San Joaquin Valley
Unified Air Pollution Control District

AUTHORITY TO CONSTRUCT

PERMIT NO.: S-0004-0005-00 **ISSUANCE DATE:** January 15, 1993

LEGAL OWNER OR OPERATOR: TEHACHAPI CUMMINGS COUNTY WATER DISTRICT
MAILING ADDRESS: P. O. BOX 326
TEHACHAPI, CA 93561

EQUIPMENT LOCATION: 41985 TEJON RANCH ROAD
WHEELER RIDGE, CA
SW 1/4, SEC. 14, T11N, R18W SBBM

EQUIPMENT DESCRIPTION: WAUKESHA MODEL 5790GL 1060 HP LEAN BURN I. C. ENGINE WITH TURBOCHARGER AND INTERCOOLER.

CONDITIONS: engine #'s 1-3

1. No emission shall cause injury, detriment, nuisance or annoyance or endanger the comfort, repose, health or safety of any persons or have a natural tendency to cause injury or damage to business or property. (Rule 4102)

2. I. C. engine shall be equipped with a device to prevent crankcase emissions. (Rule 220.1 BACT requirement)

-- CONDITIONS CONTINUE ON NEXT PAGE --

This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. PLEASE NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (805) 861-3682 WHEN CONSTRUCTION OF THE EQUIPMENT IS COMPLETED. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and the application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of any other governmental agencies which may pertain to the above equipment.

DAVID L. CROW, APCO

SEYED SADREDIN
DIRECTOR OF PERMIT SERVICES

Southern Regional Office * 2700 M Street, Suite 275 * Bakersfield, California 93301 * (805) 861-3682 * FAX (805) 861-2060

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3. I. C. engine shall use PUC quality natural gas as fuel. (Rule 220.1 BACT requirement)

4. I. C. engine exhaust total suspended particulate matter emissions shall not exceed 0.1 grain/scf. (Rule 4201)

5. Utilization of I. C. engine shall not exceed 1052 hp. (Rule 220.1)

6. Oxides of nitrogen (NOx) emissions (as NO2) shall not exceed 2.0 gram/hp-hr or 150 ppmvd @ 15% O2. (Rules 220.1 and 4701)

7. Volatile organic compound (VOC) emissions shall not exceed 1.5 gram/hp-hr. (Rule 220.1 BACT requirement)

8. Carbon monoxide (CO) emissions shall not exceed 3.0 gram/hp-hr. (Rule 220.1)

9. Particulate matter (PM10) emissions shall not exceed 0.05 gram/hp-hr. (Rule 220.1 BACT requirement)

10. PTO# 0059001 shall be surrendered within 90 days of the startup of this unit. (Rule 220.1)

11. Initial testing shall be performed to demonstrate compliance with NOx, VOC, and CO emission limits within 60 days of startup by District witnessed sample collection and official test results submitted to the District within 60 days. (Rule 1081)

12. Annual testing shall be required to demonstrate compliance with NOx and VOC emission limits. (Rule 1081)

13. If visible emissions in excess of 5% opacity or 1/4 Ringlemann are present, source test per EPA method 5 shall be performed to show compliance with Rule 4201. (Rule 1081)

I. C. ENGINE EMISSION TESTING

September 13 and 14, 1993

Prepared for

Tehachapi-Cummings Water District
P.O. Box 326
22901 Banducci Road (Brite Valley)
Tehachapi, California 93561

October 1993

Prepared by

Steiner Environmental, Inc
4930 Boylan Street
Bakersfield, California 93308

Report PS-93-3241/Project 7400-93

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ENG	A/C
1	S-0004-5-0
2	S-0004-6-0
3	S-0004-7-0
4	S-0004-4-0 ← P/O

A/C

SECTION 1

INTRODUCTION

At the request of Tehachapi-Cummings Water District (TCWD), Steiner Environmental, Inc. undertook an IC Engine emission study at one water pumping plant between Bakersfield and Tehachapi. These tests were conducted on September 13 and 14, 1993. The purpose of these tests was to determine compliance with San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) Rules and Regulations.

Engines #1, #2, #3 and #4 at Plant #1 (A/C S-0004-0005-00; S-0004-0006-00; S-0004-0007-00; P/O S-0004-000~~4~~8-00) were tested. Triplicate 1-hour NO_x, CO, CO_2 and O_2 measurements were made at each engine exhaust using CARB Method 1-100. Triplicate 1-hour EPA Method 18 tests for hydrocarbon were also conducted. A sample of the natural gas burned at each engine was collected and analyzed for CHNOS, specific gravity, moisture and Btu.

Mr. Jim McSweeney of Steiner Environmental, Inc. conducted these tests. Mr. Pat Riley of TCWD and Mr. Malcolm Mossman of Basic Compliance Engineering were on-site to observe the engine operation and the emission testing. Messrs. Sam Parks and Michael Oldershaw of SJVUAPCD were present on October 13, 1993 and Mr. Glen Slitor of SJVUAPCD was present on October 14, 1993.

Average engine gas usage over the 8-hour test period was used to calculate a volumetric stack gas flowrate and lb/hr values from each engine.

Section 2 report presents the test matrix for this program.

SECTION 2

TEST PROGRAM

Table 2-1 summarizes the tests conducted on this program. Section 3 summarizes the results of these tests.

TABLE 2-1. PLANT #1 TEST MATRIX

Date	Engine No.	Test No.	Test Parameter	Test Time
9/13/93	2	1	$NO_x/CO/CO_2/O_2/HC$	10:25 am - 11:25 am
		2	$NO_x/CO/CO_2/O_2/HC$	11:40 am - 12:40 pm
		3	$NO_x/CO/CO_2/O_2/HC$	12:55 pm - 1:55 pm
	1	1	$NO_x/CO/CO_2/O_2/HC$	2:15 pm - 3:15 pm
		2	$NO_x/CO/CO_2/O_2/HC$	3:30 pm - 4:30 pm
		3	$NO_x/CO/CO_2/O_2/HC$	4:45 pm - 5:45 pm
9/14/93	3	1	$NO_x/CO/CO_2/O_2/HC$	7:50 am - 8:50 am
		2	$NO_x/CO/CO_2/O_2/HC$	9:10 am - 10:10 am
		3	$NO_x/CO/CO_2/O_2/HC$	10:25 am - 11:25 am
	4	1	$NO_x/CO/CO_2/O_2/HC$	12:45 pm - 1:45 pm
		2	$NO_x/CO/CO_2/O_2/HC$	1:55 pm - 2:55 pm
		3	$NO_x/CO/CO_2/O_2/HC$	3:05 pm - 4:05 pm

SECTION 3

TEST RESULTS

Tables 3-1 to 3-4 summarize the test results for Engines #1 through #4 at Plant #1. All data are reported at 60°F and 29.92 inches Hg.

TABLE 3-1. SUMMARY OF EMISSIONS

PLANT : TEHACHAPI CUMMINGS WATER DISTRICT
SOURCE : ENG #1
DATE : SEPT 13,1993

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

	RUN 1	RUN 2	RUN 3	AVERAGE
Fuel Flow, scfh	6493.75	6493.75	6493.75	6493.75
Heat Input, MMBtu/hr	6.82	6.82	6.82	6.82
Oxygen, %	10.40	10.41	10.35	10.39
NOx, ppm	104.06	109.05	108.75	107.29
NOx, ppm @ O2 corr.	58.47	61.33	60.82	60.21
NOx, lb/MMBtu	0.2138	0.2243	0.2224	0.2202
NOx, lb/hr	1.46	1.53	1.52	1.50
CO, ppm	569.05	571.50	570.88	570.48
CO, ppm @ O2 corr.	319.75	321.43	319.26	320.15
CO, lb/MMBtu	0.7119	0.7156	0.7108	0.7128
CO, lb/hr	4.85	4.88	4.84	4.86
HC, ppm	23.46	30.10	38.84	30.80
HC, ppm @ O2 corr.	13.18	16.93	21.72	17.28
HC, lb/MMBtu	0.0168	0.0216	0.0277	0.0220
HC, lb/hr	0.11	0.15	0.19	0.15

TABLE 3-2. SUMMARY OF EMISSIONS

PLANT : TEHACHAPI CUMMINGS WATER DISTRICT
SOURCE : ENG #2
DATE : SEPT 13,1993

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

	RUN 1	RUN 2	RUN 3	AVERAGE
Fuel Flow, scfh	6493.75	6493.75	6493.75	6493.75
Heat Input, MMBtu/hr	6.82	6.82	6.82	6.82
Oxygen, %	10.08	10.14	10.18	10.13
NOx, ppm	127.77	125.08	126.84	126.56
NOx, ppm @ O2 corr.	69.67	68.58	69.81	69.36
NOx, lb/MMBtu	0.2549	0.2509	0.2554	0.2538
NOx, lb/hr	1.74	1.71	1.74	1.73
CO, ppm	630.17	628.33	629.12	629.21
CO, ppm @ O2 corr.	343.62	344.53	346.25	344.80
CO, lb/MMBtu	0.7655	0.7675	0.7713	0.7681
CO, lb/hr	5.22	5.23	5.26	5.23
HC, ppm	46.94	48.09	46.36	47.13
HC, ppm @ O2 corr.	25.59	26.37	25.51	25.83
HC, lb/MMBtu	0.0327	0.0336	0.0326	0.0330
HC, lb/hr	0.22	0.23	0.22	0.22

TABLE 3-3. SUMMARY OF EMISSIONS

PLANT : TEHACHAPI CUMMINGS WATER DISTRICT
SOURCE : ENG #3
DATE : SEPT 14,1993

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

	RUN 1	RUN 2	RUN 3	AVERAGE
Fuel Flow, scfh	6581.25	6581.25	6581.25	6581.25
Heat Input, MMBtu/hr	6.92	6.92	6.92	6.92
Oxygen, %	10.34	10.34	10.42	10.37
NOx, ppm	108.41	103.97	101.29	104.56
NOx, ppm @ O2 corr.	60.57	58.09	57.02	58.56
NOx, lb/MMBtu	0.2215	0.2124	0.2085	0.2142
NOx, lb/hr	1.53	1.47	1.44	1.48
CO, ppm	594.50	589.90	590.94	591.78
CO, ppm @ O2 corr.	332.15	329.58	332.69	331.47
CO, lb/MMBtu	0.7396	0.7339	0.7408	0.7381
CO, lb/hr	5.12	5.08	5.13	5.11
HC, ppm	47.19	48.16	39.02	44.79
HC, ppm @ O2 corr.	26.36	26.91	21.97	25.08
HC, lb/MMBtu	0.0336	0.0343	0.0280	0.0320
HC, lb/hr	0.23	0.24	0.19	0.22

TABLE 3-4. SUMMARY OF EMISSIONS

PLANT : TEHACHAPI CUMMINGS WATER DISTRICT
SOURCE : ENG #4
DATE : SEPT 14,1993

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

	RUN 1	RUN 2	RUN 3	AVERAGE
Fuel Flow, scfh	6581.25	6581.25	6581.25	6581.25
Heat Input, MMBtu/hr	6.90	6.90	6.90	6.90
Oxygen, %	1.24	1.20	1.18	1.21
NOx, ppm	4584.74	4554.64	4516.40	4551.93
NOx, ppm @ O2 corr.	1375.89	1364.08	1351.26	1363.74
NOx, lb/MMBtu	5.0337	4.9905	4.9436	4.9893
NOx, lb/hr	34.74	34.44	34.11	34.43
CO, ppm	355.84	404.68	445.47	402.00
CO, ppm @ O2 corr.	106.79	121.20	133.28	120.42
CO, lb/MMBtu	0.2379	0.2700	0.2969	0.2682
CO, lb/hr	1.64	1.86	2.05	1.85
HC, ppm	16.84	17.68	16.38	16.97
HC, ppm @ O2 corr.	5.05	5.29	4.90	5.08
HC, lb/MMBtu	0.0064	0.0068	0.0063	0.0065
HC, lb/hr	0.04	0.05	0.04	0.04

SECTION 4

SAMPLING EQUIPMENT AND PROCEDURES

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

4.1 SAMPLING PROCEDURES FOR CONTINUOUS MONITORING

The continuous monitors used in the Steiner Environmental Mobile Monitoring Lab are shown in Table 4-1. Figure 4-1 is a schematic of the continuous monitoring system. The procedures used to continuously monitor stack gases for NO_x, O_2, CO and CO_2 strictly follow CARB Method 1-100.

