CO2	80.78 % N2	

****

Vm(std) = [T(std) + 460 / 29.92] x Vm x Y x (Pb + (dH / 13.6)) / (Tm + 460)..... = 97.748 dscf

Vw(std) =(8.9148 x 10e-5) x (Tstd + 460) x Vic = 8.344 scf

Bws = Vw(std) / (Vm(std) + Vw(std))..... = 0.079 | Lower Bws value used.

Bws @ Saturated Conditions = Vapor Press. of H2O @ Dew Point Temp. / (Ps, in.Hg.) ..... = 1.000

%EA =(%O2 - 0.5%CO)/(0.264%N2 - (%O2-0.5%CO)) x 100 = 248.13

Md =(.44 x %CO2)+(.32 x %O2)+[.28 x (%N2 + %CO)] = 29.25

Ms = (Md x (1-Bws)) + (18.0 x Bws)..... = 28.37

P(stack) = Pbar + [Pstatic / 13.6] ..... = 28.91 in. Hg

vs = 85.49 x CP x (Sq.Rt.dP) x [Sq.Rt.(Ts + 460) / (Ms x Ps)] ..... = 41.53 ft/sec

Qs = vs x As x 60 ..... = 39,045 acf/min

Qs(std) = Qs x (1-Bws)x((Tstd + 460)/(Ts + 460)) x (Ps/29.92) ..... = 25,879 dscf/min

I = (Ts+460) x [(0.002669 x Vlc) + (Vm(std)/(Tstd + 460)/ 29.92] x 100 / (Time x Ps x An x vs x 60) = 99.15 %

SOURCE TEST CALCULATIONS

PLANT : SWEPI COALINGA
HRSG 101-B

RUN NO.: 2
DATE : JAN 30,1991

STANDARD TEMP.: 60 DEG. F

METER TEMP.	=	75.04 DEG. F	STATIC PRESS.	=	-0.21 in. H2O
STACK TEMP.	=	237.04 DEG. F	Cp	=	0.840
SQ.RT. dP	=	0.6299 in. H2O	STACK I.D.	=	inch
METER ORIFICE	=	2.51 in. H2O	DUCT LENGTH	=	47.5 inch
METER VOLUME	=	105.066 Cu.Ft.	DUCT WIDTH	=	47.5 inch
METER Y	=	1.0002	STACK AREA	=	15.668 Sq.Ft.
BAR. PRESSURE	=	29.00 in.Hg	TEST TIME	=	120.00 min.
COND.(Vlc)	=	194.5 ml	NOZZLE DIA.	=	0.3020 inch

GAS ANALYSIS : 14.95 % O2 0.00 % CO
3.42 % CO2 81.63 % N2

****

Vm(std) = [T(std) + 460 / 29.92] x Vm x Y x (Pb + (dH / 13.6)) / (Tm + 460)..... = 99.623 dscf

Vw(std) =(8.9148 x 10e-5) x (Tstd + 460) x Vic = 9.016 scf

Bws = Vw(std) / (Vm(std) + Vw(std))..... = 0.083 | Lower Bws value used.

Bws @ Saturated Conditions = Vapor Press. of H2O @ Dew Point Temp. / (Ps, in.Hg.) ..... = 1.000

%EA =(%O2 - 0.5%CO)/(0.264%N2 - (%O2-0.5%CO)) x 100 = 226.50

Md =(.44 x %CO2)+(.32 x %O2)+[.28 x (%N2 + %CO)] = 29.15

Ms = (Md x (1-Bws)) + (18.0 x Bws)..... = 28.22

P(stack) = Pbar + [Pstatic / 13.6] ..... = 28.98 in. Hg

vs = 85.49 x CP x (Sq.Rt.dP) x [Sq.Rt.(Ts + 460) / (Ms x Ps)] ..... = 41.76 ft/sec

Qs = vs x As x 60 ..... = 39,256 acf/min

Qs(std) = Qs x (1-Bws)x((Tstd + 460)/(Ts + 460)) x (Ps/29.92) ..... = 26,015 dscf/min

I = (Ts+460) x [(0.002669 x Vlc) + (Vm(std)/(Tstd + 460)/ 29.92] x 100 / (Time x Ps x An x vs x 60) = 100.52 %

EMISSION RATE CALCULATIONS

PLANT : SWEPI COALINGA
HRSG 101-A

RUN NO.: 1
DATE : JAN 29,1991
O2 CORR.: 15.0 %

STANDARD TEMP. : 60 DEG. F

Front Half Wash (FHW)	0.01056 grams	Vm(std)	114.716 ft3
Mass Filter (MF)	0.00000 grams	Vw(std)	10.046 ft3
Back Half Wash (BHW)	0.00549 grams	Qs(std)	25,984 dscfm
Front Half Sulfate (FHS)	0.41 mg H2SO4	Bws	0.081
Back Half Sulfate (BHS)	0.00 mg H2SO4	CO2	3.49 %
H2O2 Catch (SO2)	1.09 mg H2SO4	O2	14.90 %

F-FACTOR

10E6 x [3.64(%H) + 1.53(%C) + 0.57(%S) + 0.14(%N) - 0.46(%O2)] / (Btu/lb) x [(Tstd + 460)/528] ..... 8474.21 dscf/MMBtu

FILTERABLE PARTICULATE

15.432 x (FHW + MF) / [Vm(std) + Vw(std)]	0.0013 gr/scf
15.432 x (FHW + MF) / Vm(std)	0.0014 gr/dscf
gr/dscf x (12 / %CO2)	0.0049 @ 12% CO2
0.00857 x Qs(std) x gr/dscf	0.32 lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..	0.0060 lb/MMBtu

TOTAL PARTICULATE

15.432 x (FHW + MF + BHW) / [(Vm(std) + Vw(std)] ...	0.0020 gr/scf
15.432 x (FHW + MF + BHW) / (Vm(std)	0.0022 gr/dscf
gr/dscf x (12 / %CO2)	0.0074 @ 12% CO2
0.00857 x Qs(std) x gr/dscf	0.48 lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..	0.0091 lb/MMBtu

TOTAL SULFATE

0.015432 x (FHS + BHS) / [Vm(std) + Vw(std)]	0.0001 gr/scf
0.015432 x (FHS + BHS) / Vm(std)	0.0001 gr/dscf
gr/dscf x (12 / %CO2)	0.0002 @ 12% CO2
0.00857 x Qs(std) x gr/dscf	0.01 lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..	0.0002 lb/MMBtu

SULFUR DIOXIDE (SO2)

1.60982 x [T(std) + 460] x (mg H2SO4) / [98.076 x Vm(std)]	0.08 ppm
ppm x [(20.9 - Oxygen Corr.) / (20.9 - %O2)]	0.08 @ O2 corr.
ppm x (1 - Bws)	0.07 ppm (wet)
8.223E-5 x Qs(std) x 64.062 x ppm / [T(std) + 460]..	0.02 lb/hr
F-Factor x 64.062 x [1.3711E-6 / [T(std)+ 460]] x [20.9 / (20.9 - %O2)] x ppm	0.0004 lb/MMBtu
lb/hr / (dscfm x 60 min/hr)	1.37E-08 lb/dscf

SULFUR (S)

(lb/MMBtu SO2) / 2	0.0002 lb/MMBtu
(lb/MMBtu Total Sulfate) x (32 / 98.076)	0.0001 lb/MMBtu
Total Sulfur	0.0003 lb/MMBtu

EMISSION RATE CALCULATIONS

PLANT :SWEPI COALINGA
HRSG 101-A

RUN NO.: 2
DATE : JAN 29,1991
O2 CORR.: 15.0 %

STANDARD TEMP. : 60 DEG. F

Front Half Wash (FHW)	0.00635 grams	Vm(std)	114.885 ft3
Mass Filter (MF)	0.00043 grams	Vw(std)	9.763 ft3
Back Half Wash (BHW)	0.00528 grams	Qs(std)	25,744 dscfm
Front Half Sulfate (FHS)	0.36 mg H2SO4	Bws	0.078
Back Half Sulfate (BHS)	0.50 mg H2SO4	CO2	3.48 %
H2O2 Catch (SO2)	1.19 mg H2SO4	O2	15.04 %

F-FACTOR

10E6 x [3.64(%H) + 1.53(%C) + 0.57(%S) + 0.14(%N) - 0.46(%O2)] / (Btu/lb) x [(Tstd + 460)/528] ..... 8474.21 dscf/MMBtu

FILTERABLE PARTICULATE

15.432 x (FHW + MF) / [Vm(std) + Vw(std)]	0.0008 gr/scf
15.432 x (FHW + MF) / Vm(std)	0.0009 gr/dscf
gr/dscf x (12 / %CO2)	0.0031 @ 12% CO2
0.00857 x Qs(std) x gr/dscf	0.20 lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..	0.0039 lb/MMBtu

TOTAL PARTICULATE

15.432 x (FHW + MF + BHW) / [(Vm(std) + Vw(std)] ...	0.0015 gr/scf
15.432 x (FHW + MF + BHW) / (Vm(std)	0.0016 gr/dscf
gr/dscf x (12 / %CO2)	0.0056 @ 12% CO2
0.00857 x Qs(std) x gr/dscf	0.36 lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..	0.0070 lb/MMBtu

TOTAL SULFATE

0.015432 x (FHS + BHS) / [Vm(std) + Vw(std)]	0.0001 gr/scf
0.015432 x (FHS + BHS) / Vm(std)	0.0001 gr/dscf
gr/dscf x (12 / %CO2)	0.0004 @ 12% CO2
0.00857 x Qs(std) x gr/dscf	0.03 lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..	0.0005 lb/MMBtu

SULFUR DIOXIDE (SO2)

1.60982 x [T(std) + 460] x (mg H2SO4) / [98.076 x Vm(std)]	0.09 ppm
ppm x [(20.9 - Oxygen Corr.) / (20.9 - %O2)]	0.09 @ O2 corr.
ppm x (1 - Bws)	0.08 ppm (wet)
8.223E-5 x Qs(std) x 64.062 x ppm / [T(std) + 460]..	0.02 lb/hr
F-Factor x 64.062 x [1.3711E-6 / [T(std)+ 460]] x [20.9 / (20.9 - %O2)] x ppm	0.0005 lb/MMBtu
lb/hr / (dscfm x 60 min/hr) 1.49E-08	lb/dscf

SULFUR (S)

(lb/MMBtu SO2) / 2	0.0002 lb/MMBtu
(lb/MMBtu Total Sulfate) x (32 / 98.076)	0.0002 lb/MMBtu
Total Sulfur	0.0004 lb/MMBtu

EMISSION RATE CALCULATIONS

PLANT :SWEPI COALINGA
HRSG 101-B

RUN NO.: 1
DATE : JAN 30,1991
O2 CORR.: 15.0 %

STANDARD TEMP. : 60 DEG. F

Front Half Wash (FHW)	0.00481 grams	Vm(std)	97.748 ft3
Mass Filter (MF)	0.00000 grams	Vw(std)	8.344 ft3
Back Half Wash (BHW)	0.00536 grams	Qs(std)	25,879 dscfm
Front Half Sulfate (FHS)	0.50 mg H2SO4	Bws	0.079
Back Half Sulfate (BHS)	0.18 mg H2SO4	CO2	4.02 %
H2O2 Catch (SO2)	1.17 mg H2SO4	O2	15.20 %

F-FACTOR

10E6 x [3.64(%H) + 1.53(%C) + 0.57(%S) + 0.14(%N) - 0.46(%O2)] / (Btu/lb) x [(Tstd + 460)/528] ..... 8473.94 dscf/MMBtu

FILTERABLE PARTICULATE

15.432 x (FHW + MF) / [Vm(std) + Vw(std)]	0.0007 gr/scf
15.432 x (FHW + MF) / Vm(std)	0.0008 gr/dscf
gr/dscf x (12 / %CO2)	0.0023 @ 12% CO2
0.00857 x Qs(std) x gr/dscf	0.17 lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..	0.0034 lb/MMBtu

