KLEINFELDER

SOURCE TEST REPORT
LANDFILL GAS FIRED FLARE
BROWNING-FERRIS INDUSTRIES
CHATEAU FRESNO LANDFILL
FRESNO, CALIFORNIA 93792

Prepared for

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1 EXECUTIVE SUMMARY

Browning-Ferris Industries retained Kleinfelder, Inc. to perform a series of source tests of the landfill gas fired flare station located at the Chateau Fresno Landfill site in Fresno, California. The tests were conducted from 30 July through 01 August 1991. Flare inlet data consisted of monitoring the flow rate of landfill gas to the flare. Browning-Ferris personnel took intermittent samples of the landfill gas and analyzed it for gas quality (% methane by volume). These data were used to determine the heating value of the landfill gas. Flare exhaust samples were taken for methane and total non-methane organics, nitrogen oxides, sulfur oxides, carbon monoxide, particulate matter, and PM-10 (particulate matter less than 10 microns in diameter). The purpose of the tests was to quantify emission levels with respect to Authority to Construct No. 3070010101. All test and analytical procedures conformed to the Source Test Protocol submitted to the Fresno County Air Pollution Control District on 03 June 1991 and amended by their response letter dated 10 June 1991.

The flare was operated under normal conditions with a landfill gas flow rate in the vicinity of 900 cubic feet per minute and the flare combustion temperature controller set to 1500°F. Refer to Section 4 of this report for a more comprehensive discussion. Results of the tests are summarized in Table 1-1.

TABLE 1-1

COMPLIANCE SOURCE TEST RESULTS
BROWNING-FERRIS INDUSTRIES
CHATEAU FRESNO LANDFILL
LFG FIRED FLARE SYSTEM

PARAMETER	REGULATORY LIMIT	RUN 1	RUN 2	RUN 3
		At test conditions		
LFG FLOW	SCFM	893	944	791
NOx as NO_2	0.06 lb/MMBTU	0.043	0.033	0.039
	1.60 lb/hr	1.045	0.819	0.807
	38.5 lb/day	25.08	19.66	19.37
SO2	0.62 lb/hr	0.270	0.274	0.218
	14.9 lb/day	6.48	6.58	5.23
CO	7.75 lb/hr	0.136	<0.010	0.012
	186.0 lb/day	3.26	<0.24	0.29
NMHC[a]	1.92 lb/hr	0.076	0.035	0.136
	46.0 lb/day	1.82	0.84	3.26
PM10	2.92 lb/hr	0.361	0.377	0.643
	70.0 lb/day	8.67	9.05	15.42
		At regulatory limit of 1219 SCFM LFG		
NOx as NO_2	1.60 lb/hr	1.426	1.058	1.244
	38.5 lb/day	34.24	25.39	29.87
SO2	0.62 lb/hr	0.369	0.354	0.336
	14.9 lb/day	8.85	8.50	8.06
CO	7.75 lb/hr	0.186	<0.013	0.019
	186.0 lb/day	4.45	<0.31	0.45
NMHC[a]	1.92 lb/hr	0.104	0.045	0.210
	46.0 lb/day	2.48	1.08	5.02
PM10	2.92 lb/hr	0.493	0.487	0.991
	70.0 lb/day	11.84	11.69	23.78

[a] - non-methane hydrocarbons

2 INTRODUCTION

BROWNING-FERRIS INDUSTRIES (BFI) retained **KLEINFELDER, INC.** to perform a source test on the landfill gas fired flare station located at the Chateau Fresno Landfill in Fresno, California. These tests were performed from 30 July through 01 August 1991. Table 2-1 depicts sequence of events that occurred in the field.

2.1 Purpose and Objectives

The purpose of the test was to determine the emission characteristics of the flare station to allow BFI to get a permit to operate the station from the Fresno County Air Pollution Control District (FCAPCD). The site is currently regulated by Authority to Construct No. 3070010101.

2.2 Procedures

The testing program was coordinated by Mr. Ron Valles of BFI and Mr. Roland Hebert of Kleinfelder. The test procedures were outline in the Source Test Protocol submitted to the FCAPCD on 03 June 1991 and amended by a FCAPCD letter dated 10 June 1991. The following field testing methods were employed in the test program:

- Sample traverse points were determined per CARB Method 1.
- Gas stream velocity, gas temperature, and gas pressure measurements, and the verification of the absence of cyclonic flow were made via CARB Method 2.
- Molecular weight of the stack gases (carbon dioxide, oxygen, and carbon monoxide) were determined using continuous monitors operated according to CARB Method 100.
- The stack gas moisture content was measured using CARB Method 4 in conjunction with the particulate sampling.
- The particulate matter was determined using CARB Method 5.
- The PM-10 fraction of the particulate matter was sampled using an Andersen Mark III Inertial Impactor and operated according to the procedures specified by the manufacturer.

- The non-methane hydrocarbons were sampled into evacuated Tedlar bags using CARB Method 422 and submitted for analysis within 48 hours of sampling.
- The gaseous products of combustion were continuously monitored with the Kleinfelder Mobile Emissions Laboratory according to CARB Method 100.

Procedures and field data sheets for the above are presented in Section 5 and Appendix A, respectively.

The analysis for particulate matter and particle size was conducted at the Kleinfelder Air Quality Laboratory in Diamond Bar, California. The analyses for methane and non-methane organics were conducted by Atmospheric Assessment Associates at their Chatsworth, California facility. Please refer to Section 7 for detailed procedural discussions and to Appendix B for the data.

The particle size distribution curves generated from the results of the analyses were used to determine the weight fraction of total particulate matter that was less than 10 microns in mean aerodynamic diameter. This fraction was multiplied by the total particulate matter results of the CARB Method 5 tests to determine the PM-10 regulatory results.

All raw data generated from the field sampling program were combined with the analytical results into the appropriate equations from the applicable methods to determine the final results as listed in Appendix C. Sample calculations are included in Appendix D of the report. The calculations were performed using computer programs that have undergone rigorous quality control inspections before usage.

All equipment used during the field testing program was calibrated to assure accurate measurements. These included: meter boxes, nozzles, pitot tubes, and thermocouples. Calibration data are included as Appendix E of this report.

TABLE 2-1

BROWNING-FERRIS INDUSTRIES
CHATEAU FRESNO LANDFILL
LFG FIRED FLARE SYSTEM

SAMPLE LOG

TYPE	RUN NO.	DATE	TIME ON	TIME OFF
CARB 5	1	30 Jul 91	1010	1353
CARB 100	1T[a]	30 Jul 91	1155	1410
CARB PSD[c]	1	31 Jul 91	0705	1005
CARB 100	1P[b]	31 Jul 91	0715	0930
CARB 5	2	31 Jul 91	1100	1240
CARB 100	2T[a]	31 Jul 91	1110	1310
CARB 100	2P[b]	31 Jul 91	1339	1620
CARB PSD	2	31 Jul 91	1351	1651
CARB 5	3	01 Aug 91	0725	0930
CARB 100	3T[a]	01 Aug 91	0730	0945
CARB 100	3P[b]	01 Aug 91	1007	1210
CARB PSD	3	01 Aug 91	1008	1253

[a] - associated with the total particulate samples
[b] - associated with the particle size samples
[c] - particle size determination

3 SUMMARY OF RESULTS

The results of the source test are summarized in the following tables. These tables include data pertaining to the source description, general parameters (diameter, flow rates, temperatures, loads, etc.), and detailed evaluations of the emissions parameters.

TABLE 3-1

SUMMARY OF RESULTS - PERMIT CONDITIONS

Chateau Fresno Landfill

Parameter	Units	Permit Limit	Result[a]	Result[b]
NMHC[b]	lb/hr	1.92	0.082	0.120
	lb/day	46.0	1.97	2.86
NOx (as NO_2)	lb/hr	1.60	0.890	1.243
	lb/MMBTU	0.06	0.038	NA[c]
	lb/day	38.5	21.37	29.83
SOx (as SO_2)	lb/hr	0.62	0.254	0.353
	lb/day	14.9	6.10	8.47
CO	lb/hr	7.75	0.07	0.10
	lb/day	186.0	1.78	2.45
PM-10	lb/hr	2.92	0.460	0.657
	lb/day	70.0	11.05	15.77

[a] - average of three test runs at actual LFG flow conditions

[b] - average of three test runs at permit maximum LFG flow rate

[c] - not applicable

TABLE 3-2

SUMMARY OF RESULTS - EMISSIONS TESTS

Chateau Fresno Landfill

Parameter	Units	Run 1	Run 2	Run 3
Stack Temperature	^{o}F	1470	1465	1464
Moisture	% vol	9.85	9.77	4.19
Gas Meter Volume	DSCF	58.24	26.02	36.75
Gas Velocity	ft/sec	11.3	10.7	10.4
Gas Volume	ACFM	38560	36311	35410
Gas Volume	DSCFM	9679	9148	9501
Isokinetics	%	99.3	98.0	102.4
Oxygen	% vol	12.2	12.0	11.4
Carbon Dioxide	% vol	8.1	8.2	9.0
Carbon Monoxide				
Concentration	ppm,v	3.2	0.0	0.3
Emission Rate	lb/hr	0.14	0.000	0.01
Sulfur Dioxide				
Concentration	ppm,v	2.8	3.0	2.3
Emission Rate	lb/hr	0.27	0.27	0.22
Nitrogen Oxides				
Concentration	ppm,v	15.1	12.5	11.9
Emission Rate	lb/hr	1.04	0.82	0.81
PM-10				
Concentration	gr/DSCF	0.004	0.005	0.008
Emission Rate	lb/hr	0.36	0.38	0.64
NMHC				
Concentration	ppm,v	3.17	1.45	5.68
Emission Rate	lb/hr	0.076	0.035	0.136
Landfill Gas				
Methane	% vol	45.0	43.0	43.0

4 PROCESS DESCRIPTION

The landfill gas fired flare station is used to control landfill gas produced at the Chateau Fresno site. It is combusted with oxygen at a temperature in excess of 1400°F. The flare is a state of the art system. The landfill gas is collected from the existing landfill field and is pulled by an air moving device to the flare system. The landfill gas passes through a condensate collection system to remove most of the entrained moisture. The blower is a variable speed design that is capable of limiting the flow rates to those required for proper operation. The flare system is designed with automatic air control louvers and a temperature controller to monitor flame temperature for possible failures.

5 FIELD SAMPLING PROCEDURES

5.1 Introduction

This section will describe all field sampling procedures that were used during the conduct of this project. Any deviations from standard procedure are described, including the reason for the deviation, and the result of the deviation on the final results of the project.

The particulate tests were performed via CARB Method 5. The particle size distribution tests to determine the PM-10 fraction were taken using Andersen Mark III Inertial Impactors. The methane and non-methane hydrocarbons samples were taken using evacuated Tedlar bags via CARB Method 422. The continuous monitors were operated via CARB Method 100.

The calculated isokinetic percentage was within the acceptable range of 90% to 110%. The isokinetic percentage is the best single criterion in assessing the validity of an individual test run, presupposing all other sampling criteria are followed. It can be simply defined as the maintenance of the nozzle inlet velocity identical to the undisturbed mainstream velocity.

5.2 General Factors Involved in Sampling

It was essential to the production of valid data that the sampling program was performed by qualified personnel using proper test equipment. The sampling team leader was trained in source sampling and experienced in test procedures.

Valid tests required the use of appropriate test equipment that was properly calibrated and maintained. This equipment included nozzles, pitot tubes, manometers, thermocouples, flow meters and dry gas meters at a minimum. Because calibration and maintenance of this equipment was paramount to valid data collection, written records were essential.

The use of the standard procedures described herein were important as a means of ensuring test validity. Deviations were kept to a minimum and used only when absolutely necessary. They were well documented and were based upon sound engineering practices. Of particular importance were the following:

- Location of the sample site and determination of the number of sample points.
- Use of acceptable equipment that had been properly calibrated.
- Determining gas velocities.
- Maintaining isokinetic sampling conditions when appropriate.
- Sample handling, labeling, and chain of custody procedures.
- Sample analysis.
- Record keeping.

5.3 Chain of Custody Procedures

A specific Chain of Custody procedure was used for this project. The elements of this plan included:

- Train component identification.
- Sample identification.
- Sample labels.
- Documentation.
- Chain of custody forms.

The sequence of activities concerned with sample custody together with identification and tracking procedures are described below:

- Sample train preparation in the laboratory including filter holders, impingers, and other sampling equipment identified by tags and codes.
- Sample train issued to test team and master log filled out. Sample I.D. number stickers issued according to test identification code.
- Train returned to recovery area when a valid sample was obtained. Sample train accompanied by all field data sheets.
- Recovery team recovered samples using appropriate containers, affixed sample I.D. labels to sample containers, to master log, to field data sheet, and to train recovery sheet.
- All samples returned to Kleinfelder with Chain of Custody form.

- Samples transferred to appropriate laboratory personnel with Chain of Custody form.
- Samples examined at each transfer point for integrity (broken containers, loss in liquid, or seal integrity).

Upon completing the required analysis, the analyst returned the Chain of Custody form along with results. All samples were accounted for by the Project Manager. Each laboratory identified samples in its own laboratory notebooks by the field I.D. number as well as any internal identification. Notebooks are retained by each laboratory according to usual laboratory practices.

5.4 Location and Number of Traverse Points

The location of sample ports and the number of traverse points used was critical to the successful completion of the project. The specifications of CARB Method 1 were utilized in the selection of sample points. Essentially, an ideal test location is one that is a minimum distance of eight times the diameter (called 8 equivalent diameters) from any upstream disturbance (bend, constriction, tee, etc.) and at least two equivalent diameters from any downstream disturbance. The minimum requirement is a location two equivalent diameters downstream and one half equivalent diameters upstream from any flow disturbances. Additionally, stream flow characteristics should be free from any eddy currents, helical or cyclonic flow.

A review of the preliminary velocity and temperature traverse data yielded a very flat profile across the entire cross sectional area of the exhaust stack. The conclusion was reached to use 24 traverse points, 12 along each of the two ports that were located in the same horizontal plane and 90^{o} apart.

5.5 Gas Flow and Temperature Measurements

The gas volumetric flow rate and temperature profiles were measured by conducting simultaneous velocity and temperature traverses following the procedures of CARB Method 2. Gas velocity heads were measured with a calibrated "S" type pitot tube connected to an inclined manometer. A Chromel-Alumel (K type) thermocouple, attached to a digital indicator, was used to measure the gas temperature at each of the traverse points.

The static pressure of the gas stream was measured using the same pitot tube and manometer. The tips of the pitot were turned perpendicular to the gas stream, one leg of the manometer was vented to atmosphere, and the resultant pressure was the static pressure. The vented leg (impact or static) determined if the static pressure was positive or negative.

During the initial traverse at each sample location, the absence of cyclonic flow was verified. This was accomplished by turning the pitot tube perpendicular to the gas flow. If a null reading was obtained on the manometer, an acceptable flow condition existed at that traverse point. If not, the pitot was rotated until a null manometer reading was obtained and the rotation angle measured and recorded. After all traverse points were examined, the average rotation angle was determined. Since this average was less than 10 degrees, the sample location was acceptable and testing was conducted.

5.6 Particulate Sampling

The basis of this system is described in CARB Method 5. Data sheets required for preliminary traverses, data recording, and labeling are presented in Appendix A. A schematic of this system is shown in Figure 5-1.

Sampling systems of this type must be operated at such a rate to maintain $\pm$ 10% of true isokinetic rates. The isokinetic rate is the best single criteria in assessing the validity of an individual test run. It is defined as the maintenance of the sample velocity at the sampling system inlet (nozzle) identical to the undisturbed mainstream velocity adjacent to the system inlet as measured with an S type pitot tube.

The button hook nozzle tip diameter that was necessary to maintain the isokinetic rate was calculated from the results of the preliminary velocity and temperature traverse. The nozzle was securely attached to the upstream end of a probe. The downstream end of the probe was connected to the glass fiber filter. The filter holder was maintained at 248° ± 25° F throughout the test.

The sample gas passed through the filter to the glass impinger train. The first and second impingers were each charged with 100 milliliters of deionized, distilled water. The third impinger was empty and the fourth contained approximately 400 grams of indicating silica gel that collected any vapors and/or moisture not already captured.

The second impinger was a Greenburg-Smith type impinger, while the first, third , and fourth were modified by replacing the tip with a 1/2 inch tube. The entire impinger train was immersed in an ice-water bath to aid in moisture condensation and to protect the dry gas meter from excessive temperatures. The outlet temperature from the fourth impinger was measured and ice was added to the system to maintain the temperature below 68^{o} F.

From the impinger train, the sample gas was conducted through an umbilical cord to the control console which contained the following pieces of equipment (listed in order): a coarse on-off valve, a needle valve on the pump by-pass for flow control, an air-tight vacuum pump, a calibrated dry gas totalizing meter, and a calibrated orifice tube. The orifice was equipped with pressure taps connected across an inclined manometer that ensured the maintenance of isokinetic sampling rates during the conduct of each test.

The entire sampling system was subjected to a leak check prior to each run. The inlet of the nozzle was plugged and a 15 inch mercury vacuum held for at least one minute. The leakage rate did not exceed the lesser of 0.02 cubic feet per minute or 4% of the anticipated average sampling rate.

Upon completion of each test, the soiled filter was removed from the holder and placed in a sealed Petri dish. The nozzle, probe, and the front half of the filter holder were washed internally with water. Any remaining particulate matter, especially in the probe, was removed by a nylon brush followed by a final water rinsing. All washings were stored in sealed non-reactive sample bottles for subsequent laboratory analysis.

The contents of the first three impingers were measured gravimetrically. The impinger contents, connecting glassware, and the impinger washings were stored in a separate, sealed, non-reactive sample bottle for subsequent laboratory analysis.

The silica gel in the fourth impinger was reweighed to determine the weight gain. If the silica gel was not totally spent, it was reused in subsequent tests. If spent, it was removed, and fresh material added before reuse.

Samples of unexposed filters and unused reagents were stored as blanks. A system blank was also collected by washing down the nozzle, probe, filter holder, and Teflon line before a test.

All sample bottles were properly labeled and stored until they were shipped for laboratory analysis. Data sheets shown in Appendix A were completed for each sample collected. This chain of custody was intended for quality control and to minimize loss of any sample. Each sample collected was labeled for identification per contract requirements. The labeling nomenclature was maintained on the field data sheets.

5.7 Particle Size Sampling

The particle size distribution was determined utilizing an Andersen Samplers Mark III Inertial Impactor. A single sampling point of average velocity was chosen from the results of the initial velocity traverse. The actual gas velocity and temperature were monitored during the run.

The isokinetic nozzle was attached to the inlet of the Andersen head to facilitate the use of the particulate sampling isokinetic rate equation. Sample gas was drawn through the nozzle at the isokinetic rate, but not in excess of 1.00 ACFM at gas conditions. Each impactor plate was perforated with a series of precision drilled orifices arranged in concentric circles which were offset on each succeeding plate. The orifice diameters on each plate were equal, but diameters decreased in size on each subsequent downstream plate. As the sample was drawn through the Andersen head, air jets flowing through a particular plate directed the suspended particulate matter toward the collection area on the next plate directly below the orifices of the above plate. The decrease in jet diameter from plate to plate resulted in an increase in gas velocity. A sufficiently large increase in velocity resulted in a situation where the inertial forces acting on a subject particle were great enough to overcome the aerodynamic drag of the turning airstream. This situation resulted in the impaction of the particle on the collection surface. An insufficient increase in gas velocity allowed the particle to remain in the gas stream and to undergo another velocity increase as it passed through the jet on the next downstream plate. Therefore, particles of decreasing diameters were impacted out on successive downstream plates. The last plate supported an absolute filter that collected all particles not impacted out on any of the plates. Gases exiting the Andersen head passed through a probe to a standard CARB Method 5 impinger train.

Upon completion of the sampling period, extreme care was exercised while handling the Andersen head. It was not jarred upon removal from the gas stream and was always handled face up. This was done to maintain the sample integrity and not displace fractionated particulate matter from one plate to another.

The plates were carefully removed from the head. The equipment was then washed down with water to remove any adhering particulate matter. This wash was discarded since its size distribution could not be determined. The plates were carefully removed from each plate assembly and washed down with water into separate sealed sample bottles for subsequent analysis.

5.8 Continuous Emission Monitors

On-line continuous analyzers were employed to monitor the carbon dioxide (CO_2), oxygen (O_2), carbon monoxide (CO), nitrogen oxides (NO_x), and sulfur dioxide (SO_2) concentrations of the sample gas. Explicit procedures for instrumental sampling are contained in CARB Method 100. Stringent quality control requirements are contained in 40 CFR 60, Appendix A, Method 6C. The instruments that were used are summarized in Table 6-1, along with methods of detection and applicable operating ranges. All instrument signals were transmitted to a strip chart recorder. Detailed analyzer calibration procedures, error checks, and system bias checks are contained within the methods.

The most critical aspects of continuous emissions monitoring are transporting and conditioning the gas sample from the flue gas stream to the instruments. Particulate matter and water vapor can interfere with instrument performance. These were removed by using an in-line filter and condenser, respectively. A stainless steel probe was inserted into the gas stream. A fiberglass filter was connected to the end of the probe to remove suspended particulate matter. This was followed by a heated Teflon line that was connected to a condenser for moisture removal. All heated components were maintained at $248^{o} \pm 25^{o}F$.

From this point the sample was pumped through a Teflon line to the instrument manifold. A three way sample valve was located immediately downstream of the filter to allow calibration gases to be flowed through the entire system for quality control checks. A schematic of the system is presented in Figure 5-2.

Each analyzer was multipoint calibrated with a suitable zero gas and at least two upscale gases, one of which was certified as an EPA Protocol 1 gas.

5.9 Tedlar Bag Samples

The principles of CARB Method 422 were used for the sampling of methane and non-methane hydrocarbons using an integrated Tedlar bag system. The sampling system was comprised of a stainless steel probe that was inserted into the stack. A Teflon sample line was connected to the probe and ran to the Tedlar bag. A sample pump, with a needle valve for flow control, and flow meter was used to control the sample rate into the bag. The pump was connected to a sealed, rigid container that contained the bags. As the container was evacuated, the stack gas sample filled the bag. At the completion of the sample period, the Tedlar bag was removed and sealed until the appropriate analyses could be performed.

TABLE 5-1
CONTINUOUS EMISSION MONITORING EQUIPMENT

Parameter	Manufacturer	Model	Full Scale	Principle
SO_2	Western Research	721AT2	200 ppm	Ultra-violet
NO_x	TECO	10A	100 ppm	Chemilum.
O_2	Teledyne	320A	25%	Fuel Cell
CO_2	ACS	3300	20%	NDIR
CO	TECO	48	100 ppm	GFC NDIR

Figure 5-1 Method 5 Schematic

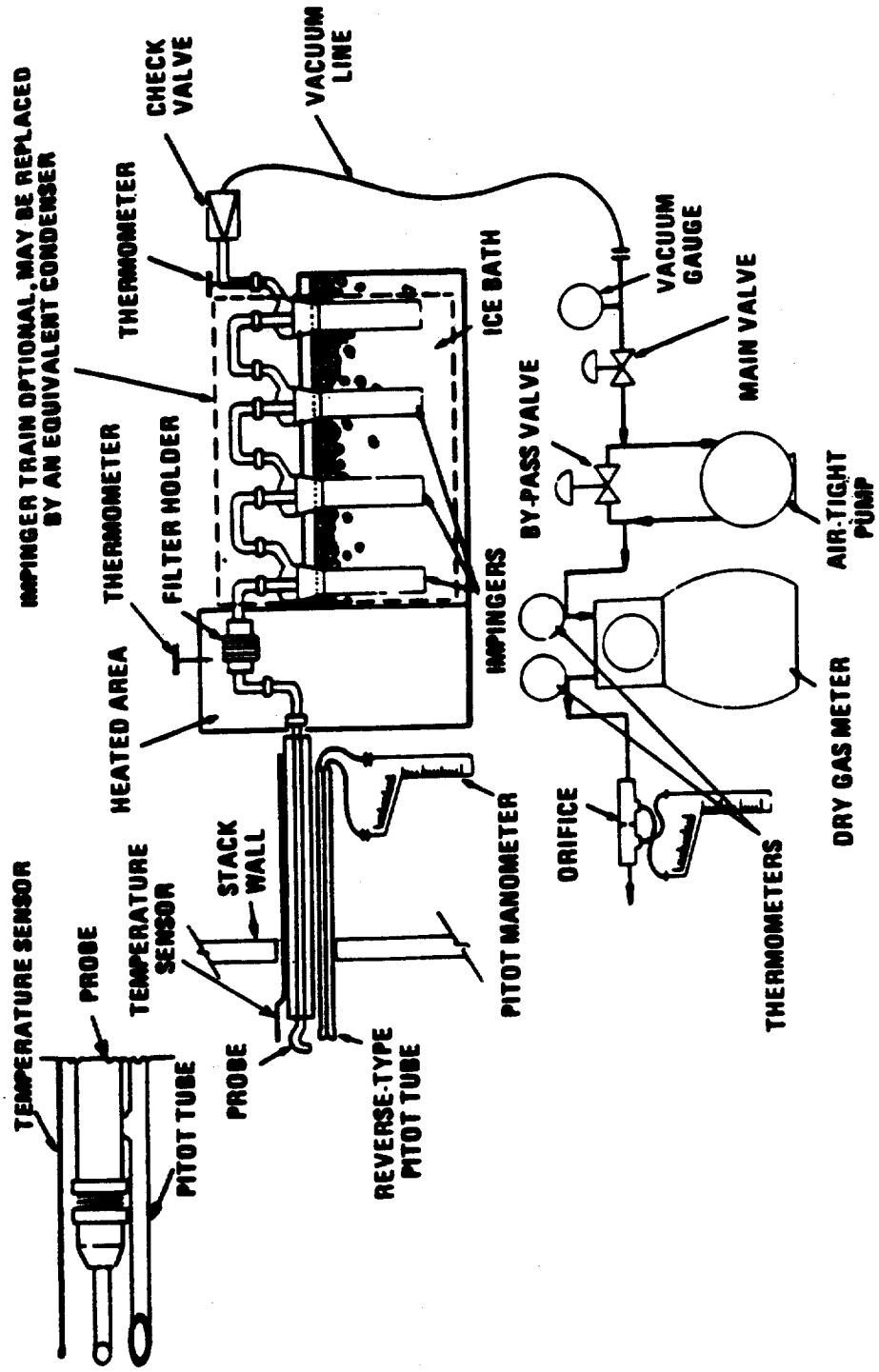
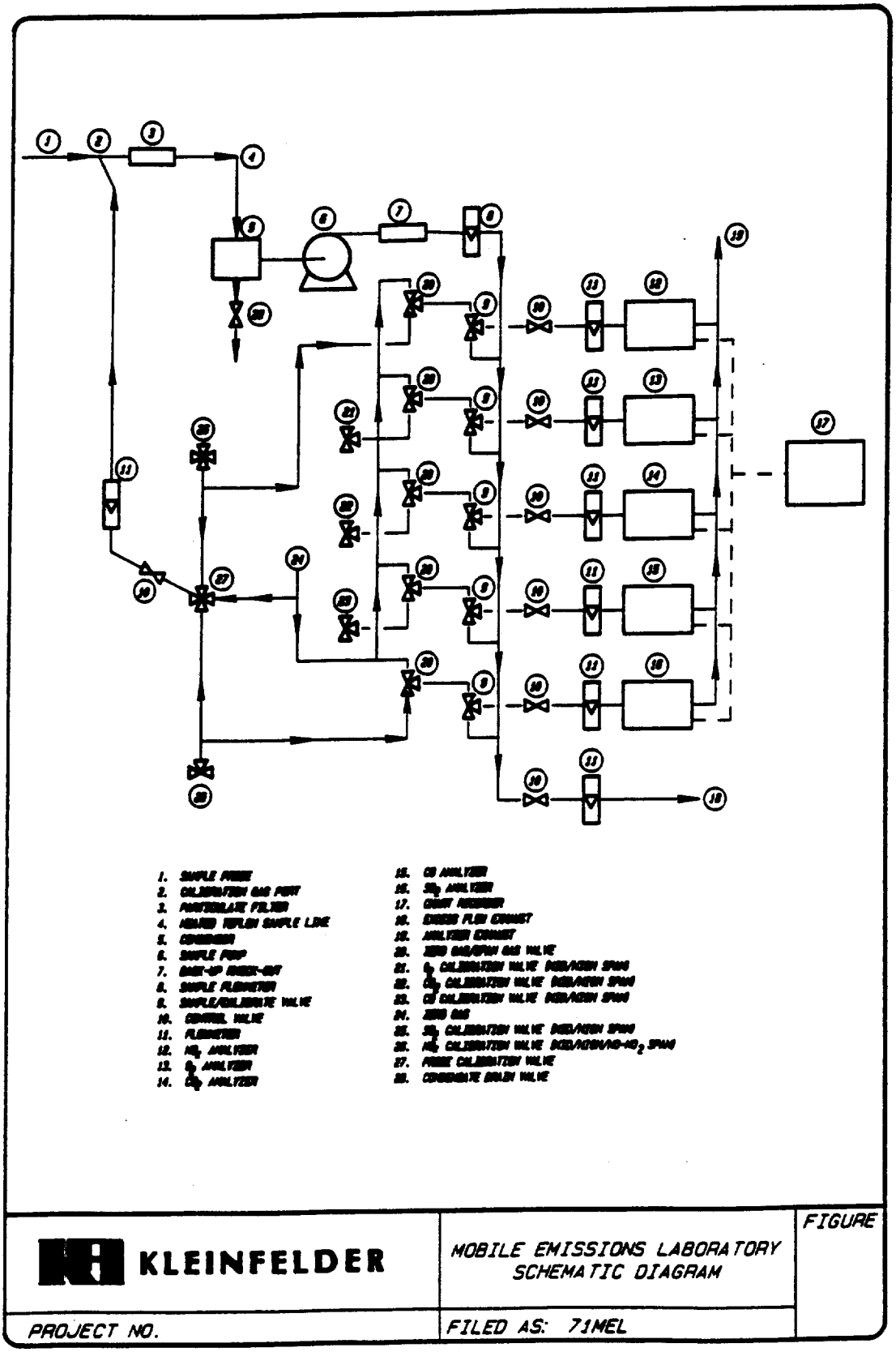


Figure 5-2 MEL Schematic



6 ANALYTICAL PROCEDURES

6.1 Introduction

The procedures described in this section were used for the analysis of the samples generated during the tests on the landfill gas fired flare station at BFI Chateau Fresno Landfill.