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

TABLE 4-1. CONTINUOUS MONITORING LAB - TRAILER 3

NO_x CHEMILUMINESCENT ANALYZER -- THERMO ELECTRON MODEL 10

Response Time (0-90%)	1.5 sec -- NO mode; 1.7 sec -- NO_x mode
Zero Drift	Negligible after 1/2 hour warmup
Linearity	±1% of full scale
Accuracy	Derived from the NO or NO_2 calibration gas, ±1% of full scale
Output	0-10 V
Operating Ranges	10, 25, 100, 250, 1000, 2500 and 10,000 ppm
Flowrate = 2 scfh	0-2.5

O_2 ANALYZER, FUEL TYPE -- TELEDYNE MODEL 326

Response Time (0-90%)	60 seconds
Accuracy	±1% of scale at constant temperatures; ±1% of scale of ±5% of reading, whichever is greater, over the operating temperature range
Output	0-1 V
Operating Ranges	0-5%, 10%, 25% O_2
Flowrate	2 scfh

CO_2/CO INFRARED ANALYZER -- ANARAD MODEL AR-600

Response Time (0-90%)	5 seconds
Zero Drift	±1%
Span Drift	±1%
Linearity	1%
Resolution	Less than 1% of full scale
Output	0-1 V
Operating Ranges	0-20% CO_2/0-5% CO
Flowrate	1000 cc/min

CO GAS FILTER CORRELATION -- THERMO ELECTRON MODEL 48

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

STRIP CHART RECORDERS (2) -- LINSEIS 7025

Pen Response	0.35 seconds Full Scale
Input Spans	1, 2, 5, 10, 20, 50, 100 MV
Zero Set	Stable access entire chart-width ±100%
Accuracy	.35% of Span
Dead Band	.15% of Span
Linearity	.25% of Span
Chart Speed	1, 2, 5, 10, 20, 50, 100 cm/min; 1, 2, 5, 10, 20, 50 cm/hr; fast advance 100 cm/min; LED indicator, forward and reverse selector
Recording Pen	Fiber tip pen
Chart Width	250 mm

SCOTSMAN TRAILER

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

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

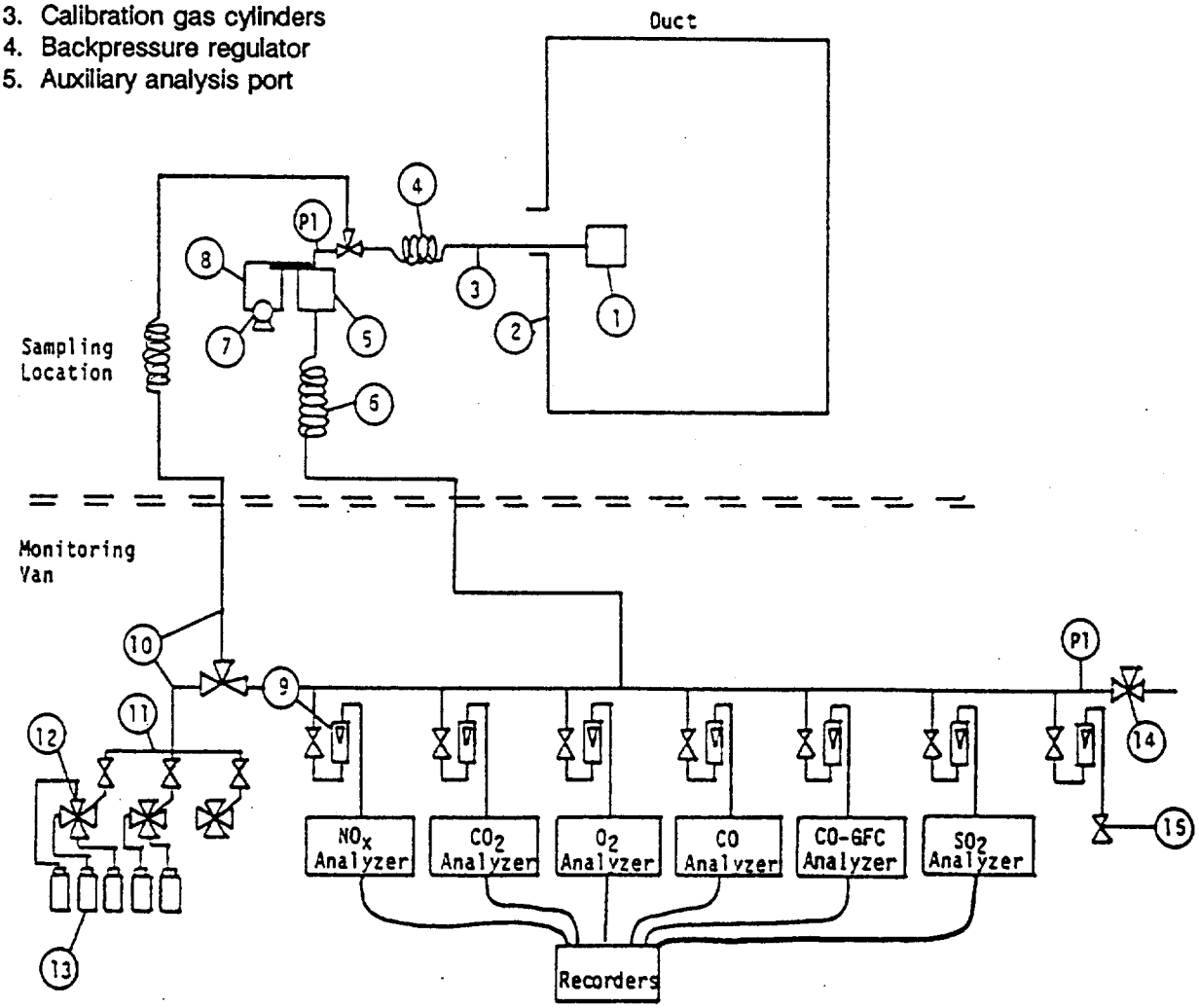

FIGURE 4-1. SCHEMATIC OF CONTINUOUS MONITORING SYSTEM

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

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

An initial calibration was performed at the start of a test period by introducing zero and span gases for each analyzer and making the necessary adjustments. Calibration gas values were recorded on the continuous monitor strip charts and field data sheets. A calibration check was completed at the end of a test and adjustments (if necessary) to the analyzers were made in preparation for another test.

An external calibration of the sampling system was performed at the start of a test day. EPA Protocol 1 gas was flowed through the entire sampling system from the probe tip. The response of the analyzers had to be within ±5% of the certified tank value before testing could proceed. An external calibration was also performed at the end of each test day.

Test data were collected by recording 10-minute averages from the strip chart recordings onto the field data sheets. Data collected over

the test period were averaged and reported. A fuel analysis was used to calculate the F-factor, dscf/MMBtu corrected to zero percent O_2 (standard conditions 60°F, 29.92 inches Mercury), as described in 40 CFR 60.45. The pollutant concentration and the F-factor were used to calculate an emission factor in lb/MMBtu.

4.2 SAMPLING PROCEDURES FOR HYDROCARBONS

The sampling train for hydrocarbons consisted of a probe (3 feet of stainless steel), a Tygon sample line, a hand pump and a Tedlar bag. The entire train was purged with stack gas three times before collecting a sample. An integrated grab sample of the stack gases was collected over the test period. After sample collection, the Tedlar bag was lowered to the mobile lab for subsequent analysis. Triplicate grab samples were collected during the test series.

SECTION 5

ANALYSIS

This section of the report describes the procedures used to analyze the samples collected during the test program. The natural gas fuel analysis was performed by Pacific Gas Technology (PGT). All other analyses were performed in the Steiner Environmental, Inc. climate-controlled laboratory located in Bakersfield, California.

5.1 ANALYSIS OF HYDROCARBON SAMPLES

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

5.3 FUEL

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

TABLE 5-1. FUEL ANALYSIS METHODS

LABORATORY TEST PROCEDURES FOR FUEL OILS AND FUEL GASES

Reference: EPA Title 40, Section 60.45

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

PACIFIC GAS TECHNOLOGY

2122 Q Street
Bakersfield, California 93301
805/324-1317
Fax: 805/324-2746

GAS ANALYSIS BY CHROMATOGRAPH

STEINER ENVIRONMENTAL, INC
4930 Boylan Street
Bakersfield, CA 93308

Attention: Jim Steiner

RECEIVED
SEP 27 1993
By_____

SAMPLED: 13-Sep-93
SUBMITTED: 16-Sep-93
REPORTED: 23-Sep-93
LAB No.: 6592-2

Sample ID : TEHACHAPI CUMMINGS WATER DISTRICT
PLANT 1 ICE # /
NATURAL GAS

STEINER ID No. : 36829

ANALYZED GAS

	MOLE %	WT %	CHONS WT %	
OXYGEN	0.05	0.09	CARBON	73.31
NITROGEN	1.16	1.86	HYDROGEN	23.58
CARBON DIOXIDE	0.63	1.59	OXYGEN	1.25
HYDROGEN	ND	0.00	NITROGEN	1.86
CARBON MONOXIDE	ND	0.00	SULFUR	0.00
HYDROGEN SULFIDE	ND	0.00		
METHANE	91.60	84.27		
ETHANE	5.67	9.78		
PROPANE	0.74	1.87		
iso-BUTANE	0.06	0.20		
n-BUTANE	0.06	0.20		
iso-PENTANE	0.01	0.04		
n-PENTANE	0.01	0.04		
HEXANE +	0.01	0.05		
TOTAL:	100.00			

SPECIFIC GRAVITY * : 0.602

SPECIFIC VOLUME : 21.80 cu ft/lb

TOTAL SULFUR as Hydrogen Sulfide : ppm (GC/FPD)

TOTAL * BTU/cu ft	DRY	:	1050	NET * BTU/cu ft	DRY	: 947
	WET	:	1031		WET	: 930
BTU/lb		:	22878	BTU/lb		: 20633

* CALCULATED ACCORDING TO : ASTM D-3588

PACIFIC GAS TECHNOLOGY

2122 Q Street
Bakersfield, California 93301
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GAS ANALYSIS BY CHROMATOGRAPH

STEINER ENVIRONMENTAL, INC
4930 Boylan Street
Bakersfield, CA 93308

Attention: Jim Steiner

RECEIVED
SEP 27 1993
By

SAMPLED: 13-Sep-93
SUBMITTED: 16-Sep-93
REPORTED: 23-Sep-93
LAB No.: 6592-1

Sample ID : TEHACHAPI CUMMINGS WATER DISTRICT
PLANT 1 ICE 2
NATURAL GAS

STEINER ID No. : 36825

ANALYZED GAS

	MOLE %	WT %	CHONS WT %	
OXYGEN	0.02	0.04	CARBON	73.42
NITROGEN	1.09	1.75	HYDROGEN	23.61
CARBON DIOXIDE	0.64	1.62	OXYGEN	1.21
HYDROGEN	ND	0.00	NITROGEN	1.75
CARBON MONOXIDE	ND	0.00	SULFUR	0.00
HYDROGEN SULFIDE	ND	0.00		
METHANE	91.74	84.45		
ETHANE	5.61	9.68		
PROPANE	0.73	1.85		
iso-BUTANE	0.06	0.20		
n-BUTANE	0.06	0.20		
iso-PENTANE	0.02	0.08		
n-PENTANE	0.01	0.04		
HEXANE +	0.02	0.10		
TOTAL:	100.00			