TOTAL PARTICULATE

15.432 x (FHW + MF + BHW) / [(Vm(std) + Vw(std)] ...	0.0015 gr/scf
15.432 x (FHW + MF + BHW) / (Vm(std)	0.0016 gr/dscf
gr/dscf x (12 / %CO2)	0.0048 @ 12% CO2
0.00857 x Qs(std) x gr/dscf	0.36 lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..	0.0071 lb/MMBtu

TOTAL SULFATE

0.015432 x (FHS + BHS) / [Vm(std) + Vw(std)]	0.0001 gr/scf
0.015432 x (FHS + BHS) / Vm(std)	0.0001 gr/dscf
gr/dscf x (12 / %CO2)	0.0003 @ 12% CO2
0.00857 x Qs(std) x gr/dscf	0.02 lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..	0.0005 lb/MMBtu

SULFUR DIOXIDE (SO2)

1.60982 x [T(std) + 460] x (mg H2SO4) / [98.076 x Vm(std)]	0.10 ppm
ppm x [(20.9 - Oxygen Corr.) / (20.9 - %O2)]	0.11 @ O2 corr.
ppm x (1 - Bws)	0.09 ppm (wet)
8.223E-5 x Qs(std) x 64.062 x ppm / [T(std) + 460]..	0.03 lb/hr
F-Factor x 64.062 x [1.3711E-6 / [T(std)+ 460]] x [20.9 / (20.9 - %O2)] x ppm	0.0005 lb/MMBtu
lb/hr / (dscfm x 60 min/hr) 1.72E-08	lb/dscf

SULFUR (S)

(lb/MMBtu SO2) / 2	0.0003 lb/MMBtu
(lb/MMBtu Total Sulfate) x (32 / 98.076)	0.0002 lb/MMBtu
Total Sulfur	0.0004 lb/MMBtu

EMISSION RATE CALCULATIONS

PLANT :SWEPI COALINGA
HRSG 101-B

RUN NO.: 2
DATE : JAN 30,1991
O2 CORR.: 15.0 %

STANDARD TEMP. : 60 DEG. F

Front Half Wash (FHW)	0.00433 grams	Vm(std)	99.623 ft3
Mass Filter (MF)	0.00233 grams	Vw(std)	9.016 ft3
Back Half Wash (BHW)	0.00899 grams	Qs(std)	26,015 dscfm
Front Half Sulfate (FHS)	0.64 mg H2SO4	Bws	0.083
Back Half Sulfate (BHS)	0.18 mg H2SO4	CO2	3.42 %
H2O2 Catch (SO2)	1.06 mg H2SO4	O2	14.95 %

F-FACTOR

10E6 x [3.64(%H) + 1.53(%C) + 0.57(%S) + 0.14(%N) - 0.46(%O2)] / (Btu/lb) x [(Tstd + 460)/528] ..... 8473.94 dscf/MMBtu

FILTERABLE PARTICULATE

15.432 x (FHW + MF) / [Vm(std) + Vw(std)]	0.0009 gr/scf
15.432 x (FHW + MF) / Vm(std)	0.0010 gr/dscf
gr/dscf x (12 / %CO2)	0.0036 @ 12% CO2
0.00857 x Qs(std) x gr/dscf	0.23 lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..	0.0044 lb/MMBtu

TOTAL PARTICULATE

15.432 x (FHW + MF + BHW) / [(Vm(std) + Vw(std)] ...	0.0022 gr/scf
15.432 x (FHW + MF + BHW) / (Vm(std)	0.0024 gr/dscf
gr/dscf x (12 / %CO2)	0.0085 @ 12% CO2
0.00857 x Qs(std) x gr/dscf	0.54 lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..	0.0103 lb/MMBtu

TOTAL SULFATE

0.015432 x (FHS + BHS) / [Vm(std) + Vw(std)]	0.0001 gr/scf
0.015432 x (FHS + BHS) / Vm(std)	0.0001 gr/dscf
gr/dscf x (12 / %CO2)	0.0004 @ 12% CO2
0.00857 x Qs(std) x gr/dscf	0.03 lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..	0.0005 lb/MMBtu

SULFUR DIOXIDE (SO2)

1.60982 x [T(std) + 460] x (mg H2SO4) / [98.076 x Vm(std)]	0.09 ppm
ppm x [(20.9 - Oxygen Corr.) / (20.9 - %O2)]	0.09 @ O2 corr.
ppm x (1 - Bws)	0.08 ppm (wet)
8.223E-5 x Qs(std) x 64.062 x ppm / [T(std) + 460]..	0.02 lb/hr
F-Factor x 64.062 x [1.3711E-6 / [T(std)+ 460]] x [20.9 / (20.9 - %O2)] x ppm	0.0005 lb/MMBtu
lb/hr / (dscfm x 60 min/hr) 1.53E-08	lb/dscf

SULFUR (S)

(lb/MMBtu SO2) / 2	0.0002 lb/MMBtu
(lb/MMBtu Total Sulfate) x (32 / 98.076)	0.0002 lb/MMBtu
Total Sulfur	0.0004 lb/MMBtu

EMISSION RATE CALCULATIONS

PLANT : SWEPI COALINGA
SOURCE : HRSG 101-A

Temp. Std. : 60 dF
Press. Std.: 29.92 in. Hg. 15 % O2 Correction

Run No.	1	2	AVERAGE
Date	1/29/91	1/29/91	
Oxygen (%)	14.90	15.04	14.97
Qs(std), dscfm	25,984	25,744	25,864
NOx, ppm	38.44	38.61	38.53
SO2, ppm			
CO, ppm	4.15	4.38	4.27
HC, ppm	1.00	2.00	1.50
F-Factor	8474.21	8474.21	8474.21
NOx, MW = 46.005			
NOx, lb/hr	7.27	7.23	7.25
NOx, ppm @ O2	37.80	38.87	38.34
NOx, lb/MMBtu	0.1376	0.1416	0.1396
SO2, MW = 64.058			
SO2, lb/hr			
SO2, ppm @ O2			
SO2, lb/MMBtu			
CO, MW = 28.010			
CO, lb/hr	0.48	0.50	0.49
CO, ppm @ O2	4.08	4.41	4.25
CO, lb/MMBtu	0.0090	0.0098	0.0094
HC, MW = 16.043			
HC, lb/hr	0.07	0.13	0.10
HC, ppm @ O2	0.98	2.01	1.50
HC, lb/MMBtu	0.0012	0.0026	0.0019

* lb/hr = 8.223E-5 x Qs(std) x MW x ppm / (Tstd + 460)

* ppm @ O2 = ppm measured x [(20.9 - O2% correction) / (20.9 - %O2 measured)]

* lb/MMBtu = F-Factor x MW x [1.3711E-6 / (Tstd + 460)] x [20.9 / (20.9 - O2%)] x ppm

* lb/Bbl = (lb/MMBtu) x (MMBtu/Bbl)

EMISSION RATE CALCULATIONS

PLANT : SWEPI COALINGA
SOURCE : HRSG 101-B

Temp. Std. : 60 dF
Press. Std.: 29.92 in. Hg. 15 % O2 Correction

Run No.	1	2	AVERAGE
Date	1/30/91	1/30/91	
Oxygen (%)	15.20	14.95	15.08
Qs(std), dscfm	25,879	26,015	25,947
NOx, ppm	36.80	38.27	37.54
SO2, ppm			
CO, ppm	3.94	11.62	7.78
HC, ppm	1.00	1.00	1.00
F-Factor	8473.94	8473.94	8473.94
NOx, MW = 46.005			
NOx, lb/hr	6.93	7.24	7.09
NOx, ppm @ O2	38.09	37.95	38.02
NOx, lb/MMBtu	0.1387	0.1382	0.1384
SO2, MW = 64.058			
SO2, lb/hr			
SO2, ppm @ O2			
SO2, lb/MMBtu			
CO, MW = 28.010			
CO, lb/hr	0.45	1.34	0.90
CO, ppm @ O2	4.08	11.52	7.80
CO, lb/MMBtu	0.0090	0.0255	0.0173
HC, MW = 16.043			
HC, lb/hr	0.07	0.07	0.07
HC, ppm @ O2	1.04	0.99	1.01
HC, lb/MMBtu	0.0013	0.0013	0.0013

* lb/hr = 8.223E-5 x Qs(std) x MW x ppm / (Tstd + 460)

* ppm @ O2 = ppm measured x [(20.9 - O2% correction) / (20.9 - %O2 measured)]

* lb/MMBtu = F-Factor x MW x [1.3711E-6 / (Tstd + 460)] x [20.9 / (20.9 - O2%)] x ppm

* lb/Bbl = (lb/MMBtu) x (MMBtu/Bbl)

Pape & Steiner Environmental Services

Location 101A

Run 1

H_2S CALCULATIONS AT S_t
(Standard Temperature to be Defined)

$$V_{m,std} = \frac{S_t}{29.92}(\gamma)(Vm)\left(\frac{P_b + \frac{\Delta H}{13.6}}{T_m + 460}\right)$$

Blank $CdSO_4$ = $[N_{I_2}(\text{mls } I_2) - N_{Na_2S_2O_3}(\text{mls } Na_2S_2O_3)][\text{Aliquot Factor}]$

$$\text{ppm } H_2S = \frac{0.8039(S_t + 460)\left(\left\{[N_{I_2}(\text{mls } I_2) - (N_{Na_2S_2O_3})(\text{mls } Na_2S_2O_3)]\text{Volume Factor}\right\} - \text{Blank}\right)}{V_{m,std}}$$

$$V_{m,std} = \frac{(60 + 460)}{29.92}(0.9875)(49.542)\left(\frac{28.81 + \frac{0}{13.6}}{45.50 + 460}\right)$$

$$= 48.459$$

Blank $CdSO_4$ = $[0.008914(10.0) - 0.0100(8.83)]\left[\frac{1}{1}\right]$

$$= 0.0014$$

$$\text{ppm } H_2S = \frac{0.8039(60 + 460)\left(\left\{[0.008914(10.0) - 0.0100(9.10)]\frac{1}{1}\right\} - 0.0014\right)}{48.459}$$

$$= 0.00$$

H_2S CALCULATIONS AT S_t 101 B

(Standard Temperature to be defined)

$$V_{m,std} = \frac{S_t}{29.92}(\gamma)(Vm)\left(\frac{P_b + \frac{\Delta H}{13.6}}{T_m + 460}\right)$$

$$\text{Blank } CdSO_4 = [N_{I_2}(\text{mls } I_2) - N_{Na_2S_2O_3}(\text{mls } Na_2S_2O_3)]$$

$$\text{ppm } H_2S = \frac{0.8039(St + 460)\left([N_{I_2}(\text{mls } I_2) - (N_{Na_2S_2O_3})(\text{mls } Na_2S_2O_3)] - \text{Blank}\right)}{V_{m,std}}$$

$$V_{m,std} = \frac{(60 + 460)}{29.92}\ (0.9875)(21.004)\left(\frac{28.92 + \frac{0}{13.6}}{65.16 + 460}\right)$$