Samples of the landfill gas were collected at the flare inlet. Flare exhaust samples were collected in the stack above the flame zone. The samples were submitted to appropriate laboratories for the analysis of the various constituents that have been previously described. The following procedures were utilized:

6.2 Moisture Content

The principles of CARB Method 4 were used to determine the moisture content of the samples. The difference between the final impinger solution volume before washing and the initial volume, measured gravimetrically to the nearest 0.1 milligram, plus the weight gain of the silica gel determined the total moisture gain for each test run.

6.3 Particulate Analysis

The analysis for particulate matter was conducted using CARB Method 5 procedures. Each run set consists of three samples: 1) the probe, nozzle, filter holder front half, and flexible line wash, 2) the filter, and 3) the impinger contents, connecting glassware and their associated wash.

All filters, including blanks, were desiccated for a minimum of 24 hours and weighed to constant weight. This was defined as a difference of no more than 0.5 milligrams or 1% of the resultant net weight, whichever was greater, between two consecutive weighings, with no less than 6 hours of desiccation time between weighings.

All liquid samples were evaporated to dryness at 105^{o}C in tared beakers, desiccated and weighed to constant weight.

6.4 Particle Size Analysis

The analysis of the individual samples was conducted identically to the particulate matter washes. All reported weights were constant weights as defined in CARB Method 5.

6.5 Tedlar Bags

Integrated Tedlar bag samples were taken at the inlet and the outlet of the flare station to collect samples for methane and non-methane hydrocarbons. The methane and total gaseous non-methane organics were analyzed using Method 25.2 as published by the South Coast Air Quality Management District. The organic content of the sample was measured by gas chromatography which separated the non-methane organics from carbon monoxide, carbon dioxide, and methane. The non-methane organics were oxidized to carbon dioxide, reduced to methane and measured using a flame ionization detector. This procedure eliminated the variable response of the flame ionization detector that is associated with different types of organics. All results were reported as parts per million of methane.

7 LIMITATIONS

This report was prepared in general accordance with the accepted standard of care that existed in California at the time the report was written. It should be recognized that estimating possible emission scenarios and chemicals is difficult. Judgements leading to conclusions and recommendations are generally made with an incomplete knowledge of the facility. Kleinfelder should be notified for additional consultation if the client wishes to reduce the uncertainties beyond the level associated with this report. No warranty, expressed or implied, is made.

N ← | A ◎ B

FIELD DATA

initial K = 26.4235

Plant BFI - CHATEAU FRESNO
Date 30 JULY 91
Test Site FLARE
Run Number 5-1
Operator QRS

Ambient Temp 91°F
Barometer 30.45" Hg
Stack Pressure -0.07
Stack H_2O % ~10%
Stack Dia 102"

Meter $\Delta H_@$ 1.67
Meter Gamma 1.0577
Meter Box # 817
Nozzle Diameter 0.593"
Probe Length 11'

Probe Mat'l
Filter Number 0007
Samp Box # N/A
PRE LEAK 0.008 cfm @ 10" Hg
POST LEAK 0.013 cfm @ 10" Hg

TRAVERSE POINT NUMBER	ELAPSED TIME (mins)	CLOCK TIME	GAS METER READING (V_m)	VELOCITY HEAD (delta p)	ORIFICE PRESSURE (delta H, "H_2O)		TEMPERATURES						PUMP VAC. "Hg
					Desired	Actual	STACK (T_s)	PROBE	FILTER	IMP	METER INLET	METER OUTLET	
A 1	0	1010	107.397	0.01	0.26	0.26	1500	103	102	93	94	92	1.0
2	8	1018	109.72	0.01	0.26	0.26	1470	106	257	71	102	93	1.0
3	16	1026	112.016	0.01	0.26	0.26	1455	108	326	56	107	96	1.0
4	24	1034	114.332	0.01	0.27	0.27	1472	250	288	69	112	99	1.0
5	32	1042	116.90	0.02	0.54	0.54	1445	250	272	68	118	102	2.0
6	40	1050	119.904	0.01	0.27	0.27	1464	250	255	68	120	103	1.0
7	48	1058	122.280	0.01	0.27	0.27	1468	250	215	73	117	105	1.0
8	56	1106	124.650	0.04	1.1	1.1	1460	250	227	70	118	107	3.0
9	64	1114	128.932	0.01	0.27	0.27	1480	250	178	75	126	108	1.0
10	72	1122	131.29	0.01	0.27	0.27	1499	250	154	83	120	108	1.0
11	80	1130	133.652	0.01	0.27	0.27	1452	250	138	84	120	108	1.0
12	88	1138	135.999	0.01	0.27	0.27	1472	250	137	90	121	110	1.0
	96	1146	138.035										
AVERAGE /SUM						0.[illegible]							

K = 26.1
T_s = 147

T_m

ambient temp 104°F

Plant BFI - CHATEAU FRESNO
Date 30 JULY 91
POST LEAK RATE 0.013 cfm @ 10"Hg

Run Number 5-1
Operator ARE

TRAVERSE POINT NUMBER	ELAPSED TIME (mins)	CLOCK TIME	GAS METER READING (V_m)	VELOCITY HEAD (delta p)	ORIFICE PRESSURE (delta H, "H_2O)		TEMPERATURES						PUMP VAC. "Hg
					Desired	Actual	STACK (T_s)	PROBE	FILTER	IMP	METER INLET	METER OUTLET	
B 1	96	1217	138.035	0.01	0.27	0.27	1425	250	207	82	104	104	1.0
2	104	1225	140.315	0.01	0.27	0.27	1424	250	255	70	112	105	1.0
3	112	1233	142.600	0.01	0.27	0.27	1434	250	316	66	117	106	1.0
4	120	1241	145.056	0.01	0.27	0.27	1470	250	237	77	121	108	1.0
5	128	1249	147.322	0.01	0.27	0.27	1471	250	351	63	123	110	1.0
6	136	1257	149.666	0.01	0.27	0.27	1472	250	305	72	125	112	1.0
7	144	1305	151.996	0.01	0.27	0.27	1465	250	234	88	125	113	1.0
8	152	1313	154.305	0.01	0.27	0.27	1488	250	183	106	127	114	1.0
9	160	1321	156.59	0.01	0.27	0.27	1503	250	164	103	127	115	1.0
10	168	1329	158.943	0.01	0.27	0.27	1505	250	152	100	128	116	1.0
11	176	1337	161.29	0.01	0.27	0.27	1493	250	144	78	129	118	1.0
12	184	1345	163.640	0.01	0.27	0.27	1483	250	135	81	129	117	1.0
	192	1353	165.958										
		[redacted]											
AVERAGE /SUM	192		58.561	0.1059 ~~0.109~~		0.3082 ~~0.314~~	1469.58	231.96 [redacted]	213.83	78.38	111.88		

KLEINFELDER, INC.

TRAIN RECOVERY SHEET

DATE 7-29-91 RUN# 5-1 METHOD CARB 5

FACILITY CHATEAU FRESNO TYPE Std. Imp

TECHNICIAN A. ERBES IMP. SOLUTION DI H_2O

	SOLUTION	VOL. (ml)	DESCRIPTION
NOZZLE-PROBE RINSE			
UMBILICAL RINSE			

	SOLUTION	FINAL (g)	INITIAL(g)	NET(g)
IMPINGER # 1	100ml H_2O	674.7	572.8	101.9
IMPINGER # 2	100ml H_2O	570.9	559.9	11.0
IMPINGER # 3	Empty	446.7	444.7	2.0
IMPINGER # 4	Silica Gel	774.9	754.8	20.1
DESCRIPTION				
IMPINGER RINSE				135.0

SILICA GEL	CONDITION	FINAL (g)	INITIAL(g)	NET (g)

FILTER	NUMBER	DESCRIPTION
	0007	TARE 0.4042g

TOTAL MOISTURE (g)

FIELD BLANKS

DISPOSITION/COMMENTS

N
A
B

FIELD DATA

Plant BFI-CHATEAU FRESNO
Date 31 JULY 1991
Test Site LFG FLARE
Run Number 5-2
Operator ARL

Ambient Temp 96°F
Barometer 30.96"
Stack Pressure -0.07
Stack H_2O % 10%
Stack Dia 102" K=26.76

Meter $^H_@$ 1.67
Meter Gamma 1.0577
Meter Box # 817
Nozzle Diameter 0.573"
Probe Length 11'

Probe Mat'l
Filter Number 0005
Samp Box # NA
PRE LEAK 0.018cfm @ 10 "Hg
POST LEAK

TRAVERSE POINT NUMBER	ELAPSED TIME (mins)	CLOCK TIME	GAS METER READING (V_m)	VELOCITY HEAD (delta p)	ORIFICE PRESSURE (delta H, "H_2O)		TEMPERATURES						PUMP VAC. "Hg
					Desired	Actual	STACK (T_s)	PROBE	FILTER	IMP	METER INLET	METER OUTLET	
B 1	0	1100	207.695	0.01	0.27	0.27	1449	250	268	60	96	95	5.0
2	5	1105	209.160	0.01	0.27	0.27	1445	250	291	57	102	95	5.0
3	10	1110	210.563	0.01	0.27	0.27	1451	250	318	53	106	97	5.0
4	15	1115	211.995	0.01	0.27	0.27	1439	250	330	52	110	98	5.0
5	20	1120	213.44	0.01	0.27	0.27	1451	250	358	52	113	100	5.0
6	25	1125	214.853	0.01	0.27	0.27	1437	250	360	54	113	102	5.0
7	30	1130	216.316	0.01	0.27	0.27	1457	250	304	69	115	105	5.0
8	35	1135	217.75	0.01	0.27	0.27	1475	250	250	72	116	105	5.0
9	40	1140	219.204	0.01	0.27	0.27	1455	250	286	69	117	106	5.0
10	45	1145	220.651	0.01	0.27	0.27	1476	250	324	56	117	107	5.0
11	50	1150	222.100	0.01	0.27	0.27	1438	250	345	51	119	107	5.0
12	55	1155	223.509	0.01	0.27	0.27	1460	250	266	67	119	109	5.0
F	60	1200	224.814										
AVERAGE /SUM													

Plant BFI-CHATEAU FRESNO
Date 31 JULY 1991
POST LEAK RATE

Run Number 5-2
Operator QRE

TRAVERSE POINT NUMBER	ELAPSED TIME (mins)	CLOCK TIME	GAS METER READING (V_m)	VELOCITY HEAD (delta p)	ORIFICE PRESSURE (delta H, "H_2O)		TEMPERATURES						PUMP VAC. "Hg	
					Desired	Actual	STACK (T_s)	PROBE	FILTER	IMP	METER INLET	METER OUTLET		
~~A~~1	60	1208	224.814	0.01	0.27	0.27	1484	250	230	70	114	108	5.0	
2	65	1213	226.271	0.01	0.27	0.27	1488	250	297	61	118	108	5.0	
3	70	1218	227.710	0.01	0.27	0.27	1475	250	331	53	120	109	5.0	
4	75	1223	229.166	0.01	0.27	0.27	1524	250	364	52	121	110	5.0	
5	80	1228	230.601	0.01	0.27	0.27	1467	250	297	66	121	113	5.0	
6	85	1233	232.04	0.01	0.27	0.27	1482	250	251	76	122	111	5.0	
7	~~90~~	1238	233.51	0.01	0.27	0.27	1478	250	268	74	122	111	5.0	~~Flare~~ Flare Stops
~~8~~	→ 92 95	1240 ~~1245~~	233.763	FLARE	DOWN	(rec)	END TEST							
9	100	~~1248~~												
10	105	~~1253~~												
11	110	~~1258~~												
12	115	~~1303~~												
	120	~~1308~~												
AVERAGE /SUM	92		26.068	0.100		0.27	1464.79	250	302.16	61.26	109.92			

KLEINFELDER, INC.

TRAIN RECOVERY SHEET

DATE 7-31-91 RUN# 5-2 METHOD CARB 5

FACILITY BFI- CHATEAU FRESNO TYPE Std. Imp

TECHNICIAN A. ERBES IMP. SOLUTION DI H_2O

	SOLUTION	VOL. (ml)	DESCRIPTION
NOZZLE-PROBE RINSE			
UMBILICAL RINSE			

	SOLUTION	FINAL (g)	INITIAL(g)	NET(g)
IMPINGER # 1	100 ml Soln	618.7	574.0	44.7
IMPINGER # 2	100 ml Soln	566.7	559.8	6.9
IMPINGER # 3	Empty	445.6	444.7	.9
IMPINGER # 4	Silica Gel	683.8	676.5	7.3
DESCRIPTION				
IMPINGER RINSE				59.8

SILICA GEL

CONDITION	FINAL (g)	INITIAL(g)	NET (g)

FILTER

NUMBER	DESCRIPTION
0005	TARE 0.3982 g

TOTAL MOISTURE (g)

FIELD BLANKS

DISPOSITION/COMMENTS

Impinger sample turned yellow (light)
The flare flamed up during this test

FIELD DATA

Plant BFI - CHATEAU FRESNO
Date 1 AUGUST 1991
Test Site Left FLARE
Run Number 5-3
Operator ORG

Ambient Temp 65°F
Barometer 30.53" Hg
Stack Pressure -0.07
Stack H_2O % 10%
Stack Dia 102"

Meter $\Delta H_@$ 1.67
Meter Gamma 1.0577
Meter Box # 817
Nozzle Diameter 0.573"
Probe Length 11'
K = 26.76

Probe Mat'l
Filter Number
Samp Box # NA
PRE LEAK 0.010 cfm @ 10" Hg
POST LEAK 0.008 cfm @ 10" Hg

TRAVERSE POINT NUMBER	ELAPSED TIME (mins)	CLOCK TIME	GAS METER READING (V_m)	VELOCITY HEAD (delta p)	ORIFICE PRESSURE (delta H, "H_2O)		TEMPERATURES						PUMP VAC. "Hg
					Desired	Actual	STACK (T_s)	PROBE	FILTER	IMP	METER INLET	METER OUTLET	
B 1	0	0725	273.608	0.01	0.27	0.27	1475	250	190	48	65	64	2.5
2	5	0730	275.05	0.01	0.27	0.27	1451	250	228	38	73	64	2.5
3	10	0735	276.576	0.01	0.27	0.27	1453	250	265	34	78	67	2.5
4	15	0740	277.930	0.01	0.27	0.27	1472	250	300	41	83	70	2.5
5	20	0745	279.401	0.01	0.27	0.27	1440	250	328	44	86	71	2.5
6	25	0750	280.86	0.01	0.27	0.27	1479	250	326	38	87	75	2.5
7	30	0755	282.307	0.01	0.27	0.27	1424	250	336	35	89	78	3.0
8	35	0800	283.809	0.01	0.27	0.27	1443	250	369	34	90	77	3.0
9	40	0805	285.28	0.01	0.27	0.27	1479	250	360	34	91	78	3.0
10	45	0810	286.80	0.01	0.27	0.27	1470	250	266	46	92	80	3.0
11	50	0815	288.268	0.01	0.27	0.27	1472	250	215	53	92	80	3.0
12	55	0820	289.7[illegible]	0.01	0.27	0.27	1480	250	296	46	93	80	3.0
	60	0825	291.271										
AVERAGE /SUM													

Plant BFI - CHATEAU FRESNO
Date 1 August 1991
POST LEAK RATE 0.008 cfm @ 10" Hg

Run Number 5-3
Operator ARZ

TRAVERSE POINT NUMBER	ELAPSED TIME (mins)	CLOCK TIME	GAS METER READING (V_m)	VELOCITY HEAD (delta p)	ORIFICE PRESSURE (delta H, "H_2O)		TEMPERATURES						PUMP VAC. "Hg
					Desired	Actual	STACK (T_s)	PROBE	FILTER	IMP	METER INLET	METER OUTLET	
	ON	0830	291.271										
A 12	65	0835	292.74	0.01	0.27	0.27	1490	~250	313	40	88	80	3
11	70	0840	293.810	0.005	0.135	0.135	1502	250	284	52	89	81	2.5
10	75	0845	295.053	0.01	0.27	0.27	1452	250	294	48	91	82	3.0
9	80	0850	296.55	0.01	0.27	0.27	1440	250	302	46	92	81	3.0
8	85	0855	298.026	0.01	0.27	0.27	1447	250	320	40	93	82	3.0
7	90	0900	299.554	0.01	0.27	0.27	1450	250	358	39	93	83	3.0
6	95	0905	301.051	0.01	0.27	0.27	1494	250	251	56	93	83	3.0
5	100	0910	302.58	0.01	0.27	0.27	1462	250	327	50	95	84	3.0
4	105	0915	304.091	0.01	0.27	0.27	1447	250	346	41	97	85	3.0
3	110	0920	305.603	0.01	0.27	0.27	1472	250	258	55	97	85	3.0
2	115	0925	307.100	0.01	0.27	0.27	1466	250	225	60	97	86	3.0
1	120	0930	308.656	0.01	0.27	0.27	1465	250	299	49	98	87	3.0
AVERAGE /SUM	120		35.048	0.0988		0.2644	1463.54	250	294.00	44.46	83.85		

KLEINFELDER, INC.

TRAIN RECOVERY SHEET

DATE 31-July-91 RUN# 5-3 METHOD CARB5

FACILITY BFI - CHATEAU FRESNO TYPE Std. Imp

TECHNICIAN A. ERBES IMP. SOLUTION DI H_2O

	SOLUTION	VOL. (ml)	DESCRIPTION
NOZZLE-PROBE RINSE			
UMBILICAL RINSE			

	SOLUTION	FINAL (g)	INITIAL(g)	NET(g)
IMPINGER # 1	100 ml Soln	596.9	575.2	21.7
IMPINGER # 2	100 ml Soln	568.0	563.5	4.5
IMPINGER # 3	Empty	445.6	445.2	.4
IMPINGER # 4	Silica Gel	707.6	700.1	7.5
DESCRIPTION				
IMPINGER RINSE				34.1

SILICA GEL	CONDITION	FINAL (g)	INITIAL(g)	NET (g)

FILTER	NUMBER	DESCRIPTION
	0010	TARE 0.4078g

TOTAL MOISTURE (g)

FIELD BLANKS

DISPOSITION/COMMENTS

FIELD DATA

Plant BFI - CHATEAU FRESNO
Date 31 JULY 1991
Test Site LFG FLARE
Run Number PS-1
Operator QAR

Ambient Temp 70°F
Barometer 30.46 "
Stack Pressure -0.07
Stack H_2O % 10%
Stack Dia 102"

Meter $^{\wedge}H_@$ 1.67
Meter Gamma 1.0577
Meter Box # 817
Nozzle Diameter 0.492
Probe Length 11"
K=14.37

Probe Mat'l S.Steel
Filter Number NA
Samp Box # NA
PRE LEAK 0.010 cfm @ 10" Hg
POST LEAK 0.008 cfm @ 10" Hg

TRAVERSE POINT NUMBER	ELAPSED TIME (mins)	CLOCK TIME	GAS METER READING (V_m)	VELOCITY HEAD (delta p)	ORIFICE PRESSURE (delta H, "H_2O)		TEMPERATURES						PUMP VAC. "Hg
					Desired	Actual	STACK (T_s)	PROBE	FILTER	IMP	METER INLET	METER OUTLET	
	0	0705	166.302	0.01	0.14	0.14	1496			72	71	71	0.05
	15	0720	169.692	0.01	0.14	0.14	1503			69	84	74	1.0
	30	0735	172.88	0.01	0.14	0.14	1500			71	91	81	1.0
	45	0750	176.182	0.01	0.14	0.14	1498			63	95	84	1.0
	60	0805	179.586	0.01	0.14	0.14	1501			62	96	86	1.0
	75	0820	182.910	0.01	0.14	0.14	1499			69	98	89	1.5
	90	0835	186.360	0.01	0.14	0.14	1499			68	100	91	1.5
	105	0850	189.81	0.01	0.14	0.14	1500			67	101	92	1.5
	120	0905	193.22	0.01	0.14	0.14	1500			70	102	94	1.5
	135	0920	196.766	0.01	0.14	0.14	1470			68	104	95	1.5
	150	0935	200.135	0.01	0.14	0.14	1503			65	106	97	2.0
	165	0950	203.536	0.01	0.14	0.14	1500			66	108	99	2.0
	180	1005	207.093				1501			69	109	99	2.0
AVERAGE /SUM	180		40.591	0.100		0.14	1497.69			67.62	92.96		

KLEINFELDER, INC.

TRAIN RECOVERY SHEET

DATE 7-29-91 RUN# PS#1 METHOD Particle Size

FACILITY CHATEAU FRESNO TYPE Std. Imp

TECHNICIAN A. ERBES IMP. SOLUTION DI H_2O

	SOLUTION	VOL. (ml)	DESCRIPTION
NOZZLE-PROBE RINSE			
UMBILICAL RINSE			

	SOLUTION	FINAL (g)	INITIAL(g)	NET(g)
IMPINGER # 1	100 ml H_2O	582.1	537.8	44.3
IMPINGER # 2	100 ml H_2O	551.4	549.5	1.9
IMPINGER # 3	Empty	450.5	449.1	1.4
IMPINGER # 4	Silica Gel	664.0	655.6	8.4
DESCRIPTION				
IMPINGER RINSE				56.0

SILICA GEL

CONDITION	FINAL (g)	INITIAL(g)	NET (g)

FILTER

NUMBER	DESCRIPTION

TOTAL MOISTURE (g)

FIELD BLANKS

DISPOSITION/COMMENTS

FIELD DATA

Plant BFI-CHATEAU FRESNO
Date 31 JULY 1991
Test Site LFG FLARE
Run Number PS-2
Operator ARR

Ambient Temp 108
Barometer 30.46" Hg
Stack Pressure -0.07
Stack H_2O % 10%
Stack Dia 102"

Meter $^{\circ}H_@$ 1.67
Meter Gamma 1.0577
Meter Box # 817
Nozzle Diameter 0.492
Probe Length 11'
K=14.37

Probe Mat'l
Filter Number NA
Samp Box # NA
PRE LEAK 0.000 cfm @ 10" Hg
POST LEAK 0.000 cfm @ 10" Hg

TRAVERSE POINT NUMBER	ELAPSED TIME (mins)	CLOCK TIME	GAS METER READING (V_m)	VELOCITY HEAD (delta p)	ORIFICE PRESSURE (delta H, "H_2O)		TEMPERATURES						PUMP VAC. "Hg
								PROCESS DATA					
					Desired	Actual	STACK (T_s)	~~PROBE~~ * FLARE TEMP	~~FILTER~~ SCFM	IMP	METER INLET	METER OUTLET	
	0	1351	234.036	0.01	0.14	0.14	1450	1498	1320	82	114	113	1.0
	15	1406	237.173	0.01	0.14	0.14	1416	1497	1340	97	119	111	1.0
	30	1421	240.315	0.01	0.14	0.14	1450	1502	1340	71	123	114	1.0
	45	1436	243.500	0.01	0.14	0.14	1427	1519	1320	77	127	118	1.0
	60	1451	246.683	0.01	0.14	0.14	1460	1502	1360	80	129	120	1.0
	75	1506	249.98	0.01	0.14	0.14	1475	1501	1380	85	130	121	1.0
	90	1521	253.22	0.01	0.14	0.14	1469	1500	1400	92	131	122	1.5
	105	1536	256.653	0.01	0.14	0.14	1450	1502	1400	83	129	122	1.5
	120	1551	260.053	0.01	0.14	0.14	1453	1502	1360	86	129	122	1.5
	135	1606	263.383	0.01	0.14	0.14	1441	1496	1410	90	128	121	1.5
	150	1621	266.736	0.01	0.14	0.14	1462	1502	1380	93	126	119	2.0
	165	1636	270.164	0.01	0.14	0.14	1460	1501	1360	95	125	118	2.0
	180	1651	273.478				1463	1499	1380	97	123	116	2.0
AVERAGE /SUM	180		39.442	0.100		0.14	1452.00	1501.62	1365.38	85.23	121.63		

* This temp taken from flare control panel.
Thermocouple is ~ same height as sampling ports.
Flare set point @ 1500°F

KLEINFELDER, INC.

TRAIN RECOVERY SHEET

DATE 31-JULY-91 RUN# PS-2 METHOD PSD - PM10

FACILITY BFI - CHATEAU FRESNO TYPE Std. Imp.

TECHNICIAN A. ERBES IMP. SOLUTION DI H_2O

	SOLUTION	VOL. (ml)	DESCRIPTION
NOZZLE-PROBE RINSE			
UMBILICAL RINSE			

	SOLUTION	FINAL (g)	INITIAL(g)	NET(g)
IMPINGER # 1	100 ml Soln	601.2	541.8	59.4
IMPINGER # 2	100 ml Soln	555.3	551.7	3.6
IMPINGER # 3	Empty	451.8	450.2	1.6
IMPINGER # 4	Silica Gel	676.1	663.9	12.2
DESCRIPTION				
IMPINGER RINSE				76.8

SILICA GEL	CONDITION	FINAL (g)	INITIAL(g)	NET (g)

FILTER	NUMBER	DESCRIPTION

TOTAL MOISTURE (g)

FIELD BLANKS

DISPOSITION/COMMENTS

FIELD DATA

Plant BFI-CHATEAU FRESNO
Date 1 AUG. 1991
Test Site LFG FLARE
Run Number PS-3
Operator RLR

Ambient Temp 86°F
Barometer 30.53" Hg
Stack Pressure -0.07
Stack H_2O % 10%
Stack Dia 102"

Meter $\Delta H_@$ 1.67
Meter Gamma 1.0577
Meter Box # 817
Nozzle Diameter 0.492
Probe Length 11'
K=14.37

Probe Mat'l NA
Filter Number NA
Samp Box # NA
PRE LEAK 0.004 cfm @ 10" Hg
POST LEAK 0.005 cfm @ 10" Hg

TRAVERSE POINT NUMBER	ELAPSED TIME (mins)	CLOCK TIME	GAS METER READING (V_m)	VELOCITY HEAD (delta p)	ORIFICE PRESSURE (delta H, "H_2O)		TEMPERATURES (PROCESS DATA)						PUMP VAC. "Hg
					Desired	Actual	STACK (T_s)	PROBE STACK TEMP*	FILTER SCFM*	IMP	METER INLET	METER OUTLET	
	0	1008	308.829	0.01	0.14	0.14	1515	1499	1080	72	86	86	0.5
	15	1023	311.990	0.01	0.14	0.14	1487	1504	1080	66	93	86	1.0
	30	1038	315.353	0.01	0.14	0.14	1475	1500	1120	68	100	91	1.0
	45	1053	318.637	0.01	0.14	0.14	1422	1498	1120	71	103	94	1.0
	60	1108	321.921	0.01	0.14	0.14	1458	1496	1160	74	104	96	1.5
	75	1123	325.240	0.01	0.14	0.14	1447	1502	1170	77	105	98	1.5
	90	1138	328.543	0.01	0.14	0.14	1446	1501	1200	73	106	98	1.5
	105	1153	331.806	0.01	0.14	0.14	1441	1498	1200	70	107	100	1.5
	120	1208	335.038	0.01	0.14	0.14	1490	1499	1230	71	108	102	1.5
	135	1223	338.231	0.01	0.14	0.14	1439	1499	1250	71	109	101	1.5
	150	1238	341.5	0.01	0.14	0.14	1421	1502	1270	74	110	103	1.5
	165	1253	344.512				1430	1503	1300	78	111	103	1.5
AVERAGE /SUM	165		35.630	0.100		0.14	1455.92	1500.08	1181.67	72.08	100.00		

* TAKEN from flare control panel.

KLEINFELDER, INC.