SPECIFIC GRAVITY * : 0.601

SPECIFIC VOLUME : 21.81 cu ft/lb

TOTAL SULFUR as Hydrogen Sulfide : ppm (GC/FPD)

TOTAL * BTU/cu ft	DRY	:	1050	NET * BTU/cu ft	DRY	: 947
	WET	:	1031		WET	: 930
BTU/lb		:	22897	BTU/lb		: 20650

* CALCULATED ACCORDING TO : ASTM D-3588

PACIFIC GAS TECHNOLOGY

2122 Q Street
Bakersfield, California 93301
805/324-1317
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GAS ANALYSIS BY CHROMATOGRAPH

STEINER ENVIRONMENTAL, INC
4930 Boylan Street
Bakersfield, CA 93308

Attention: Jim Steiner

RECEIVED
SEP 27 1993
By_____

SAMPLED: 14-Sep-93
SUBMITTED: 16-Sep-93
REPORTED: 23-Sep-93
LAB No.: 6592-3

Sample ID : TEHACHAPI CUMMINGS WATER DISTRICT
PLANT 1 ICE # 3
NATURAL GAS

STEINER ID No. : 36833

ANALYZED GAS

	MOLE %	WT %	CHONS WT %	
OXYGEN	ND	0.00	CARBON	73.56
NITROGEN	1.06	1.71	HYDROGEN	23.67
CARBON DIOXIDE	0.58	1.47	OXYGEN	1.07
HYDROGEN	ND	0.00	NITROGEN	1.71
CARBON MONOXIDE	ND	0.00	SULFUR	0.00
HYDROGEN SULFIDE	ND	0.00		
METHANE	91.72	84.50		
ETHANE	5.76	9.95		
PROPANE	0.74	1.87		
iso-BUTANE	0.06	0.20		
n-BUTANE	0.05	0.17		
iso-PENTANE	0.01	0.04		
n-PENTANE	0.01	0.04		
HEXANE +	0.01	0.05		
TOTAL:	100.00			

SPECIFIC GRAVITY * : 0.601

SPECIFIC VOLUME : 21.83 cu ft/lb

TOTAL SULFUR as Hydrogen Sulfide : ppm (GC/FPD)

TOTAL * BTU/cu ft	DRY	:	1052	NET * BTU/cu ft	DRY	: 949
	WET	:	1034		WET	: 932
BTU/lb		:	22964	BTU/lb		: 20711

* CALCULATED ACCORDING TO : ASTM D-3588

PACIFIC GAS TECHNOLOGY

2122 Q Street
Bakersfield, California 93301
805/324-1317
Fax: 805/324-2746

GAS ANALYSIS BY CHROMATOGRAPH

STEINER ENVIRONMENTAL, INC
4930 Boylan Street
Bakersfield, CA 93308

Attention: Jim Steiner

RECEIVED
SEP 27 1993
By_____

SAMPLED: 14-Sep-93
SUBMITTED: 16-Sep-93
REPORTED: 23-Sep-93
LAB No.: 6592-4

Sample ID : TEHACHAPI CUMMINGS WATER DISTRICT
PLANT 1 ICE # 4
NATURAL GAS

STEINER ID No. : 36837

ANALYZED GAS

	MOLE %	WT %	CHONS WT %	
OXYGEN	0.07	0.13	CARBON	73.16
NITROGEN	1.28	2.05	HYDROGEN	23.52
CARBON DIOXIDE	0.62	1.56	OXYGEN	1.26
HYDROGEN	ND	0.00	NITROGEN	2.05
CARBON MONOXIDE	ND	0.00	SULFUR	0.00
HYDROGEN SULFIDE	ND	0.00		
METHANE	91.47	84.00		
ETHANE	5.63	9.69		
PROPANE	0.75	1.89		
iso-BUTANE	0.06	0.20		
n-BUTANE	0.06	0.20		
iso-PENTANE	0.02	0.08		
n-PENTANE	0.01	0.04		
HEXANE +	0.03	0.15		
TOTAL:	100.00			

SPECIFIC GRAVITY * : 0.603

SPECIFIC VOLUME : 21.76 cu ft/lb

TOTAL SULFUR as Hydrogen Sulfide : ppm (GC/FPD)

TOTAL * BTU/cu ft	DRY	:	1049	NET * BTU/cu ft	DRY	: 946
	WET	:	1030		WET	: 929
BTU/lb		:	22817	BTU/lb		: 20579

* CALCULATED ACCORDING TO : ASTM D-3588

SECTION 6

QUALITY ASSURANCE

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

6.1 CONTINUOUS MONITORS QUALITY ASSURANCE

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

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

Multi-point calibration linearity checks of the continuous analyzers were performed on the following dates May 9, 1991 through May 16, 1991. The results were well within the CARB limitations of ±2% of full scale. Tables 6-2 through 6-6 list the results of these checks.

6.2 QUALITY ASSURANCE OF HYDROCARBON ANALYSES

Each sample container is purged in the field with sample prior to the actual tests. A certified gas is used to calibrate the gas chromatograph used to measure the hydrocarbons. The calibration certificate for the gas used appears at the end of this section. Duplicate analyses of some samples were conducted. Table 6-1 presents the results of the Quality Assurance checks.

TABLE 6-1. QA/QC RESULTS

Engine No.	Test No.	Test Parameter	Duplicate (%)
1	2	$>C_2$ Hydrocarbon	110.8
2	1	$>C_2$ Hydrocarbon	85.8
3	1	$>C_2$ Hydrocarbon	103.9
4	1	$>C_2$ Hydrocarbon	107.5

TABLE 6-2. NO_x CALIBRATION SUMMARY

Monitoring Trailer: 3		Calibrated by: JP 5/9/91	
Analyzer:	TECO	Calibrator Manufacturer:	Environics
Model:	10 AR	Model:	201-1520
Serial Number:	15311-154	Serial Number:	1122
NO_x Standard:	CC7204, CC72048		
Concentration:	9760 ppm, 1039 ppm		
Cylinder Pressure:	2000 psi, 2000 psi		

NO_x CALIBRATION AND LINEARITY CHECKS

Range 0-2500 ppm

Calibration Points	Flow, Dil. cc/min	Flow, Std. cc/min	NO_x out ppm	Chart ppm	% Difference +2% Full Scale
Zero	2944.8	0	0	0	0
80% URL	2332.9	603.8	2005	2005.0	0
1	2487.1	450.7	1497	1502.5	+ 0.22
2	2638.9	302.0	1002	1010.0	+ 0.32
3	2790.6	152.3	505	505.0	0

Range 0-1000 ppm

Calibration Points	Flow, Dil. cc/min	Flow, Std. cc/min	NO_x out ppm	Chart ppm	% Difference +2% Full Scale
Zero	4919.8	0	0	0	0
80% URL	4515.9	402.0	798.0	798	0
1	4616.3	303.2	601.5	602	+ 0.05
2	4716.6	204.1	405.0	409	+ 0.40
3	4814.5	103.6	205.5	207	+ 0.15

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

TECO Model 10-AR/Trailer #3/May 9, 1991

Range 0-100 ppm

Calibration Points	Flow, Dil. cc/min	Flow, Std. cc/min	NO_x out ppm	Chart ppm	% Difference +2% Full Scale
Zero	9339.6	0	0	0	0
80% URL	9256.4	76.9	80.4	80.4	0
1	9278.4	56.9	59.5	60.1	+ 0.6
2	9298.0	38.2	39.9	39.8	+ 0.1
3	9320.1	19.5	20.3	19.9	- 0.4

Range 0-25 ppm

Calibration Points	Flow, Dil. cc/min	Flow, Std. cc/min	NO_x out ppm	Chart ppm	% Difference +2% Full Scale
Zero	4916.6	0	0	0	0
80% URL	4821.9	94.7	20.00	20.00	0
1	4846.3	70.1	14.80	15.02	+ 0.88
2	4865.4	46.9	9.90	10.00	+ 0.40
3	4890.4	23.8	5.03	5.03	0

Range 0-10 ppm

Calibration Points	Flow, Dil. cc/min	Flow, Std. cc/min	NO_x out ppm	Chart ppm	% Difference +2% Full Scale
Zero	9335.3	0	0	0	0
80% URL	9263.8	72.3	8.04	8.04	0
1	9283.3	53.4	5.95	5.92	- 0.3
2	9298.0	35.8	3.99	3.93	- 0.6
3	9320.0	18.3	2.03	2.02	- 0.1

TABLE 6-3. CO CALIBRATION SUMMARY

Monitoring Trailer: 3		Calibrated by: JP 5/10/91	
Analyzer:	TECO	Calibrator Manufacturer:	Environics
Model:	48	Model:	201-1520
Serial Number:	25149-219	Serial Number:	1122
CO Standard:	CC81181, CC345		
Concentration:	10430 ppm, 1001 ppm		
Cylinder Pressure:	2000 psi, 2000 psi		

CO CALIBRATION AND LINEARITY CHECKS

Range 0-1000 ppm

Calibration Points	Flow, Dil. cc/min	Flow, Std. cc/min	CO out ppm	Chart ppm	% Difference ±2% Full Scale
Zero	7368.0	0	0	0	0
80% URL	6809.1	558.9	791.2	791.2	0
1	6948.6	420.3	594.5	598.0	+ 0.35
2	7090.5	281.1	397.7	411.0	+ 1.30
3	9160.9	179.4	200.3	211.0	+ 1.10

Range 0-500 ppm

Calibration Points	Flow, Dil. cc/min	Flow, Std. cc/min	CO out ppm	Chart ppm	% Difference ±2% Full Scale
Zero	7371.6	0	0	0	0
80% URL	7090.5	281.1	397.7	397.7	0
1	7161.5	211.8	299.6	307.5	+ 1.58
2	2890.9	56.0	198.3	201.0	+ 0.54
3	2917.8	28.3	100.2	100.5	+ 0.06

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

TECO Model 48/Trailer #3/May 10, 1991

Range 0-100 ppm

Calibration Points	Flow, Dil. cc/min	Flow, Std. cc/min	CO out ppm	Chart ppm	% Difference +2% Full Scale
Zero	8838.0	0	0	0	0
80% URL	8140.4	697.6	79.0	79.0	0
1	8319.1	524.1	59.3	59.1	- 0.2
2	8492.9	350.9	39.7	39.8	+ 0.1
3	8671.5	177.2	20.0	20.3	+ 0.3

Range 0-20 ppm

Calibration Points	Flow, Dil. cc/min	Flow, Std. cc/min	CO out ppm	Chart ppm	% Difference +2% Full Scale
Zero	4917.8	0	0	0	0
80% URL	4838.9	78.9	16.05	16.05	0
1	4858.6	58.3	11.90	12.08	+ 0.9
2	4878.2	39.1	7.96	8.02	+ 0.3
3	4897.7	19.9	4.04	4.14	+ 0.5

Range 0-10 ppm

Calibration Points	Flow, Dil. cc/min	Flow, Std. cc/min	CO out ppm	Chart ppm	% Difference +2% Full Scale
Zero	8845.5	0	0	0	0
80% URL	8774.3	71.2	8.04	8.04	0
1	8796.3	52.6	5.94	6.05	+ 1.1
2	8813.5	35.3	3.99	4.15	+ 1.6
3	9711.6	19.7	2.02	2.10	+ 0.8