$$= 19.851$$

$$\text{Blank } CdSO_4 = [0.008974\ (10.0) - 0.0100\ (8.83)]$$

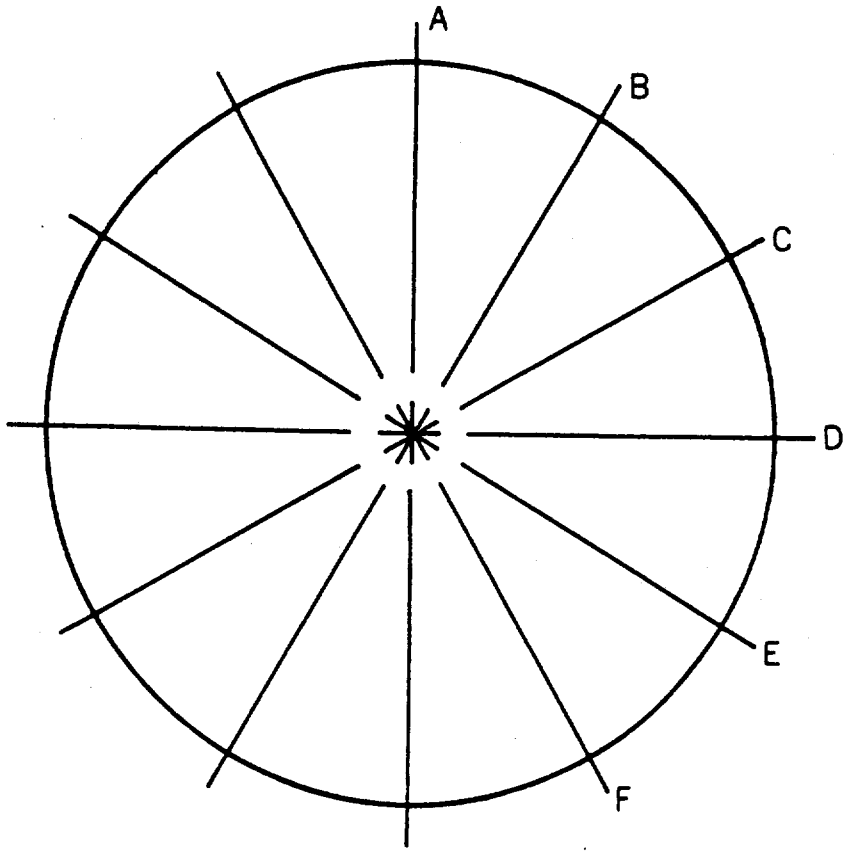
$$= 0.0014$$

$$\text{ppm } H_2S = \frac{0.8039(60 + 460)\left([0.008974\ (10.0) - 0.010\ (9.07)] - 0.0014\right)}{19.851}$$

$$= 0.00$$

Pape & Steiner Environmental Services

NOZZLE CALIBRATION DATA



DIAMETER (in.)

A 0.3015

B 0.3000

C 0.3041

D 0.3025

E _____

F _____

AVG. 0.3020

DATE 7-27-89

NOZZLE NO. 270

OPERATOR SM

DRY GAS METER / ORIFICE METER CALIBRATION DATA

Date 1/25/91
Bar. Press, in.Hg 29.82
Meter Box No. ... 779

Dry Gas Meter No. ... 68190
Standard Test Meter # 69279
Operator ..... JP

STANDARD TEST METER			DRY TEST METER				
Press. dHs (in. H2O)	Temp. Ts (dF)	Volume Vs (ft3)	Press. dH (in. H2O)	Temp. Tdi (dF)	Temp. Tdo (dF)	Volume Vd (ft3)	Time t (min)
	65.0	248.576		87	76	921.910	
-1.7	64.0	226.813	0.5	77	73	899.608	57.0
Avg/Net :	64.5	21.763			78	22.302	
	62.0	270.299		84	72	944.224	
-2.7	64.0	249.073	1.0	77	72	922.444	40.0
Avg/Net :	63.0	21.226			76	21.780	
	62.0	293.037		85	73	967.238	
-3.7	62.0	270.691	1.5	79	73	944.616	34.0
Avg/Net :	62.0	22.346			78	22.622	
	62.0	317.148		90	74	991.599	
-4.6	62.0	293.522	2.0	84	76	967.732	31.0
Avg/Net :	62.0	23.626			81	23.867	
	62.0	341.810		83	74	1016.415	
-6.2	63.0	317.845	3.0	84	74	992.297	26.0
Avg/Net :	62.5	23.965			79	24.118	

$Y = Vs \times (Pbar + (dHs / 13.6)) \times (Avg.\ Td + 460) / [\ Vd \times (Pbar + (dH / 13.6)) \times (\ Ts + 460)]$

$Ko = [(Vs/t) \times [(Tdo + 460) / (Ts + 460)] \times [(Pbar + (dHs/13.6) / (Pbar + (dH/13.6)] / [((Tdo + 460) \times dH) / (Pbar + (dH/13.6)) \times (Mm)]^{0.5}$

dH :	0.5	1.0	1.5	2.0	3.0	Avg.	Std.Dev.
Y :	0.9960	0.9902	1.0041	1.0093	1.0015	1.0002	0.0066
Ko :	1	0.6823	0.6898	0.6921	0.6786	0.6878	0.0064

Y : 0.66 % Relative Std. Dev.

Ko : 0.93 % Relative Std. Dev.

DRY GAS METER / ORIFICE METER CALIBRATION DATA

Date 8/17/90
Bar. Press, in.Hg 29.68
Meter Box No. ...PORTABLE

Dry Gas Meter No. ... 6825354
Standard Test Meter # 69279
Operator ..... TD

STANDARD TEST METER			DRY TEST METER				
Press. dHs (in. H2O)	Temp. Ts (dF)	Volume Vs (ft3)	Press. dH (in. H2O)	Temp. Tdi (dF)	Temp. Tdo (dF)	Volume Vd (ft3)	Time t (min)
	0.0	0.000		0	0	0.000	
0.0	0.0	0.000	0.5	0	0	0.000	0.0
Avg/Net :	0.0	0.000			0	0.000	
	0.0	0.000		0	0	0.000	
0.0	0.0	0.000	1.0	0	0	0.000	0.0
Avg/Net :	0.0	0.000			0	0.000	
	66.0	358.901		84	76	415.874	
-3.4	66.0	330.682	1.5	68	68	387.215	51.0
Avg/Net :	66.0	28.219			74	28.659	
	0.0	0.000		0	0	0.000	
0.0	0.0	0.000	2.0	0	0	0.000	0.0
Avg/Net :	0.0	0.000			0	0.000	
	0.0	0.000		0	0	0.000	
0.0	0.0	0.000	3.0	0	0	0.000	0.0
Avg/Net :	0.0	0.000			0	0.000	

$$y = Vs \times (Pbar + (dHs / 13.6)) \times (Avg.\ Td + 460) / [\ Vd \times (Pbar + (dH / 13.6)) \times (\ Ts + 460)]$$

$$Ko = [(Vs/t) \times [(Tdo + 460) / (Ts + 460)] \times [(Pbar + (dHs/13.6) / (Pbar + (dH/13.6)] / [((Tdo + 460) \times dH) / (Pbar + (dH/13.6)) \times (Mm)]^{0.5}$$

dH :	0.5	1.0	1.5	2.0	3.0	Avg.	Std.Dev.
y :			0.9875			0.9875	0.3950
Ko :			0.5748			0.5748	0.2299

y : 40.00 % Relative Std. Dev.

Ko : 40.00 % Relative Std. Dev.

Scott Specialty Gases a division of
Scott Environmental Technology Inc. 2600 CAJON BLVD., SAN BERNARDINO, CA 92405
TELEX: 510-100-8831 (ScotGas)
FAX: 714-887-0549
PHONE: 714-887-2571

Date: 6/7/90
Our Project No.: 7053
Your P.O. No.: SP2546-90 REL# 16

PAPE & STEINER
5801 NORRIS ROAD
BAKERSFIELD, CA 93308
ATTEN: SUE POWERS

Gentlemen:

Thank you for choosing Scott for your Specialty Gas needs. The analyses for the gases ordered, as reported by our laboratory, are listed below. Results are in volume percent, unless otherwise indicated.

ANALYTICAL REPORT

CGA 590
Cyl. No. ALM-6096 Analytical Accuracy ±1%

Component	Concentration
CARBON DIOXIDE	8.020%
TRACEABLE TO CRM2636 CARBON MONOXIDE	201.2 ppm
OXYGEN	14.97%
NITROGEN	BALANCE

*GRAVIMETRIC MASTER GAS

Cyl. No. _____ Analytical Accuracy _____

Component	Concentration

Cyl. No. _____ Analytical Accuracy _____

Component	Concentration

Cyl. No. _____ Analytical Accuracy _____

Component	Concentration

Analyst _____

Approved By _____

* CERTIFIED TO HAVE BEEN BLENDED AGAINST NIST CERTIFIED WEIGHTS AND VERIFIED TO BE CORRECT BY INDEPENDENT ANALYSIS.

SCOTT-MARRIN, INC.
2001 THIRD ST. • UNIT H • RIVERSIDE, CA 92507
TELEPHONE (714) 784-1240

REPORT OF ANALYSIS
NIST TRACEABLE GAS MIXTURES

PAPE01

TO:
SUE POWERS
PAPE & STEINER
5801 NORRIS RD.
BAKERSFIELD, CA 93308

DATE: 11/19/90

CUSTOMER ORDER NUMBER: SP2750-90 REL-6

CYLINDER NUMBER	COMPONENT	CONCENTRATION(v/v)	NIST TRACEABLE REFERENCE STANDARD
CC68761	Carbon Monoxide	76.4 ± 0.8 ppm	SRM 1679c
	Carbon Dioxide	15.39 ± 0.15 %	SRM 1675b
	Oxygen	7.17 ± 0.07 %	SRM 2658a
	Nitrogen	Balance	
CC68762	Carbon Monoxide	76.0 ± 0.8 ppm	SRM 1679c
	Carbon Dioxide	15.49 ± 0.15 %	SRM 1675b
	Oxygen	7.32 ± 0.07 %	SRM 2658a
	Nitrogen	Balance	

ppm = umole/mole % = mole-%

The above analyses are traceable to the National Institute of Standards and Technology by intercomparison with the reference standards listed above.
Where indicated, volumetric and gravimetric reference standards are traceable thru use of our analytical balance. NIST Report No. MMAP 232.09/202491.

Analyst: M.S. Calhoun

Approved: J.T.Marrin

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

SCOTT-MARRIN, INC.
2001 THIRD ST. • UNIT H • RIVERSIDE, CA 92507
TELEPHONE (714) 784-1240

REPORT OF ANALYSIS
NIST TRACEABLE GAS MIXTURES

PAPE01

TO:
SUE POWERS
PAPE & STEINER ENVIRONMENTAL
5801 NORRIS RD.
BAKERSFIELD, CA 93308

DATE: 11/19/90

CUSTOMER ORDER NUMBER: SP2750-90 REL-8

CYLINDER NUMBER	COMPONENT	CONCENTRATION(v/v)	NIST TRACEABLE REFERENCE STANDARD
CC65300	Carbon Monoxide	15.75 ± 0.16 ppm	SRM 2613a
	Carbon Dioxide	4.92 ± 0.05 %	SRM 1674b
	Oxygen	14.58 ± 0.15 %	SRM 2659
	Nitrogen	Balance	
CC60307	Carbon Monoxide	77.3 ± 0.8 ppm	SRM 1679c
	Carbon Dioxide	15.53 ± 0.16 %	SRM 1675b
	Oxygen	7.36 ± 0.07 %	SRM 2658a
	Nitrogen	Balance	
CC12485	Carbon Monoxide	79.3 ± 0.8 ppm	SRM 1679c
	Carbon Dioxide	7.80 ± 0.08 %	SRM 1674b
	Oxygen	3.97 ± 0.04 %	SRM 2658a
	Nitrogen	Balance	

ppm = umole/mole % = mole-%

The above analyses are traceable to the National Institute of Standards and Technology by intercomparison with the reference standards listed above.
Where indicated, volumetric and gravimetric reference standards are traceable thru use of our analytical balance. NIST Report No. MMAP 232.09/202491.