TRAIN RECOVERY SHEET

DATE 01 Aug 91

RUN# PS-3 METHOD PSD - PM10

FACILITY BFI Chateau Fresno

TYPE Std Imp

TECHNICIAN

IMP. SOLUTION H_2O

	SOLUTION	VOL. (ml)	DESCRIPTION
NOZZLE-PROBE RINSE			
UMBILICAL RINSE			

	SOLUTION	FINAL (g)	INITIAL(g)	NET(g)
IMPINGER # 1	H_2O	653.8	601.2	52.6
IMPINGER # 2	H_2O	557.7	555.3	2.4
IMPINGER # 3	MT	451.9	451.8	.1
IMPINGER # 4	GEL	688.3	676.1	12.2
DESCRIPTION				
IMPINGER RINSE				67.3

SILICA GEL	CONDITION	FINAL (g)	INITIAL(g)	NET (g)

FILTER	NUMBER	DESCRIPTION

TOTAL MOISTURE (g)

FIELD BLANKS

DISPOSITION/COMMENTS

19129-111

BFI - CHATEAU FRESNO

LFG FIRED FLARE

EXHAUST STACK

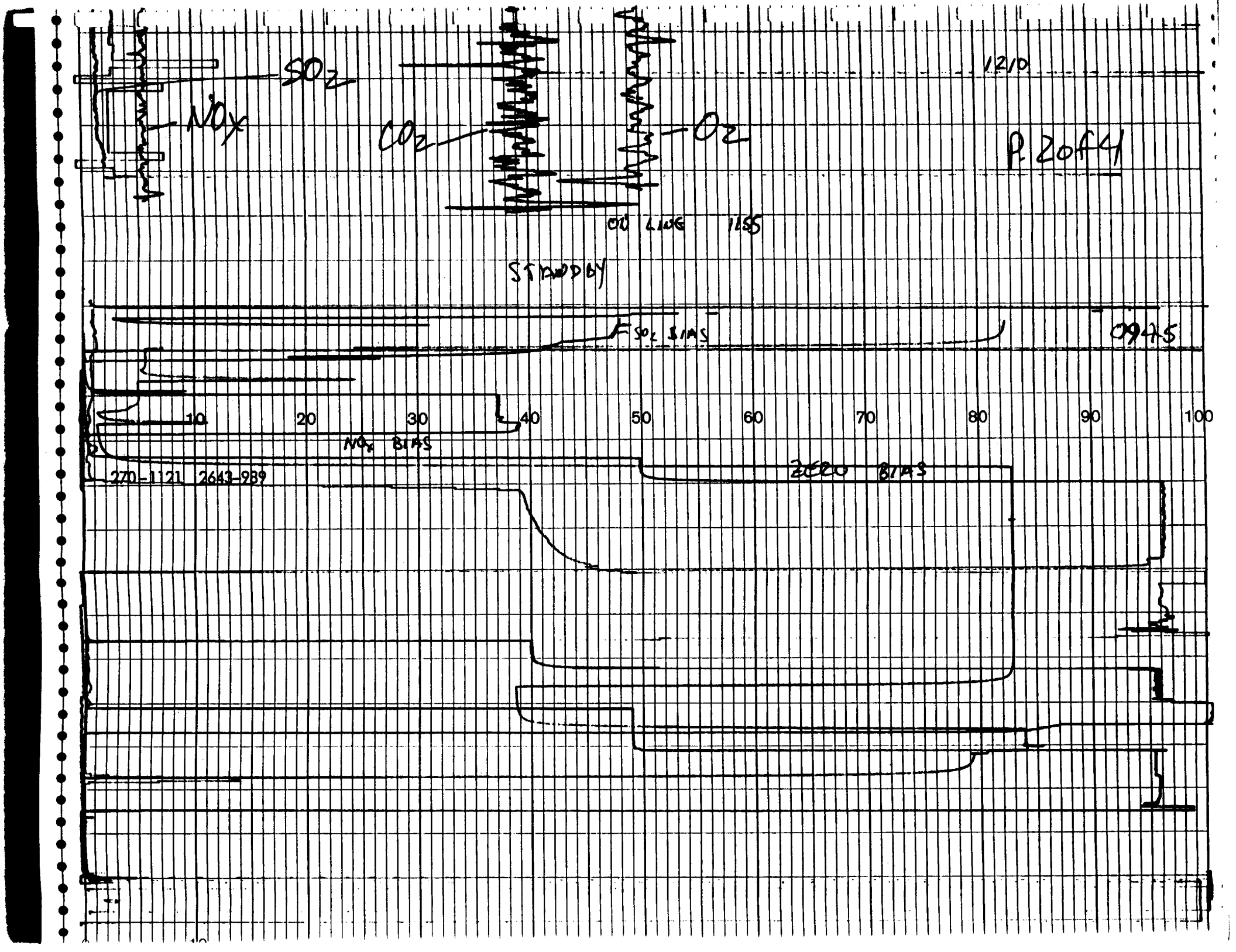
30 JUL 91

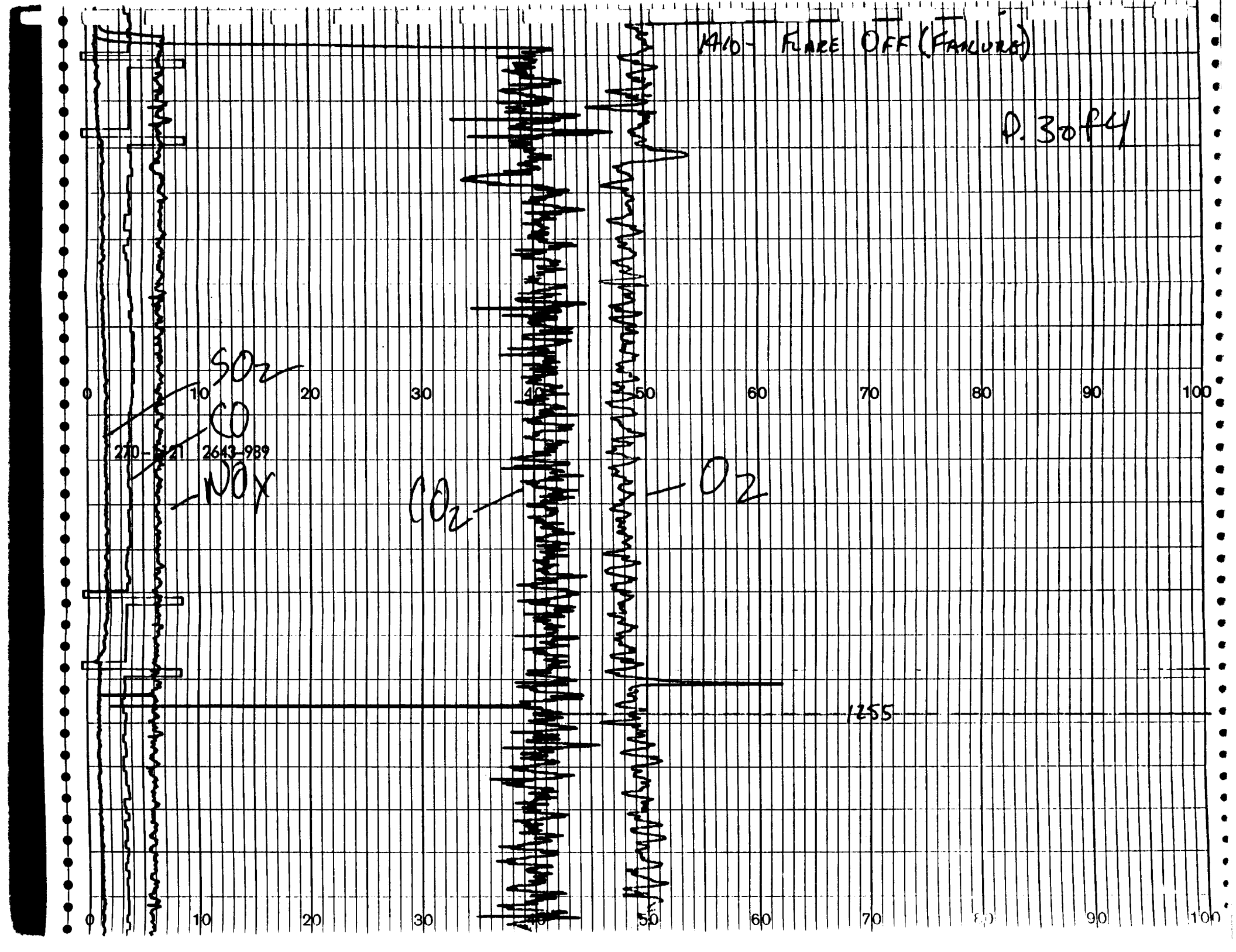
Plot 4

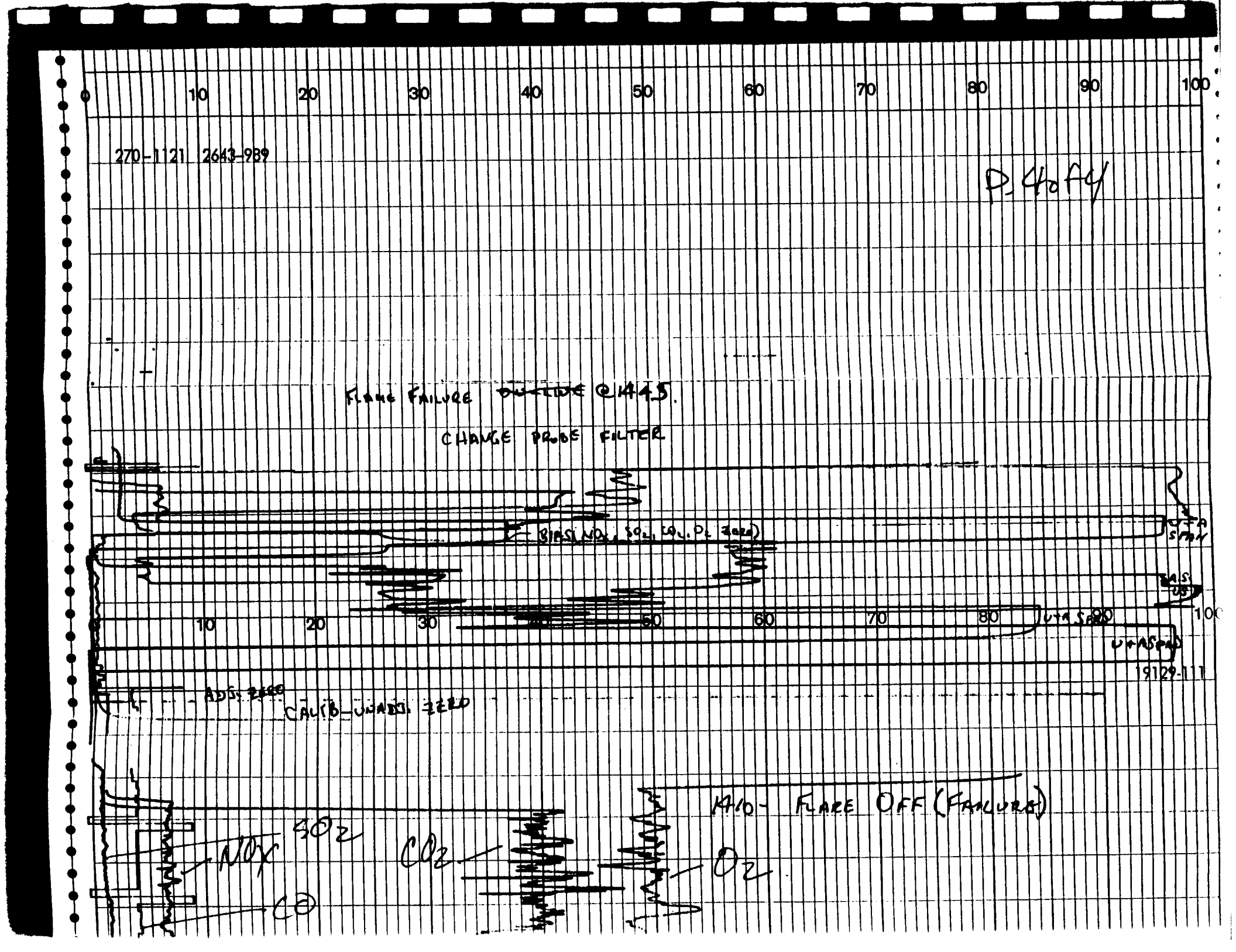
CHART : 2 mm/min

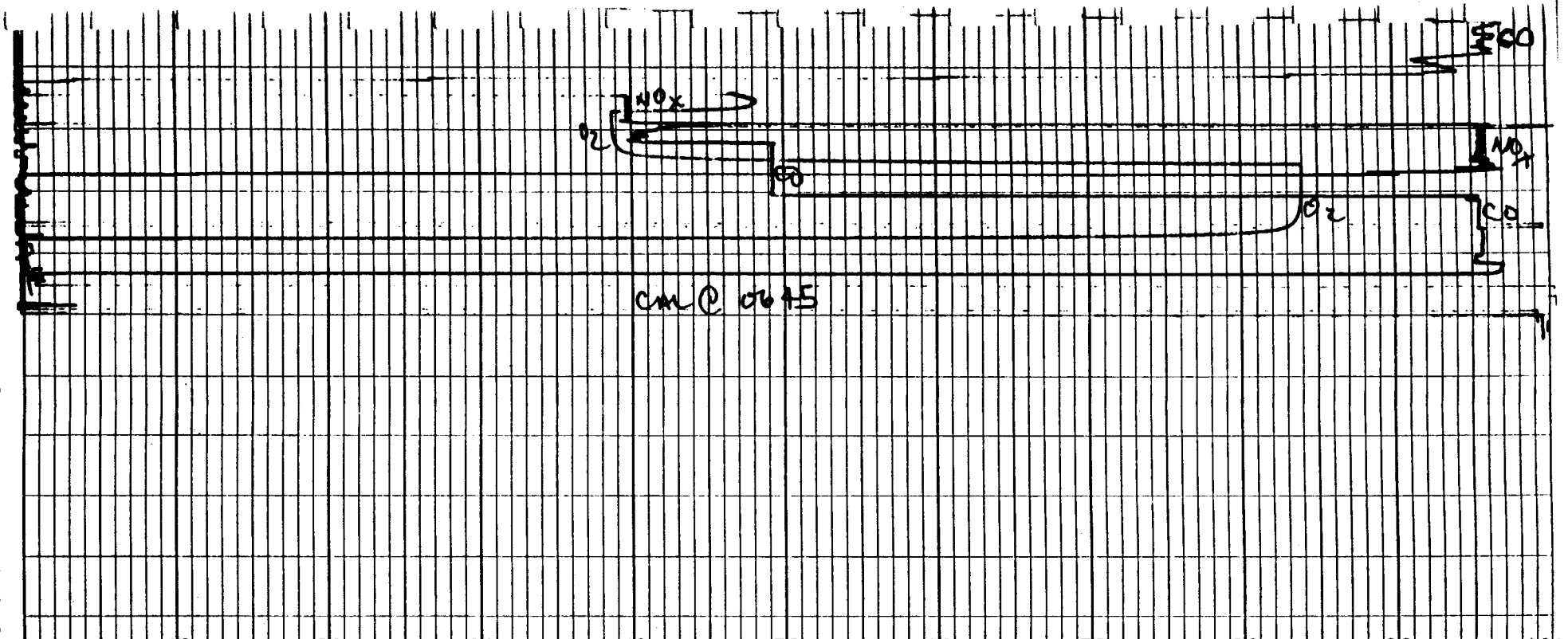
PARAMETER	FULL SCALE	COLOR
CO_2	20% v/v	BLUE
NO_x	250 PPM	BLACK
O_2	25% v/v	RED
CO	100 PPM	PURPLE
SO_2	200 PPM	GREEN

270-1121 2643-989


SO2
NOx
CO2
O2
1210
P. 20f41
00 LINE 1155
STANDBY
SO2 BIAS
0945
10
20
30
40
50
60
70
80
90
100
NOx BIAS
270-1121 2643-989
2000 BIAS


1410 - FLARE OFF (FAILURE)
P. 3 of 4
SO2
CO
NOX
CO2
O2
1255
0
10
20
30
40
50
60
70
80
90
100


270-1121 2643-989
P. 4 of 4
FLAME FAILURE DECLINE @1445.
CHANGE PROBE FILTER
BIAS_NOx, SO2, SO2, P2 ZERO)
UVA SPAN
BIAS UV
UVA SPAN
UVASPAN
9129-111
ADS: ZERO
CALIB_UVADJ. ZERO
1410 - FLAME OFF (FAILURE)
NOx
SO2
CO2
CO
O2

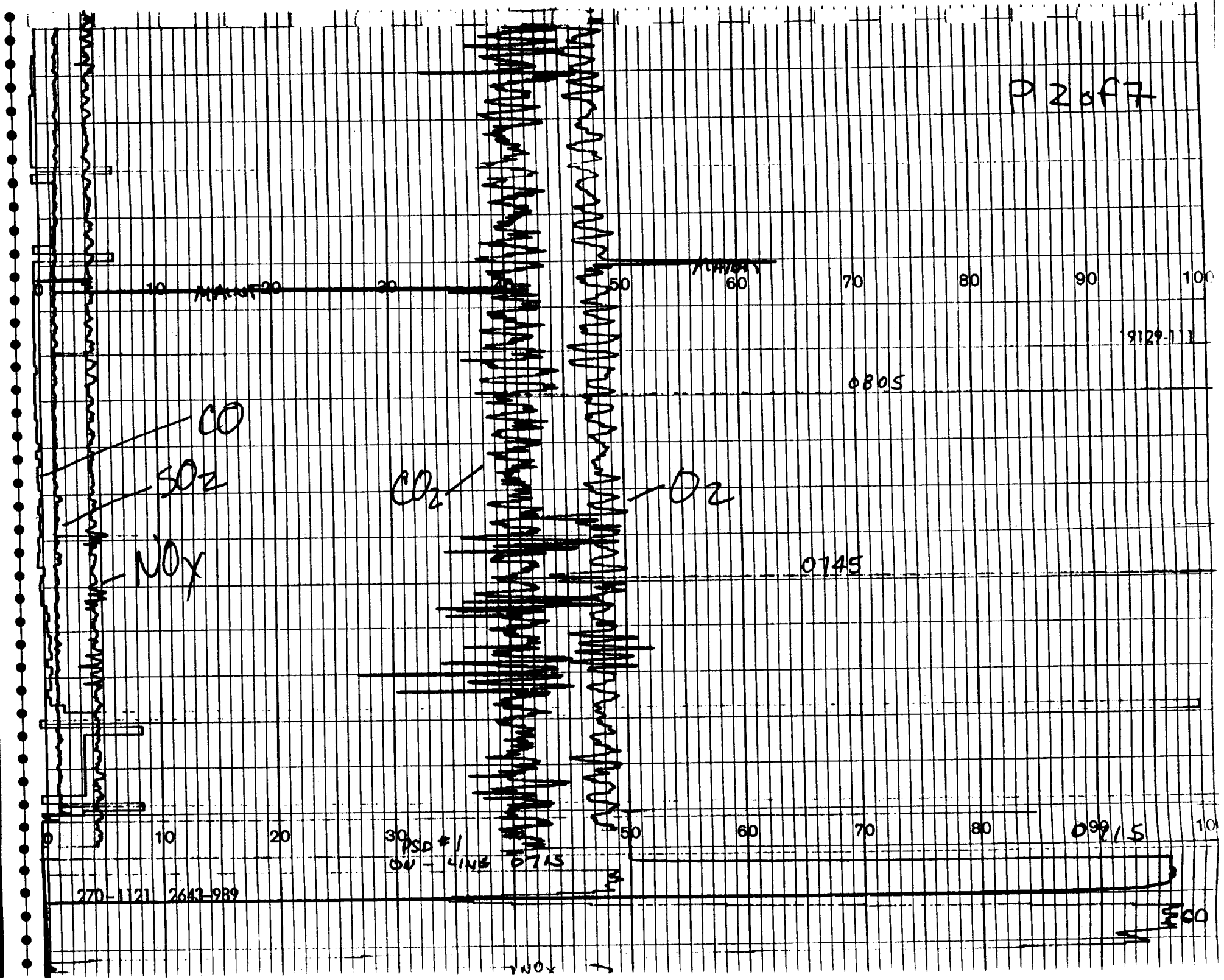


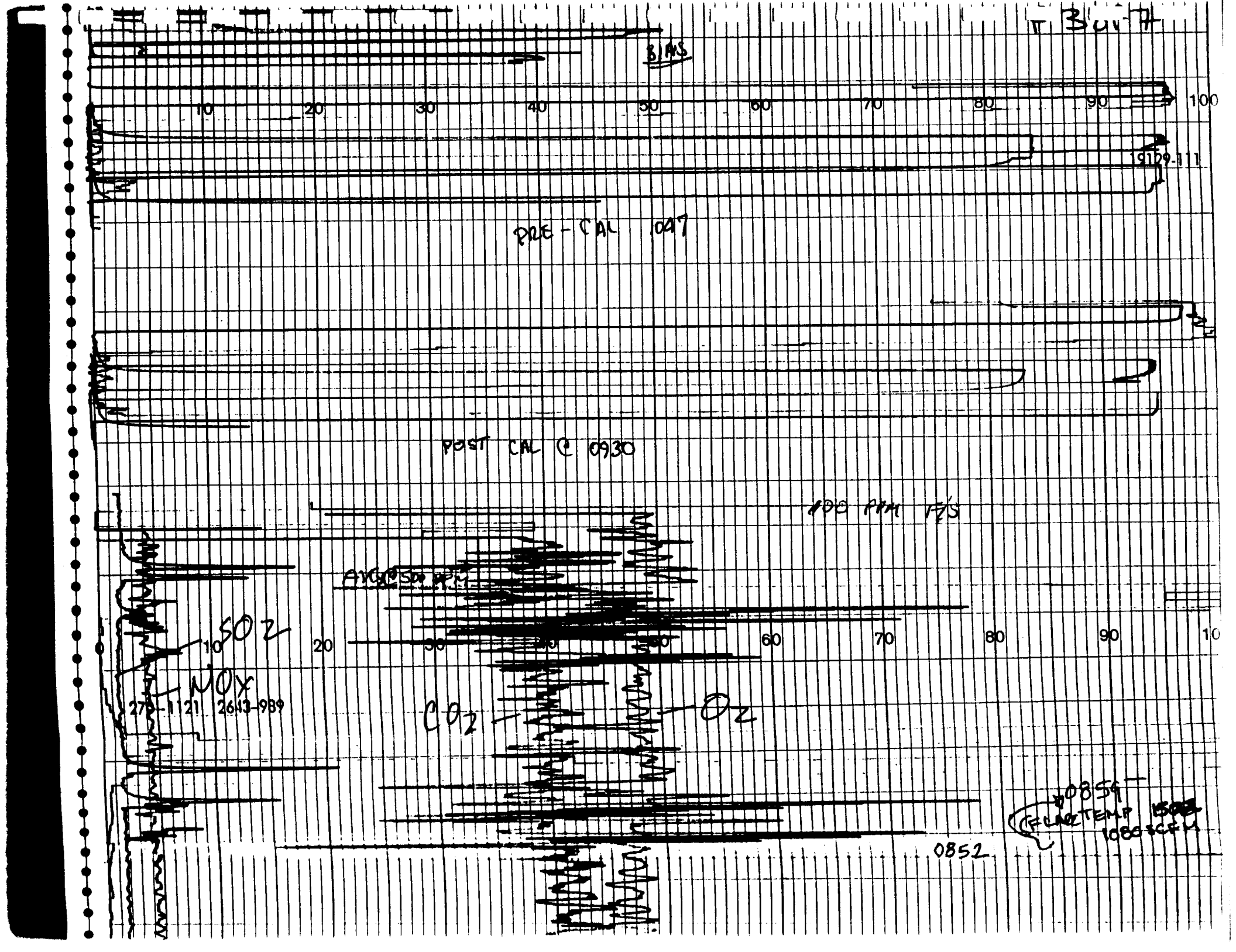
9129-111

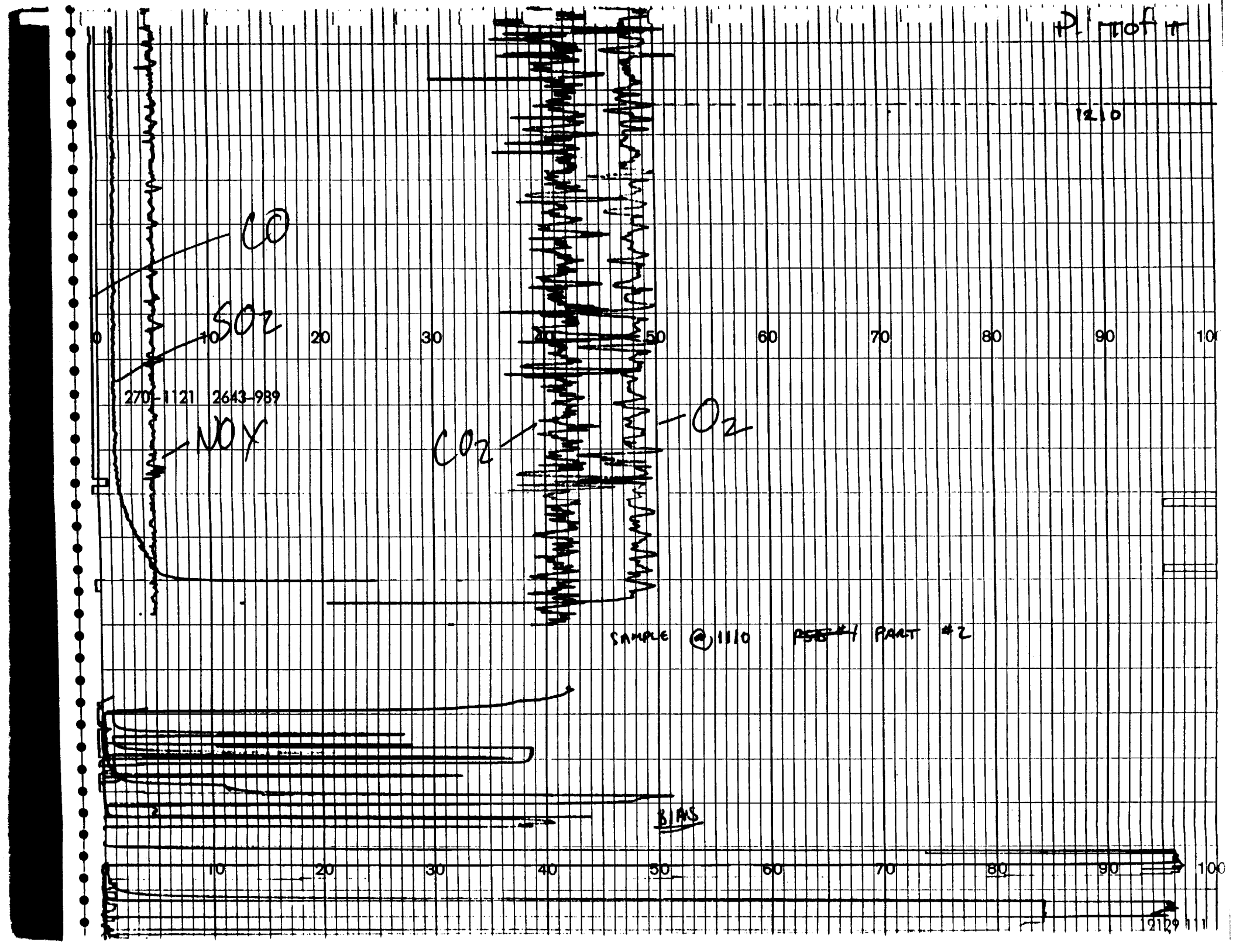
P 1 of 7

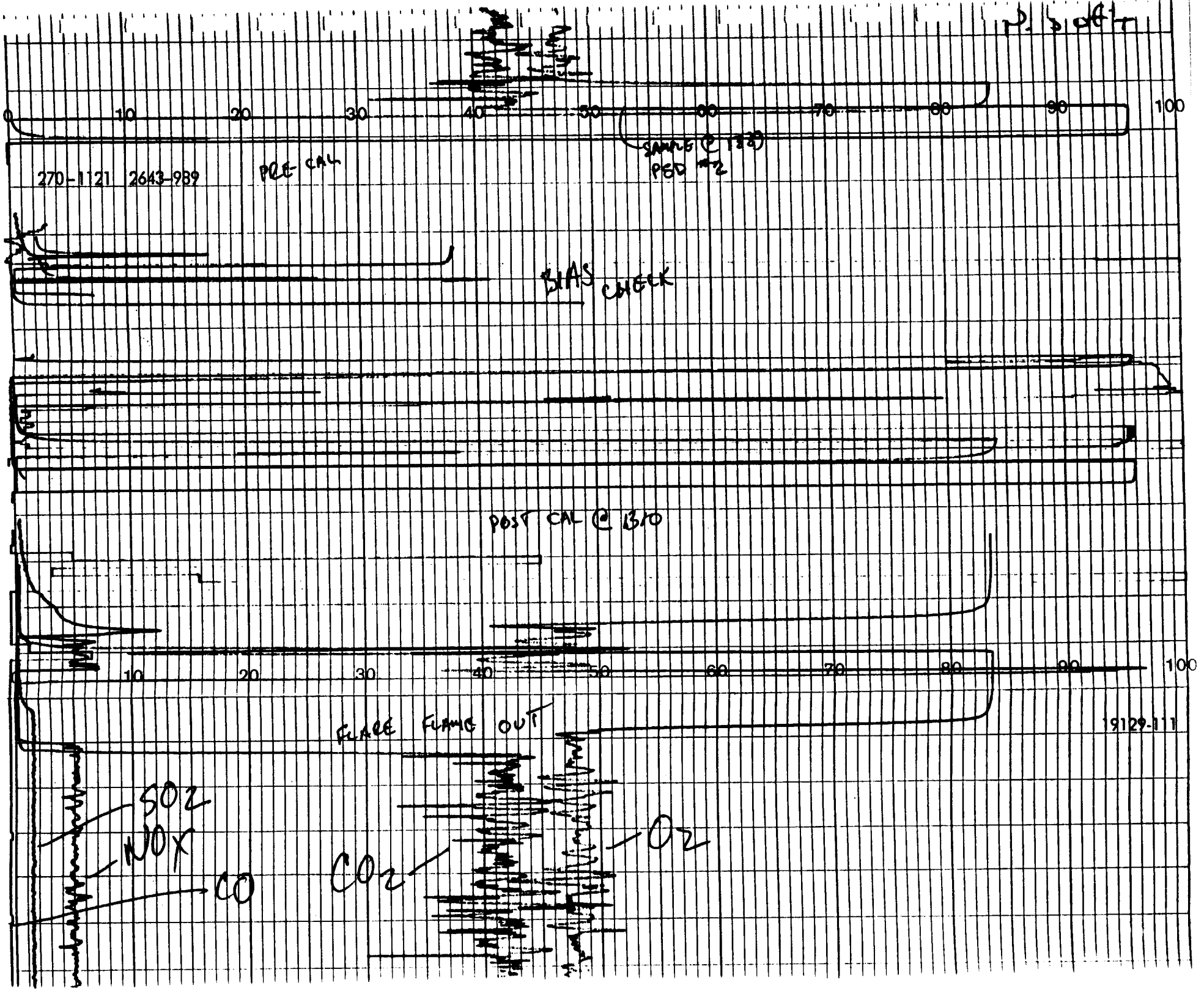
BAI CHATTEM FRED JR
LFG FLARE EXHAUST
31 JUL 91
CHART SPEED: 2 mm/min