TABLE 6-4. CO CALIBRATION SUMMARY

Monitoring Trailer: 3		Calibrated by: JP 5/13/91	
Analyzer:	ANARAD	Calibrator Manufacturer:	Environics
Model:	AR 602	Model:	201-1520
Serial Number:	2340	Serial Number:	1122
CO Standard:	ALM17548, ALM15154		
Concentration:	42490 ppm, 22560 ppm, 10430 ppm		
Cylinder Pressure:	2000 psi, 2000 psi, 2000 psi		

CO CALIBRATION AND LINEARITY CHECKS

Range 0-50,000 ppm

Calibration Points	Flow, Dil. cc/min	Flow, Std. cc/min	CO out ppm	Chart ppm	% Difference +2% Full Scale
Zero	* NA	* NA	0	0	0
80% URL	* NA	* NA	42490	42490	0
1	* NA	* NA	22560	22600	+ 0.08
2	* NA	* NA	10430	10100	- 0.66

* Used Concentrated Gas Cylinders

TABLE 6-5. CO_2 CALIBRATION SUMMARY

Monitoring Trailer: 3		Calibrated by: JP 5/16/91	
Analyzer:	ANARAD	Calibrator Manufacturer:	Environics
Model:	AR 602	Model:	201-1520
Serial Number:	2340	Serial Number:	1122
CO_2 Standard:	CC86353		
Concentration:	41.2%		
Cylinder Pressure:	1000 psi		

CO_2 CALIBRATION AND LINEARITY CHECKS

Range 0-20 %

Calibration Points	Flow, Dil. cc/min	Flow, Std. cc/min	CO_2 out %	Chart %	% Difference +2% Full Scale
Zero	1998.0	--	0	0	0
80% URL	1278.1	719.9	16.21	16.21	0
1	1451.9	531.0	12.05	12.30	+ 1.25
2	1628.1	355.2	8.06	8.20	+ 0.70
3	1801.9	179.3	4.07	4.16	+ 0.45

TABLE 6-6. O_2 CALIBRATION SUMMARY

Monitoring Trailer: 3		Calibrated by: JP 5/14/91	
Analyzer:	Teledyne	Calibrator Manufacturer:	Environics
Model:	326A	Model:	201-1520
Serial Number:	44535	Serial Number:	1122
O_2 Standard:	A14722		
Concentration:	45%		
Cylinder Pressure:	1750 psi		

O_2 CALIBRATION AND LINEARITY CHECKS

Range 0-25 %

Calibration Points	Flow, Dil. cc/min	Flow, Std. cc/min	O_2 out %	Chart %	% Difference +2% Full Scale
Zero	1991.8	--	0	0	0
80% URL	1094.6	897.2	20.2	20.20	0
1	1836.1	943.5	15.3	15.25	- 0.20
2	2139.6	618.9	10.1	10.38	+ 1.10
3	2445.5	311.0	5.08	5.30	+ 0.88

Range 0-10 %

Calibration Points	Flow, Dil. cc/min	Flow, Std. cc/min	O_2 out %	Chart %	% Difference +2% Full Scale
Zero	4441.1	--	0	0	0
80% URL	3632.5	808.6	8.19	8.19	0
1	3828.2	596.8	6.07	6.11	+ 0.3
2	4024.0	398.8	4.06	4.20	+ 1.4
3	4219.8	201.2	2.05	2.21	+ 1.6

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

Teledyne Model 326A/Trailer #3/May 14, 1991

Range 0-5 %

Calibration Points	Flow, Dil. cc/min	Flow, Std. cc/min	O_2 out %	Chart %	% Difference +2% Full Scale
Zero	7885.8	--	0	0	0
80% URL	7166.4	719.4	4.10	4.10	0
1	7340.2	530.6	3.03	3.08	+ 1.0
2	7513.9	354.7	2.03	2.10	+ 1.4
3	7687.7	179.3	1.03	1.11	+ 1.6

APPENDIX A

STEINER ENVIRONMENTAL RAW DATA

Steiner Environmental, Inc.

CONTINUOUS MONITOR DATA SHEET

Plant TEHACHAPI CUMMINGS WATER DIST
Date 9.13.93 Run No. 1+2
Test Location PLANT #1 ENGINE #2
Operator JM
Fuel Type NAT. GAS Trailer No. 3

APCD Witness/Number
Client Rep PAT RILEY
Generator Type
Burner Type
O_2 Controller Type

Time	Sample Point	Dry Uncorrected O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
		20.9	16.15	801			206.8	HIGH SPAN
		0.0	0.0	0.0			0.0	ZERO GASES
		20.9	16.00	802			204.8	BIAS SPAN
		0.09	0.0	0.0			0.0	BIAS ZERO
		0.09						QA LEAK ✓
		10.08	5.90	632			124.5	RUN #1 ICE #2
1025		10.05	5.88	630			129.3	
35		10.03	5.92	630			130.0	36822 HC 1
45		10.12	5.92	630			130.7	
55		10.12	5.86	630			130.0	
05		10.12	5.80	629			130.7	
15								
		0.0	0.0	0.0			0.0	ZERO
		20.94	16.10	801			211.4	SPAN
								RECAL
							124.3	RUN #2 ICE #2
1140		10.20	5.96	626			126.5	
50		10.20	5.96	628			125.7	36823 HC 2
00		10.15	5.88	629			125.7	
10		10.10	5.88	629			125.5	
20		10.10	5.84	630			125.5	
30		10.10	5.86	628				

Miscellaneous Information

CALIBRATION GASES

NO_x CC68618
SO_2
CO CC63451
$CO/CO_2/O_2$ CC105493

Wet Bulb: Dry Bulb:
Barometric Press:

RESPONSE TIME

Upscale: Downscale:
Upscale: Downscale:
Upscale: Downscale:

PROCESS DATA

Fuel Flow:
Steam Flow:
Rating:

CONVERTER GAS

	Cal Gas Values	Actual Values
NO		
NO_2		

Conv. Efficiency:

CMDS.FRM.F1A

Steiner Environmental, Inc.

CONTINUOUS MONITOR DATA SHEET

Plant TEHACHAPI CUMMINGS WATER DIST
Date 9.13.93 Run No. 3 - ICE * RUN 1
Test Location PLANT 1 ICE #2 & #1
Operator JM
Fuel Type NAT. GAS Trailer No. 3

APCD Witness/Number
Client Rep PAT RILEY
Generator Type
Burner Type
O_2 Controller Type

Time	Sample Point	O_2 % (Dry Uncorrected)	CO_2 % (Dry Uncorrected)	CO ppm (Dry Uncorrected)	SO_2 ppm (Dry Uncorrected)	NO ppm (Dry Uncorrected)	NO_x ppm (Dry Uncorrected)	Comments
		20.9	16.15	801			206.8	HIGH SPAN
		0.0	0.0	0.0			0.0	ZERO GASES
		0.0	0.0	0.0			0.0	ZERO
		20.9	16.32	801			208.3	SPAN
								RECAL
1255		10.10	5.90	626			125.6	RUN #3 ICE #2
05		10.10	6.00	629			127.3	
15		10.08	6.16	630			127.3	36824 HC 3
25		10.07	6.08	629			128.3	
35		10.05	5.94	628			128.7	36825 NG ALL
45		10.05	5.90	628			129.5	
		0.0	0.0	0.0			0.0	ZERO
		20.88	16.56	799			209.8	SPAN RECAL
1415		10.45	5.80	564			100.8	RUN #1 ICE #1
		10.46	5.88	566			101.3	
		10.38	5.76	567			102.3	36826 HC 1
		10.31	5.80	570			108.8	
		10.31	5.80	570			108.8	
		10.29	5.80	573			108.8	
		0.0	0.0	0.0			1.25	ZERO
		20.75	16.16	799			209.8	SPAN RECAL

Miscellaneous Information

CALIBRATION GASES
NO_x
SO_2
CO
$CO/CO_2/O_2$

Wet Bulb: Dry Bulb:
Barometric Press:

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

PROCESS DATA
Fuel Flow:
Steam Flow:
Rating:

CONVERTER GAS

	Cal Gas Values	Actual Values
NO		
NO_2		

Conv. Efficiency:

CMDS.FRM.F1A

Steiner Environmental, Inc.

CONTINUOUS MONITOR DATA SHEET

Plant TEHACHAPI CUMMINGS WATER DIST
Date 9.13.93 Run No. 2 + 3
Test Location PLANT 1 ENGINE 1
Operator JM
Fuel Type NAT. GAS Trailer No. 3

APCD Witness/Number
Client Rep PATRILEY
Generator Type
Burner Type
O_2 Controller Type

Time	Sample Point	O_2 % (Dry Uncorrected)	CO_2 % (Dry Uncorrected)	CO ppm (Dry Uncorrected)	SO_2 ppm (Dry Uncorrected)	NO ppm (Dry Uncorrected)	NO_x ppm (Dry Uncorrected)	Comments
		20.9	16.15	801			206.8	HIGH SPAN
		0.0	0.0	0.0			0.0	ZERO GASES
1530		10.38	5.72	570			107.5	RUN #2 ICE #1
40		10.40	5.76	572			108.0	
50		10.40	5.78	573			109.0	36827 HC 2
60		10.38	5.78	572			109.8	
10		10.35	5.78	571			110.3	
20		10.35	5.72	571			110.5	
		0.0	0.0	0.0			0.0	ZERO
		20.77	16.10	801			207.3	SPAN RECAL
1645		10.33	5.60	570			107.5	RUN #3 ICE #1
55		10.38	5.56	570			108.0	
05		10.33	5.54	570			109.3	36828 HC 3
15		10.31	5.52	571			109.5	
25		10.31	5.56	570			109.5	36829 NG ALL
35		10.31	5.60	570			109.5	
		0.0	0.0	0.0			0.0	ZERO
		20.80	16.00	799			207.3	SPAN
		0.06	0.0	0.0			0.0	BIAS ZERO
		20.80	15.96	793			204.8	BIAS SPAN
		0.06						QA LEAK ✓

Miscellaneous Information

CALIBRATION GASES
NO_x
SO_2
CO
$CO/CO_2/O_2$

Wet Bulb: Dry Bulb:
Barometric Press:

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

PROCESS DATA
Fuel Flow:
Steam Flow:
Rating:

CONVERTER GAS

	Cal Gas Values	Actual Values
NO		
NO_2		

Conv. Efficiency:

CMDS.FRM.F1A

Steiner Environmental, Inc.

CONTINUOUS MONITOR DATA SHEET

Plant TEHACHAPI CUMMINGS WATER DIST.
Date 9.14.93 Run No. 1+2
Test Location PLANT 1 ENGINE 3
Operator JM
Fuel Type NAT GAS Trailer No. 3

APCD Witness/Number
Client Rep PAT RILEY
Generator Type
Burner Type
O_2 Controller Type

Time	Sample Point	O_2 % (Dry Uncorrected)	CO_2 % (Dry Uncorrected)	CO ppm (Dry Uncorrected)	SO_2 ppm (Dry Uncorrected)	NO ppm (Dry Uncorrected)	NO_x ppm (Dry Uncorrected)	Comments
		20.9	16.15	801			206.8	HIGH
		0.0	0.0	0.0			0.0	ZERO
		20.9	15.96	791			207.3	BIAS SPAN
		0.06	0.0	0.0			0.0	BIAS ZERO
		0.06						QA LEAK ✓
750		10.25	5.64	598			113.0	RUN #1 ENGINE 3
00		10.25	5.60	597			110.8	
10		10.30	5.58	596			107.5	
20		10.40	5.50	595			107.0	HC 36830 1
30		10.50	5.44	592			107.0	
40		10.50	5.38	589			107.0	
		0.0	0.0	0.0			0.0	ZERO
		21.02	15.90	801			208.0	SPAN RECAL
910		10.38	5.62	588			104.5	RUN #2 ENGINE 3
20		10.38	5.64	588			104.5	
30		10.35	5.70	589			104.5	HC 36831 2
40		10.35	5.68	590			104.0	
50		10.30	5.64	590			103.3	
00		10.30	5.62	590			103.3	
		0.0	0.0	0.0			0.0	ZERO
		20.9	15.95	799			207.0	SPAN RECAL

Miscellaneous Information

CALIBRATION GASES
NO_x CC68618
SO_2
CO CC63451
$CO/CO_2/O_2$ CC105493

Wet Bulb: Dry Bulb:
Barometric Press:

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

PROCESS DATA
Fuel Flow:
Steam Flow:
Rating:

CONVERTER GAS

	Cal Gas Values	Actual Values
NO		
NO_2		

Conv. Efficiency:

CMDS.FRM.F1A

Steiner Environmental, Inc.