Analyst: M.S. Calhoun

Approved: J.T.Marrin

SCOTT - MARRIN, INC. 2001 THIRD ST., UNIT H RIVERSIDE, CALIFORNIA 92507

REPORT OF ANALYSIS

CUSTOMER ORDER NUMBER: B1-SP2750-90 Rel. 11

CYLINDER NUMBER CC7207

COMPONENT	CONCENTRATION (v/v)
Nitric Oxide	50.9 ± 0.5 ppm
Nitrogen Dioxide	<0.3 ppm
Nitrogen*	Balance

Cylinder Pressure: 2000 psig

*Oxygen-free.

Replicate	12/10/90	12/17/90
Analysis	50.8 ppm	51.1 ppm
Data On	50.7 ppm	51.1 ppm
NO: Mean	50.7 ppm	51.1 ppm

Expiration Date NO: 6/17/92

(The Nitric Oxide analysis was performed in accordance with Section 3.0.4 of the revised EPA) (aceability protocol No. 1 dated June 9, 1987. The analysis is traceable to the National) (nstitute of Standards & Technology by direct intercomparison with GMIS, cylinder number) (CC88855 at 50 ppm Nitric Oxide in Oxygen-free Nitrogen. The analysis was performed using a) (Monitor Labs Model 8440, S/N 136 analyzer with continuous chemiluminescence detection. The) (last multipoint calibration was performed 10/23/90.)

CYLINDER NUMBER CC12840

COMPONENT	CONCENTRATION (v/v)
Nitric Oxide	40.5 ± 0.4 ppm
Nitrogen Dioxide	<0.2 ppm
Nitrogen*	Balance

Cylinder Pressure: 2000 psig

*Oxygen-free.

Replicate	12/10/90	12/17/90
Analysis	40.5 ppm	40.5 ppm
Data On	40.7 ppm	40.4 ppm
NO: Mean	40.6 ppm	40.4 ppm

Expiration Date NO: 6/17/92

(The Nitric Oxide analysis was performed in accordance with Section 3.0.4 of the revised EPA) (aceability protocol No. 1 dated June 9, 1987. The analysis is traceable to the National) (nstitute of Standards & Technology by direct intercomparison with GMIS, cylinder number) (CC88855 at 50 ppm Nitric Oxide in Oxygen-free Nitrogen. The analysis was performed using a) (Monitor Labs Model 8440, S/N 136 analyzer with continuous chemiluminescence detection. The) (last multipoint calibration was performed 10/23/90.)

SCOTT-MARRIN, INC.
2001 THIRD ST. • UNIT H • RIVERSIDE, CA 92507
TELEPHONE (714) 784-1240

REPORT OF ANALYSIS
EPA PROTOCOL GAS MIXTURES

PAPE01

TO:
SUE POWERS
STEINER ENVIRONMENTAL, INC.
4930 BOYLAN ST.
BAKERSFIELD, CA 93308

DATE : 12/10/90

CUSTOMER ORDER NUMBER: SP2750-90REL.14

COMPONENT	CONCENTRATION(v/v)	REFERENCE STANDARD	ANALYZER MAKE,MODEL,S/N,DETECTION	EXPIRATION DATE	REPLICATE ANALYSIS DATA	
CYLINDER NO.: CC94437						
			Monitor Labs Model 8440		11/21/90	12/04/90
Nitric Oxide	81.5 ± 0.8 ppm	GMIS	S/N 136	06/04/92	81.2 ppm	81.7 ppm
		Cylinder #	Continuous		81.6 ppm	81.6 ppm
Nitrogen,O2-Free Balance		CC12643	Chemiluminescence		81.2 ppm	81.7 ppm
Cylinder Pressure: 2000 psig		@ 99.3 ppm	Last Cal Date: 10/23/90		Mean: 81.3 ppm	81.7 ppm
CYLINDER NO.: CC94427						
			Monitor Labs Model 8440		11/21/90	12/04/90
Nitric Oxide	50.5 ± 0.5 ppm	GMIS	S/N 136	06/04/92	50.4 ppm	50.6 ppm
		Cylinder #	Continuous		50.5 ppm	50.3 ppm
Nitrogen,O2-Free Balance		CC88855	Chemiluminescence		50.5 ppm	50.5 ppm
Cylinder Pressure: 2000 psig		@ 50.0 ppm	Last Cal Date: 10/23/90		Mean: 50.5 ppm	50.5 ppm

CC94437 NO_x = 81.5 ppm
NO_2 < 0.4 ppm
CC94427 NO_x = 50.5 ppm
NO_2 < 0.3 ppm

ppm = umole/mole % = mole-%

The above analyses were performed in accordance with EPA-1987 Traceability Protocol # 1, Section 3.0.4, Procedure G1.

Analyst: M.S. Calhoun

Approved: J.T.Marrin

Scott Specialty Gases a division of
Scott Environmental Technology Inc. 2600 CAJON BLVD., SAN BERNARDINO, CA 92405
TELEX: 510-100-8831 (ScotGas)
FAX: 714-887-0549
PHONE: 714-887-2571

PAPE & STEINER
5801 NORRIS ROAD
BAKERSFIELD, CA 93308

Date: 4/23/90
Our Project No.: 6264
Your P.O. No.: SP2546-90 REL 12

Gentlemen:

Thank you for choosing Scott for your Specialty Gas needs. The analyses for the gases ordered, as reported by our laboratory, are listed below. Results are in volume percent, unless otherwise indicated.

ANALYTICAL REPORT

CGA 660
Cyl. No. AAL-2062 Analytical Accuracy ±1%/±5%

Component	Concentration
NITRIC OXIDE	37.91 ppm
NOX	54.91 ppm
NITROGEN DIOXIDE	17 ppm
NITROGEN	BALANCE
NO2=±5%	

Cyl. No. _____ Analytical Accuracy _____

Component	Concentration

Cyl. No. _____ Analytical Accuracy _____

Component	Concentration

Cyl. No. _____ Analytical Accuracy _____

Component	Concentration

Analyst _____

Approved By _____

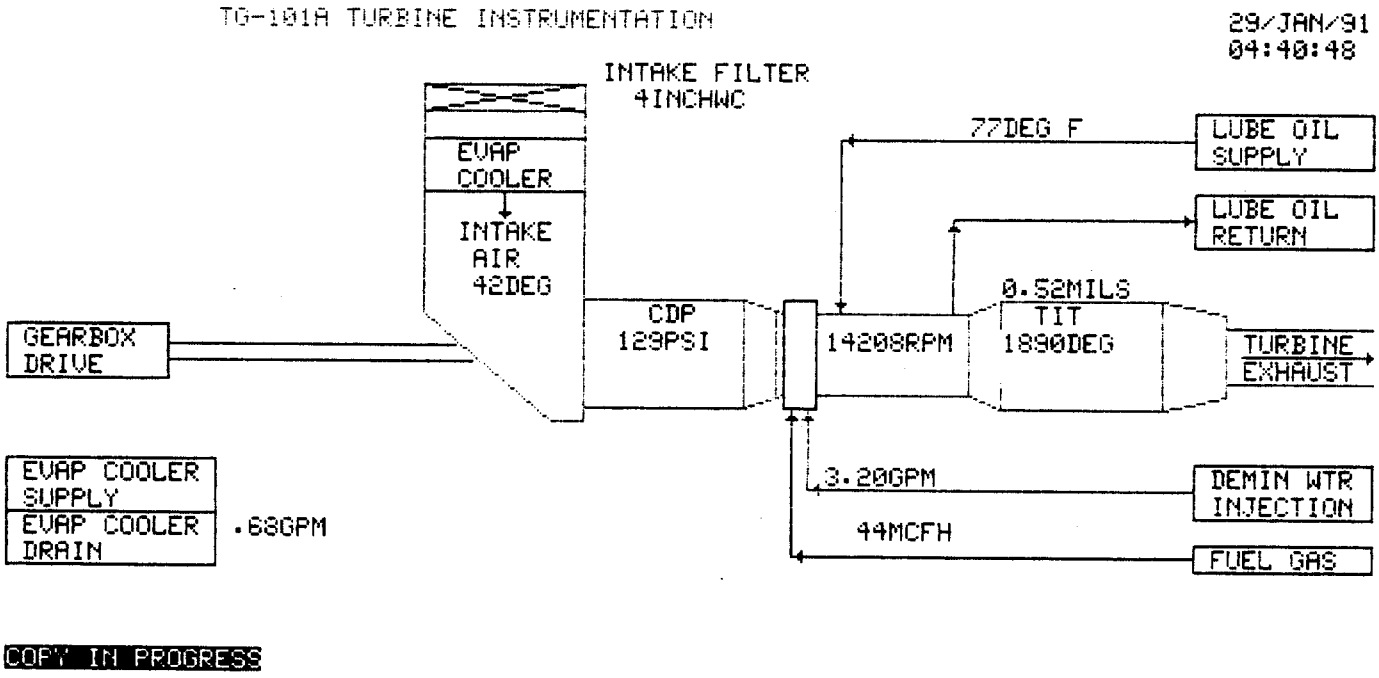
The only liability of this Company for gas which fails to comply with this analysis shall be replacement thereof by the Company without extra cost.

APPENDIX B

SWEPI COALINGA COGEN OPERATING DATA

DIAGRAM NUMBER: 2005 VERSION: 0

DATE: 01/29/91 TIME: 04:40:49



COPY IN PROGRESS

DIAGRAM NUMBER: 3050 VERSION: 0

DATE: 01/29/91 TIME: 04:41:06

29/JAN/91 GAS TOTALIZERS 04:41:01

FUEL GAS 207.8707 MCF	24 HR RUNNING	
FUEL GAS 1082.649 MCF	24 HR PREVIOUS	
FUEL GAS 1270.526 MCF	7 DAY RUNNING	
FUEL GAS 7592.704 MCF	7 DAY PREVIOUS	
FUEL GAS 21850.96 MCF	MONTH RUNNING	
FUEL GAS 32978.96 MCF	MONTH PREVIOUS	

FUEL GAS 214.2018 MCF	24 HR RUNNING	
FUEL GAS 1090.296 MCF	24 HR PREVIOUS	
FUEL GAS 1304.507 MCF	7 DAY RUNNING	
FUEL GAS 7557.798 MCF	7 DAY PREVIOUS	
FUEL GAS 28524.13 MCF	MONTH RUNNING	
FUEL GAS 32560.51 MCF	MONTH PREVIOUS	

0.77 RATIO

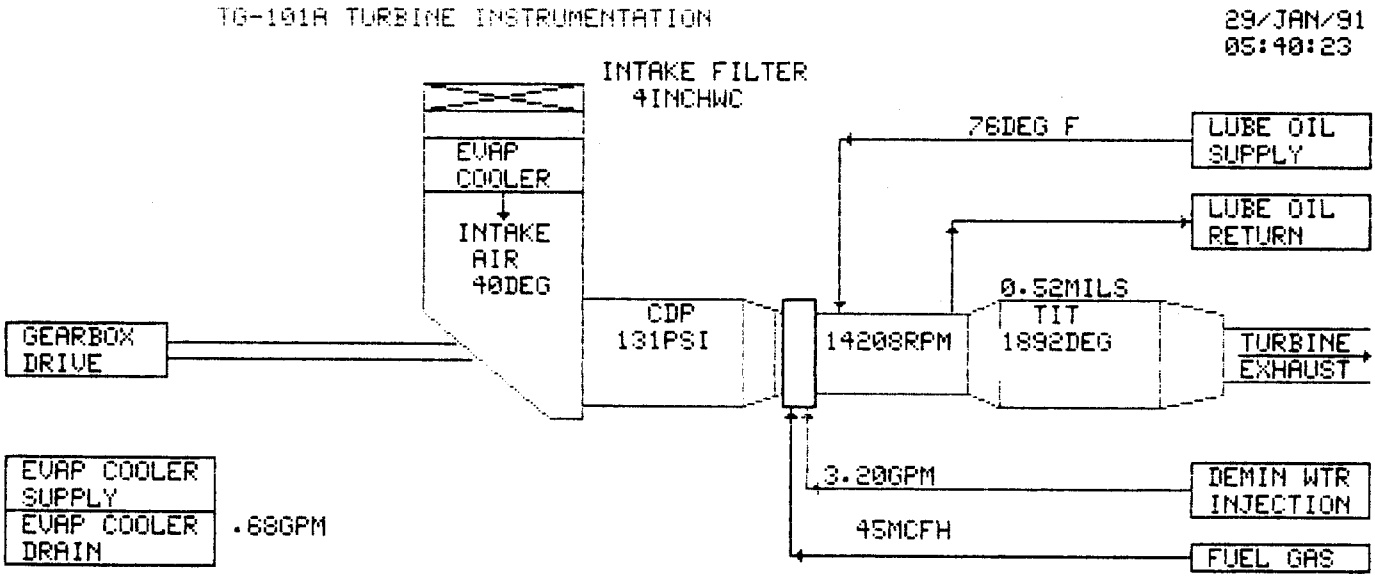
FUEL GAS 425.5081 MCF	24 HR RUNNING	
FUEL GAS 2164.165 MCF	24 HR PREVIOUS	
FUEL GAS 2589.799 MCF	7 DAY RUNNING	
FUEL GAS 15217.91 MCF	7 DAY PREVIOUS	
FUEL GAS 50722.02 MCF	MONTH RUNNING	
FUEL GAS 65984.48 MCF	MONTH PREVIOUS	