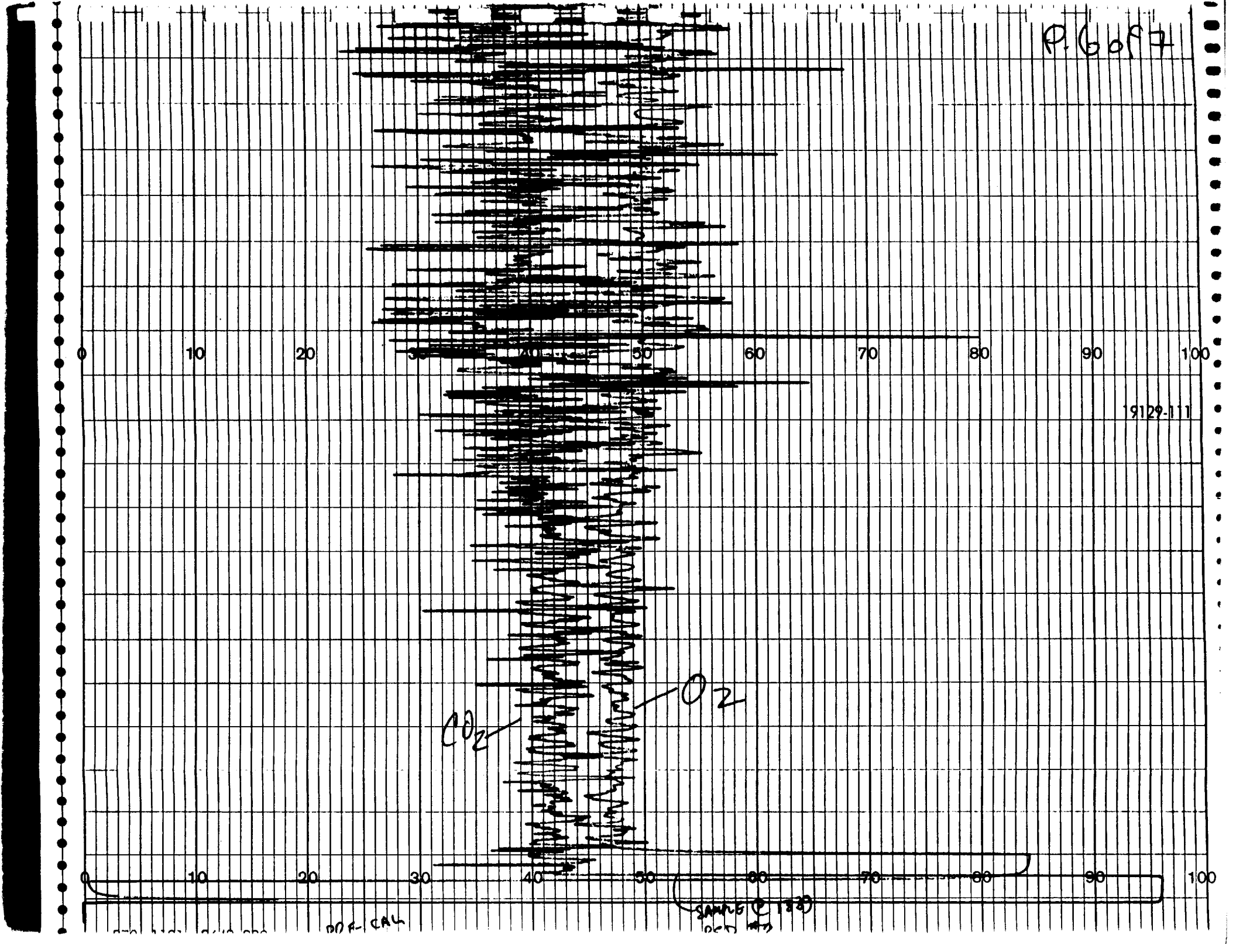
CO_2	20%	BLUE
NOx	250 PPM	BLACK
O_2	25 %	RED
CO	100 PPM	PURPLE
SO_2	200 PPM	GREEN

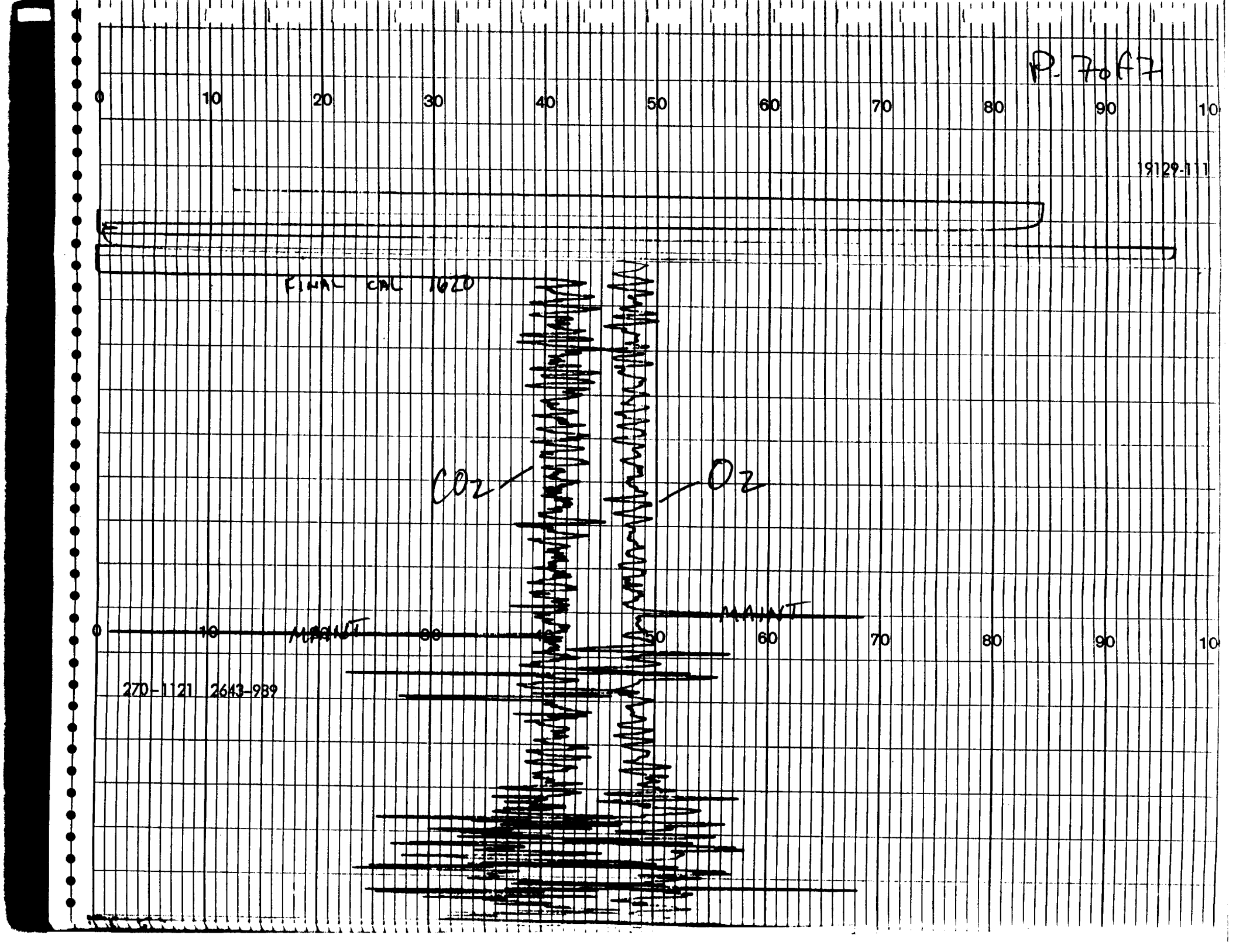

P 26 FT
CO
SO2
NOX
CO2
O2
0805
0745
0915
ECO
PSD #1
ΦU - LINE 0715
270-1121 2643-989
19129-111

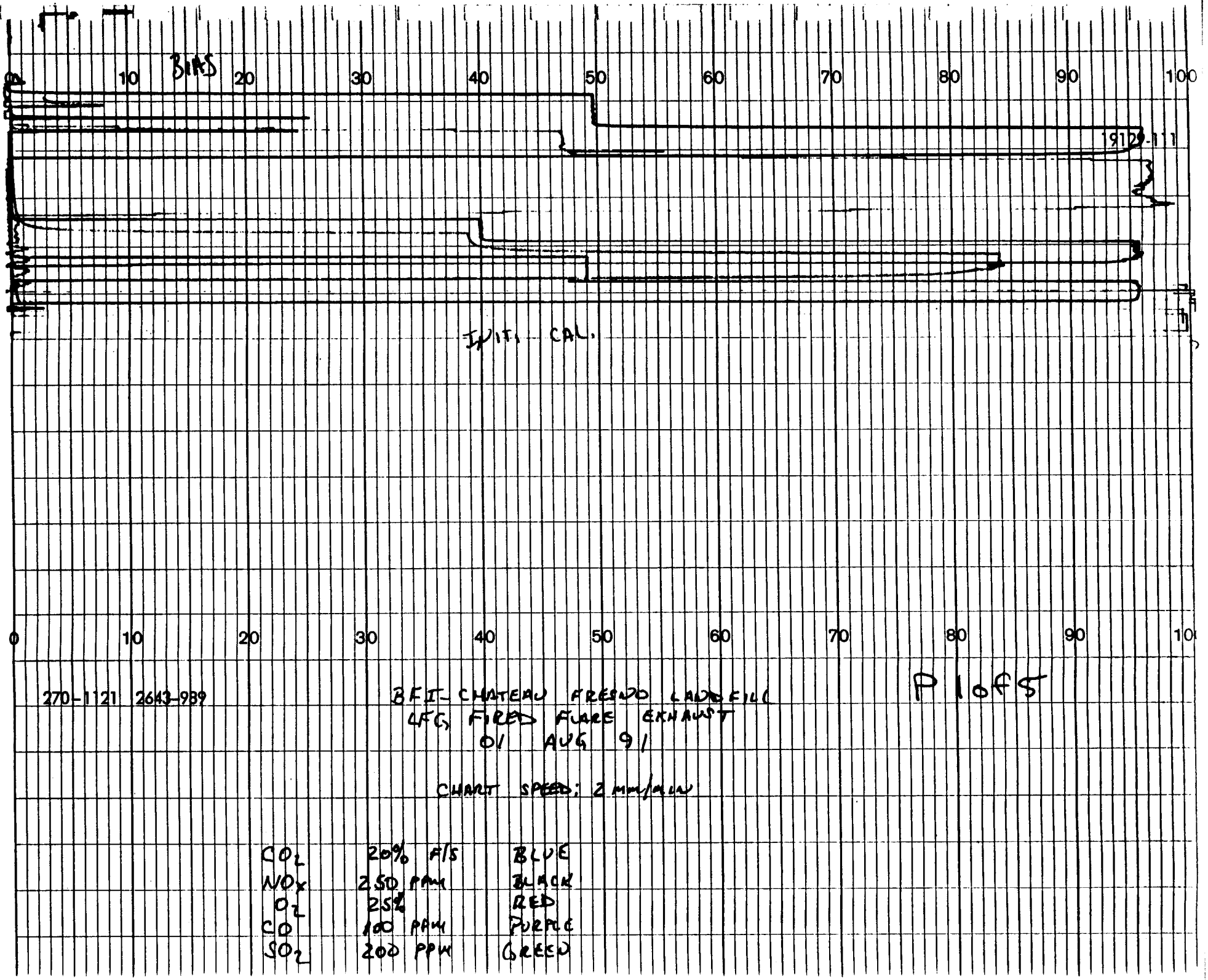

BIAS
10
20
30
40
50
60
70
80
90
100
PRE-CAL 1047
POST CAL @ 0930
400 PPM FS
AVG 50 PPM
10
20
60
70
80
90
SO2
NOX
CO2
O2
0852


CO
SO2
270-1121 2643-989
NOX
CO2
O2
SAMPLE @ 1110 PSS #1 PART #2
BIAS
0
10
20
30
40
50
60
70
80
90
100


0
10
20
30
40
50
60
70
80
90
100
SAMPLE @ 1350
PRE CAL
270-1121 2643-989
BIAS CHECK
POST CAL @ 1310
FLAME FLAME OUT
19129-111
SO2
NOX
CO
CO2
O2


P.6687
0
10
20
30
40
50
60
70
80
90
100
19129-111
CO2
O2
0
10
20
30
40
50
60
70
80
90
100
SAMPLE @ 1880


P- 7 of 7
0
10
20
30
40
50
60
70
80
90
10
19129-111
FINAL CAL 1620
CO2
O2
MAINT
MAINT
270-1121 2643-989



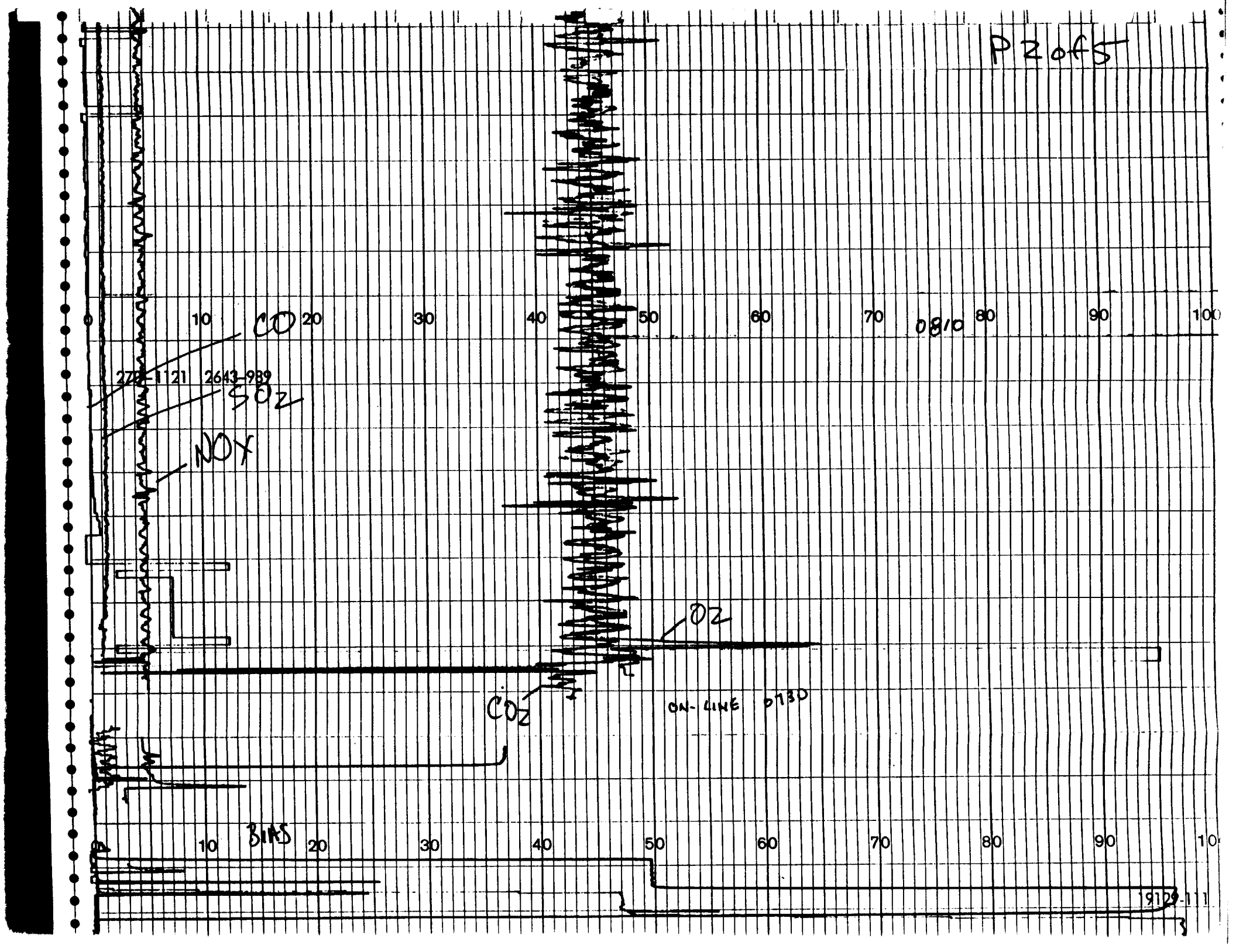
270-1121 2643-989

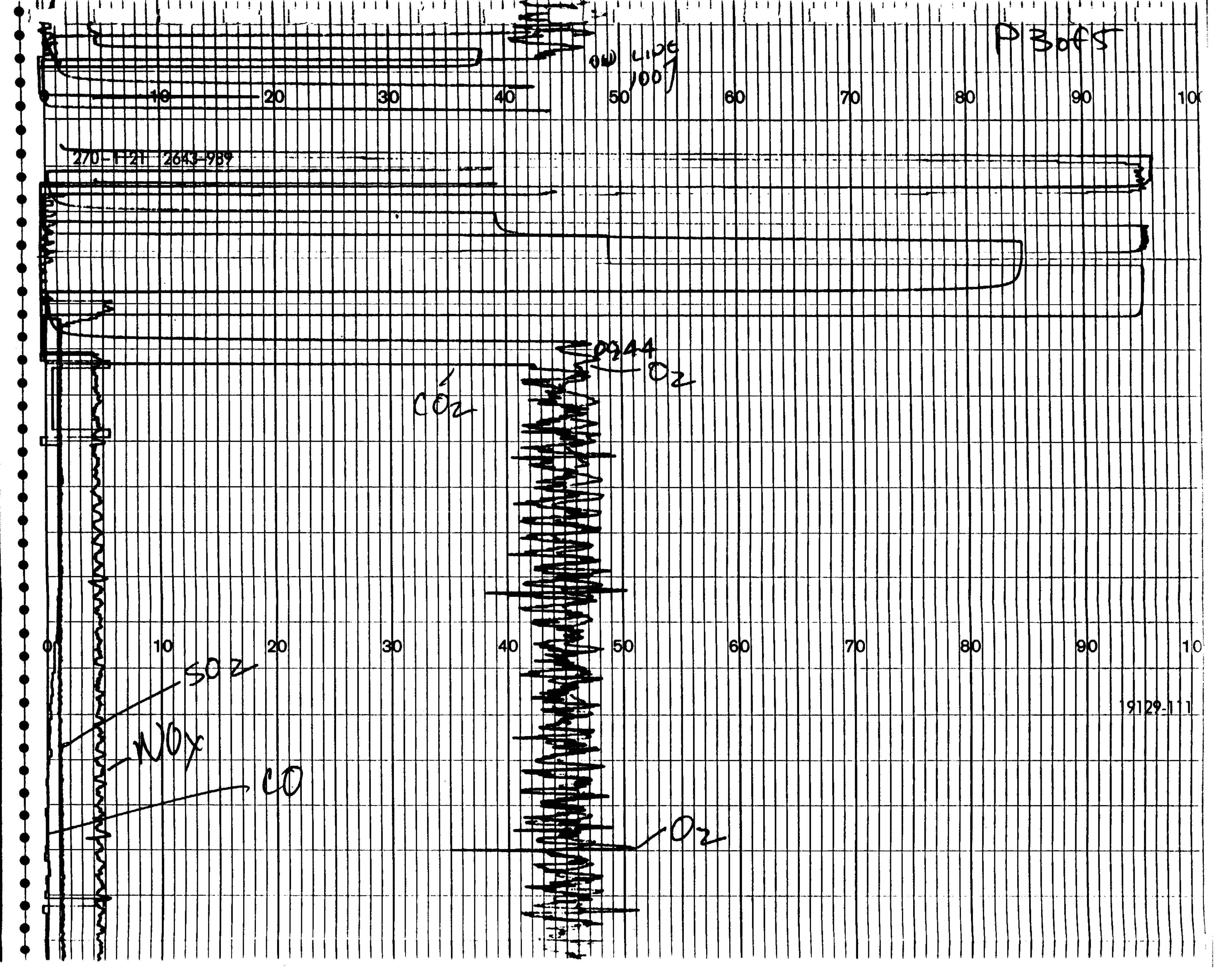
BFI- CHATEAU FRESNO LANDFILL
4FG, FIRED FLARE EXHAUST
01 AUG 91

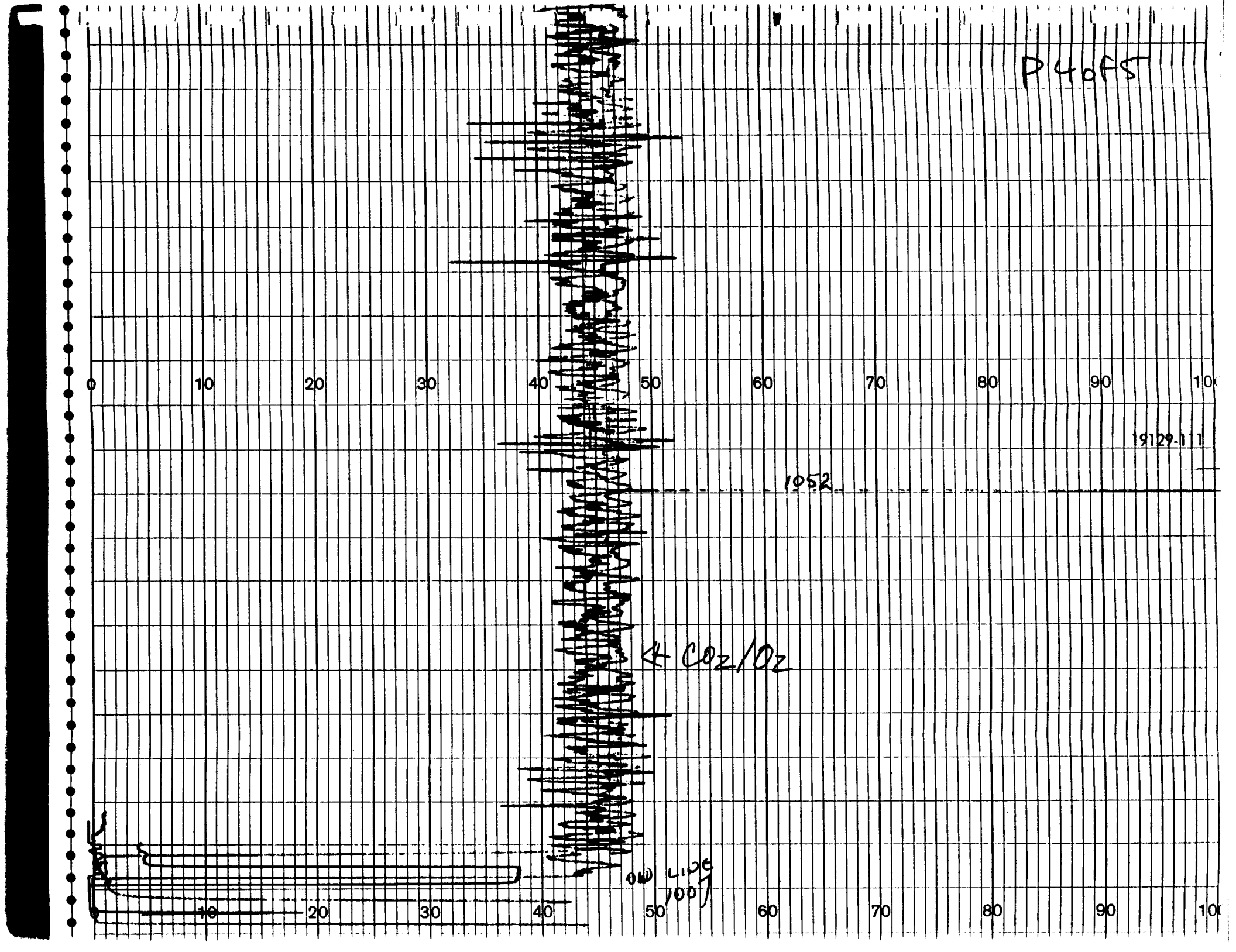
P 1 OF 5

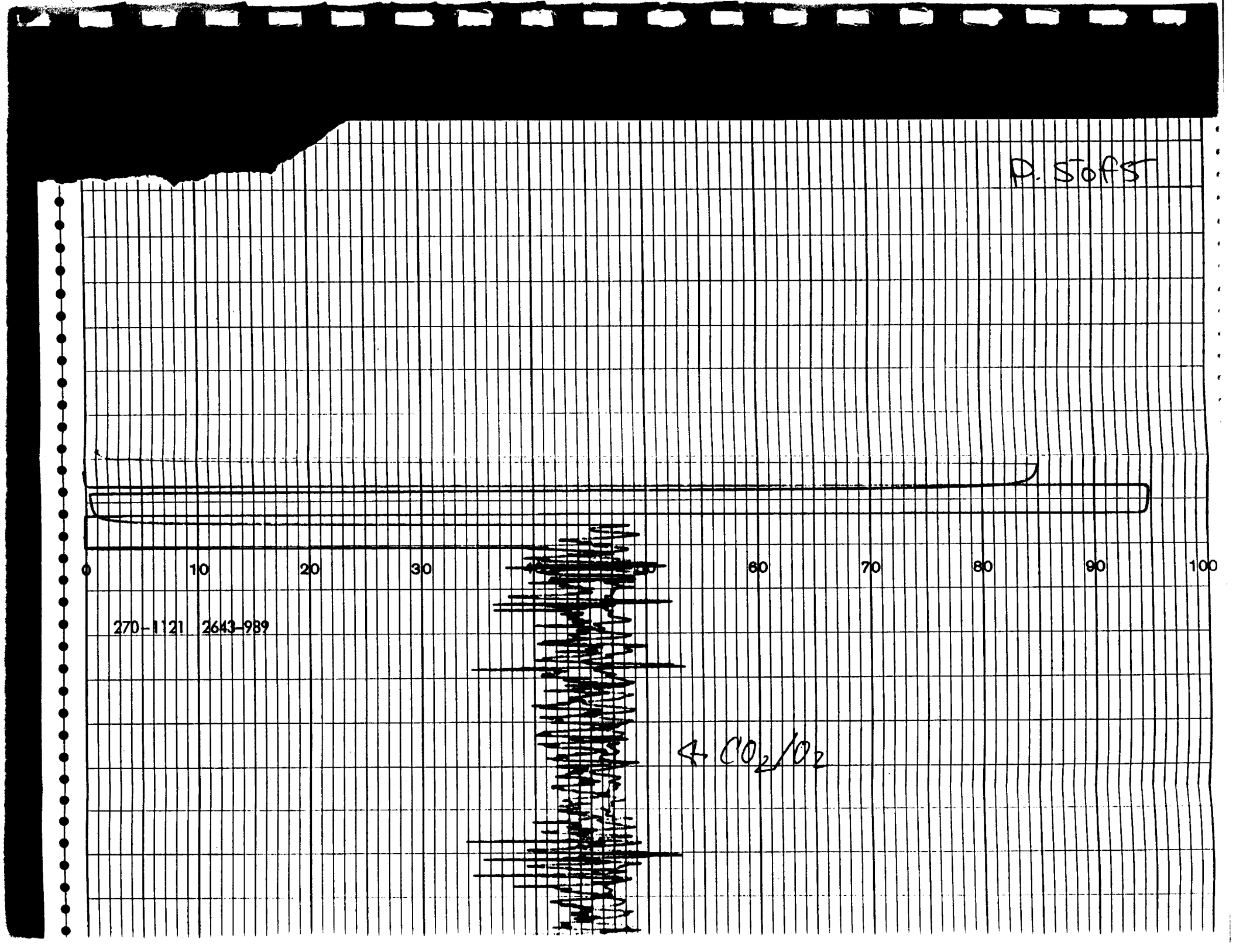
CHART SPEED: 2 mm/min

CO_2	20% F/S	BLUE
NO_x	250 PPM	BLACK
O_2	25%	RED
CO	100 PPM	PURPLE
SO_2	200 PPM	GREEN


P2 of 5
0 10 CO 20 30 40 50 60 70 08/0 80 90 100
2643-939
SO2
NOX
O2
CO2
ON-LINE D730
0 10 BIAS 20 30 40 50 60 70 80 90 10
9109-111


P 3 of 5
ON LINE
1007
270-1 21 2643-989
0944
O2
CO2
SO2
NOx
CO
O2
19129-111


P40f5
0
10
20
30
40
50
60
70
80
90
19129-111
1052
4 CO2/O2
0
10
20
30
40
50
60
70
80
90


R. Stoft
0
10
20
30
60
70
80
90
100
270-1121 2643-989
$\dot{V}_{CO_2}/\dot{V}_{O_2}$

LABORATORY ANALYSIS REPORT

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

Report Date:	September 4, 1991
Client:	Kleinfelder, Inc.
P.O. No.:	70-1631-121
Project No.:	71-4022-66001
Site:	BFI Fresno
Date Received:	August 29, 1991
Date Analyzed:	August 30, 1991

ANALYSIS DESCRIPTION

Methane was analyzed by thermal conductivity detection/gas chromatography (TCD/GC). TGNMO was analyzed by flame ionization detection/gas chromatography (FID/GC).