CONTINUOUS MONITOR DATA SHEET

Plant TEHACHAPI CUMMINGS WATER DIST.
Date 9.14.93 Run No. 3 - ENGINE 4 RUN 1
Test Location PLANT 1 ENGINE 3 + 4
Operator JM
Fuel Type NAT GAS Trailer No. 3

APCD Witness/Number GLENN
Client Rep PAT RILEY
Generator Type
Burner Type
O_2 Controller Type

Time	Sample Point	Dry Uncorrected O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
		20.9	16.15	801			206.8	HIGH
		0.0	0.0	0.0			0.0	ZERO
1025		10.38	5.60	591			102.0	RUN #3 ENGINE 3
35		10.38	5.60	590			102.0	
45		10.38	5.60	590			101.3	36832 HC 3
55		10.38	5.60	590			101.3	
05		10.38	5.56	590			101.3	36833 ASTM NG ALL
15		10.38	5.56	588			101.3	
		0.0	0.0	0.0			207.8	ZERO
		20.75	16.00	798			0.0	SPAN RECAL
		4.27					8130	O_2 0-5% NO_x 0-10,000
1245		1.25	11.02	350			4590	RUN #1 ENGINE 4
55		1.24	11.04	355			4590	
05		1.24	11.04	355			4580	36834 HC 1
15		1.24	11.04	357			4580	
25		1.24	11.05	354			4580	
35		1.23	11.06	360			4580	
		0.0	0.0	0.0			0.0	ZERO
		4.25	16.25	798			8125	SPAN RECAL

Miscellaneous Information

CALIBRATION GASES
NO_x CC719
SO_2
CO
$CO/CO_2/O_2$

Wet Bulb: Dry Bulb:
Barometric Press:

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

PROCESS DATA
Fuel Flow:
Steam Flow:
Rating:

CONVERTER GAS

	Cal Gas Values	Actual Values
NO		
NO_2		

Conv. Efficiency:

CMDS.FRM.F1A

Steiner Environmental, Inc.

CONTINUOUS MONITOR DATA SHEET

Plant TEHACHAPI CUMMINGS WATER DIST.
Date 9·14·93 Run No. 2 + 3
Test Location PLANT 1 ENGINE 4
Operator JM
Fuel Type NAT. GAS Trailer No. 3

APCD Witness/Number GLENN
Client Rep PAT RILEY
Generator Type
Burner Type
O_2 Controller Type

Time	Sample Point	O_2 % (Dry Uncorrected)	CO_2 % (Dry Uncorrected)	CO ppm (Dry Uncorrected)	SO_2 ppm (Dry Uncorrected)	NO ppm (Dry Uncorrected)	NO_x ppm (Dry Uncorrected)	Comments
		4.27	16.15	801			8130	HIGH SPAN
		0.0	0.0	0.0			0.0	ZERO GASES
1355		1.22	11.00	373			4580	RUN # 2 ENGINE 4
05		1.21	11.02	402			4550	
15		1.20	11.07	411			4565	36835 HC 2
25		1.20	10.98	410			4580	
35		1.19	10.80	420			4560	
45		1.19	10.72	409			4560	
		0.0	0.0	0.0			0.0	ZERO
		4.25	16.03	799			8170	SPAN RECAL
1505		1.19	10.94	425			4540	RUN #3 ENGINE 4
15		1.19	10.96	435			4525	
25		1.19	11.00	431			4530	
35		1.18	11.02	445			4520	36836 HC 3
45		1.17	11.04	459			4520	
55		1.17	11.08	471			4530	36837 NG ALL
		0.0	0.0	0.0			0.0	ZERO
		4.25	16.36	797			8170	SPAN
		0.05	0.0	0.0			0.0	EXT ZERO
		4.26	16.16	794			8085	EXT SPAN
		0.04						QA LEAK ✓

Miscellaneous Information

CALIBRATION GASES
NO_x
SO_2
CO
$CO/CO_2/O_2$

Wet Bulb: Dry Bulb:
Barometric Press:

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

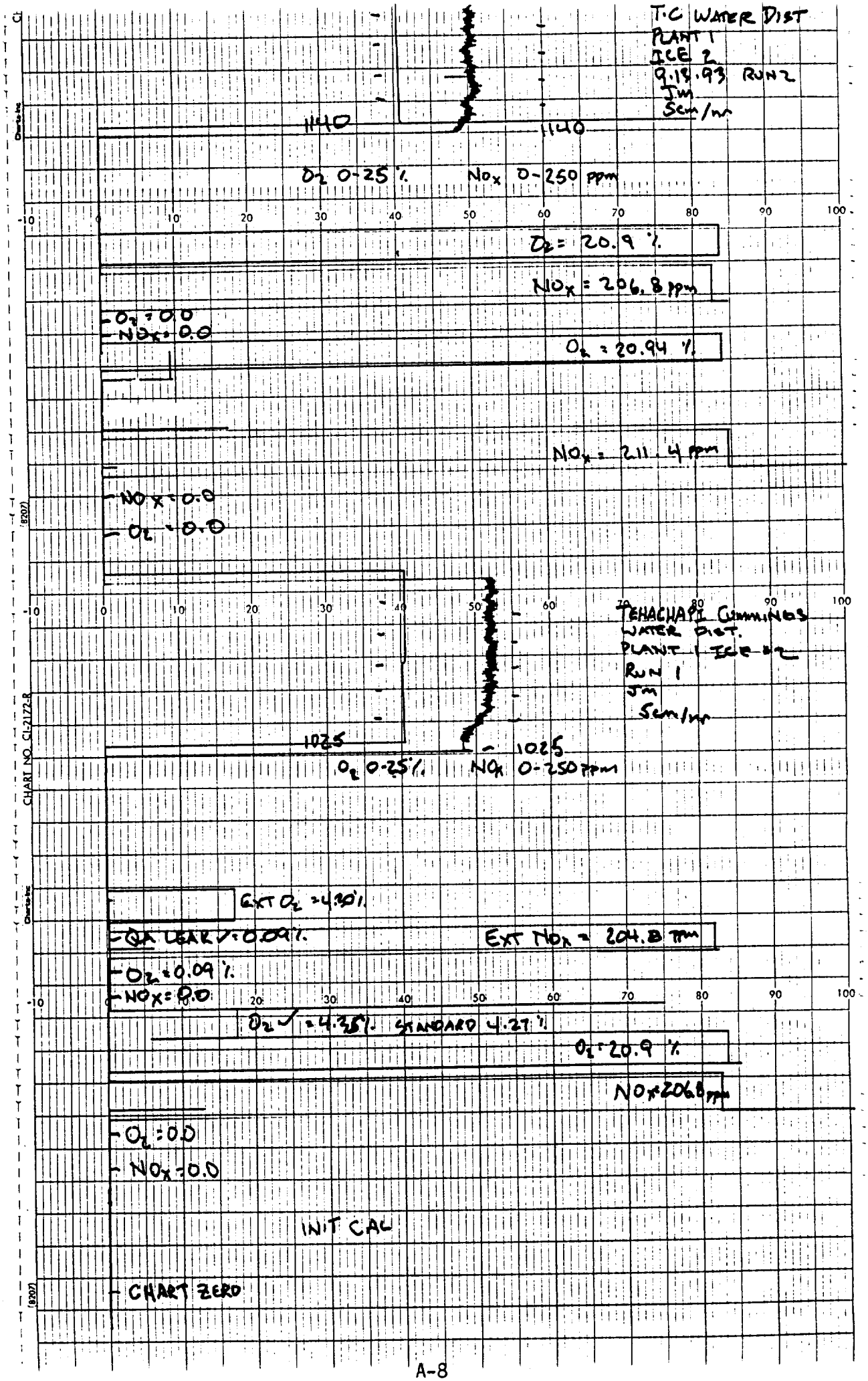
PROCESS DATA
Fuel Flow:
Steam Flow:
Rating:

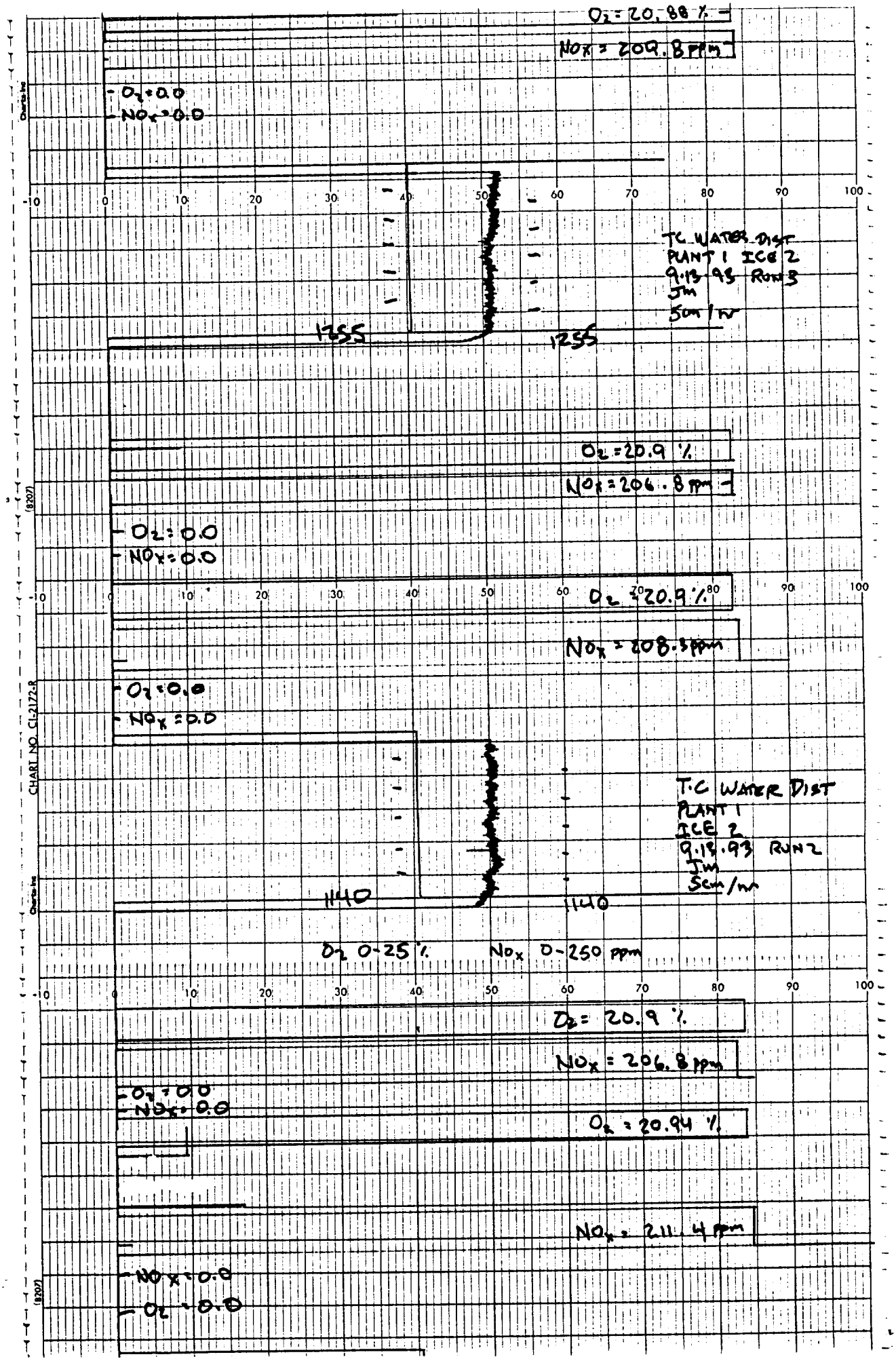
CONVERTER GAS

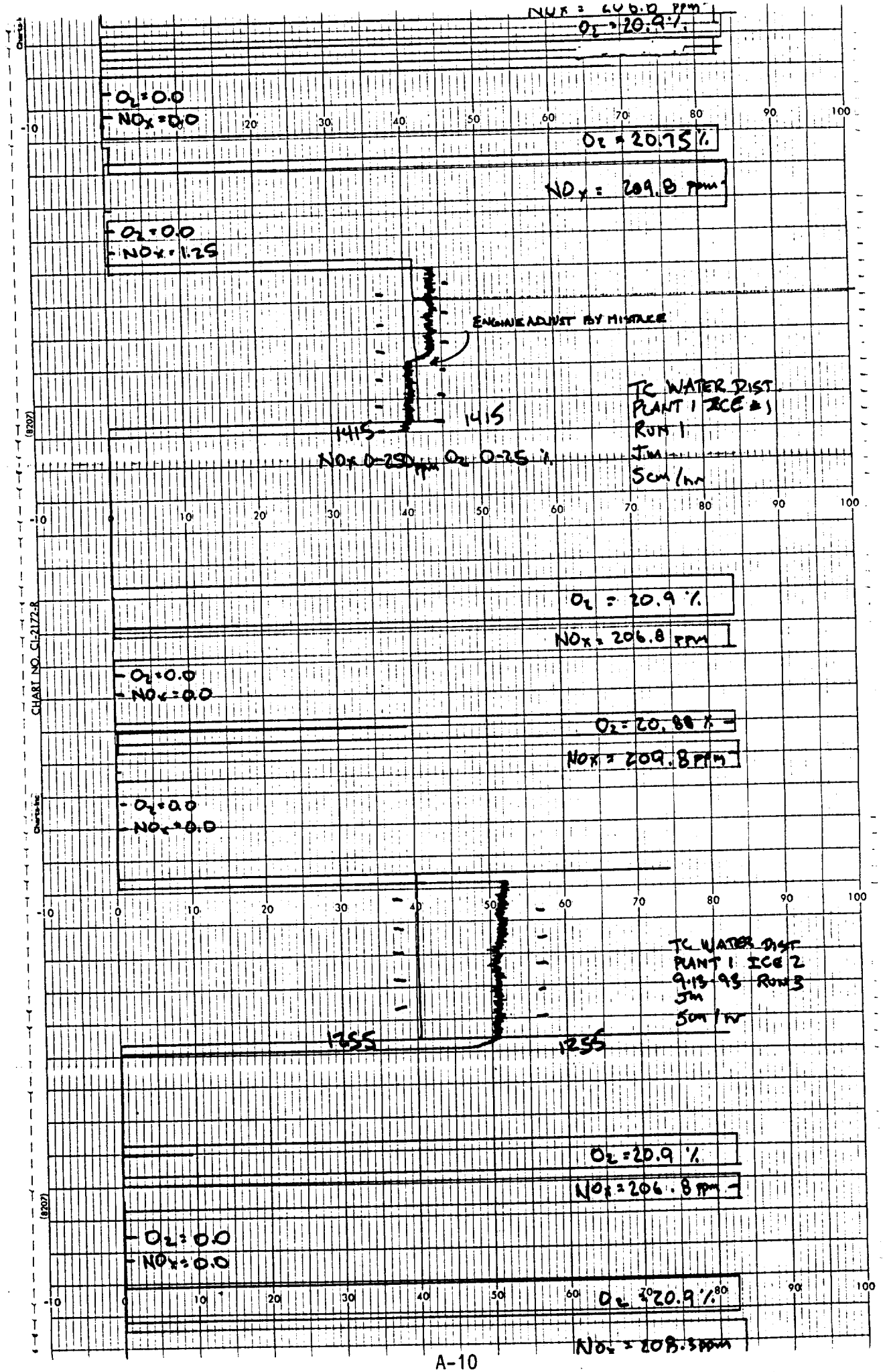
	Cal Gas Values	Actual Values
NO		
NO_2		

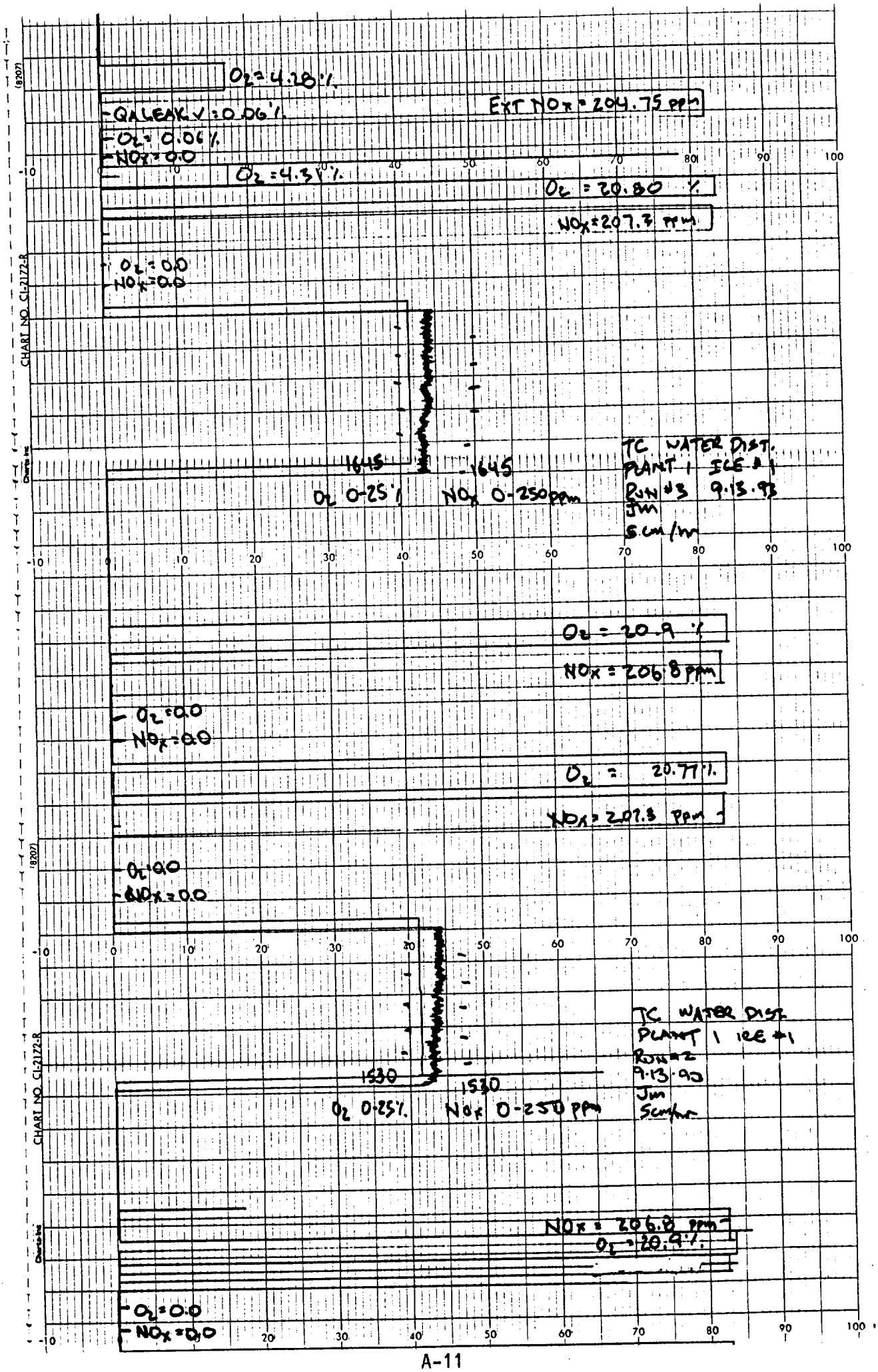
Conv. Efficiency:

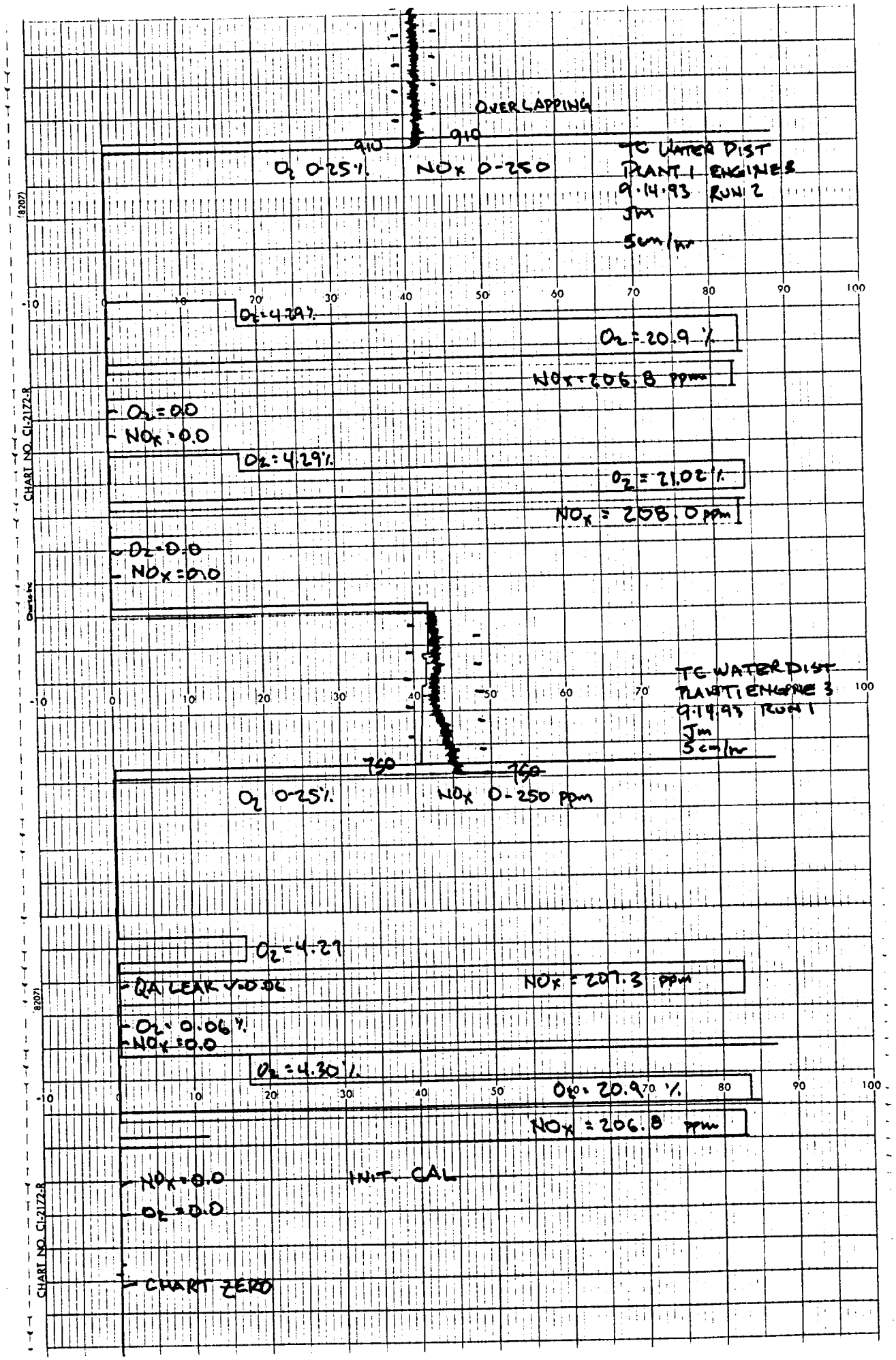
CMDS.FRM.F1A

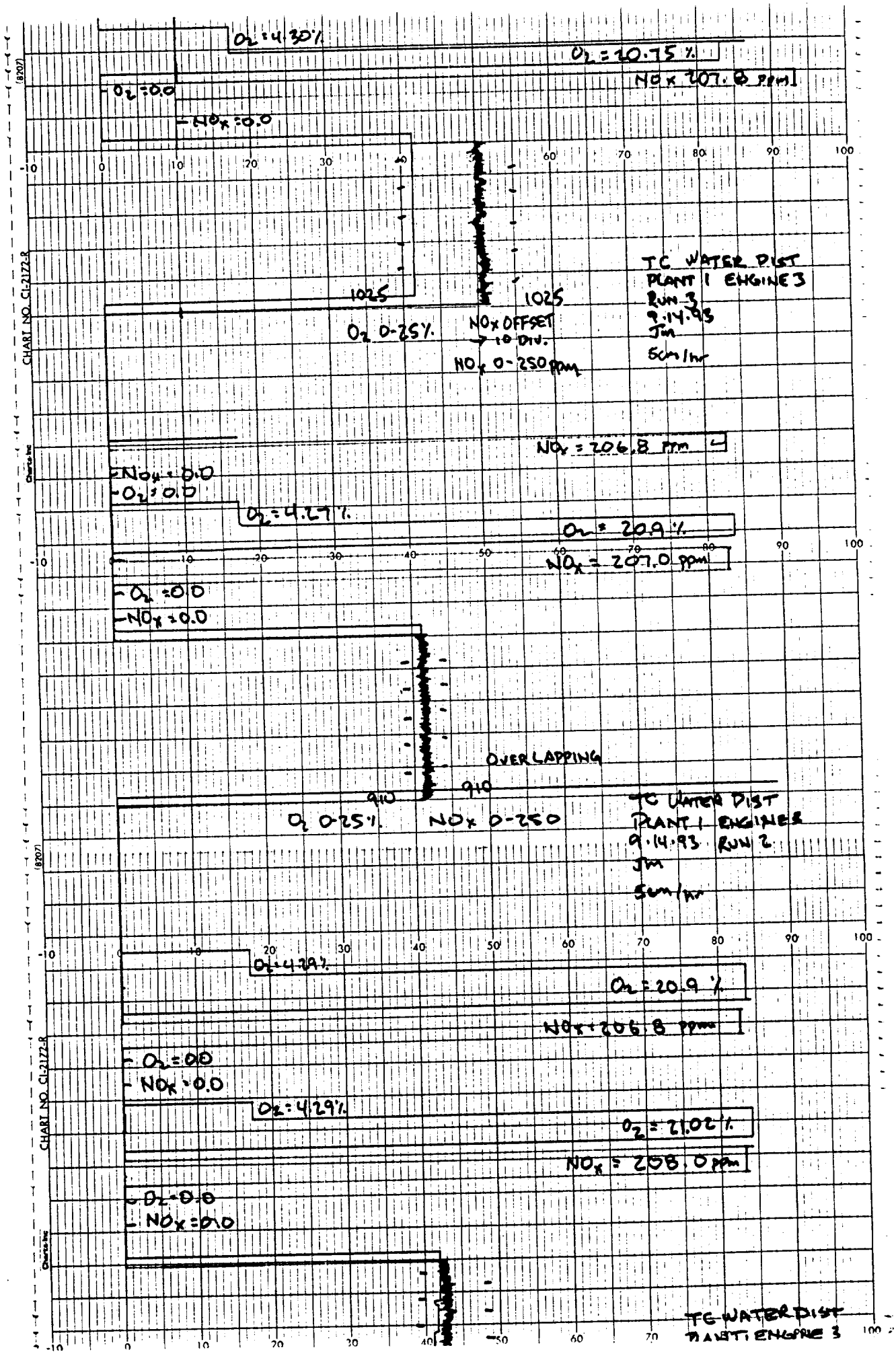

T.C WATER DIST
PLANT 1
ICE 2
9.18.93 RUN 2
JM
Scm/m
1140
1140
O2 0-25 %
NOx 0-250 ppm
O2 = 20.9 %
NOx = 206.8 ppm
O2 = 0.0
NOx = 0.0
O2 = 20.94 %
NOx = 211.4 ppm
NOx = 0.0
O2 = 0.0
TEHACHAPI CUMMINGS
WATER DIST.
PLANT 1 ICE #2
RUN 1
JM
Scm/m
1025
1025
O2 0-25%
NOx 0-250 ppm
EXT O2 = 4.30%
QA LEAK = 0.09%
EXT NOx = 204.8 ppm
O2 = 0.09 %
NOx = 0.0
O2 = 4.35% STANDARD 4.27 %
O2 = 20.9 %
NOx = 206.8 ppm
O2 = 0.0
NOx = 0.0
INIT CAL
CHART ZERO
CHART NO. CI-21172-R

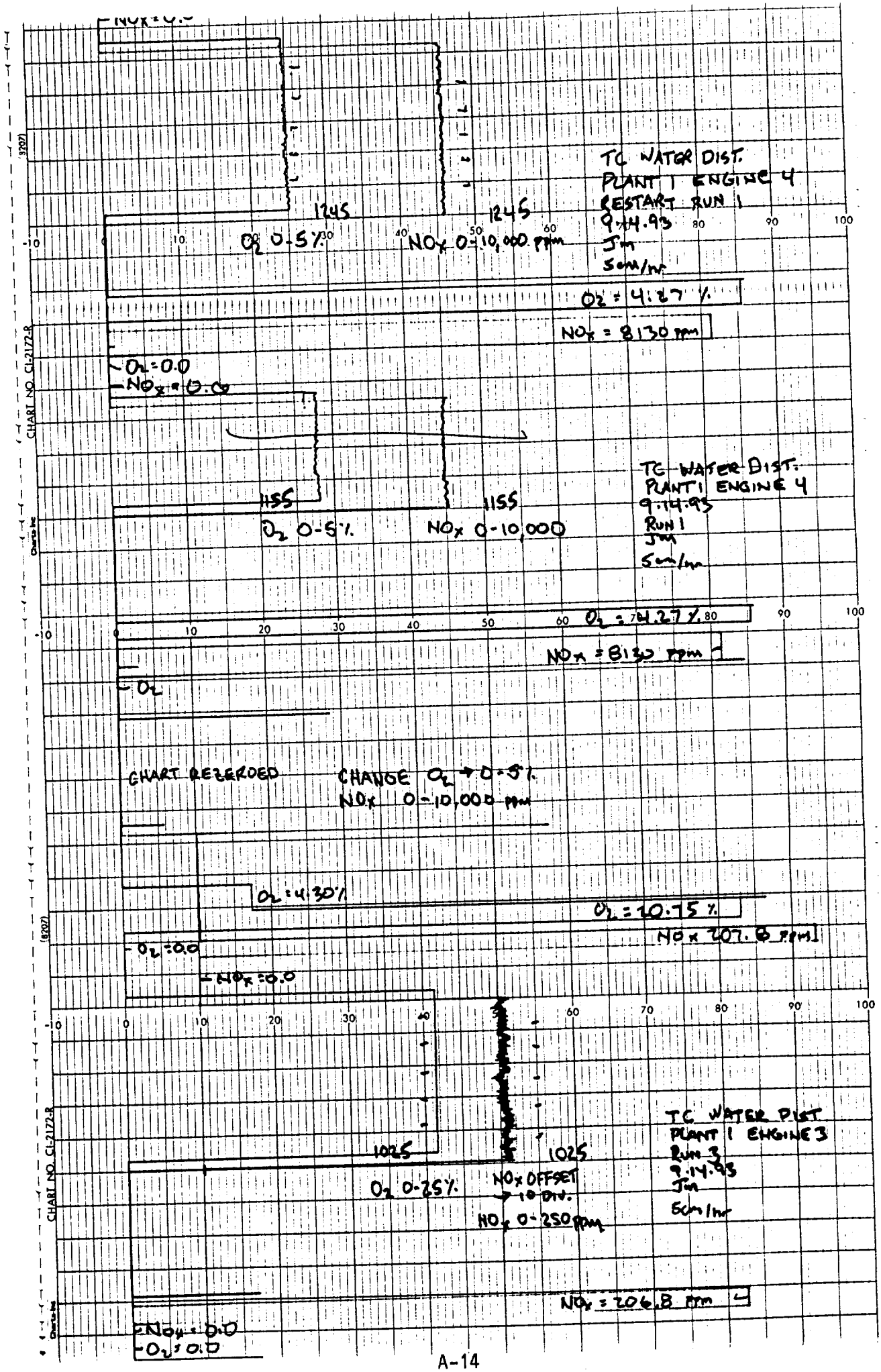

O2 = 20.88 %
NOx = 209.8 ppm
O2 = 0.0
NOx = 0.0
-10 0 10 20 30 40 50 60 70 80 90 100
TC WATER DIST
PLANT 1 ICE 2
9.13.93 RUN 3
JM
5cm/m
1255
1255
O2 = 20.9 %
NOx = 206.8 ppm
O2 = 0.0
NOx = 0.0
-10 0 10 20 30 40 50 60 70 80 90 100
O2 = 20.9 %
NOx = 208.3 ppm
O2 = 0.0
NOx = 0.0
T.C WATER DIST
PLANT 1
ICE 2
9.18.93 RUN 2
JM
5cm/m
1140
1140
O2 0-25 %
NOx 0-250 ppm
-10 0 10 20 30 40 50 60 70 80 90 100
O2 = 20.9 %
NOx = 206.8 ppm
O2 = 0.0
NOx = 0.0
O2 = 20.94 %
NOx = 211.4 ppm
NOx = 0.0
O2 = 0.0
CHART NO. CL-2172-R
(8207)


NOx = 206.0 ppm
O2 = 20.9 %
O2 = 0.0
NOx = 0.0
O2 = 20.75 %
NOx = 209.8 ppm
O2 = 0.0
NOx = 1.25
ENGINE ADJUST BY MISTAKE
TC WATER DIST.
PLANT 1 ICE #1
RUN 1
JM
5cm/hr
1415
1415
NOx 0-250 ppm O2 0-25 %
O2 = 20.9 %
NOx = 206.8 ppm
O2 = 0.0
NOx = 0.0
O2 = 20.88 %
NOx = 209.8 ppm
O2 = 0.0
NOx = 0.0
TC WATER DIST
PLANT 1 ICE 2
9-13-95 RUN 3
JM
5cm/hr
1255
1255
O2 = 20.9 %
NOx = 206.8 ppm
O2 = 0.0
NOx = 0.0
O2 = 20.9 %
NOx = 208.3 ppm
CHART NO. CL-2172-R
(8207)