0.75 RATIO

COPY IN PROGRESS

DIAGRAM NUMBER: 2005 VERSION: 0

DATE: 01/29/91 TIME: 05:40:27



COPY IN PROGRESS

DIAGRAM NUMBER: 3050 VERSION: 0

DATE: 01/29/91 TIME: 05:40:03

29/JAN/91 GAS TOTALIZERS 05:40:01

FUEL GAS 251.7789 MCF	24 HR RUNNING	
FUEL GAS 1062.649 MCF	24 HR PREVIOUS	
FUEL GAS 1314.438 MCF	7 DAY RUNNING	
FUEL GAS 7582.704 MCF	7 DAY PREVIOUS	
FUEL GAS 21892.45 MCF	MONTH RUNNING	
FUEL GAS 32978.96 MCF	MONTH PREVIOUS	

FUEL GAS 253.2281 MCF	24 HR RUNNING	
FUEL GAS 1090.296 MCF	24 HR PREVIOUS	
FUEL GAS 1349.534 MCF	7 DAY RUNNING	
FUEL GAS 7557.798 MCF	7 DAY PREVIOUS	
FUEL GAS 28569.95 MCF	MONTH RUNNING	
FUEL GAS 32560.51 MCF	MONTH PREVIOUS	

0.77 RATIO

FUEL GAS 515.2272 MCF	24 HR RUNNING	
FUEL GAS 2164.165 MCF	24 HR PREVIOUS	
FUEL GAS 2679.632 MCF	7 DAY RUNNING	
FUEL GAS 15217.91 MCF	7 DAY PREVIOUS	
FUEL GAS 50807.43 MCF	MONTH RUNNING	
FUEL GAS 65984.48 MCF	MONTH PREVIOUS	

0.75 RATIO

COPY IN PROGRESS

DIAGRAM NUMBER: 2005 VERSION: 0

DATE: 01/29/91 TIME: 06:38:49

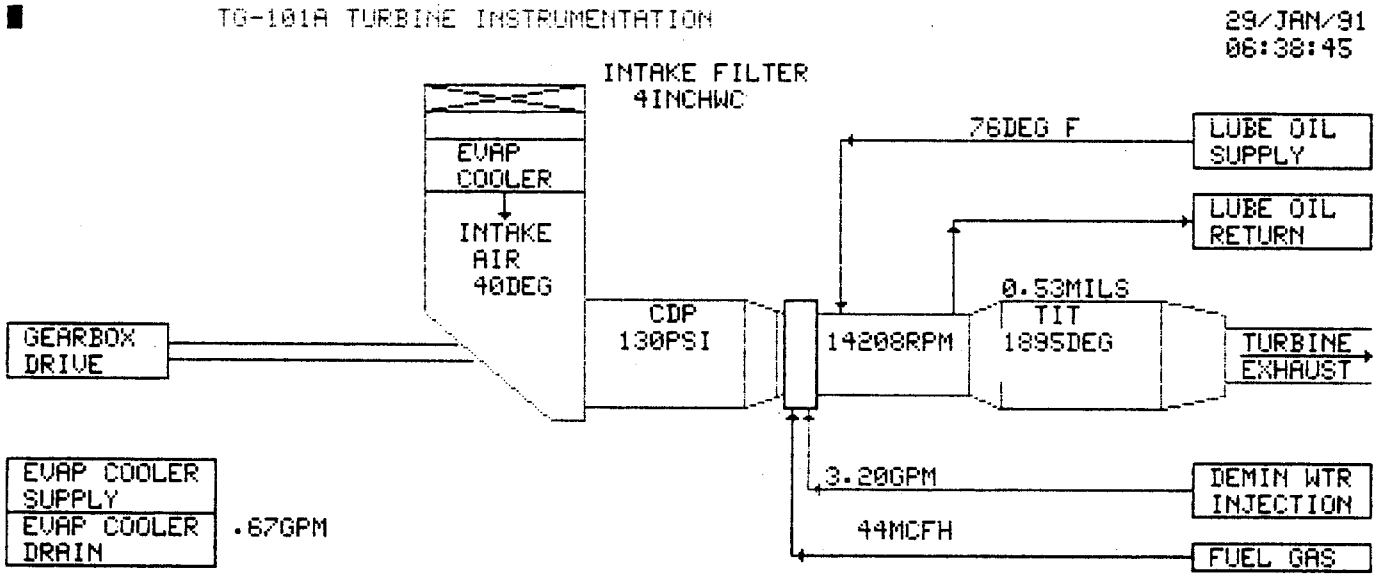


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DIAGRAM NUMBER: 3050 VERSION: 0

DATE: 01/29/91 TIME: 06:38:33

29/JAN/91 GAS TOTALIZERS 06:38:33

FUEL GAS 295.4218 MCF	24 HR RUNNING	
FUEL GAS 1062.848 MCF	24 HR PREVIOUS	
FUEL GAS 1358.085 MCF	7 DAY RUNNING	
FUEL GAS 7532.704 MCF	7 DAY PREVIOUS	
FUEL GAS 21933.57 MCF	MONTH RUNNING	
FUEL GAS 32978.96 MCF	MONTH PREVIOUS	

0.77 RATIO

FUEL GAS 303.9660 MCF	24 HR RUNNING	
FUEL GAS 1090.296 MCF	24 HR PREVIOUS	
FUEL GAS 1394.269 MCF	7 DAY RUNNING	
FUEL GAS 7557.798 MCF	7 DAY PREVIOUS	
FUEL GAS 28616.06 MCF	MONTH RUNNING	
FUEL GAS 32560.51 MCF	MONTH PREVIOUS	

0.74 RATIO

FUEL GAS 604.4728 MCF	24 HR RUNNING	
FUEL GAS 2164.165 MCF	24 HR PREVIOUS	
FUEL GAS 2768.791 MCF	7 DAY RUNNING	
FUEL GAS 15217.91 MCF	7 DAY PREVIOUS	
FUEL GAS 50900.07 MCF	MONTH RUNNING	
FUEL GAS 65984.48 MCF	MONTH PREVIOUS	

COPY IN PROGRESS

DIAGRAM NUMBER: 2005 VERSION: 0

DATE: 01/29/91 TIME: 07:35:45

TG-101A TURBINE INSTRUMENTATION

29/JAN/91
07:35:41

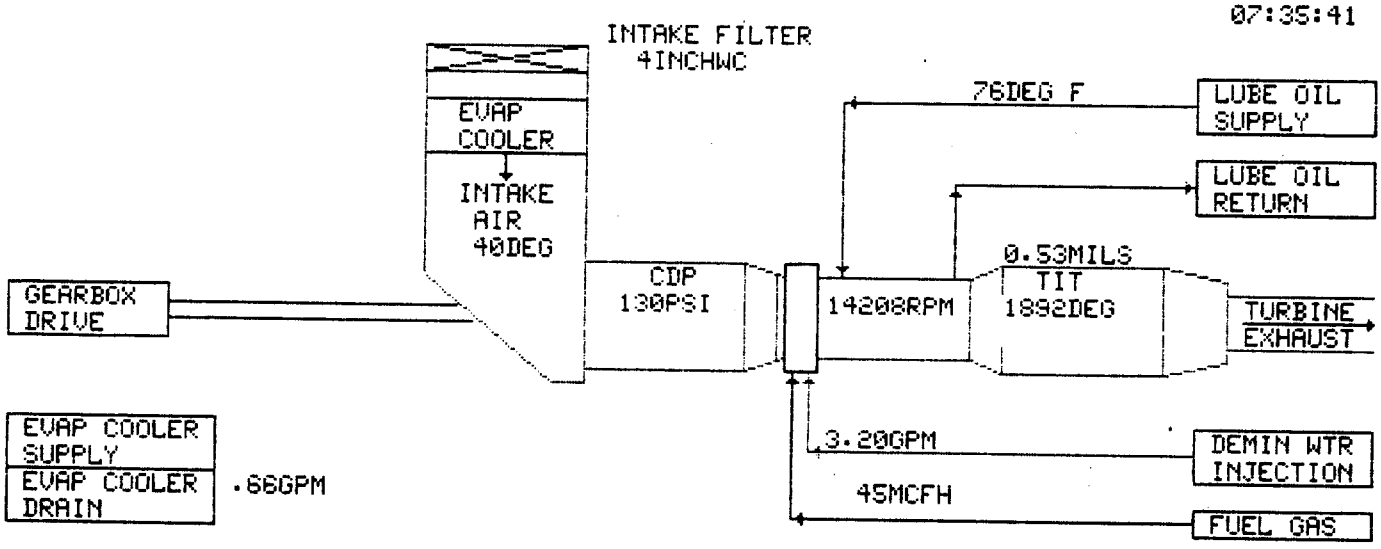

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DIAGRAM NUMBER: 3050 VERSION: 0

DATE: 01/29/91 TIME: 07:35:29

29/JAN/91 GAS TOTALIZERS 07:35:27

FUEL GAS 337.9608 MCF	24 HR RUNNING	
FUEL GAS 1062.649 MCF	24 HR PREVIOUS	
FUEL GAS 1400.585 MCF	7 DAY RUNNING	
FUEL GAS 7592.704 MCF	7 DAY PREVIOUS	
FUEL GAS 21973.60 MCF	MONTH RUNNING	
FUEL GAS 32978.96 MCF	MONTH PREVIOUS	

FUEL GAS 347.5201 MCF	24 HR RUNNING	
FUEL GAS 1090.296 MCF	24 HR PREVIOUS	
FUEL GAS 1437.825 MCF	7 DAY RUNNING	
FUEL GAS 7557.798 MCF	7 DAY PREVIOUS	
FUEL GAS 28661.08 MCF	MONTH RUNNING	
FUEL GAS 32560.51 MCF	MONTH PREVIOUS	