AtmAA Lab No.	Sample ID	Test Date	[redacted]	
			(%,v/v)	(ppm, v/v)
92411-9	OUT-1	8-29	<1	8.17
92411-10	OUT-2	8-29	<1	1.45
92411-11	OUT-3	8-29	<1	5.68

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

Michael L. Porter
Laboratory Director

KLEINFELDER, INC.
Diamond Bar, California

LABORATORY DATA
PARTICULATE DRYDOWNS

DATE ANALYZED 8/6/91
DATE FINISHED
ANALYST

TEST DATE 30 Jul 91
FACILITY CHATEAU

BOOK PAGE	FRACTION	BEAKER/ FILTER NO.	ALIQUOT FACTOR	GROSS WT (gm)	TARE WT (gm)	(NET WT * AF) - BLANK = FINAL
	RUN NO. 5-1 LABORATORY CONTROL NO. 5-1-FA					
	B	A1D	1	103.1098	103.0931	0.0167
	RUN NO. 5-1 LABORATORY CONTROL NO. 5-1-FB					
	B	C01	1	88.5401	88.5358	0.0043
	RUN NO. 5-1 LABORATORY CONTROL NO. 5-1-BA					
	C	A12	1	105.7603	105.7601	0.0002

FRACTIONS:
A = FILTER CATCH
B = PROBE CATCH
C = IMPINGER CATACH
F = SOLVENT CATCH
AF = TOTAL VOLUME / ALIQUOT VOLUME

KLEINFELDER, INC.
Diamond Bar, California

LABORATORY DATA
PARTICULATE DRYDOWNS

DATE ANALYZED 06 Aug 91
DATE FINISHED
ANALYST

TEST DATE 30 Jul 91
FACILITY Chateau

BOOK PAGE	FRACTION	BEAKER/ FILTER NO.	ALIQUOT FACTOR	GROSS WT (gm)	TARE WT (gm)	(NET WT * AF) - BLANK = FINAL
	RUN NO. 5-1 LABORATORY CONTROL NO. 5-1-BB					
	C	B02	1	113.5223	113.5210	0.0013
	RUN NO. 5-1 LABORATORY CONTROL NO. 5-1-FC					
	A	0007		0.4028	0.4042	0.0000
	RUN NO. BLK LABORATORY CONTROL NO. BLK					
	B, C	C02	100/100	88.5343	88.5344	0.0000

FRACTIONS:
A = FILTER CATCH
B = PROBE CATCH
C = IMPINGER CATACH
F = SOLVENT CATCH
AF = TOTAL VOLUME / ALIQUOT VOLUME

KLEINFELDER, INC.
Diamond Bar, California

LABORATORY DATA
PARTICULATE DRYDOWNS

DATE ANALYZED 06 AUG 91
DATE FINISHED
ANALYST

TEST DATE 31 JUL 91
FACILITY CHATEAU

BOOK PAGE	FRACTION	BEAKER/ FILTER NO.	ALIQUOT FACTOR	GROSS WT (gm)	TARE WT (gm)	(NET WT * AF) - BLANK = FINAL
	RUN NO. 5-2 LABORATORY CONTROL NO. 5-2-FA					
	B	A02		110.7060	110.6957	0.0103
	RUN NO. 5-2 LABORATORY CONTROL NO. 5-2-FB					
	B	C05		86.9829	86.9796	0.0033
	RUN NO. 5-2 LABORATORY CONTROL NO. 5-2-BA					
	C	A03		110.8983	110.8980	0.0003

FRACTIONS:
A = FILTER CATCH
B = PROBE CATCH
C = IMPINGER CATACH
F = SOLVENT CATCH
AF = TOTAL VOLUME / ALIQUOT VOLUME

KLEINFELDER, INC.
Diamond Bar, California

LABORATORY DATA
PARTICULATE DRYDOWNS

DATE ANALYZED 06 Aug 91
DATE FINISHED
ANALYST

TEST DATE 31 Jul 91
FACILITY Chateau

BOOK PAGE	FRACTION	BEAKER/ FILTER NO.	ALIQUOT FACTOR	GROSS WT (gm)	TARE WT (gm)	(NET WT * AF) - BLANK = FINAL
	RUN NO. 5-2 LABORATORY CONTROL NO. 5-2-BB					
	C	B01		109.8226	109.8222	0.0004
	RUN NO. 5-2 LABORATORY CONTROL NO. 5-2-FC					
	A	0005		0.3989	0.3982	0.0007
	RUN NO. LABORATORY CONTROL NO.					

FRACTIONS:
A = FILTER CATCH
B = PROBE CATCH
C = IMPINGER CATCH
F = SOLVENT CATCH
AF = TOTAL VOLUME / ALIQUOT VOLUME

KLEINFELDER, INC.
Diamond Bar, California

LABORATORY DATA
PARTICULATE DRYDOWNS

DATE ANALYZED 06 Aug 91
DATE FINISHED
ANALYST

TEST DATE 01 Aug 91
FACILITY CHATEAU

BOOK PAGE	FRACTION	BEAKER/ FILTER NO.	ALIQUOT FACTOR	GROSS WT (gm)	TARE WT (gm)	(NET WT * AF) - BLANK = FINAL
	RUN NO. 5-3 LABORATORY CONTROL NO. 5-3-FA					
	B	C09		89.7467	89.7402	0.0065
	RUN NO. 5-3 LABORATORY CONTROL NO. 5-3-FB					
	B	C11		89.3395	89.3257	0.0138
	RUN NO. 5-3 LABORATORY CONTROL NO. 5-3-BA					
	C	A06		111.1625	111.1621	0.0004

FRACTIONS:
A = FILTER CATCH
B = PROBE CATCH
C = IMPINGER CATACH
F = SOLVENT CATCH
AF = TOTAL VOLUME / ALIQUOT VOLUME

KLEINFELDER, INC.
Diamond Bar, California

LABORATORY DATA
PARTICULATE DRYDOWNS

DATE ANALYZED 06 AUG 91
DATE FINISHED
ANALYST

TEST DATE 01 AUG 91
FACILITY CHATEAU

BOOK PAGE	FRACTION	BEAKER/ FILTER NO.	ALIQUOT FACTOR	GROSS WT (gm)	TARE WT (gm)	(NET WT * AF) - BLANK = FINAL
	RUN NO. 5-3 LABORATORY CONTROL NO. 5-3-3B					
	C	C07		89.5197	89.5193	0.0004
	RUN NO. 5-3 LABORATORY CONTROL NO. 5-3-FC					
	A	0010		0.4071	0.4078	0.0000
	RUN NO. LABORATORY CONTROL NO.					

FRACTIONS:
A = FILTER CATCH
B = PROBE CATCH
C = IMPINGER CATACH
F = SOLVENT CATCH
AF = TOTAL VOLUME / ALIQUOT VOLUME

KLEINFELDER, INC.

Diamond Bar, California

PARTICULATE DRYDOWNS

DATE ANALYZED 6 AUG 91

DATE FINISHED

ANALYST A. GRBES

TEST DATE 31 JULY 91

FACILITY BFI - CHATEAU FRESNO

BOOK PAGE	FRACTION	BEAKER/ FILTER NO.	ALIQUOT FACTOR	GROSS WT (gm)	TARE WT (gm)	(NET WT * AF) - BLANK = FINAL
	RUN NO. PSD1 LABORATORY CONTROL NO. PSD1-PØ					
	A	B03	1.0	110.0400	110.0354	0.0046
	RUN NO. PSD1 LABORATORY CONTROL NO. PSD1-P1					
	A	B04	1.0	111.3730	111.3699	0.0031
	RUN NO. PSD1 LABORATORY CONTROL NO. PSD1-P2					
	A	B06	1.0	109.8703	109.8646	0.0057

FRACTIONS:
A = FILTER CATCH
B = PROBE CATCH
C = IMPINGER CATACH
F = SOLVENT CATCH
AF = TOTAL VOLUME / ALIQUOT VOLUME

KLEINFELDER, INC.

Diamond Bar, California

PARTICULATE DRYDOWNS

DATE ANALYZED 6 AUG 91

DATE FINISHED

ANALYST A. ERBES

TEST DATE 31 JULY 91

FACILITY BEI - CHATEAU FRESNO

BOOK PAGE	FRACTION	BEAKER/ FILTER NO.	ALIQUOT FACTOR	GROSS WT (gm)	TARE WT (gm)	(NET WT * AF) - BLANK = FINAL
	RUN NO. PSD1 LABORATORY CONTROL NO. PSD1-P3					
	A	B09	1.0	110.6832	110.6808	0.0024
	RUN NO. PSD1 LABORATORY CONTROL NO. PSD1-P4					
	A	B10	1.0	109.6829	109.6798	0.0031
	RUN NO. PSD1 LABORATORY CONTROL NO. PSD1-P5					
	A	C03	1.0	87.3748	87.3724	0.0024

FRACTIONS:

A = FILITER CATCH
B = PROBE CATCH
C = IMPINGER CATACH
F = SOLVENT CATCH
AF = TOTAL VOLUME / ALIQUOT VOLUME

KLEINFELDER, INC.

Diamond Bar, California

PARTICULATE DRYDOWNS

DATE ANALYZED 6 AUG 91

DATE FINISHED

ANALYST A. ELBES

TEST DATE 31 JULY 91

FACILITY BEI - CHATEAU FRESNO

BOOK PAGE	FRACTION	BEAKER/ FILTER NO.	ALIQUOT FACTOR	GROSS WT (gm)	TARE WT (gm)	(NET WT * AF) - BLANK = FINAL
	RUN NO. PSD1 LABORATORY CONTROL NO. PSD1-P6					
	A	C04	1.0	88.6697	88.6676	0.0021
	RUN NO. PSD1 LABORATORY CONTROL NO. PSD1-P7					
	A	C06	1.0	87.9444	87.9442	0.0002
	RUN NO. PSD1 LABORATORY CONTROL NO. PSD1-P8					
	A	C10	1.0	89.7347	89.7334	0.0013

FRACTIONS:
A = FILTER CATCH
B = PROBE CATCH
C = IMPINGER CATCH
F = SOLVENT CATCH
AF = TOTAL VOLUME / ALIQUOT VOLUME

KLEINFELDER, INC.

Diamond Bar, California

PARTICULATE DRYDOWNS

DATE ANALYZED 6 AUG 91

DATE FINISHED

ANALYST A. Erbes

TEST DATE 31 JULY 91

FACILITY BFI - CHATEAU FRESNO

BOOK PAGE	FRACTION	BEAKER/ FILTER NO.	ALIQUOT FACTOR	GROSS WT (gm)	TARE WT (gm)	(NET WT * AF) - BLANK = FINAL
	RUN NO. PSD1 LABORATORY CONTROL NO. PSD1-B/U					
		C08	1.0	87.9986	87.9959	0.0027
	RUN NO. LABORATORY CONTROL NO.					
	RUN NO. LABORATORY CONTROL NO.					

FRACTIONS:
A = FILTER CATCH
B = PROBE CATCH
C = IMPINGER CATACH
F = SOLVENT CATCH
AF = TOTAL VOLUME / ALIQUOT VOLUME

KLEINFELDER, INC.

Diamond Bar, California

PARTICULATE DRYDOWNS

DATE ANALYZED 7 AUG 91

DATE FINISHED

ANALYST A. Erbes

TEST DATE 31 JULY 91

FACILITY BFI-CHATEAU FRESNO

BOOK PAGE	FRACTION	BEAKER/ FILTER NO.	ALIQUOT FACTOR	GROSS WT (gm)	TARE WT (gm)	(NET WT * AF) - BLANK = FINAL
	RUN NO. PSD 2 LABORATORY CONTROL NO. PSD2-PØ					
	A	A07	1.0	110.9472	110.9429	0.0043
	RUN NO. PSD2 LABORATORY CONTROL NO. PSD2-P1					
	A	B08	1.0	110.1743	110.1700	0.0043
	RUN NO. PSD 2 LABORATORY CONTROL NO. PSD2-P2					
	A	B11	1.0	109.9525	109.9492	0.0033

FRACTIONS:
A = FILTER CATCH
B = PROBE CATCH
C = IMPINGER CATACH
F = SOLVENT CATCH
AF = TOTAL VOLUME / ALIQUOT VOLUME

KLEINFELDER, INC.
Diamond Bar, California
PARTICULATE DRYDOWNS

DATE ANALYZED 7 AUG 91
DATE FINISHED
ANALYST A. Echeo

TEST DATE 31 JULY 91
FACILITY BFI - CHATEAU FRESNO

BOOK PAGE	FRACTION	BEAKER/ FILTER NO.	ALIQUOT FACTOR	GROSS WT (gm)	TARE WT (gm)	(NET WT * AF) - BLANK = FINAL
	RUN NO. PSD2 LABORATORY CONTROL NO. PSD2-P3					
	A	B12	1.0	109.6758	109.6750	0.0008
	RUN NO. PSD2 LABORATORY CONTROL NO. PSD2-P4					
	A	C02	1.0	88.6091	88.6086	0.0005
	RUN NO. PSD2 LABORATORY CONTROL NO. PSD2-P5					
	A	C03	1.0	87.3751	87.3740	0.0011

FRACTIONS:
A = FILTER CATCH
B = PROBE CATCH
C = IMPINGER CATACH
F = SOLVENT CATCH
AF = TOTAL VOLUME / ALIQUOT VOLUME

KLEINFELDER, INC.
Diamond Bar, California
PARTICULATE DRYDOWNS

DATE ANALYZED 7 AUG 91
DATE FINISHED
ANALYST A. Erbio

TEST DATE 31 JULY 91
FACILITY BFI - CHATEAU FRESNO

BOOK PAGE	FRACTION	BEAKER/ FILTER NO.	ALIQUOT FACTOR	GROSS WT (gm)	TARE WT (gm)	(NET WT * AF) - BLANK = FINAL
	RUN NO. PSD2 LABORATORY CONTROL NO. PSD2-P6					
	A	C05	1.0	86.9797	86.9796	0.0001
	RUN NO. PSD2 LABORATORY CONTROL NO. PSD2-P7					
	A	C06	1.0	87.9449	87.9440	0.0009
	RUN NO. PSD2 LABORATORY CONTROL NO. PSD2-P8					
	A	C08	1.0	87.9978	87.9977	0.0001

FRACTIONS:
A = FILTER CATCH
B = PROBE CATCH
C = IMPINGER CATACH
F = SOLVENT CATCH
AF = TOTAL VOLUME / ALIQUOT VOLUME

KLEINFELDER, INC.
Diamond Bar, California
PARTICULATE DRYDOWNS

DATE ANALYZED 7 AUG 91
DATE FINISHED
ANALYST A. Erbes

TEST DATE 31 JULY 91
FACILITY BFI - CHATEAU FRESNO

BOOK PAGE	FRACTION	BEAKER/ FILTER NO.	ALIQUOT FACTOR	GROSS WT (gm)	TARE WT (gm)	(NET WT * AF) - BLANK = FINAL
	RUN NO. PSD2 LABORATORY CONTROL NO. PSD2 - B/U					
	A	C09	1.0	89.7421	89.7407	0.0014
	RUN NO. LABORATORY CONTROL NO.					
	RUN NO. LABORATORY CONTROL NO.					

FRACTIONS:
A = FILTER CATCH
B = PROBE CATCH
C = IMPINGER CATACH
F = SOLVENT CATCH
AF = TOTAL VOLUME / ALIQUOT VOLUME

KLEINFELDER, INC.

Diamond Bar, California

PARTICULATE DRYDOWNS

DATE ANALYZED 8 AUG 91

DATE FINISHED

ANALYST A. Erbeo

TEST DATE 1 AUG 91

FACILITY BFI - CHATEAU FRESNO

BOOK PAGE	FRACTION	BEAKER/ FILTER NO.	ALIQUOT FACTOR	GROSS WT (gm)	TARE WT (gm)	(NET WT * AF) - BLANK = FINAL
	RUN NO. PSD3 LABORATORY CONTROL NO. PSD3-P0					
	A	B06		109.8678	109.8666	0.0012
	RUN NO. PSD3 LABORATORY CONTROL NO. PSD3-P1					
	A	B04		111.3697	111.3695	0.0002
	RUN NO. PSD3 LABORATORY CONTROL NO. PSD3-P2					
	A	C10		89.7390	~~89.7385~~ (RW) 89.7352	0.0038

FRACTIONS:
A = FILTER CATCH
B = PROBE CATCH
C = IMPINGER CATACH
F = SOLVENT CATCH
AF = TOTAL VOLUME / ALIQUOT VOLUME

KLEINFELDER, INC.
Diamond Bar, California
PARTICULATE DRYDOWNS

DATE ANALYZED 8 AUG 1991
DATE FINISHED 9 AUG 1991
ANALYST A. Erbes

TEST DATE 1 AUG 91
FACILITY BFI - CHATEAU FRESNO

BOOK PAGE	FRACTION	BEAKER/ FILTER NO.	ALIQUOT FACTOR	GROSS WT (gm)	TARE WT (gm)	(NET WT * AF) - BLANK = FINAL
	RUN NO. PSD3 LABORATORY CONTROL NO. PSD3-P3					
	A	C11		89.3291	89.3262	0.0029
	RUN NO. PSD3 LABORATORY CONTROL NO. PSD3-P4					
	C	A03	1.0	110.9026	110.8989	0.0037
	RUN NO. PSD3 LABORATORY CONTROL NO. PSD3-P5					
	C	A06	1.0	111.1662	111.1615	0.0047

FRACTIONS:
A = FILTER CATCH
B = PROBE CATCH
C = IMPINGER CATACH
F = SOLVENT CATCH
AF = TOTAL VOLUME / ALIQUOT VOLUME

KLEINFELDER, INC.
Diamond Bar, California
PARTICULATE DRYDOWNS

DATE ANALYZED 9 AUG 91 (~~8~~ 9)
DATE FINISHED
ANALYST A. Erbes

TEST DATE 1 AUG 91
FACILITY

BOOK PAGE	FRACTION	BEAKER/ FILTER NO.	ALIQUOT FACTOR	GROSS WT (gm)	TARE WT (gm)	(NET WT * AF) - BLANK = FINAL
	RUN NO. PSD3 LABORATORY CONTROL NO. PSD3-P6					
	C	B03	1.0	110.0388	110.0345	0.0043
	RUN NO. PSD3 LABORATORY CONTROL NO. PSD3-P7					
	C	C01	1.0	88.5373	88.5364	0.0009
	RUN NO. PSD3 LABORATORY CONTROL NO. PSD3-P8					
		C04	1.0	86.6707	86.6695	0.0012

FRACTIONS:
A = FILTER CATCH
B = PROBE CATCH
C = IMPINGER CATACH
F = SOLVENT CATCH
AF = TOTAL VOLUME / ALIQUOT VOLUME

KLEINFELDER, INC.
Diamond Bar, California
PARTICULATE DRYDOWNS

DATE ANALYZED 9 AUG 91 TEST DATE 1 AUG 91
DATE FINISHED FACILITY
ANALYST

BOOK PAGE	FRACTION	BEAKER/ FILTER NO.	ALIQUOT FACTOR	GROSS WT (gm)	TARE WT (gm)	(NET WT * AF) - BLANK = FINAL
	RUN NO. PSD3 LABORATORY CONTROL NO. PSD3-B/U					
	C	C07	1.0	89.5205	89.5198	0.0007
	RUN NO. LABORATORY CONTROL NO.					
	RUN NO. LABORATORY CONTROL NO.					

FRACTIONS:
A = FILTER CATCH
B = PROBE CATCH
C = IMPINGER CATACH
F = SOLVENT CATCH
AF = TOTAL VOLUME / ALIQUOT VOLUME

KLEINFELDER, INC., DIAMOND BAR, CAL.

CLIENT: BFI - CHATEAU FRESNO
SOURCE: LFG FIRED FLARE EXHAUST
TEST DATE: 30 JUL 91
RUN NO.: 1 CARB 5 TOTAL PARTICULATE

STANDARD TEMP.: 68 DEG F STANDARD PRESS.: 29.92 in HG

PLANT GAS FLOW DATA

STACK DIAMETER (inches)	102.00
STACK CROSS-SECTIONAL AREA (sq feet)	56.744
BAROMETRIC PRESSURE (inches Hg)	30.45
OXYGEN CONTENT (%)	12.22
CARBON DIOXIDE CONTENT (%)	8.07
MOISTURE CONTENT (%)	9.846
STACK TEMPERATURE (deg F)	1469.60
STACK STATIC PRESSURE (inches water)	-0.07
STACK GAS DRY MOLECULAR WEIGHT	29.79
VELOCITY PRESSURE (sq rt inches water)	0.11
PITOT TUBE CORRECTION FACTOR	0.840
VELOCITY (ft per sec)	11.33
EXHAUST GAS FLOW RATE (ACFM)	38,560.2
EXHAUST GAS FLOW RATE (DSCFM)	9,679.3

FIELD SAMPLING DATA

DRY GAS VOLUME METERED (DCF)	58.561
DRY GAS VOLUME SAMPLED (DSCF)	58.242
DRY GAS METER TEMPERATURE (deg F)	111.90
DRY GAS METER GAMMA	1.06
AVERAGE ORIFICE PRESSURE (inches water)	0.31
TOTAL RUN TIME (min)	192.00
NOZZLE DIAMETER (inches)	0.573
ISOKINETIC (%)	99.31

ANALYTICAL DATA

MOISTURE RECOVERED (mls)	135.00
NOZZLE, PROBE & WASHES (mg)	21.00
FILTER (mg)	0.00
IMPINGERS (mg)	1.50

EMISSIONS DATA

FRONT HALF	(gr/DSCF)	0.0056
	(lb/hr)	0.462
BACK HALF	(gr/DSCF)	0.0004
	(lb/hr)	0.033
TOTAL	(gr/DSCF)	0.0060
	(lb/hr)	0.495

KLEINFELDER, INC., DIAMOND BAR, CAL.

CLIENT: BFI - CHATEAU FRESNO
SOURCE: LFG FIRED FLARE EXHAUST
TEST DATE: 31 JUL 91
RUN NO.: 2 CARB 5 TOTAL PARTICULATE

STANDARD TEMP.: 68 DEG F STANDARD PRESS.: 29.92 in HG

PLANT GAS FLOW DATA

STACK DIAMETER (inches)	102.00
STACK CROSS-SECTIONAL AREA (sq feet)	56.744
BAROMETRIC PRESSURE (inches Hg)	30.46
OXYGEN CONTENT (%)	12.02
CARBON DIOXIDE CONTENT (%)	8.22
MOISTURE CONTENT (%)	9.770
STACK TEMPERATURE (deg F)	1464.80
STACK STATIC PRESSURE (inches water)	-0.07
STACK GAS DRY MOLECULAR WEIGHT	29.80
VELOCITY PRESSURE (sq rt inches water)	0.10
PITOT TUBE CORRECTION FACTOR	0.840
VELOCITY (ft per sec)	10.67
EXHAUST GAS FLOW RATE (ACFM)	36,311.4
EXHAUST GAS FLOW RATE (DSCFM)	9,148.3

FIELD SAMPLING DATA

DRY GAS VOLUME METERED (DCF)	26.068
DRY GAS VOLUME SAMPLED (DSCF)	26.023
DRY GAS METER TEMPERATURE (deg F)	109.90
DRY GAS METER GAMMA	1.06
AVERAGE ORIFICE PRESSURE (inches water)	0.27
TOTAL RUN TIME (min)	92.00
NOZZLE DIAMETER (inches)	0.573
ISOKINETIC (%)	97.98

ANALYTICAL DATA

MOISTURE RECOVERED (mls)	59.80
NOZZLE, PROBE & WASHES (mg)	13.60
FILTER (mg)	0.70
IMPINGERS (mg)	0.70

EMISSIONS DATA

FRONT HALF	(gr/DSCF)	0.0085
	(lb/hr)	0.665
BACK HALF	(gr/DSCF)	0.0004
	(lb/hr)	0.033
TOTAL	(gr/DSCF)	0.0089
	(lb/hr)	0.698

KLEINFELDER, INC., DIAMOND BAR, CAL.

CLIENT: BFI - CHATEAU FRESNO
SOURCE: LFG FIRED FLARE EXHAUST
TEST DATE: 01 AUG 91
RUN NO.: 3 CARB 5 TOTAL PARTICULATE

STANDARD TEMP.: 68 DEG F STANDARD PRESS.: 29.92 in HG

PLANT GAS FLOW DATA

STACK DIAMETER (inches)	102.00
STACK CROSS-SECTIONAL AREA (sq feet)	56.744
BAROMETRIC PRESSURE (inches Hg)	30.53
OXYGEN CONTENT (%)	12.02
CARBON DIOXIDE CONTENT (%)	8.31
MOISTURE CONTENT (%)	4.189
STACK TEMPERATURE (deg F)	1463.50
STACK STATIC PRESSURE (inches water)	-0.07
STACK GAS DRY MOLECULAR WEIGHT	29.82
VELOCITY PRESSURE (sq rt inches water)	0.10
PITOT TUBE CORRECTION FACTOR	0.840
VELOCITY (ft per sec)	10.40
EXHAUST GAS FLOW RATE (ACFM)	35,409.8
EXHAUST GAS FLOW RATE (DSCFM)	9,501.1

FIELD SAMPLING DATA

DRY GAS VOLUME METERED (DCF)	35.048
DRY GAS VOLUME SAMPLED (DSCF)	36.750
DRY GAS METER TEMPERATURE (deg F)	83.80
DRY GAS METER GAMMA	1.06
AVERAGE ORIFICE PRESSURE (inches water)	0.26
TOTAL RUN TIME (min)	120.00
NOZZLE DIAMETER (inches)	0.573
ISOKINETIC (%)	102.14

ANALYTICAL DATA

MOISTURE RECOVERED (mls)	34.10
NOZZLE, PROBE & WASHES (mg)	20.30
FILTER (mg)	0.00
IMPINGERS (mg)	0.80

EMISSIONS DATA

FRONT HALF	(gr/DSCF)	0.0085
	(lb/hr)	0.694
BACK HALF	(gr/DSCF)	0.0003
	(lb/hr)	0.027
TOTAL	(gr/DSCF)	0.0089
	(lb/hr)	0.722

KLEINFELDER, INC., DIAMOND BAR, CAL.

CLIENT: BFI - CHATEAU FRESNO
SOURCE: LFG FIRED FLARE
TEST DATE: 31 JULY 1991
RUN NO.: PARTICLE SIZE #PS-1

STANDARD TEMP.: 60 DEG F STANDARD PRESS.: 29.92 in HG

PLANT GAS FLOW DATA

STACK DIAMETER (inches)	102.00	
STACK CROSS-SECTIONAL AREA (sq feet)	56.744	
BAROMETRIC PRESSURE (inches Hg)	30.46	P_b =
OXYGEN CONTENT (%)	12.50	
CARBON DIOXIDE CONTENT (%)	8.00	
MOISTURE CONTENT (%)	5.944	
STACK TEMPERATURE (deg F)	1497.69	1957.7
STACK STATIC PRESSURE (inches water)	-0.07	P_s = 30.455
STACK GAS DRY MOLECULAR WEIGHT	29.79	
VELOCITY PRESSURE (sq rt inches water)	0.10	
PITOT TUBE CORRECTION FACTOR	0.840	
VELOCITY (ft per sec)	10.68	
EXHAUST GAS FLOW RATE (ACFM)	36,345.0	
EXHAUST GAS FLOW RATE (DSCFM)	9,242.4	

FIELD SAMPLING DATA

DRY GAS VOLUME METERED (DCF)	40.591	
DRY GAS VOLUME SAMPLED (DSCF)	41.117	
DRY GAS METER TEMPERATURE (deg F)	92.96	
DRY GAS METER GAMMA	1.06	
AVERAGE ORIFICE PRESSURE (inches water)	0.14	P_m = 30.47
TOTAL RUN TIME (min)	180.00	
NOZZLE DIAMETER (inches)	0.492	
ISOKINETIC (%)	106.23	

ANALYTICAL DATA

MOISTURE RECOVERED (mls)	56.00
NOZZLE, PROBE & WASHES (mg)	0.00
FILTER (mg)	0.00

EMISSIONS DATA

FRONT HALF	(gr/DSCF)	0.0000
	(lb/hr)	0.000
TOTAL	(gr/DSCF)	0.0000
	(lb/hr)	0.000

$$\frac{41.117 \mid 1957.7 \mid 29.92}{180 \mid 520 \mid 30.455 \mid 0.9406} = 0.90 \text{ ACFM}$$

ST.	0	1	2	3	4	5	6	7	8	8/0
A.D.	>14.2	14.2	8.6	6.0	4.1	2.5	1.27	0.8	0.54	<0.54

KLEINFELDER, INC., DIAMOND BAR, CAL.