0.77 RATIO

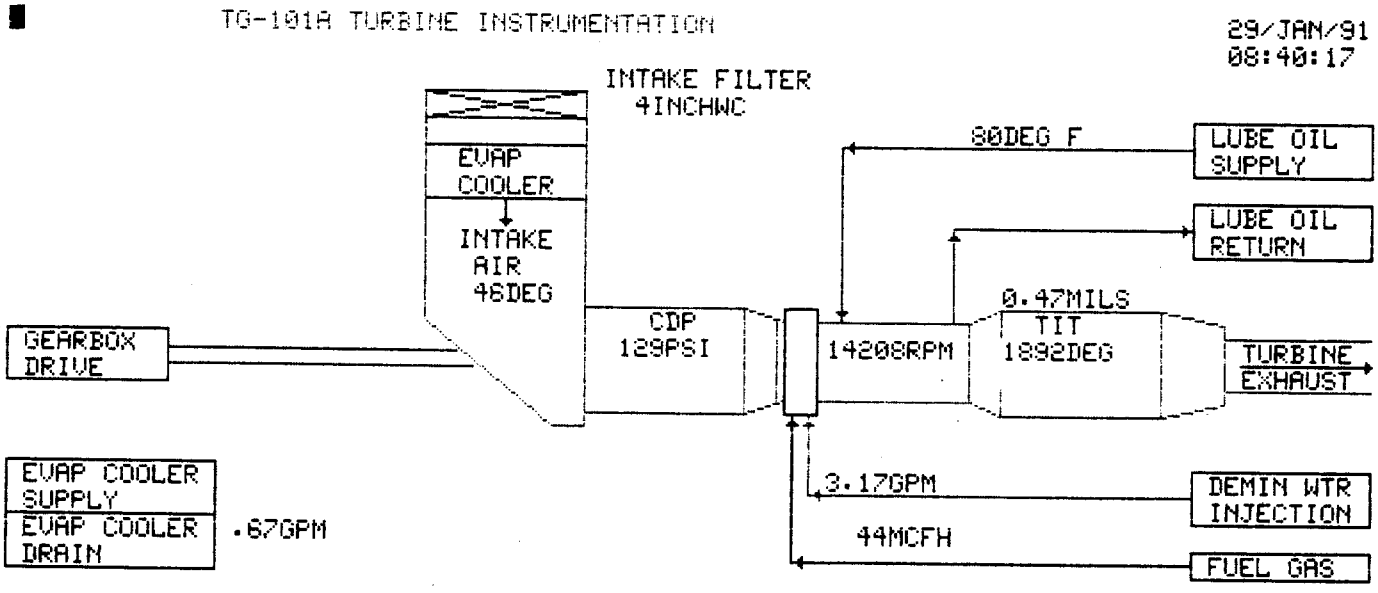
FUEL GAS 691.3334 MCF	24 HR RUNNING	
FUEL GAS 2164.165 MCF	24 HR PREVIOUS	
FUEL GAS 2855.550 MCF	7 DAY RUNNING	
FUEL GAS 15217.91 MCF	7 DAY PREVIOUS	
FUEL GAS 50990.66 MCF	MONTH RUNNING	
FUEL GAS 65984.48 MCF	MONTH PREVIOUS	

0.73 RATIO

COPY IN PROGRESS

DIAGRAM NUMBER: 2005 VERSION: 0

DATE: 01/29/91 TIME: 08:40:20



COPY IN PROGRESS

DIAGRAM NUMBER: 3050 VERSION: 0

DATE: 01/29/91 TIME: 08:40:03

29/JAN/91 GAS TOTALIZERS 08:40:01

FUEL GAS 385.7537 MCF	24 HR RUNNING	
FUEL GAS 1062.649 MCF	24 HR PREVIOUS	
FUEL GAS 1448.413 MCF	7 DAY RUNNING	
FUEL GAS 7592.704 MCF	7 DAY PREVIOUS	
FUEL GAS 22019.02 MCF	MONTH RUNNING	
FUEL GAS 32978.96 MCF	MONTH PREVIOUS	

0.76 RATIO

FUEL GAS 789.3427 MCF	24 HR RUNNING	
FUEL GAS 2184.165 MCF	24 HR PREVIOUS	
FUEL GAS 2953.615 MCF	7 DAY RUNNING	
FUEL GAS 15217.91 MCF	7 DAY PREVIOUS	
FUEL GAS 51083.18 MCF	MONTH RUNNING	
FUEL GAS 65984.48 MCF	MONTH PREVIOUS	

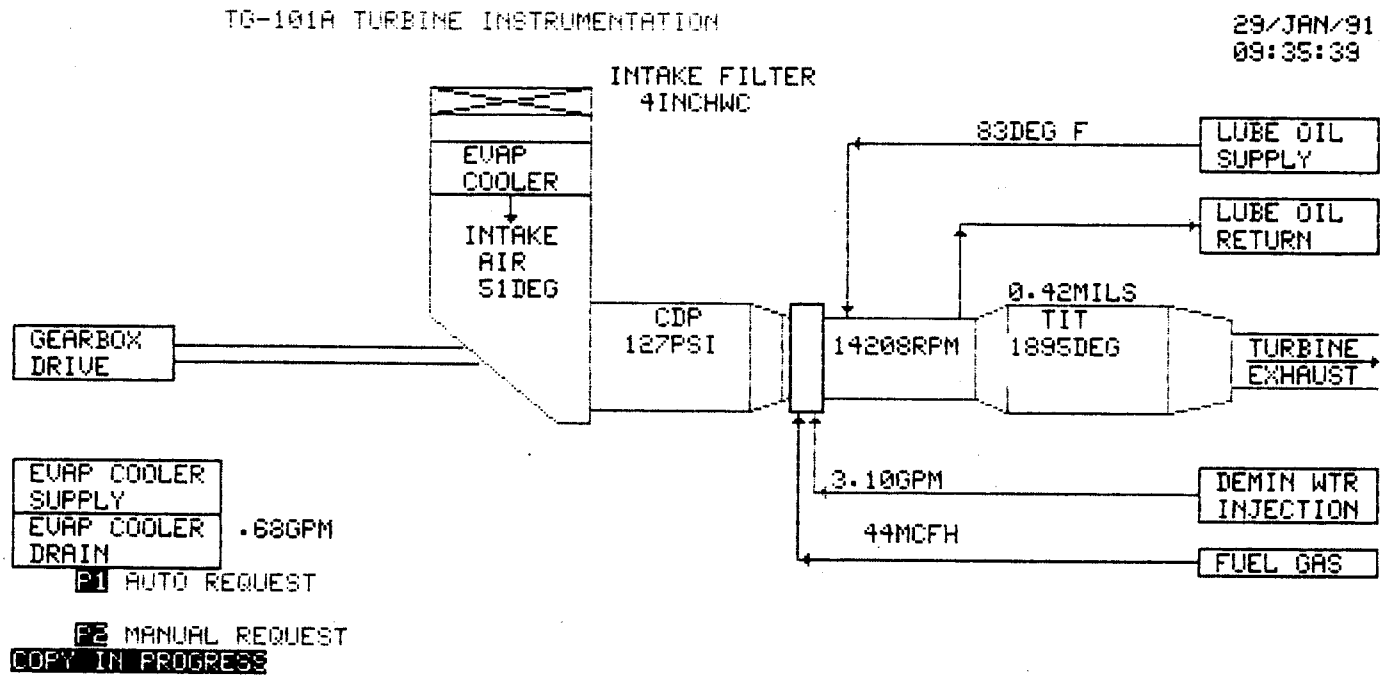
FUEL GAS 398.8375 MCF	24 HR RUNNING	
FUEL GAS 1090.296 MCF	24 HR PREVIOUS	
FUEL GAS 1487.132 MCF	7 DAY RUNNING	
FUEL GAS 7557.798 MCF	7 DAY PREVIOUS	
FUEL GAS 28711.37 MCF	MONTH RUNNING	
FUEL GAS 32560.51 MCF	MONTH PREVIOUS	

0.74 RATIO

COPY IN PROGRESS

DIAGRAM NUMBER: 2005 VERSION: 0

DATE: 01/29/91 TIME: 09:35:42



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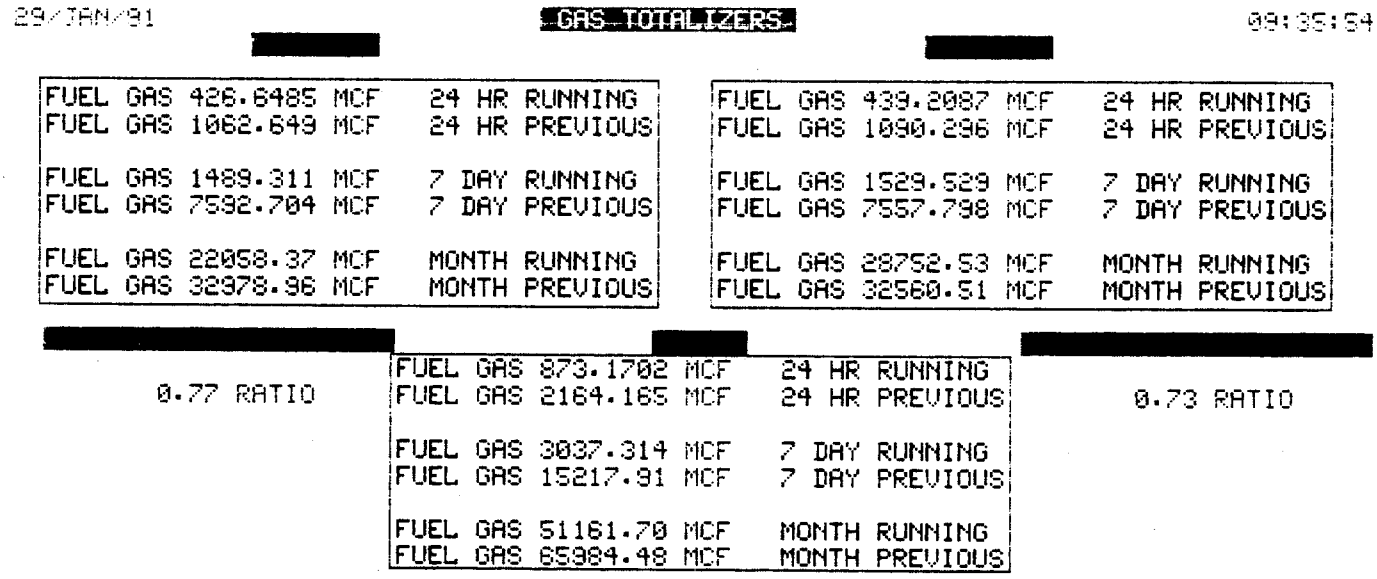

DIAGRAM NUMBER: 3050 VERSION: 0

DATE: 01/30/91 TIME: 04:41:03

30/JAN/91 GAS TOTALIZERS 04:40:58

FUEL GAS 206.3277 MCF	24 HR RUNNING	
FUEL GAS 1058.914 MCF	24 HR PREVIOUS	
FUEL GAS 2327.886 MCF	7 DAY RUNNING	
FUEL GAS 7592.704 MCF	7 DAY PREVIOUS	
FUEL GAS 22863.44 MCF	MONTH RUNNING	
FUEL GAS 32978.96 MCF	MONTH PREVIOUS	

FUEL GAS 213.7589 MCF	24 HR RUNNING	
FUEL GAS 1092.180 MCF	24 HR PREVIOUS	
FUEL GAS 2396.216 MCF	7 DAY RUNNING	
FUEL GAS 7557.798 MCF	7 DAY PREVIOUS	
FUEL GAS 29587.29 MCF	MONTH RUNNING	
FUEL GAS 32560.51 MCF	MONTH PREVIOUS	

0.77 RATIO

FUEL GAS 423.2353 MCF	24 HR RUNNING	
FUEL GAS 2163.163 MCF	24 HR PREVIOUS	
FUEL GAS 4750.917 MCF	7 DAY RUNNING	
FUEL GAS 15217.91 MCF	7 DAY PREVIOUS	
FUEL GAS 52771.98 MCF	MONTH RUNNING	
FUEL GAS 65984.48 MCF	MONTH PREVIOUS	

0.74 RATIO

COPY IN PROGRESS

DIAGRAM NUMBER: 2011 VERSION: 0

DATE: 01/30/91 TIME: 04:40:47

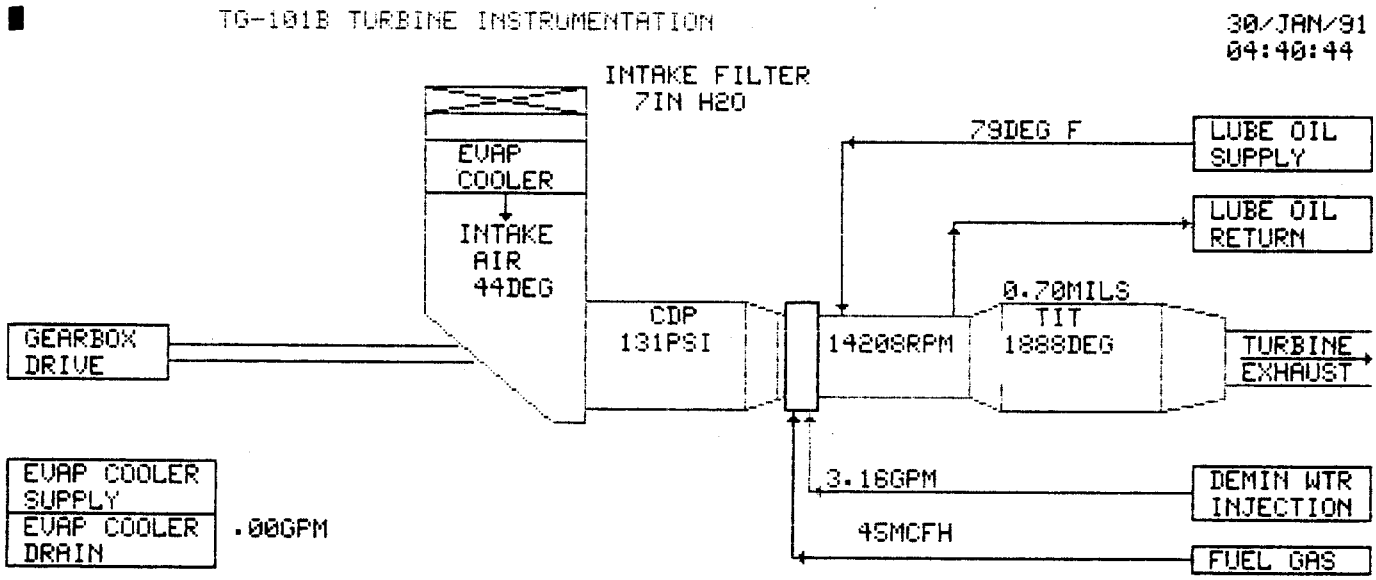

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DIAGRAM NUMBER: 3050 VERSION: 0

DATE: 01/30/91 TIME: 05:38:06

30/JAN/91 GAS TOTALIZERS 05:38:04

FUEL GAS 248.4298 MCF	24 HR RUNNING	
FUEL GAS 1058.914 MCF	24 HR PREVIOUS	
FUEL GAS 2389.954 MCF	7 DAY RUNNING	
FUEL GAS 7582.704 MCF	7 DAY PREVIOUS	
FUEL GAS 22903.58 MCF	MONTH RUNNING	
FUEL GAS 32378.96 MCF	MONTH PREVIOUS	

FUEL GAS 257.1888 MCF	24 HR RUNNING	
FUEL GAS 1092.180 MCF	24 HR PREVIOUS	
FUEL GAS 2439.687 MCF	7 DAY RUNNING	
FUEL GAS 7557.798 MCF	7 DAY PREVIOUS	
FUEL GAS 29630.21 MCF	MONTH RUNNING	
FUEL GAS 32560.51 MCF	MONTH PREVIOUS	

0.76 RATIO

FUEL GAS 509.5195 MCF	24 HR RUNNING	
FUEL GAS 2163.163 MCF	24 HR PREVIOUS	
FUEL GAS 4837.327 MCF	7 DAY RUNNING	
FUEL GAS 15217.91 MCF	7 DAY PREVIOUS	
FUEL GAS 52852.28 MCF	MONTH RUNNING	
FUEL GAS 65984.48 MCF	MONTH PREVIOUS	

0.74 RATIO

COPY IN PROGRESS

DIAGRAM NUMBER: 2011 VERSION: 0

DATE: 01/30/91 TIME: 05:38:25

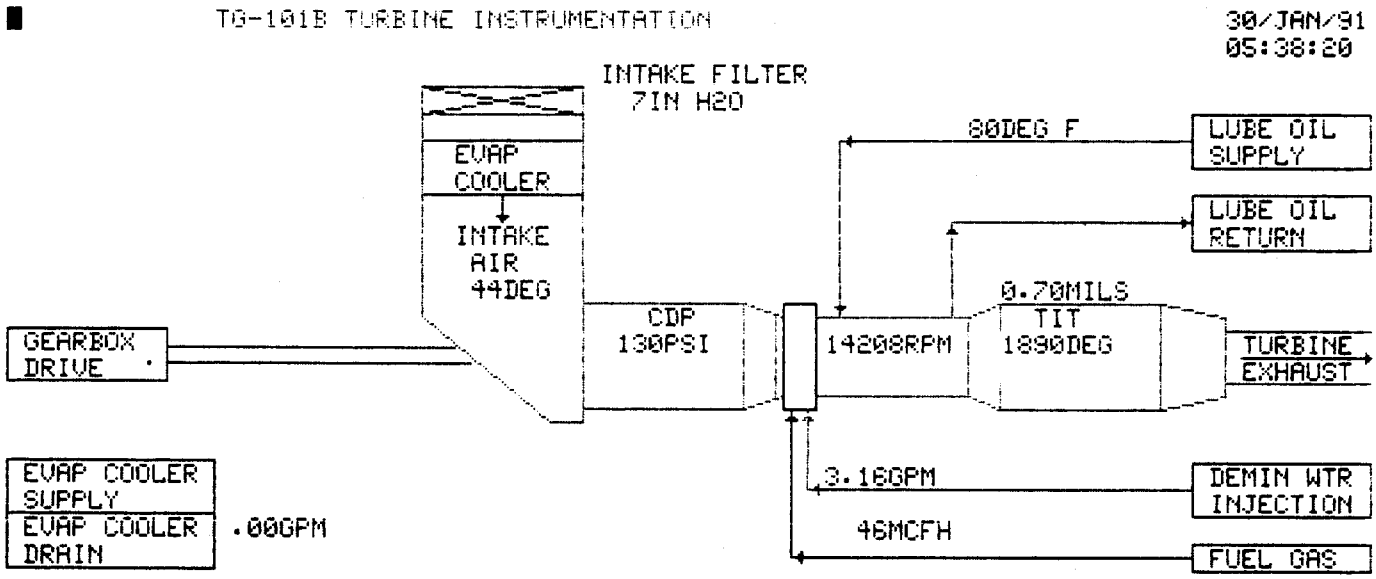

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DIAGRAM NUMBER: 3050 VERSION: 0

DATE: 01/30/91 TIME: 06:37:57

30/JAN/91 GAS TOTALIZERS 06:37:57

FUEL GAS 292.5667 MCF	24 HR RUNNING	
FUEL GAS 1058.914 MCF	24 HR PREVIOUS	
FUEL GAS 2414.076 MCF	7 DAY RUNNING	
FUEL GAS 7592.704 MCF	7 DAY PREVIOUS	
FUEL GAS 22945.63 MCF	MONTH RUNNING	
FUEL GAS 32978.96 MCF	MONTH PREVIOUS	

FUEL GAS 302.7342 MCF	24 HR RUNNING	
FUEL GAS 1092.180 MCF	24 HR PREVIOUS	
FUEL GAS 2485.213 MCF	7 DAY RUNNING	
FUEL GAS 7557.798 MCF	7 DAY PREVIOUS	
FUEL GAS 29675.77 MCF	MONTH RUNNING	
FUEL GAS 32560.51 MCF	MONTH PREVIOUS	

0.76 RATIO

FUEL GAS 599.8250 MCF	24 HR RUNNING	
FUEL GAS 2163.163 MCF	24 HR PREVIOUS	
FUEL GAS 4928.118 MCF	7 DAY RUNNING	
FUEL GAS 15217.91 MCF	7 DAY PREVIOUS	
FUEL GAS 52936.38 MCF	MONTH RUNNING	
FUEL GAS 65384.48 MCF	MONTH PREVIOUS	

0.74 RATIO

COPY IN PROGRESS

DIAGRAM NUMBER: 2011 VERSION: 0

DATE: 01/30/91 TIME: 06:37:39

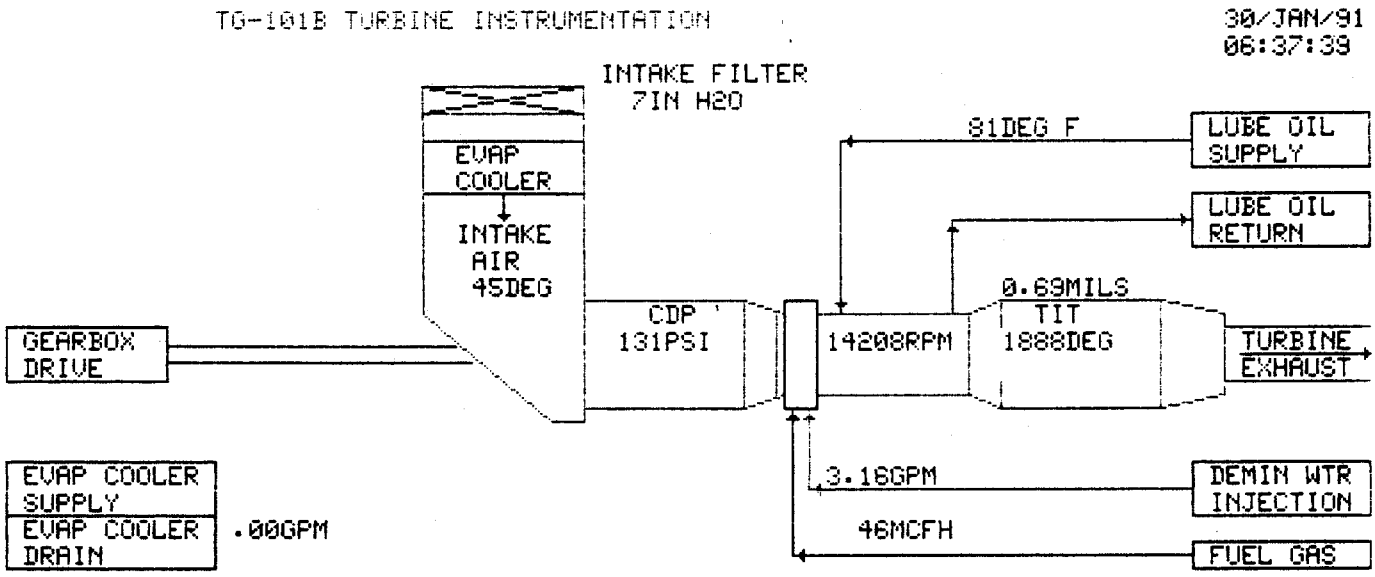

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DIAGRAM NUMBER: 3050 VERSION: 0

DATE: 01/30/91 TIME: 07:41:06

30/JAN/91 GAS TOTALIZERS 07:41:04

FUEL GAS 339.3084 MCF	24 HR RUNNING	
FUEL GAS 1058.914 MCF	24 HR PREVIOUS	
FUEL GAS 2460.819 MCF	7 DAY RUNNING	
FUEL GAS 7582.704 MCF	7 DAY PREVIOUS	
FUEL GAS 22990.03 MCF	MONTH RUNNING	
FUEL GAS 32978.96 MCF	MONTH PREVIOUS	

FUEL GAS 350.8921 MCF	24 HR RUNNING	
FUEL GAS 1092.180 MCF	24 HR PREVIOUS	
FUEL GAS 2533.382 MCF	7 DAY RUNNING	
FUEL GAS 7557.798 MCF	7 DAY PREVIOUS	
FUEL GAS 29724.49 MCF	MONTH RUNNING	
FUEL GAS 32560.51 MCF	MONTH PREVIOUS	