CLIENT: BFI - CHATEAU FRESNO
SOURCE: LFG FIRED FLARE
TEST DATE: 31 JULY 1991
RUN NO.: PARTICLE SIZE #PS-2

STANDARD TEMP.: 60 DEG F STANDARD PRESS.: 29.92 in HG

PLANT GAS FLOW DATA

STACK DIAMETER (inches)	102.00
STACK CROSS-SECTIONAL AREA (sq feet)	56.744
BAROMETRIC PRESSURE (inches Hg)	30.46
OXYGEN CONTENT (%)	12.50
CARBON DIOXIDE CONTENT (%)	8.00
MOISTURE CONTENT (%)	8.578
STACK TEMPERATURE (deg F)	1452.00
STACK STATIC PRESSURE (inches water)	-0.07
STACK GAS DRY MOLECULAR WEIGHT	29.79
VELOCITY PRESSURE (sq rt inches water)	0.10
PITOT TUBE CORRECTION FACTOR	0.840
VELOCITY (ft per sec)	10.61
EXHAUST GAS FLOW RATE (ACFM)	36,111.3
EXHAUST GAS FLOW RATE (DSCFM)	9,139.1

FIELD SAMPLING DATA

DRY GAS VOLUME METERED (DCF)	39.442
DRY GAS VOLUME SAMPLED (DSCF)	37.983
DRY GAS METER TEMPERATURE (deg F)	121.63
DRY GAS METER GAMMA	1.06
AVERAGE ORIFICE PRESSURE (inches water)	0.14
TOTAL RUN TIME (min)	180.00
NOZZLE DIAMETER (inches)	0.492
ISOKINETIC (%)	99.24

ANALYTICAL DATA

MOISTURE RECOVERED (mls)	76.80
NOZZLE, PROBE & WASHES (mg)	0.00
FILTER (mg)	0.00

EMISSIONS DATA

FRONT HALF	(gr/DSCF)	0.0000
	(lb/hr)	0.000
TOTAL	(gr/DSCF)	0.0000
	(lb/hr)	0.000

$$\frac{37.983 \mid 1912 \mid 29.92 \mid}{180 \mid 520 \mid 30.455 \mid 0.9142} = 0.83 \text{ ACFM}$$

	0	1	2	3	4	5	6	7	8	B/U
M	>14.8	14.8	9.0	6.2	4.3	2.6	1.32	0.84	0.56	<0.56

KLEINFELDER, INC., DIAMOND BAR, CAL.

CLIENT: BFI - CHATEAU FRESNO
SOURCE: LFG FIRED FLARE
TEST DATE: 1 AUG 1991
RUN NO.: PARTICLE SIZE #PS-3

STANDARD TEMP.: 60 DEG F STANDARD PRESS.: 29.92 in HG

PLANT GAS FLOW DATA

STACK DIAMETER (inches)	102.00
STACK CROSS-SECTIONAL AREA (sq feet)	56.744
BAROMETRIC PRESSURE (inches Hg)	30.53
OXYGEN CONTENT (%)	12.50
CARBON DIOXIDE CONTENT (%)	8.00
MOISTURE CONTENT (%)	8.042
STACK TEMPERATURE (deg F)	1455.92
STACK STATIC PRESSURE (inches water)	-0.07
STACK GAS DRY MOLECULAR WEIGHT	29.79
VELOCITY PRESSURE (sq rt inches water)	0.10
PITOT TUBE CORRECTION FACTOR	0.840
VELOCITY (ft per sec)	10.59
EXHAUST GAS FLOW RATE (ACFM)	36,067.3
EXHAUST GAS FLOW RATE (DSCFM)	9,183.8

FIELD SAMPLING DATA

DRY GAS VOLUME METERED (DCF)	35.630
DRY GAS VOLUME SAMPLED (DSCF)	35.719
DRY GAS METER TEMPERATURE (deg F)	100.00
DRY GAS METER GAMMA	1.06
AVERAGE ORIFICE PRESSURE (inches water)	0.14
TOTAL RUN TIME (min)	165.00
NOZZLE DIAMETER (inches)	0.492
ISOKINETIC (%)	101.31

ANALYTICAL DATA

MOISTURE RECOVERED (mls)	67.32
NOZZLE, PROBE & WASHES (mg)	0.00
FILTER (mg)	0.00

EMISSIONS DATA

FRONT HALF	(gr/DSCF)	0.0000
	(lb/hr)	0.000
TOTAL	(gr/DSCF)	0.0000
	(lb/hr)	0.000

$$\frac{35.719 \mid 1915.9 \mid 29.92}{165 \mid 520 \mid 30.525 \mid 0.9196} = 0.85 \text{ ACFM}$$

	0	1	2	3	4	5	6	7	8	B/U
μ	>14.8	14.8	9.0	6.2	4.3	2.6	1.32	0.84	0.56	<0.56

KLEINFELDER, INC.

Diamond Bar, California

PARTICLE SIZE DISTRIBUTION ANALYSIS

Client: BFI - Chateau Fresno Source: LFG Fired Flare System

Location: Exhaust Stack Date: 31 July 91

Test No: 1 Impactor Flow Rate: 0.90 ACFM

STAGE	Wgt. (mg)	Wgt %	Cum. %	Size (u)
Pre-Sep				
0	4.6	16.67	100.00	> 14.2
1	3.1	11.23	83.33	14.2
2	5.7	20.65	72.10	8.6
3	2.4	8.70	51.45	6.0
4	3.1	11.23	42.75	4.1
5	2.4	8.70	31.52	2.5
6	2.1	7.61	22.82	1.27
7	0.2	0.72	15.21	0.80
8	1.3	4.71	14.49	0.54
Back-Up	2.7	9.78	9.78	< 0.54

KLEINFELDER, INC.

Diamond Bar, California

PARTICLE SIZE DISTRIBUTION ANALYSIS

Client: BFI - Chateau Fresno Source: LFG Fired Flare System

Location: Exhaust Stack Date: 31 July 91

Test No: 2 Impactor Flow Rate: 0.83 ACFM

STAGE	Wgt. (mg)	Wgt %	Cum. %	Size (u)
Pre-Sep				
0	4.3	25.59	100.00	> 14.8
1	4.3	25.59	74.41	14.8
2	3.3	19.64	48.82	9.0
3	0.8	4.76	29.18	6.2
4	0.5	2.98	24.42	4.3
5	1.1	6.55	21.44	2.6
6	0.1	0.60	14.89	1.32
7	0.9	5.36	14.29	0.84
8	0.1	0.60	8.93	0.56
Back-Up	1.4	8.33	8.33	< 0.56

KLEINFELDER, INC.

Diamond Bar, California

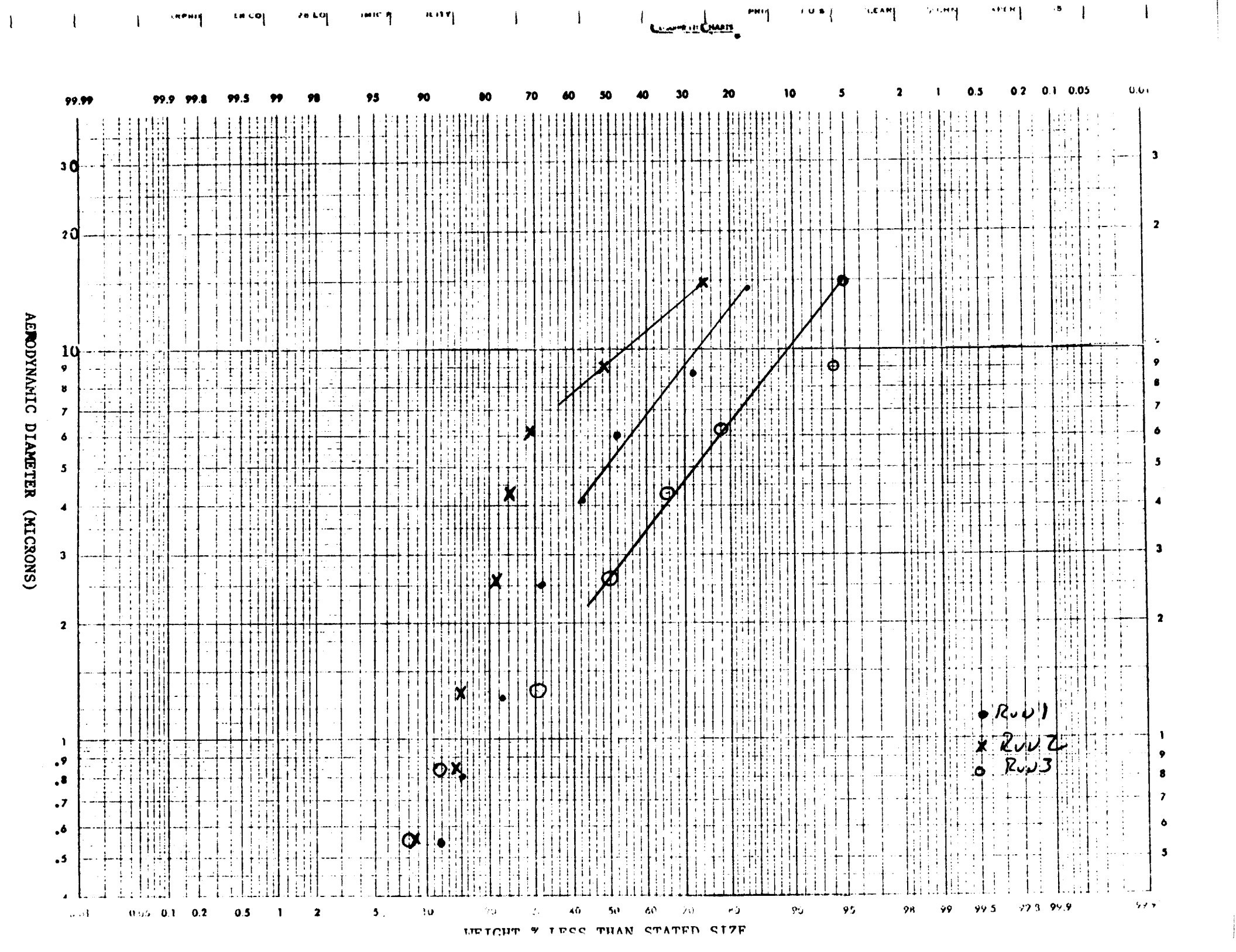
PARTICLE SIZE DISTRIBUTION ANALYSIS

Client: BFI - Chateau Fresno Source: LFG Fired Flare System

Location: Exhaust Stack Date: 01 August 91

Test No: 3 Impactor Flow Rate: 0.85 ACFM

STAGE	Wgt. (mg)	Wgt %	Cum. %	Size (u)
Pre-Sep				
0	1.2	5.08	100.00	> 14.8
1	0.2	0.85	94.92	14.8
2	3.8	16.10	94.07	9.0
3	2.9	12.29	77.97	6.2
4	3.7	15.68	65.68	4.3
5	4.7	19.92	50.00	2.6
6	4.3	18.22	30.08	1.32
7	0.9	3.81	11.86	0.84
8	1.2	5.08	8.05	0.56
Back-Up	0.7	2.97	2.97	< 0.56


99.99 99.9 99.8 99.5 99 98 95 90 80 70 60 50 40 30 20 10 5 2 1 0.5 0.2 0.1 0.05
30 20 10 9 8 7 6 5 4 3 2 1 .9 .8 .7 .6 .5
AERODYNAMIC DIAMETER (MICRONS)
WEIGHT % LESS THAN STATED SIZE
Run1
Run2
Run3

KLEINFELDER, INC.

Diamond Bar, CA

CORRECTED CEM CONCENTRATIONS

Plant: BFI CHATEAU FRESNO Date: 30-Jul-91
Source: LFG FIRED FLARE Location: EXHAUST STACK
Run No.: 1 - TPM Time On: 1155 Time Off: 1355

PARAMETER	ANALYZER READING	ZERO DRIFT AVERAGE	SPAN DRIFT AVERAGE	CYLINDER CONC	CORRECTED READING
CO2	8.10	0.00	19.18	19.10	8.07
O2	12.25	0.00	21.05	21.00	12.22
CO	3.40	.20	96.50	96.60	3.21
NOx	15.30	0.00	242.60	239.00	15.07
SO2	2.80	0.00	192.00	192.00	2.80

Plant: BFI CHATEAU FRESNO Date: 31-Jul-91
Source: LFG FIRED FLARE Location: EXHAUST STACK
Run No.: 1 - PSD Time On: 715 Time Off: 915

PARAMETER	ANALYZER READING	ZERO DRIFT AVERAGE	SPAN DRIFT AVERAGE	CYLINDER CONC	CORRECTED READING
CO2	8.19	0.00	19.03	19.10	8.22
O2	11.96	0.00	20.90	21.00	12.02
CO		0.00	0.00		0.00
NOx		0.00	0.00		0.00
SO2		0.00	0.00		0.00

Plant: BFI CHATEAU FRESNO Date: 31-Jul-91
Source: LFG FIRED FLARE Location: EXHAUST STACK
Run No.: 2 - TPM Time On: 1110 Time Off: 1250

PARAMETER	ANALYZER READING	ZERO DRIFT AVERAGE	SPAN DRIFT AVERAGE	CYLINDER CONC	CORRECTED READING
CO2	8.33	0.00	19.15	19.10	8.31
O2	12.02	0.00	21.00	21.00	12.02
CO	.50	.50	96.85	96.60	0.00
NOx	12.50	0.00	239.00	239.00	12.50
SO2	3.00	0.00	191.80	192.00	3.00

KLEINFELDER, INC.

Diamond Bar, CA

CORRECTED CEM CONCENTRATIONS

Plant: BFI CHATEAU FRESNO Date: 31-Jul-91
Source: LFG FIRED FLARE Location: EXHAUST STACK
Run No.: 2 - PSD Time On: 1340 Time Off: 1620

PARAMETER	ANALYZER READING	ZERO DRIFT AVERAGE	SPAN DRIFT AVERAGE	CYLINDER CONC	CORRECTED READING
CO2	8.14	0.00	19.20	19.10	8.10
O2	12.19	.05	21.07	21.00	12.13
CO		0.00	0.00		0.00
NOx		0.00	0.00		0.00
SO2		0.00	0.00		0.00

Plant: BFI CHATEAU FRESNO Date: 1-Aug-91
Source: LFG FIRED FLARE Location: EXHAUST STACK
Run No.: 3 - TPM Time On: 740 Time Off: 940

PARAMETER	ANALYZER READING	ZERO DRIFT AVERAGE	SPAN DRIFT AVERAGE	CYLINDER CONC	CORRECTED READING
CO2	8.98	0.00	19.05	19.10	9.00
O2	11.47	0.00	21.10	21.00	11.42
CO	.30	0.00	95.90	96.60	.30
NOx	11.60	-.25	238.50	239.00	11.86
SO2	2.30	0.00	192.00	192.00	2.30

Plant: BFI CHATEAU FRESNO Date: 1-Aug-91
Source: LFG FIRED FLARE Location: EXHAUST STACK
Run No.: 3 - PSD Time On: 1010 Time Off: 1210

PARAMETER	ANALYZER READING	ZERO DRIFT AVERAGE	SPAN DRIFT AVERAGE	CYLINDER CONC	CORRECTED READING
CO2	8.80	0.00	18.98	19.10	8.86
O2	11.72	.05	21.20	21.00	11.59
CO		0.00	0.00		0.00
NOx		0.00	0.00		0.00
SO2		0.00	0.00		0.00

KLEINFELDER, INC.
Diamond Bar, California

ANALYZER CALIBRATION ERROR

Facility: BFI Chateau Fresno Date: 30 Jul 91

Source: LFG Fired Flare Station Operator: RPH

Location: Exhaust Stack Time: 0845 - 0930

Day No. 1	Specie	Full Scale	Cylinder Value	Analyzer Reading	Absolute Diff.	Diff. % Span
Zero	CO	100 ppm	0	0	0.0	0.00
Midscale			45.7	45.4	0.3	0.30
Upscale			96.6	96.0	0.6	0.60
Zero	SO_2	200 ppm	0	0	0.0	0.00
Midscale			100	99.6	0.4	0.20
Upscale			192	192	0.0	0.00
Zero	NO_x	250 ppm	0	0	0.0	0.00
Midscale			100	100	0.0	0.00
Upscale			239	239	0.0	0.00
Zero	O_2	25% vol	0	0	0.0	0.00
Midscale			9.5	9.6	0.1	0.40
Upscale			21.0	21.0	0.0	0.00
Zero	CO_2	20% vol	0	0	0.0	0.00
Midscale			10.0	9.8	0.2	0.10
Upscale			19.1	19.1	0.0	0.00

KLEINFELDER, INC.
Diamond Bar, California

CALIBRATION DRIFT TEST

Facility: BFI Chateau Fresno
Date: 30 Jul 91
Source: LFG Fired Flare Station
Operator: RPH
Location: Exhaust Stack
Time: 0945 - 1420

Run No. 1	Specie	Full Scale	Initial Response	Final Response	Drift (% Span)
Zero	CO	100 ppm	0.0	0.4	0.40
Upscale			96.0	97.0	1.00
Zero	SO_2	200 ppm	0.0	0.0	0.00
Upscale			192.4	191.6	0.40
Zero	NO_x	250 ppm	0.0	0.0	0.00
Upscale			239.0	246.2	2.90
Zero	O_2	25% vol	0.0	0.0	0.00
Upscale			21.0	21.1	0.40
Zero	CO_2	20% vol	0.0	0.0	0.00
Upscale			19.1	19.26	0.80

KLEINFELDER, INC.

Diamond Bar, California

SUMMARY OF CEM DATA

Project BFI CHATEAU FRESNO LANDFILL Date 30 JULY 1991 Sheet 1 of 1

Plant LFG FIRED FLARE SYSTEM Location FLARE EXHAUST STACK

Operator R P HEBERT

Time	CO 100 ppm		SO_2 200 ppm		CO_2 20% Vol		O_2 25% Vol		NO_x 250 ppm		NO							
	% Chart	Conc. (ppm)	% Chart	Conc. (ppm)	% Chart	Conc. (ppm)	% Chart	Conc. (ppm)	% Chart	Conc. (%)	% Chart	Conc. (%)	% Chart	Conc.	% Chart	Conc.	% Chart	Conc.
1155-1205			1.4	2.8	39.0	7.80	50.0	12.50	5.6	14.0								
1205-1215			1.2	2.4	39.5	7.90	50.0	12.50	5.8	14.5								
1215-1225			1.2	2.4	39.7	7.94	49.8	12.45	5.8	14.5								
1225-1235			1.1	2.2	40.0	8.00	49.8	12.45	5.8	14.5								
1235-1245			1.0	2.0	40.0	8.00	49.6	12.40	6.0	15.0								
1245-1255			1.0	2.0	40.6	8.12	49.2	12.30	6.0	15.0								
1255-1305			1.6	3.2	42.2	8.44	48.0	12.00	6.2	15.5								
1305-1315			1.8	3.6	41.4	8.28	48.0	12.00	6.2	15.5								
1315-1325			1.8	3.6	41.5	8.30	48.0	12.00	6.4	16.0								
1325-1335			1.8	3.6	41.0	8.20	48.2	12.05	6.6	16.5								
1335-1345			1.7	3.4	41.0	8.20	48.4	12.10	6.6	16.5								
1345-1355			1.4	2.8	40.4	8.08	48.8	12.20	6.6	16.5								
	from chart																	
AVERAGE	3.4	3.4	1.4	2.8	40.5	8.10	49.0	12.25	6.1	15.3								

KLEINFELDER, INC.
Diamond Bar, California

SAMPLE SYSTEM BIAS TEST

Facility: BFI Chateau Fresno Date: 30 Jul 91

Source: LFG Fired Flare Station Operator: RPH

Location: Exhaust Stack Time: 0940 - 1440

Run No. 1	Specie	Full Scale	Analyzer Calib. Response	Initial Values		Final Values	
				Response	% Bias	Response	% Bias
Zero	CO	100 ppm	0.0	0.7	0.7	0.5	0.5
Upscale			96.0				
Zero	SO2	200 ppm	0.0	0.0	0.0	4.8	2.4
Upscale			100.0	96.0	2.0		
Zero	NOx	250 ppm	0.0	0.0	0.0	0.0	0.0
Upscale			100.0	93.0	2.8	93.0	2.8
Zero	O2	25% vol	0.0	0.3	1.2	0.3	1.2
Upscale			21.0				
Zero	CO2	20% vol	0.0	0.0	0.0	0.0	0.0
Upscale			19.1				

KLEINFELDER, INC.
Diamond Bar, California

ANALYZER CALIBRATION ERROR

Facility: BFI Chateau Fresno Date: 31 Jul 91

Source: LFG Fired Flare Station Operator: RPH

Location: Exhaust Stack Time: 0645 - 0715

Day No. 2	Specie	Full Scale	Cylinder Value	Analyzer Reading	Absolute Diff.	Diff. % Span
Zero	CO	100 ppm	0	0	0.0	0.00
Midscale			45.7	48.0	2.3	2.30
Upscale			96.6	96.0	0.6	0.60
Zero	SO_2	200 ppm	0	0	0.0	0.00
Midscale			100	100.0	0.0	0.00
Upscale			192	192	0.0	0.00
Zero	NO_x	250 ppm	0	0	0.0	0.00
Midscale			100	99.5	0.5	0.25
Upscale			239	239	0.0	0.00
Zero	O_2	25% vol	0	0	0.0	0.00
Midscale			9.5	9.7	0.2	0.80
Upscale			21.0	21.0	0.0	0.00
Zero	CO_2	20% vol	0	0	0.0	0.00
Midscale			10.0	9.84	0.16	0.08
Upscale			19.1	19.1	0.0	0.00

KLEINFELDER, INC.
Diamond Bar, California

CALIBRATION DRIFT TEST

Facility: BFI Chateau Fresno — Date: 31 Jul 91

Source: LFG Fired Flare Station — Operator: RPH

Location: Exhaust Stack — Time: 0715 - 0930

Run No. 1P	Specie	Full Scale	Initial Response	Final Response	Drift (% Span)
Zero	CO	100 ppm			
Upscale					
Zero	SO_2	200 ppm			
Upscale					
Zero	NO_x	250 ppm			
Upscale					
Zero	O_2	25% vol	0.0	0.0	0.00
Upscale			21.0	20.8	0.80
Zero	CO_2	20% vol	0.0	0.0	0.00
Upscale			19.1	18.96	0.70

KLEINFELDER, INC.

Diamond Bar, California

SUMMARY OF CEM DATA

Project BFI CHATEAU FRESNO LANDFILL Date 31 JULY 1991 Sheet 1 of 1

Plant LFG FIRED FLARE SYSTEM Location FLARE EXHAUST STACK

Operator R P HEBERT

Time	CO 100 ppm		SO_2 200 ppm		CO_2 20% Vol		O_2 25% Vol		NO_x 250 ppm		NO							
	% Chart	Conc. (ppm)	% Chart	Conc. (ppm)	% Chart	Conc. (%)	% Chart	Conc. (%)	% Chart	Conc. (ppm)	% Chart	Conc. (ppm)	% Chart	Conc.	% Chart	Conc.	% Chart	Conc.
0715-0725					41.0	8.20	48.0	12.00										
0725-0735					41.0	8.20	48.0	12.00										
0735-0745					41.0	8.20	48.0	12.00										
0745-0755					41.0	8.20	48.0	12.00										
0755-0805					40.8	8.16	48.0	12.00										
0805-0815					41.0	8.20	48.0	12.00										
0815-0825					41.0	8.20	47.2	11.80										
0825-0835					41.0	8.20	47.2	11.80										
0835-0845					41.5	8.30	47.0	11.75										
0845-0855					41.5	8.30	47.8	11.95										
0855-0905					40.5	8.10	48.4	12.10										
0905-0915					40.0	8.00	48.4	12.10										
AVERAGE					40.9	8.19	47.8	11.96										

KLEINFELDER, INC.
Diamond Bar, California

CALIBRATION DRIFT TEST

Facility: BFI Chateau Fresno Date: 31 Jul 91

Source: LFG Fired Flare Station Operator: RPH

Location: Exhaust Stack Time: 1045 - 1320

Run No. 2	Specie	Full Scale	Initial Response	Final Response	Drift (% Span)
Zero	CO	100	0.0	1.0	0.00
Upscale		ppm	95.7	98.0	2.30
Zero	SO_2	200	0.0	0.0	0.00
Upscale		ppm	192.0	191.6	0.20
Zero	NO_x	250	0.0	0.0	0.00
Upscale		ppm	239.0	239.0	0.00
Zero	O_2	25%	0.0	0.0	0.00
Upscale		vol	21.0	21.0	0.00
Zero	CO_2	20%	0.0	0.0	0.00
Upscale		vol	19.1	19.2	0.50

KLEINFELDER, INC.

Diamond Bar, California

SUMMARY OF CEM DATA

Project BFI CHATEAU FRESNO LANDFILL Date 31 JULY 1991 Sheet 1 of 1

Plant LFG FIRED FLARE SYSTEM Location FLARE EXHAUST STACK

Operator R P HEBERT

Time	CO 100 ppm		SO_2 200 ppm		CO_2 20% vol		O_2 25% vol		NO_x 250 ppm		NO							
	% Chart	Conc. (ppm)	% Chart	Conc. (ppm)	% Chart	Conc. (%)	% Chart	Conc. (%)	% Chart	Conc. (ppm)	% Chart	Conc. (ppm)	% Chart	Conc.	% Chart	Conc.	% Chart	Conc.
1110-1120	<0.5	<0.5	1.5	3.0	41.3	8.26	48.2	12.05	5.0	12.5								
1120-1130	<0.5	<0.5	1.5	3.0	41.5	8.30	48.0	12.00	5.0	12.5								
1130-1140	<0.5	<0.5	1.5	3.0	42.0	8.40	48.0	12.00	5.0	12.5								
1150-1200	<0.5	<0.5	1.5	3.0	41.7	8.34	48.4	12.10	5.0	12.5								
1200-1210	<0.5	<0.5	1.5	3.0	41.5	8.30	48.0	12.00	5.0	12.5								
1210-1220	<0.5	<0.5	1.5	3.0	41.8	8.36	48.0	12.00	5.0	12.5								
1220-1230	<0.5	<0.5	1.5	3.0	41.4	8.28	48.0	12.00	5.0	12.5								
1230-1240	<0.5	<0.5	1.5	3.0	41.5	8.30	48.0	12.00	5.0	12.5								
1240-1250	<0.5	<0.5	1.5	3.0	42.0	8.40	48.0	12.00	5.0	12.5								
AVERAGE	<0.5	<0.5	1.5	3.0	41.6	8.33	48.1	12.02	5.0	12.5								

KLEINFELDER, INC.
Diamond Bar, California

CALIBRATION DRIFT TEST

Facility: BFI Chateau Fresno — Date: 31 Jul 91

Source: LFG Fired Flare Station — Operator: RPH

Location: Exhaust Stack — Time: 1339 - 1620

Run No. 2P	Specie	Full Scale	Initial Response	Final Response	Drift (% Span)
Zero	CO	100 ppm			
Upscale					
Zero	SO_2	200 ppm			
Upscale					
Zero	NO_x	250 ppm			
Upscale					
Zero	O_2	25% vol	0.05	0.05	0.00
Upscale			21.05	21.1	0.20
Zero	CO_2	20% vol	0.0	0.0	0.00
Upscale			19.2	19.2	0.00

KLEINFELDER, INC.