0.76 RATIO

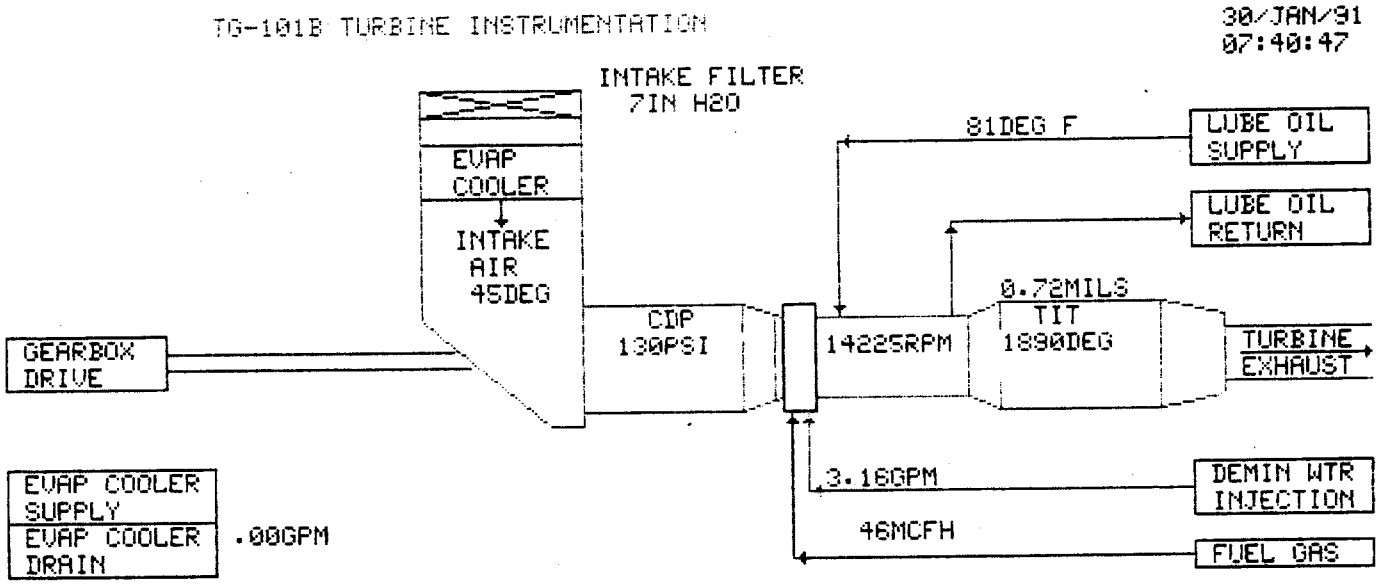
FUEL GAS 685.4847 MCF	24 HR RUNNING	
FUEL GAS 2163.163 MCF	24 HR PREVIOUS	
FUEL GAS 5024.298 MCF	7 DAY RUNNING	
FUEL GAS 15217.91 MCF	7 DAY PREVIOUS	
FUEL GAS 53025.21 MCF	MONTH RUNNING	
FUEL GAS 65984.48 MCF	MONTH PREVIOUS	

0.74 RATIO

COPY IN PROGRESS

DIAGRAM NUMBER: 2011 VERSION: 0

DATE: 01/30/91 TIME: 07:40:50



COPY IN PROGRESS

DIAGRAM NUMBER: 3050 VERSION: 0

DATE: 01/30/91 TIME: 08:37:36

30/JAN/91 08:37:33

GAS TOTALIZERS

FUEL GAS 380.7083 MCF	24 HR RUNNING
FUEL GAS 1058.914 MCF	24 HR PREVIOUS
FUEL GAS 2502.229 MCF	7 DAY RUNNING
FUEL GAS 7592.704 MCF	7 DAY PREVIOUS
FUEL GAS 23029.78 MCF	MONTH RUNNING
FUEL GAS 32978.96 MCF	MONTH PREVIOUS

[redacted] 0.75 RATIO

FUEL GAS 780.5005 MCF	24 HR RUNNING
FUEL GAS 2163.163 MCF	24 HR PREVIOUS
FUEL GAS 5109.256 MCF	7 DAY RUNNING
FUEL GAS 15217.91 MCF	7 DAY PREVIOUS
FUEL GAS 53104.75 MCF	MONTH RUNNING
FUEL GAS 65984.48 MCF	MONTH PREVIOUS

[redacted]

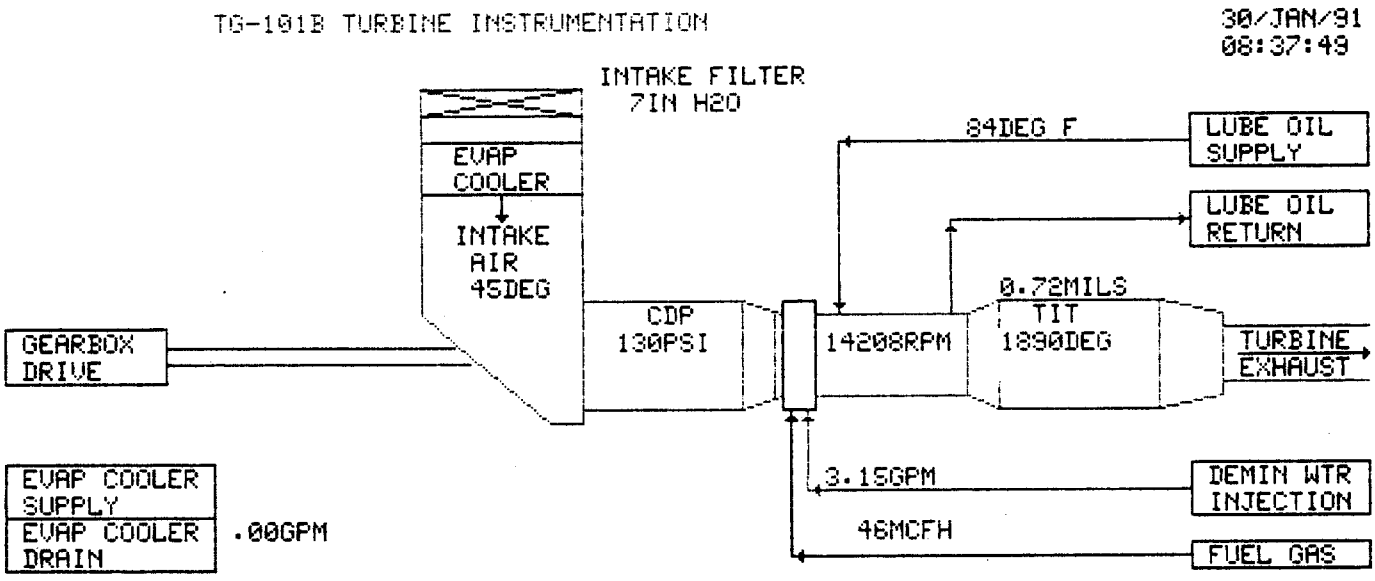
FUEL GAS 393.9765 MCF	24 HR RUNNING
FUEL GAS 1092.180 MCF	24 HR PREVIOUS
FUEL GAS 2576.436 MCF	7 DAY RUNNING
FUEL GAS 7557.798 MCF	7 DAY PREVIOUS
FUEL GAS 29767.82 MCF	MONTH RUNNING
FUEL GAS 32560.51 MCF	MONTH PREVIOUS

[redacted] 0.73 RATIO

COPY IN PROGRESS

DIAGRAM NUMBER: 2011 VERSION: 0

DATE: 01/30/91 TIME: 08:37:54



COPY IN PROGRESS

DIAGRAM NUMBER: 3050 VERSION: 0

DATE: 01/30/91 TIME: 09:41:08

30/JAN/91 GAS TOTALIZERS 09:41:02

FUEL GAS 427.7813 MCF	24 HR RUNNING
FUEL GAS 1058.914 MCF	24 HR PREVIOUS
FUEL GAS 2549.308 MCF	7 DAY RUNNING
FUEL GAS 7592.704 MCF	7 DAY PREVIOUS
FUEL GAS 23074.43 MCF	MONTH RUNNING
FUEL GAS 32978.96 MCF	MONTH PREVIOUS

FUEL GAS 442.0926 MCF	24 HR RUNNING
FUEL GAS 1032.180 MCF	24 HR PREVIOUS
FUEL GAS 2624.530 MCF	7 DAY RUNNING
FUEL GAS 7557.798 MCF	7 DAY PREVIOUS
FUEL GAS 29815.03 MCF	MONTH RUNNING
FUEL GAS 32560.51 MCF	MONTH PREVIOUS

0.76 RATIO

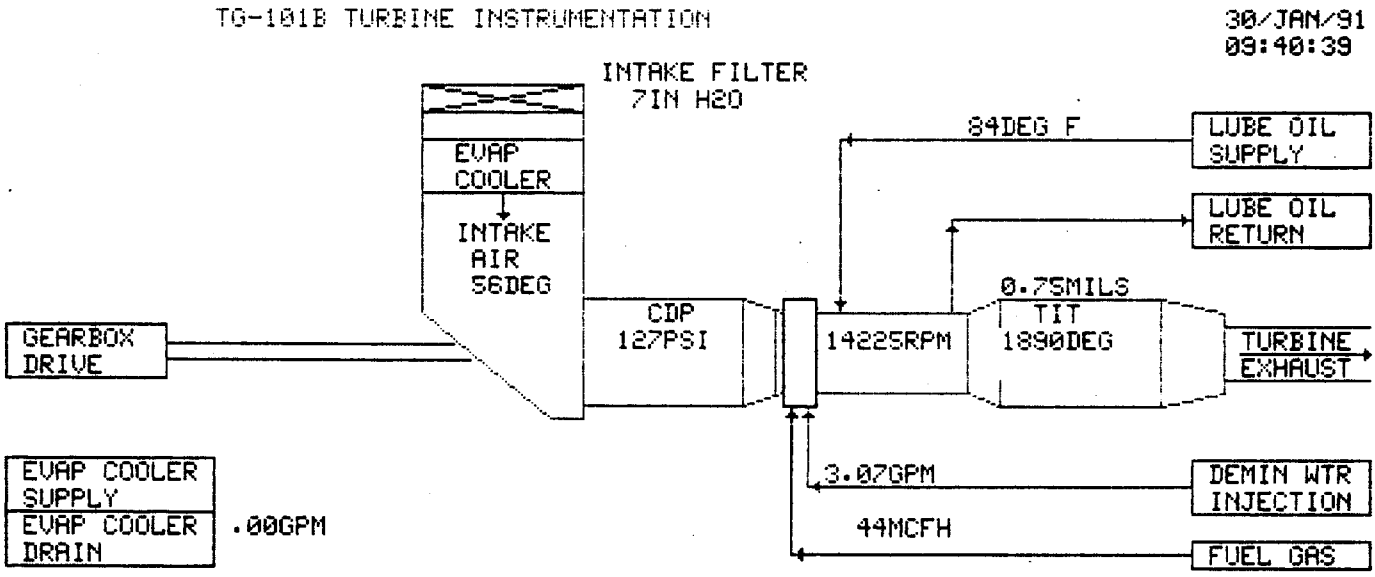
FUEL GAS 876.0396 MCF	24 HR RUNNING
FUEL GAS 2163.163 MCF	24 HR PREVIOUS
FUEL GAS 5204.816 MCF	7 DAY RUNNING
FUEL GAS 15217.91 MCF	7 DAY PREVIOUS
FUEL GAS 53193.98 MCF	MONTH RUNNING
FUEL GAS 65984.48 MCF	MONTH PREVIOUS

0.74 RATIO

COPY IN PROGRESS

DIAGRAM NUMBER: 2011 VERSION: 0

DATE: 01/30/91 TIME: 09:40:42



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