Diamond Bar, California

SUMMARY OF CEM DATA

Project BFI CHATEAU FRESNO LANDFILL Date 31 JULY 1991 Sheet 1 of 1

Plant LFG FIRED FLARE SYSTEM Location FLARE EXHAUST STACK

Operator R P HEBERT

Time	CO 100 ppm		SO_2 200 ppm		CO_2 20% Vol		O_2 25% Vol		NO_x 250 ppm		NO							
	% Chart	Conc. (ppm)	% Chart	Conc. (ppm)	% Chart	Conc. (%)	% Chart	Conc. (%)	% Chart	Conc. (ppm)	% Chart	Conc. (ppm)	% Chart	Conc.	% Chart	Conc.	% Chart	Conc.
1340-1350					42.0	8.40	47.0	11.75										
1350-1400					41.5	8.30	47.8	11.95										
1400-1410					42.0	8.40	48.0	12.00										
1410-1420					42.0	8.40	48.0	12.00										
1420-1430					41.0	8.20	48.8	12.20										
1430-1440					40.0	8.00	49.0	12.25										
1440-1450					39.0	7.80	51.0	12.75										
1450-1500					39.3	7.86	50.0	12.50										
1500-1510					40.0	8.00	50.0	12.50										
1510-1520					38.0	7.60	51.0	12.75										
1520-1530					40.0	8.00	49.0	12.25										
1530-1540					41.0	8.20	48.8	12.20										
1540-1550					41.0	8.20	48.0	12.00										
1550-1600					41.0	8.20	48.0	12.00										
1600-1610					41.5	8.30	48.0	12.00										
1610-1620					42.0	8.40	48.0	12.00										
AVERAGE					40.7	8.14	48.8	12.19										

KLEINFELDER, INC.
Diamond Bar, California

SAMPLE SYSTEM BIAS TEST

Facility: BFI Chateau Fresno Date: 31 Jul 91

Source: LFG Fired Flare Station Operator: RPH

Location: Exhaust Stack Time: 1100 -

Run No. 2	Specie	Full Scale	Analyzer Calib. Response	Initial Values		Final Values	
				Response	% Bias	Response	% Bias
Zero	CO	100	0.0	0.7	0.7	0.5	0.5
Upscale		ppm	96.0				
Zero	SO2	200	0.0	0.0	0.0	4.8	2.4
Upscale		ppm	100.0	96.0	2.0		
Zero	NOx	250	0.0	0.0	0.0	0.0	0.0
Upscale		ppm	100.0	93.0	2.8	93.0	2.8
Zero	O2	25%	0.0	0.3	1.2	0.3	1.2
Upscale		vol	21.0				
Zero	CO2	20%	0.0	0.0	0.0	0.0	0.0
Upscale		vol	19.1				

KLEINFELDER, INC.
Diamond Bar, California

ANALYZER CALIBRATION ERROR

Facility: BFI Chateau Fresno Date: 01 Aug 91

Source: LFG Fired Flare Station Operator: RPH

Location: Exhaust Stack Time: 0700 - 0730

Day No. 3	Specie	Full Scale	Cylinder Value	Analyzer Reading	Absolute Diff.	Diff. % Span
Zero	CO	100 ppm	0	0	0.0	0.00
Midscale			45.7	47.0	1.3	1.30
Upscale			96.6	96.8	0.2	0.20
Zero	SO_2	200 ppm	0	0	0.0	0.00
Midscale			100	99.6	0.4	0.20
Upscale			192	192	0.0	0.00
Zero	NO_x	250 ppm	0	0	0.0	0.00
Midscale			100	100	0.0	0.00
Upscale			239	239	0.0	0.00
Zero	O_2	25% vol	0	0	0.0	0.00
Midscale			9.5	9.7	0.2	0.80
Upscale			21.0	21.0	0.0	0.00
Zero	CO_2	20% vol	0	0	0.0	0.00
Midscale			10.0	9.80	0.20	0.10
Upscale			19.1	19.1	0.0	0.00

KLEINFELDER, INC.
Diamond Bar, California

CALIBRATION DRIFT TEST

Facility: BFI Chateau Fresno — Date: 01 Aug 91

Source: LFG Fired Flare Station — Operator: RPH

Location: Exhaust Stack — Time: 0740 - 0940

Run No. 5	Specie	Full Scale	Initial Response	Final Response	Drift (% Span)
Zero	CO	100	0.0	0.0	0.00
Upscale		ppm	96.8	95.0	1.80
Zero	SO_2	200	0.0	0.0	0.00
Upscale		ppm	192.0	192.0	0.00
Zero	NO_x	250	0.0	-0.5	0.25
Upscale		ppm	239.0	238.0	0.40
Zero	O_2	25%	0.0	0.0	0.00
Upscale		vol	21.0	21.2	0.80
Zero	CO_2	20%	0.0	0.0	0.00
Upscale		vol	19.1	19.0	0.50

KLEINFELDER, INC.

Diamond Bar, California

SUMMARY OF CEM DATA

Project BFI CHATEAU FRESNO LANDFILL Date 01 AUGUST 1991 Sheet 1 of 1

Plant LFG FIRED FLARE SYSTEM Location FLARE EXHAUST STACK

Operator R P HEBERT

Time	CO 100 ppm		SO_2 200 ppm		CO_2 20% vol		O_2 25% vol		NO_x 250 ppm		NO							
	% Chart	Conc. (ppm)	% Chart	Conc. (ppm)	% Chart	Conc. (%)	% Chart	Conc. (%)	% Chart	Conc. (ppm)	% Chart	Conc. (ppm)	% Chart	Conc.	% Chart	Conc.	% Chart	Conc.
0740-0750			1.4	2.8	45.0	9.00	45.8	11.45	4.8	12.0								
0750-0800			1.4	2.8	45.0	9.00	46.0	11.50	4.8	12.0								
0800-0810			1.3	2.6	45.0	9.00	46.0	11.50	4.8	12.0								
0810-0820			1.2	2.4	45.0	9.00	45.8	11.45	4.6	11.5								
0820-0830			1.2	2.4	45.0	9.00	46.0	11.50	4.6	11.5								
0830-0840			1.2	2.4	45.0	9.00	45.8	11.45	4.6	11.5								
0840-0850			1.2	2.4	45.0	9.00	45.6	11.40	4.6	11.5								
0850-0900			1.1	2.2	45.0	9.00	45.6	11.40	4.6	11.5								
0900-0910			1.0	2.0	45.0	9.00	45.6	11.40	4.6	11.5								
0910-0920			1.0	2.0	44.8	8.96	46.0	11.50	4.6	11.5								
0920-0930			1.0	2.0	44.4	8.88	46.2	11.55	4.6	11.5								
0930-0940			1.0	2.0	44.4	8.88	46.2	11.55	4.6	11.5								
	from chart																	
AVERAGE	0.3	0.3	1.2	2.3	44.9	8.98	45.9	11.47	4.65	11.6								

KLEINFELDER, INC.
Diamond Bar, California

SAMPLE SYSTEM BIAS TEST

Facility: BFI Chateau Fresno
Date: 01 Aug 91
Source: LFG Fired Flare Station
Operator: RPH
Location: Exhaust Stack
Time: 0700 - 1000

Run No. 3	Specie	Full Scale	Analyzer Calib. Response	Initial Values		Final Values	
				Response	% Bias	Response	% Bias
Zero	CO	100 ppm	0.0	0.0	0.0	0.0	0.0
Upscale			96.8				
Zero	SO2	200 ppm	0.0	0.0	0.0	0.0	0.0
Upscale			99.5				
Zero	NOx	250 ppm	0.0	0.0	0.0	-1.0	0.4
Upscale			100.0	92.5	3.0	95.0	2.0
Zero	O2	25% vol	0.0	0.05	0.2	0.25	1.0
Upscale			21.0				
Zero	CO2	20% vol	0.0	0.0	0.0	0.0	0.0
Upscale			19.1				

BROWNING FERRIS INDUSTRIES
CHATEAU FRESNO LANDFILL
LFG FLARE PROCESS DATA

TEST NUMBER	DATE	AVERAGE TEMP (^{O}F)	AVERAGE FLOW RATE (SCFM
5-1	7/30/91	1499.32	893.01
5-2	7/31/91	1500.71	943.95
5-3	8/01/91	1499.89	790.60
PSD-1	7/31/91	1498.00	818.30
PSD-2	7/31/91	1501.62	1050.30
PSD-3	8/01/91	1500.08	909.00

LANDFILL GAS QUALITY (% METHANE)

7/30/91	45% Methane @ 1100
7/31/91	43% Methane @ 0830
8/01/91	43% Methane @ 0830

PLEASE NOTE: These readings were taken from the flare's control panel. Flare temperature set point at 1500^{O} F. The flare thermocouple is at the approximate height of the sampling ports on the exhaust stack.

KLEINFELDER, INC.

Diamond Bar, California

SUMMARY OF CEM DATA

Project BFI CHATEAU FRESNO LANDFILL Date 01 AUGUST 1991 Sheet 1 of 1

Plant LFG FIRED FLARE SYSTEM Location FLARE EXHAUST STACK

Operator R P HEBERT

Time	CO 100 ppm		SO_2 200 ppm		CO_2 20% Vol		O_2 25% Vol		NO_x 250 ppm		NO							
	% Chart	Conc. (ppm)	% Chart	Conc. (ppm)	% Chart	Conc. (%)	% Chart	Conc. (%)	% Chart	Conc. (ppm)	% Chart	Conc. (ppm)	% Chart	Conc.	% Chart	Conc.	% Chart	Conc.
1010-1020					44.0	8.80	46.8	11.70										
1020-1030					44.5	8.90	46.8	11.70										
1030-1040					43.0	8.60	46.8	11.70										
1040-1050					44.0	8.80	46.8	11.70										
1050-1100					44.3	8.86	46.6	11.65										
1100-1110					44.3	8.86	46.8	11.70										
1110-1120					44.0	8.80	47.0	11.75										
1120-1130					44.0	8.80	47.0	11.75										
1130-1140					44.0	8.80	46.8	11.70										
1140-1150					44.0	8.80	47.0	11.75										
1150-1200					44.0	8.80	47.0	11.75										
1200-1210					44.0	8.80	47.0	11.75										
AVERAGE					44.0	8.80	46.9	11.72										

KLEINFELDER, INC.
Diamond Bar, California

CALIBRATION DRIFT TEST

Facility: BFI Chateau Fresno
Date: 01 Aug 91
Source: LFG Fired Flare Station
Operator: RPH
Location: Exhaust Stack
Time: 1007 - 1215

Run No. 3P	Specie	Full Scale	Initial Response	Final Response	Drift (% Span)
Zero	CO	100 ppm			
Upscale					
Zero	SO_2	200 ppm			
Upscale					
Zero	NO_x	250 ppm			
Upscale					
Zero	O_2	25% vol	0.05	0.05	0.00
Upscale			21.15	21.25	0.40
Zero	CO_2	20% vol	0.0	0.0	0.00
Upscale			19.0	18.96	0.20

KLEINFELDER, INC.

EXAMPLE CALCULATIONS

METHODS 1 THROUGH 4

Plant: BFI - Chateau Fresno Date: 30 Jul 91

Location: LF6 Flare Exhaust Run No: 1 Carb 5

STANDARD CONDITIONS

Temperature T_{std} 68 °F Pressure P_{std} 29.92 "Hg

METER VOLUME CORRECTED FOR LEAK

$Vm = (Vm) - (Li - La)(Ti)$

$Vm = (\quad) - (\quad - \quad)(\quad)$

$Vm = 58.561\ ft^3$

STANDARD METER VOLUME, DRY

$$Vm_{std} = (Vm)(Y)\frac{Tstd}{Tm}\frac{(Pb + \Delta H/13.6)}{Pstd}$$

$$Vm_{std} = (58.561)(1.0)\frac{(528)}{(571.88)}\frac{(30.45 + 0.30/13.6)}{(29.92)}$$

$Vm_{std} = 58.242\ ft^3$

WATER CONTENT OF GAS

Water in Sample

$Vw_{std} = (0.0000894)(Tstd)(Vlc)$

$Vw_{std} = (0.0000894)(528)(135.0)$

$Vw_{std} = 6.372\ ft^3$

Water in Stack Gas

$Bwo = 100\ (Vw_{std}) / (Vw_{std} + Vm_{std})$

$Bwo = (100)(6.372) / (6.372 + 58.242)$

$Bwo = 9.862\ \%vol$

Saturation Water Volume

$V_{sat} = \exp(3.725253 + 0.006364(T_s) - (2078115/T_s^2))$

$V_{sat} = \exp(3.725253 + 0.006364(1929.6) - 2078115/((1929.6)^2))$

$V_{sat} =$ 5,111,983 "Hg

$B_{sat} = V_{sat}(100)/P_b$

$B_{sat} = (5,111,983)(100)/(30.45)$

$B_{sat} =$ 16,788,120 %vol

Use smaller value of Bwo or Bsat in all calculations asking for Bwo.

DRY GAS MOLECULAR WEIGHT

$MW_d = 0.32(\%O_2) + 0.44(\%CO_2) + 0.28(\%CO + \%N_2)$

$MW_d = 0.32(12.22) + 0.44(8.07) + 0.28(\quad + 79.71)$

$MW_d =$ 29.780 lb/mole

WET GAS MOLECULARE WEIGHT

$MW_w = MW_d(1 - Bwo/100) + 18(Bwo/100)$

$MW_w = (29.78)(1 - 9.862/100) + 18(9.862/100)$

$MW_w =$ 28,618 lb/mole

STACK GAS VELOCITY

$V_s = 85.48(Cp)(P)(T_s/(MW_w)(P_b + P_s/13.6))^{0.5}$

$V_s = 85.48(.864)(.1059)(1929.6/(28,618)(30.45 + -0.07/13.6))^{0.5}$

$V_s =$ 11,316 ft/sec

STACK CROSS-SECTIONAL AREA

Circular Stacks

$As = (3.1416)(Ds^2)/576$

$As = 3.1416\ (102)^2/576$

$As = 56.744$ ft^2

Rectangular Stacks

$As = (L)(W)/144$

$As = (\quad)(\quad)/144$

$As =$ _____ ft^2

VOLUMETRIC FLOW AT STACK CONDITIONS

$Qa = (Vs)(As)(60)$

$Qa = (11.316)(56.744)(60)$

$Qa = 38526.9$ ACFM

VOLUMETRIC FLOW AT WET STANDARD CONDITIONS

$$Qsw = \frac{(Qa)}{Ts}\frac{(Tstd)}{Pstd}\frac{(Pb + Ps/13.6)}{}$$

$$Qsw = \frac{(38526.9)(528)}{(1929.6)}\frac{(30.45 + -0.07/13.6)}{(29.92)}$$

$Qsw = 10,727.2$ SCFM,W

VOLUMETRIC FLOW AT DRY STANDARD CONDITIONS

$Qsd = Qsw\ (1 - Bwo/100)$

$Qsd = (10727.1)(1 - 9.862/100)$

$Qsd = 9,669.2$ SCFM,D

NOMENCLATURE

		Units
An	cross-sectional area of nozzle	ft^2
As	cross-sectional area of stack	ft^2
Bsat	saturation volume of water at stack temperature	%vol
Bwo	moisture content of stack gas	%vol
Cp	pitot tube calibration coefficient	
Ds	stack diameter	inch
L	length of rectangular duct	inch
La	maximum allowable leak rate	CFM
Li	observed leak rate	CFM
MWd	dry molecular weight of stack gas	lb/mole
MWw	wet molecular weight of stack gas	lb/mole
Pb	barometric pressure	"Hg
Ps	static pressure of stack gas	"H_2O
Pstd	standard pressure	"Hg
Qa	stack gas volumetric flow, stack conditions	CFM
Qsd	stack gas volumetric flow, dry standard condition	CFM
Qsw	stack gas volumetric flow, wet standard condition	CFM
Ti	total test time	min
Tm	dry gas meter temperature	°R
Ts	stack temperature	°R
Tstd	standard temperature	°R
Vlc	volume of liquid collected	mls
Vm	gas volume at meter condition	ft^3
Vm_{std}	gas volume at dry standard condition	ft^3
Vs	stack gas velocity	fps
Vsat	saturated vapor pressure of water	"Hg
Vw_{std}	water volume at standard conditions	ft^3
W	width of rectangular duct	inch
Y	accuracy of dry gas meter	
H	orifice differential pressure	"H_2O
P	velocity pressure head(average of square roots)	"$H_2O^{0.5}$
%CO	carbon monoxide content of stack gas	%vol
$\%CO_2$	carbon dioxide content of stack gas	%vol
$\%N_2$	nitrogen content of stack gas	%vol
$\%O_2$	oxygen content of stack gas	%vol

KLEINFELDER, INC.

EXAMPLE CALCULATIONS

METHOD 5

Plant: BFI Chateau Fresno Date: 30 Jul 91

Location: LFG Flare Exhaust Run No.: 1 CARB5

STANDARD CONDITIONS

Temperature T_{std} 68 °F Pressure P_{std} 29.92 "Hg

ISOKINETIC VARIATION

$$I = \frac{49.8667\,(Vmstd)\,(Ts)}{(Ti)(Pb + Ps/13.6)(Vs)(An)(1-Bwo/100)(Tstd)}$$

$$I = \frac{49.8667(58.242)(1929.4)}{(192)(30.45 + -.07/13.6)(11316)(0.00179)(1-9.864/100)(528)}$$

I = 99.45 %

LABORATORY RESULTS(mg)

	Actual	Water	Acetone	MeCl
Front Half	21.0			
Filter	0.0			
Back Half	1.50			

PARTICULATE CONCENTRATION

Dry Standard Conditions

$Csd = 0.01543\,(Wp) / (Vm_{std})$

$Csd = 0.01543\,(22.5)/(58.242)$

Csd = 0.0059611 gr/DSCF

Wet Standard Conditions

Csw = Csd (1 - Bwo/100)

Csw = (0.005361)(1 - 9.862/100)

Csw = 0.005373 gr/WSCF

Actual Stack Conditions

$$Ca = (Csd)\left(\frac{Tstd}{Ts}\right)\left(\frac{Pb + Ps/13.6}{Pstd}\right)(1 - Bwo/100)$$

$$Ca = (0.005361)\left(\frac{528}{(192+96)}\right)\left(\frac{30.45 + -0.07/13.6}{29.92}\right)(1 - 9.862/100)$$

Ca = 0.0015 gr/ACF

PARTICULATE EMISSION RATE

Ep = (Csd) (60) (Qsd) / 7000

Ep = (0.005361)(60)(9,669.2)/7000

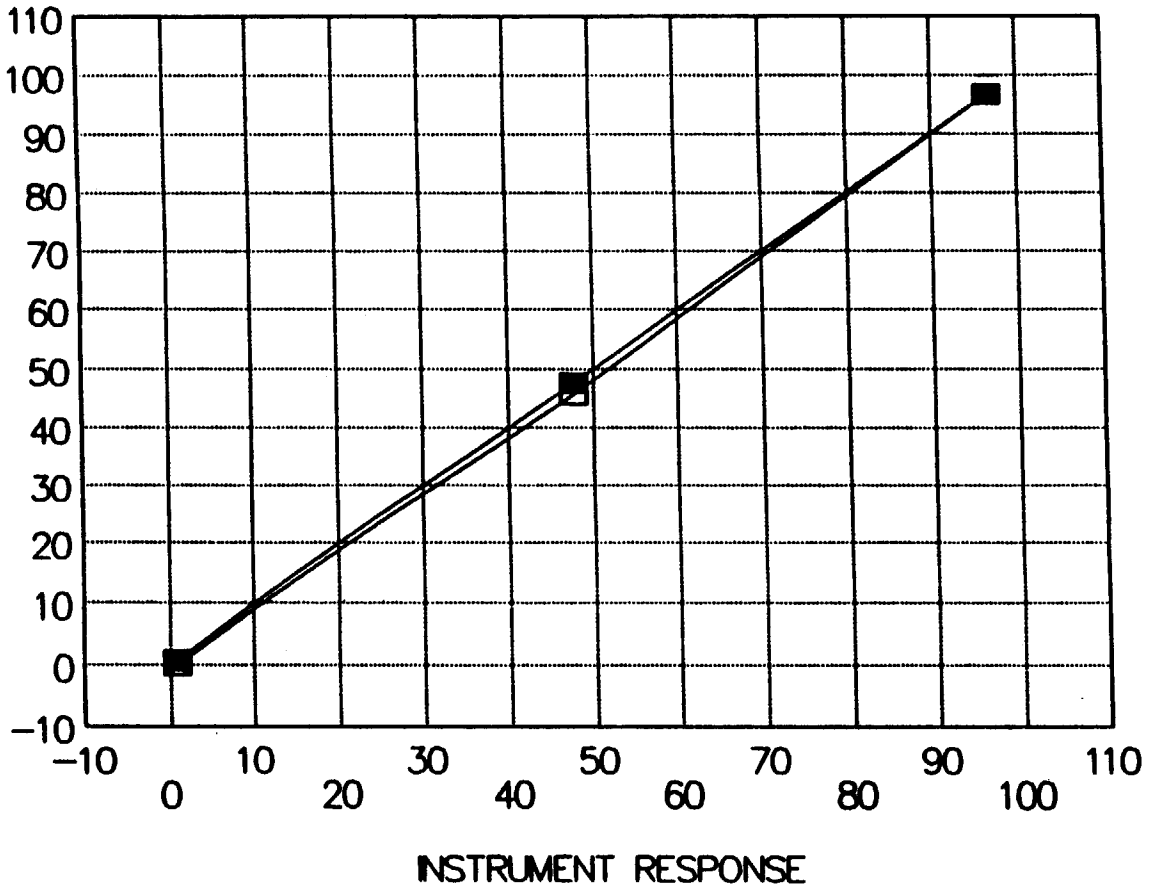
Ep = 0.494 lb/hr

NOMENCLATURE

		Units
An	cross-sectional area of nozzle	ft^2
Bwo	moisture content of stack gas	%vol
Ca	particulate concentration at stack condition	gr/ft^3
Csd	concentration at dry standard condition	gr/ft^3
Csw	concentration at wet standard condtion	gr/ft^3
Ep	particulate emission rate	lb/hr
I	isokinetic variation	%
Pb	barometric pressure	"Hg
Ps	static presuure of stack gas	"H_2O
Pstd	standard pressure	"Hg
Qsd	stack gas volumetric flow, dry std condition	CFM
Ti	total test time	min
Ts	stack temperature	^oR
Tstd	standard temperature	^oR
Vm_{std}	gas volume at dry standard condition	ft^3
Vs	stack gas velocity	fps
Wp	weight of particulate matter collected	mg

TECO 48H CO CALIBRATION

100 PPM FULL SCALE

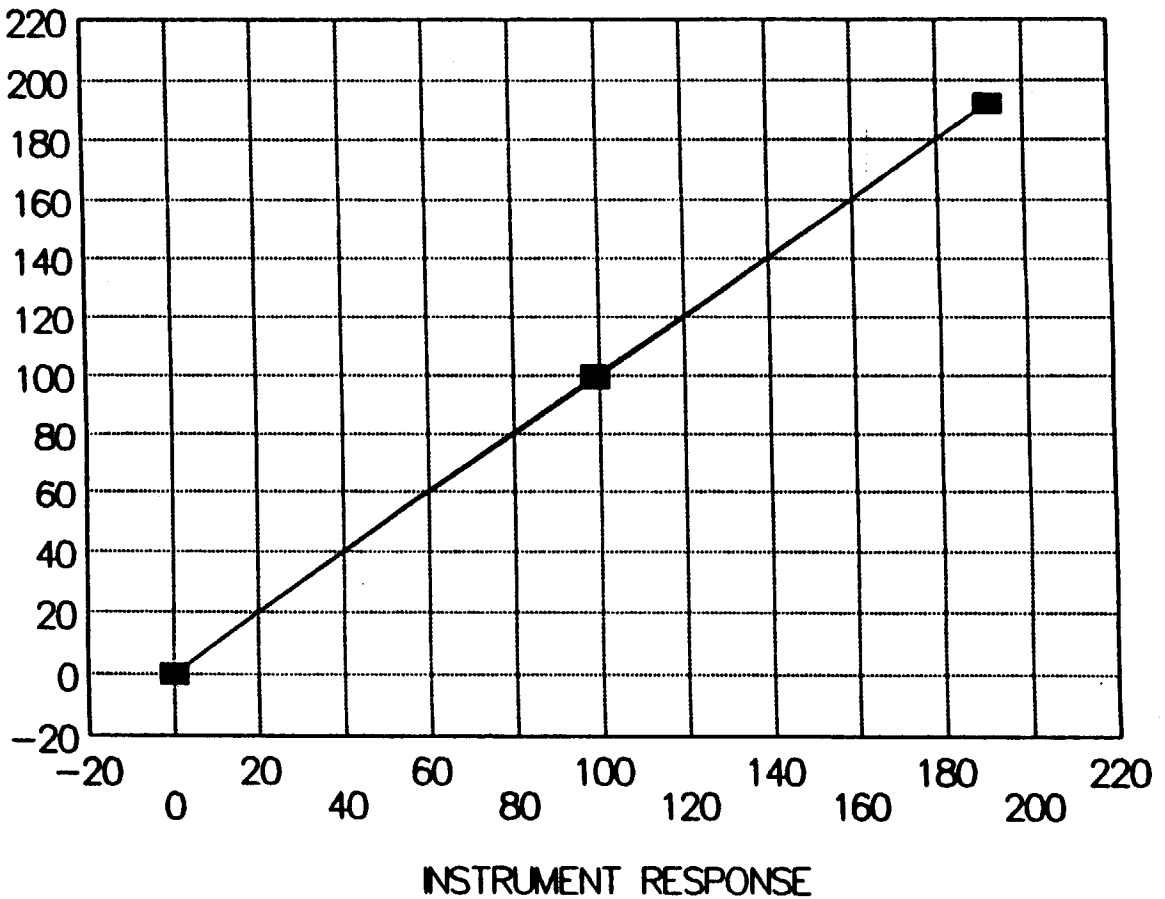


CALIBRATION DATA

RESPONSE	ACTUAL
.8	0.0
47.7	45.7
96.7	96.6

WR 721AT2 SO2 CALIBRATION

200 PPM FULL SCALE

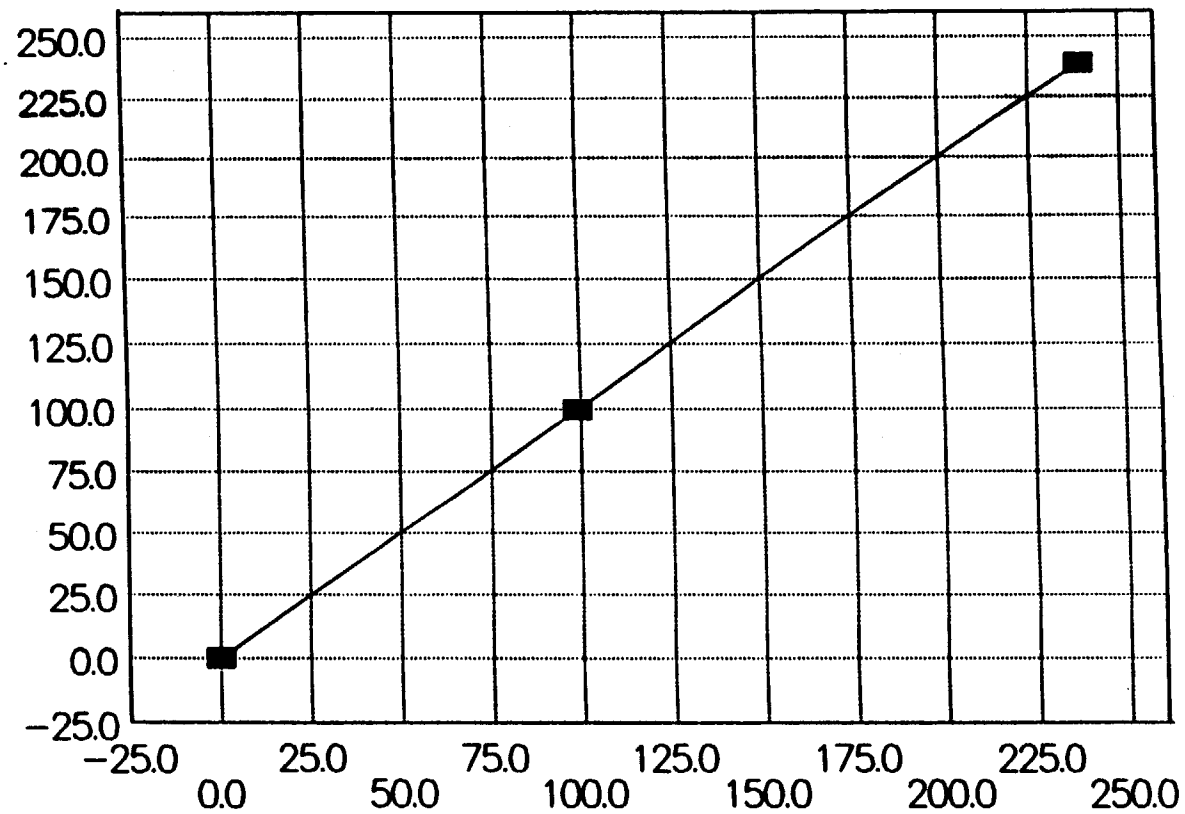


CALIBRATION DATA

RESPONSE	ACTUAL
0.0	0.0
99.0	100.0
192.0	192.0

TECO 10 AR NOX CALIBRATION

250 PPM FULL SCALE



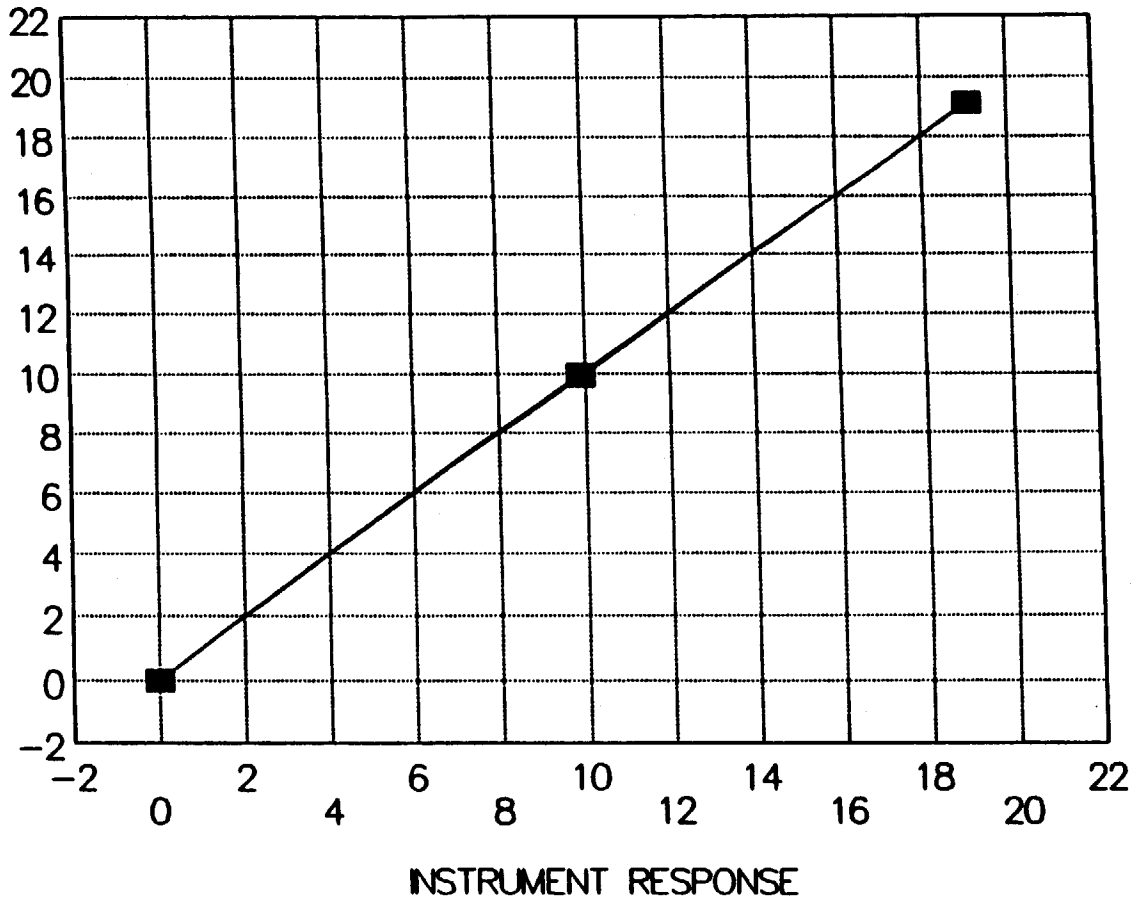
ACTUAL

CALIBRATION DATA

RESPONSE	ACTUAL
0.0	0.0
99.0	99.6
239.0	239.0

ACS 3300 CO2 CALIBRATION

20% VOLUME FULL SCALE



RESPONSE

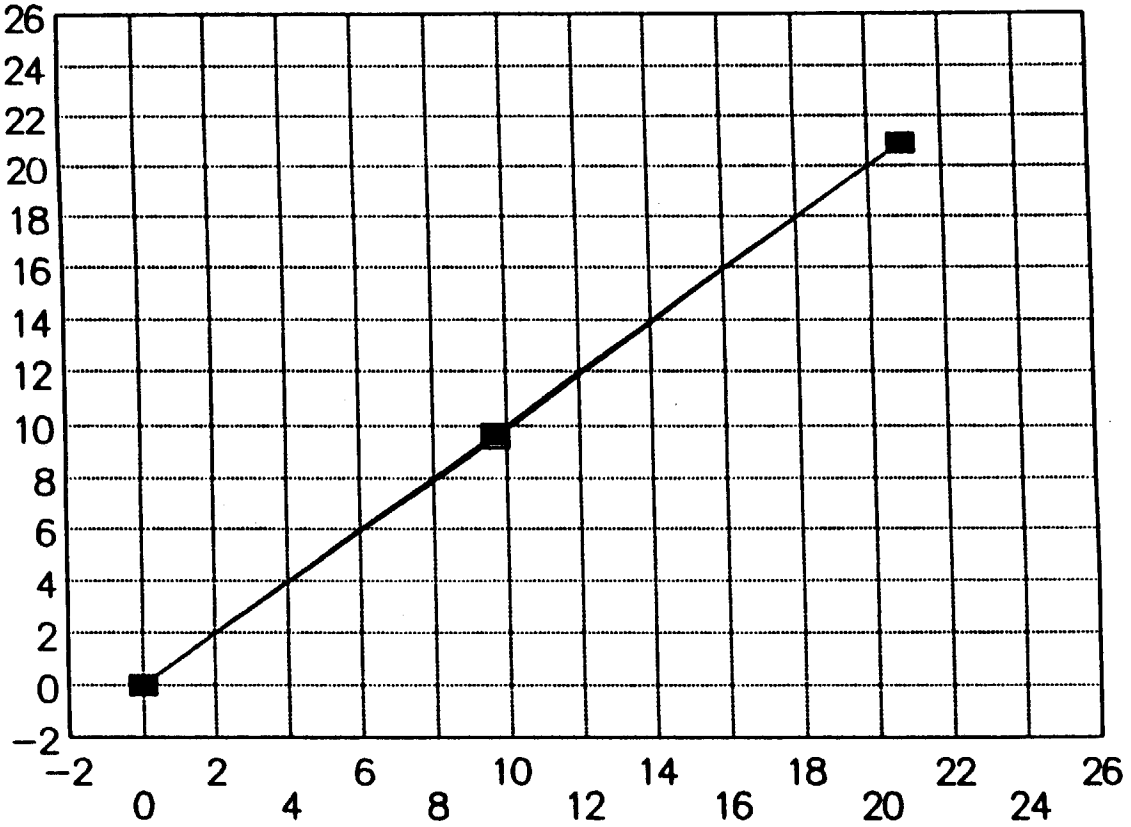
ACTUAL

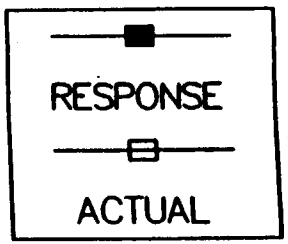
CALIBRATION DATA

RESPONSE	ACTUAL
0.0	0.0
9.9	10.0
19.1	19.1

TELEDYNE 320AX 02 CALIBRATION

25% VOLUME FULL SCALE





CALIBRATION DATA

RESPONSE	ACTUAL
0.0	0.0
9.7	9.5
20.9	20.9

TELEX: 510-100-8831 (ScotGas)
FAX: 714-887-0549
PHONE: 714-887-2571

Scott Specialty Gases a division of
Scott Environmental Technology Inc. 2600 CAJON BLVD., SAN BERNARDINO, CA 92405

Date: 2/14/90
Our Project No.: 4842
Your P.O. No.: 71Y10001-001

KLEINFELDER
526 HOFGAARDEN
CITY OF INDUSTRY, CA 91744

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

Cyl. No. AAL-3328 — Analytical Accuracy ±1%

Component	Concentration
CARBON DIOXIDE	19.08%
NIST TRACEABLE TO CRM1675	
NITROGEN	BALANCE

Cyl. No. ALM-11662 — Analytical Accuracy ±1%

Component	Concentration
NITRIC OXIDE	507.3 ppm
NOX	507.9 ppm
* GRAVIMETRIC MASTER GAS	
NITROGEN	BALANCE

Cyl. No. ALM-3487 — Analytical Accuracy ±1%

Component	Concentration
SULFUR DIXOIDE	100.0 ppm
NITROGEN	BALANCE
*GRAVIMETRIC MASTER GAS	

Cyl. No. ALM-5695 — Analytical Accuracy ±1%

Component	Concentration
NITROGEN DIOXIDE	235 ppm
NITRIC OXIDE	189.6 ppm
NOX	424.6 ppm
NITROGEN	BALANCE
NO2 ±5% ANALYSIS	

CERTIFIED

Analyst _____ Approved By _____

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

TELEX: 510-100-8631 (ScotGas)
FAX: 714-887-0549
PHONE: 714-887-2571

Scott Specialty Gases

a division of

Scott Environmental Technology Inc. 2600 CAJON BLVD., SAN BERNARDINO, CA 92405

Shipped From: Scott SAN BERNARDINO, CA
Date Shipped 2/14/90
Our Project No: 4842
Your P.O. No: 71Y10001-001
Page 1 of 1
Expiration Date 8/91

KLEINFELDER

CERTIFICATE OF ANALYSIS – EPA PROTOCOL GASES*

Certified Per Traceability Protocol No. 1 Procedure No. G1 Cylinder No. 1L-3261 Cylinder Pressure 1900 psig Certified Accuracy ±1% % NBS Traceable

REFERENCE STD

COMPONENTS	CERTIFIED CONC	SRM/CRM NO.	CYL. NO.	CONC.
SULFUR DIOXIDE	192.1 ppm	GMIS TRACEABLE TO CRM 1661A	ALM-2395	495 ppm

GAS ANALYZER

MAKE/MODEL/SERIAL NO.	LAST CAL. DATE	ANALYTICAL PRINCIPLE
HORIBA AIA23 56174104	1/29/90	INFRA-RED

BALANCE GAS NITROGEN

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

Component SULFUR DIOXIDE

First Analysis Date 1/29/90 Units ppm

Z 00.0	R 99.0	T 42.9
R 99.0	Z 00.0	T 42.9
Z 00.0	T 42.9	R 99.0

Mean Test Assay 192.1 ppm

Second Analysis Date 2/5/90 Units ppm

Z 00.0	R 99.0	T 42.9
R 99.0	Z 00.0	T 42.9
Z 00.0	T 42.9	R 99.0

Mean Test Assay 192.1 ppm

Component _____

Date _____ Units _____

Z _____	R _____	T _____
R _____	Z _____	T _____
Z _____	T _____	R _____

Mean Test Assay _____

Date _____ Units _____

Z _____	R _____	T _____
R _____	Z _____	T _____
Z _____	T _____	R _____

Mean Test Assay _____

Component _____

Date _____ Units _____

Z _____	R _____	T _____
R _____	Z _____	T _____
Z _____	T _____	R _____

Mean Test Assay _____

Date _____ Units _____

Z _____	R _____	T _____
R _____	Z _____	T _____
Z _____	T _____	R _____

Mean Test Assay _____

Chronology: Date _____
Assay _____

Analyst D. BUTTERFIELD

Approved By: R. Sheely

TELEX: 510-100-8831 (ScotGas)
FAX: 714-887-0549
PHONE: 714-887-2571

Scott Specialty Gases a division of

Scott Environmental Technology Inc. 2600 CAJON BLVD., SAN BERNARDINO, CA 92405

Shipped From: Scott SAN BERNARDINO, CA
Date Shipped 2/14/90
Our Project No: 4842
Your P.O. No: 71Y10001-001
Page 1 of 1
Expiration Date: 8/91

KLEINFELDER

CERTIFICATE OF ANALYSIS – EPA PROTOCOL GASES*

Certified Per Traceability Protocol No. 1 Procedure No. G1 Cylinder No. ALM-11729 Cylinder Pressure 1900 psig Certified Accuracy ±1% % NBS Traceable

REFERENCE STD

COMPONENTS	CERTIFIED CONC	SRM/CRM NO.	CYL. NO.	CONC.
NITRIC OXIDE	99.52 ppm	CRM 1684B	ALM-3640	97.28 ppm
NOX	99.65 ppm			

GAS ANALYZER

MAKE/MODEL/SERIAL NO.	LAST CAL. DATE	ANALYTICAL PRINCIPLE
THERMO-ELECTRON 10 AR 14853-150	11/10/89	CHEMI-LUMINENSCENT

BALANCE GAS NITROGEN

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

Component NITRIC OXIDE

First Analysis Date 1/25/90 Units ppm

Z 0.00	R 97.29	T 99.50
R 97.20	Z 0.04	T 99.40
Z 0.00	T 99.50	R 97.28

Mean Test Assay 99.49 ppm

Second Analysis Date 2/1/90 Units ppm

Z 0.00	R 97.30	T 99.50
R 97.26	Z 0.06	T 99.49
Z 0.06	T 99.50	R 97.20

Mean Test Assay 99.52 ppm

Component _____

Date _____ Units _____

Z _____	R _____	T _____
R _____	Z _____	T _____
Z _____	T _____	R _____

Mean Test Assay _____

Date _____ Units _____

Z _____	R _____	T _____
R _____	Z _____	T _____
Z _____	T _____	R _____

Mean Test Assay _____

Component _____

Date _____ Units _____

Z _____	R _____	T _____
R _____	Z _____	T _____
Z _____	T _____	R _____

Mean Test Assay _____

Date _____ Units _____

Z _____	R _____	T _____
R _____	Z _____	T _____
Z _____	T _____	R _____

Mean Test Assay _____

Chronology: Date _____
Assay _____

Analyst LEE OLDHAM

Approved By: R. Sheely

TELEX: 510-100-6631 (ScotGas)
FAX: 714-887-0549
PHONE: 714-887-2571

Scott Specialty Gases a division of

Scott Environmental Technology Inc. 2600 CAJON BLVD., SAN BERNARDINO, CA 92405

KLEINFELDER

Shipped From: Scott SAN BERNARDINO, CA
Date Shipped 2/14/90
Our Project No: 4842
Your P.O. No: 71Y10001-001
Page 1 of 1
Expiration Date: 8/91

CERTIFICATE OF ANALYSIS—EPA PROTOCOL GASES*

Certified Per Traceability Protocol No. 1 Procedure No. G1 Cylinder No. ALM-11742 Cylinder Pressure 1900 psig Certified Accuracy ±1% % NBS Traceable

REFERENCE STD

COMPONENTS	CERTIFIED CONC	SRM/CRM NO.	CYL. NO.	CONC.
NITRIC OXIDE	238.4 ppm	CRM 1685 B	CAL-5841	236 ppm
NOX	238.9 ppm			

GAS ANALYZER

MAKE/MODEL/SERIAL NO.	LAST CAL. DATE	ANALYTICAL PRINCIPLE
THERMO-ELECTRON 10 AR 14853-150	11/10/89	CHEMI-LUMINENSCENT

BALANCE GAS NITROGEN

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

Component NITRIC OXIDE
First Analysis Date 1/25/90 Units ppm

Z 0.00	R 94.40	T 95.48
R 94.34	Z 0.03	T 95.38
Z 0.03	T 95.50	R 94.35

Mean Test Assay 238.7 ppm

Second Analysis Date 2/1/90 Units ppm

Z 0.00	R 94.42	T 95.30
R 94.25	Z 0.01	T 95.20
Z 0.00	T 95.19	R 94.10

Mean Test Assay 238.4 ppm

Component _____
Date _____ Units _____

Z	R	T
R	Z	T
Z	T	R

Mean Test Assay _____

Date _____ Units _____

Z	R	T
R	Z	T
Z	T	R

Mean Test Assay _____

Component _____
Date _____ Units _____

Z	R	T
R	Z	T
Z	T	R

Mean Test Assay _____

Date _____ Units _____

Z	R	T
R	Z	T
Z	T	R

Mean Test Assay _____

Chronology: Date _____
Assay _____

Analyst LEE OLDHAM

Approved By: R. Sheehy

TELEX: 510-100-6831 (ScotGas)
FAX: 714-887-0549
PHONE: 714-887-2571

Scott Specialty Gases a division of

Scott Environmental Technology Inc. 2600 CAJON BLVD., SAN BERNARDINO, CA 92405

Shipped From: Scott SAN BERNARDINO, CA
Date Shipped 2/14/90
Our Project No: 4842
Your P.O. No: 71Y10001-001
Page 1 of 1
Expiration Date: 8/90

KLEINFELDER

CERTIFICATE OF ANALYSIS – EPA PROTOCOL GASES*

Certified Per Traceability Protocol No. 1 Procedure No. G1 Cylinder No. AAL-1181 Cylinder Pressure 1900 psig Certified Accuracy ±1% % NBS Traceable

REFERENCE STD

COMPONENTS	CERTIFIED CONC	SRM/CRM NO.	CYL. NO.	CONC.
OXYGEN	9.525%	CRM 2659	AAL-18588	20.67%
CARBON DIOXIDE	10.02 %	CRM1675 B	ALM-1308	14.08%

GAS ANALYZER

MAKE/MODEL/SERIAL NO.	LAST CAL. DATE	ANALYTICAL PRINCIPLE
BECKMAN 755 100410	1/29/90	PARAMAGNETIC
HORIBA PIR 2000 406004	1/29/90	INFRA-RED

BALANCE GAS NITROGEN

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

Component OXYGEN
First Analysis Date 1/29/90 Units %

Z 00.0	R 82.7	T 38.1
R 82.7	Z 00.0	T 38.1
Z 00.0	T 38.1	R 82.7

Mean Test Assay 9.525%

Second Analysis Date _____ Units _____

Z	R	T
R	Z	T
Z	T	R

Mean Test Assay _____

Component CARBON DIOXIDE
Date 1/29/90 Units %

Z 00.0	R 71.7	T 58.6
R 71.7	Z 00.0	T 58.5
Z 00.0	T 58.5	R 71.7

Mean Test Assay 10.02%

Date _____ Units _____

Z	R	T
R	Z	T
Z	T	R

Mean Test Assay _____

Component _____
Date _____ Units _____

Z	R	T
R	Z	T
Z	T	R

Mean Test Assay _____

Date _____ Units _____

Z	R	T
R	Z	T
Z	T	R

Mean Test Assay _____

Chronology: Date _____
Assay _____

Analyst D. BUTTERFIELD

Approved By: R. Sluder

TELEX: 510-100-6831 (ScottGas)
FAX: 714-887-0549
PHONE: 714-887-2571

Scott Specialty Gases a division of

Scott Environmental Technology Inc. 2600 CAJON BLVD., SAN BERNARDINO, CA 92405

Date: 2/14/90

Our Project No.: 4842

Your P.O. No.: 71Y10001-001

KLEINFELDER
526 HOFGAARDEN
CITY OF INDUSTRY, CA 91744

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

Cyl. No. AAL-3328 Analytical Accuracy ±1%

Component	Concentration
CARBON DIOXIDE	19.08%
NIST TRACEABLE TO CRM1675	
NITROGEN	BALANCE

Cyl. No. ALM-11662 Analytical Accuracy ±1%

Component	Concentration
NITRIC OXIDE	507.3 ppm
NOX	507.9 ppm
* GRAVIMETRIC MASTER GAS	
NITROGEN	BALANCE

Cyl. No. ALM-3487 Analytical Accuracy ±1%

Component	Concentration
SULFUR DIXOIDE	100.0 ppm
NITROGEN	BALANCE
*GRAVIMETRIC MASTER GAS	

Cyl. No. ALM-5695 Analytical Accuracy ±1%

Component	Concentration
NITROGEN DIOXIDE	235 ppm
NITRIC OXIDE	189.6 ppm
NOX	424.6 ppm
NITROGEN	BALANCE
NO2 ±5% ANALYSIS	

Analyst _____ Approved By _____

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

ANALYTICAL REPORT – cont'd

Date: 2/14/90

KLEINFELDER

Our Project No.: 4842

Your P.O. No.: 71Y10001-001

Cyl. No. ALM-3484	Analytical Accuracy ±1%
Component	Concentration
SULFUR DIXOIDE	1010 ppm
*GRAVIMETRIC MASTER GAS	
NITROGEN	BALANCE

Cyl. No.	Analytical Accuracy
Component	Concentration

Cyl. No. ALM-8304	Analytical Accuracy ±1%
Component	Concentration
CARBON MONOXIDE	45.74 ppm
* GRAVIMETRIC MASTER GAS	
NITROGEN	BALANCE

Cyl. No.	Analytical Accuracy
Component	Concentration

Cyl. No.	Analytical Accuracy
Component	Concentration

Cyl. No.	Analytical Accuracy
Component	Concentration

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

Analyst

Approved By

TELEX: 510-100-8831 (ScotGas)
FAX: 714-887-0549
PHONE: 714-887-2571

Scott Specialty Gases a division of

Scott Environmental Technology Inc. 2600 CAJON BLVD., SAN BERNARDINO, CA 92405

KLEINFELDER

Shipped From: Scott SAN BERNARDINO, CA
Date Shipped 2/14/90
Our Project No: 4842
Your P.O. No: 71Y10001-001
Page 1 of 1
Expiration Date: 8/91

CERTIFICATE OF ANALYSIS—EPA PROTOCOL GASES*

Certified Per Traceability Protocol No. 1 Procedure No. G1 Cylinder No. ALM-6149 Cylinder Pressure 1900 psig Certified Accuracy ±1% % NBS Traceable

	REFERENCE STD			GAS ANALYZER		
COMPONENTS	CERTIFIED CONC	SRM/CRM NO.	CYL. NO.	CONC.	MAKE/MODEL/SERIAL NO.	LAST CAL. DATE	ANALYTICAL PRINCIPLE
CARBON MONOXIDE	96.64 ppm	GMIS TRACEABLE TO CRM2636	AAL-1081	253.3 ppm	HORIBA AIA 24 4564403	1/29/90	INFRA-RED

BALANCE GAS NITROGEN

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

Component CARBON MONOXIDE
First Analysis Date 1/29/90 Units ppm

Z 00.0	R 95.0	T 39.7
R 95.0	Z 00.0	T 39.6
Z 00.0	T 39.6	R 95.0

Mean Test Assay 96.72 ppm

Second Analysis Date 2/5/90 Units ppm

Z 00.0	R 95.0	T 39.6
R 95.0	Z 00.0	T 39.6
Z 00.0	T 39.6	R 95.0

Mean Test Assay 96.64 ppm

Component _____
Date _____ Units _____

Z	R	T
R	Z	T
Z	T	R

Mean Test Assay _____

Date _____ Units _____

Z	R	T
R	Z	T
Z	T	R

Mean Test Assay _____

Component _____
Date _____ Units _____

Z	R	T
R	Z	T
Z	T	R

Mean Test Assay _____

Date _____ Units _____

Z	R	T
R	Z	T
Z	T	R

Mean Test Assay _____

Chronology: Date _____
Assay _____

Analyst D. BUTTERFIELD

Approved By: R. Sheehy

KLEINFELDER, INC.
Diamond Bar, California

SOURCE SAMPLING NOZZLE CALIBRATION

Project No. _____ Date 30 July 91

Calibrated by RPH Instrument _____

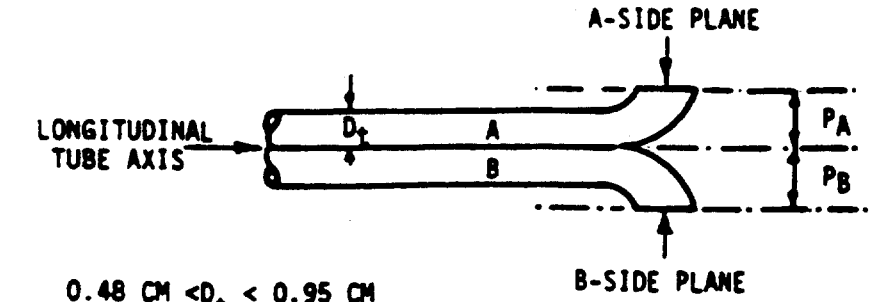
Nozzle Number	Nominal Size	Reading Number			Average
		1	2	3	
SN1012	0.500	0.572	0.573	0.573	0.573
PS 1	0.500	0.493	0.491	0.492	0.492

KLEINFELDER, INC.

Diamond Bar, California

PITOT TUBE CALIBRATION

Tube ID: P9A Date: 5/20/91 Calibrated By: Jon K

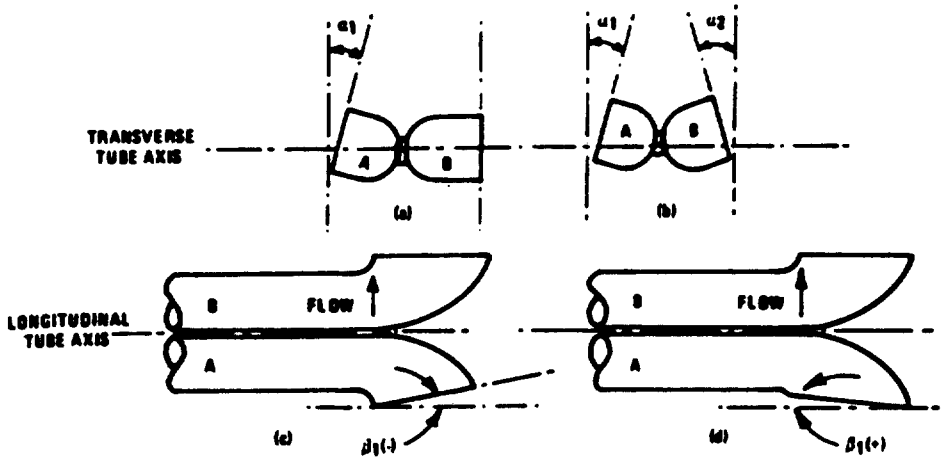


NOTE:

$1.05\ D_t < P < 1.50\ D_t$

$P_A = P_B$

0.48 CM $\leq D_t \leq$ 0.95 CM
(3/16 IN.) (3/8 IN.)



D_t = 3/8 "

P_a = 1.25

P_b = 1.25

a_1 = 3.5

a_2 = 2.5

B_1 = 0

B_2 = +1.0

Z = 0.01

W = 0.03

KLEINFELDER, INC.

Diamond Bar, California

TEMPERATURE SENSOR CALIBRATION DATA FORM

Date 5/21/91 Thermocouple No. A

Barometric Pressure 30.02 in. Hg Ambient Temperature 72 °F

Calibrated by Jon K Reference: Mercury in glass ✓

Other

Reference Point Number	Source (Specify)	Reference Thermometer Temperature (deg F)	Thermocouple Potentiometer Temperature (deg F)	Difference %
Low	Ice bath	32	31.6	0.08
Ambient	H_2O	72	71.6	0.08
High	Boiling H_2O	212	212.4	0.06

$$\text{Diff.} = \frac{(\text{Ref. Temp} + 460) - (\text{Test Temp} + 460)}{(\text{Ref. Temp.} + 460} \times 100$$

KLEINFELDER, INC.
City of Industry, California

POST TEST METER BOX CALIBRATION FORM

Meter Box No. D817C Date 7/5/91 Calibrated by Jim C

Barometric Pressure 29.80 Ambient Temp 74 Pre Test Y_i _____

Project Name _____ Project No. _____ Hrun _____ Vac 3

Orifice Manometer (in. H_2O) H	Gas Volume: Wet Test Meter (ft^3) V_w	Gas Volume: Dry Gas Meter (ft^3) V_d	Temperatures: Wet Test Meter (° F) T_w	Temperatures: Dry Gas Meter (° F) T_d	Time (min) T_i	Y_i	$H@_i$
0.90	5.488	5,255	73	84	10	1.0635	1.66
0.90	5,456	5.305	73	88.5	10	1.0560	1.67
0.90	5,434	5,320	72.5	90.5	10	1.0536	1.67
						Y_i AVG 1.0577	$\overline{H@_i}$ = 1.6

METER BOX CALIBRATION HISTORY

Last Calibration Date _____ Calibrated by _____

$H_@$ of Calibration _____ Y_i of Calibration _____

KLEINFELDER, INC.
City of Industry, California

POST TEST METER BOX CALIBRATION FORM

Meter Box No. 0887C Date 8/5/91 Calibrated by Jon K

Barometric Pressure 29.96 Ambient Temp 73 Pre Test Y_i _____

Project Name _____ Project No. _____ Hrun _____ Vac _____

Orifice Manometer (in. H_2O) H	Gas Volume: Wet Test Meter (ft^3) V_w	Gas Volume: Dry Gas Meter (ft^3) V_d	Temperatures: Wet Test Meter (° F) T_w	Temperatures: Dry Gas Meter (° F) T_d	Time (min) T_i	Y_i	$H@_i$
0.90	5.403	5.220	75.5	84.5	10	1.050	1.72
0.90	5.414	5.290	75.0	89	10	1.048	1.69
0.90	5.350	5.248	74.5	92.5	10	1.051	1.72
						Y_i AVG 1.050	

$\overline{H@_i}$ = 1.71

METER BOX CALIBRATION HISTORY

Last Calibration Date _____ Calibrated by _____

$H_@$ of Calibration _____ Y_i of Calibration _____

APPLICATION FOR AUTHORIZATION

TO USE

_____
(Document and Date)

TO: Kleinfelder, Inc.
1370 Valley Vista Drive, Suite 150
Diamond Bar, California 91765

Attention: Russell E. Erbes, Regional Manager

FROM:

_____
Name of person/entity

_____
Address

_____
City, State, Zip Code

_____
Telephone Number

Gentlemen:

Applicant hereby applies for permission to use:

_____
(Repeat document name and date)

for the purpose(s) of:

_____
(state here why you wish to do what is contemplated as set forth above)

Applicant understands and agrees that the above-referenced document is copyrighted and that Kleinfelder, Inc. is the copyright owner and that unauthorized use or copying of such document is strictly prohibited without the express written permission of Kleinfelder, Inc. Applicant understands that Kleinfelder, Inc. may withhold such permission at its sole discretion, or grant such permission upon such terms and conditions as it deems acceptable, such as the payment of a re-use fee.

Date: _____

_____
Applicant

BY: _____
Name

its: _____
Title