O2 = 4.28 %
EXT NOx = 204.75 ppm
QALEAK V = 0.06 %
O2 = 0.06 %
NOx = 0.0
O2 = 4.31 %
O2 = 20.80 %
NOx = 207.3 ppm
O2 = 0.0
NOx = 0.0
1645
1645
O2 0-25 %
NOx 0-250 ppm
TC WATER DIST.
PLANT 1 ICE #1
RUN #3 9.13.93
JM
5 cm/m
O2 = 20.9 %
NOx = 206.8 ppm
O2 = 0.0
NOx = 0.0
O2 = 20.77 %
NOx = 207.3 ppm
O2 = 0.0
NOx = 0.0
1530
1530
O2 0-25 %
NOx 0-250 ppm
TC WATER DIST.
PLANT 1 ICE #1
RUN #2
9.13.93
JM
5 cm/m
NOx = 206.8 ppm
O2 = 20.9 %
O2 = 0.0
NOx = 0.0
CHART NO. CI-2172-R
(8207)
Dwyer Inc


OVERLAPPING
910
910
O2 0-25%
NOx 0-250
TC WATER DIST
PLANT 1 ENGINES
9.14.93 RUN 2
JM
5cm/hr
O2=4.29%
O2=20.9 %
NOx=206.8 ppm
O2=0.0
NOx=0.0
O2=4.29%
O2=21.02%
NOx=208.0 ppm
O2=0.0
NOx=0.0
TC WATER DIST
PLANT 1 ENGINE 3
9.14.93 RUN 1
JM
5cm/hr
750
750
O2 0-25%
NOx 0-250 ppm
O2=4.27
QA LEAK 0.06
NOx=207.3 ppm
O2=0.06%
NOx=0.0
O2=4.30%
O2=20.9 %
NOx=206.8 ppm
NOx=0.0
O2=0.0
INIT. CAL
CHART ZERO
CHART NO. CI-2172-R
(8207)


O2 = 4.30%
O2 = 20.75 %
NOx 207.0 ppm
O2 = 0.0
NOx = 0.0
1025
1025
O2 0-25%
NOx OFFSET → 10 DIV.
NOx 0-250 ppm
TC WATER DIST
PLANT 1 ENGINE 3
RUN 3
9.14.93
JM
5cm/hr
NOx = 206.8 ppm
NOx = 0.0
O2 = 0.0
O2 = 4.27%
O2 = 20.9 %
NOx = 207.0 ppm
O2 = 0.0
NOx = 0.0
OVERLAPPING
910
910
O2 0-25%
NOx 0-250
TC WATER DIST
PLANT 1 ENGINE 3
9.14.93 RUN 2
JM
5cm/hr
O2 = 4.29%
O2 = 20.9 %
NOx = 206.8 ppm
O2 = 0.0
NOx = 0.0
O2 = 4.29%
O2 = 21.02 %
NOx = 208.0 ppm
O2 = 0.0
NOx = 0.0
TC WATER DIST
PLANT 1 ENGINE 3
CHART NO. CI-2172-R
(8207)
Charts Inc


NOx = 0.0
TC WATER DIST.
PLANT 1 ENGINE 4
RESTART RUN 1
9.14.93
Jm
5cm/m
1245
1245
O2 0-5%
NOx 0-10,000 ppm
O2 = 4.27 %
NOx = 8130 ppm
O2 = 0.0
NOx = 0.0
TC WATER DIST.
PLANT 1 ENGINE 4
9.14.93
RUN 1
Jm
5cm/m
1155
1155
O2 0-5%
NOx 0-10,000
O2 = 4.27 %
NOx = 8130 ppm
O2
CHART REZERODED
CHANGE O2 → 0-5%
NOx 0-10,000 ppm
O2 = 4.30%
O2 = 10.75 %
NOx 207.8 ppm
O2 = 0.0
NOx = 0.0
TC WATER DIST
PLANT 1 ENGINE 3
Run 3
9.14.93
Jm
5cm/m
1025
1025
O2 0-25%
NOx OFFSET
→ 10 Div.
NOx 0-250 ppm
NOx = 206.8 ppm
NOx = 0.0
O2 = 0.0
CHART NO. CL-2172-R
CHART NO. CL-2172-R

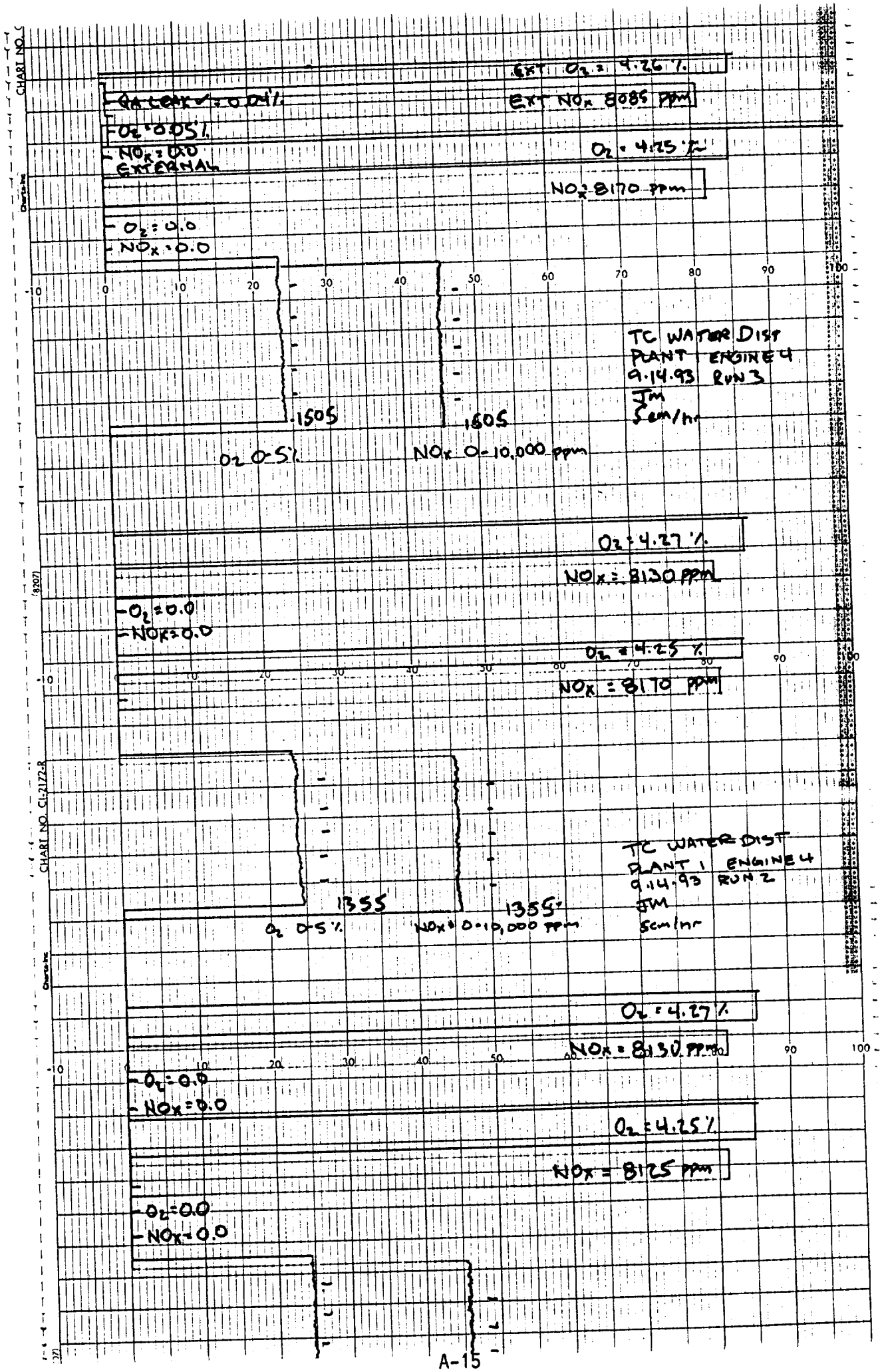
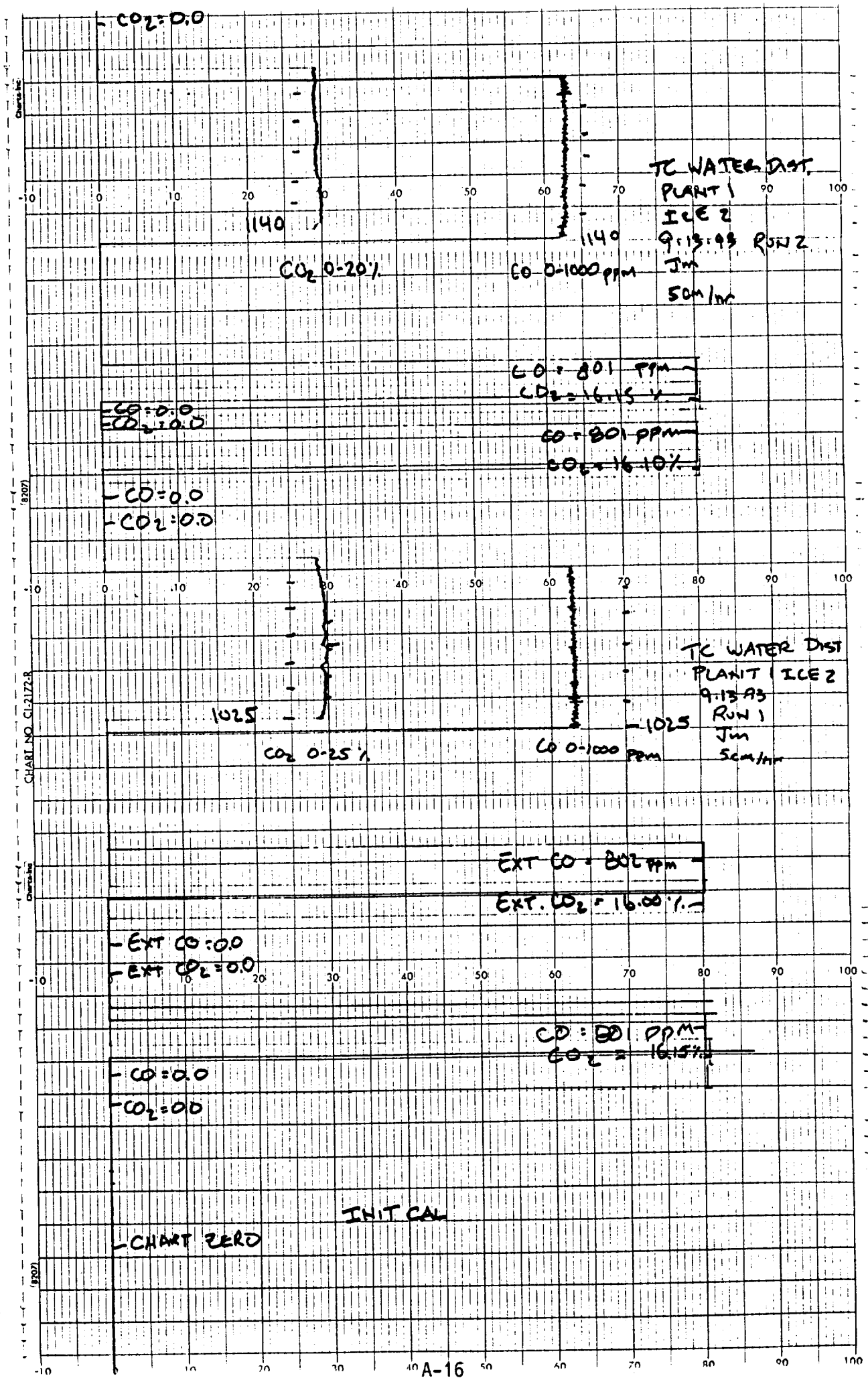
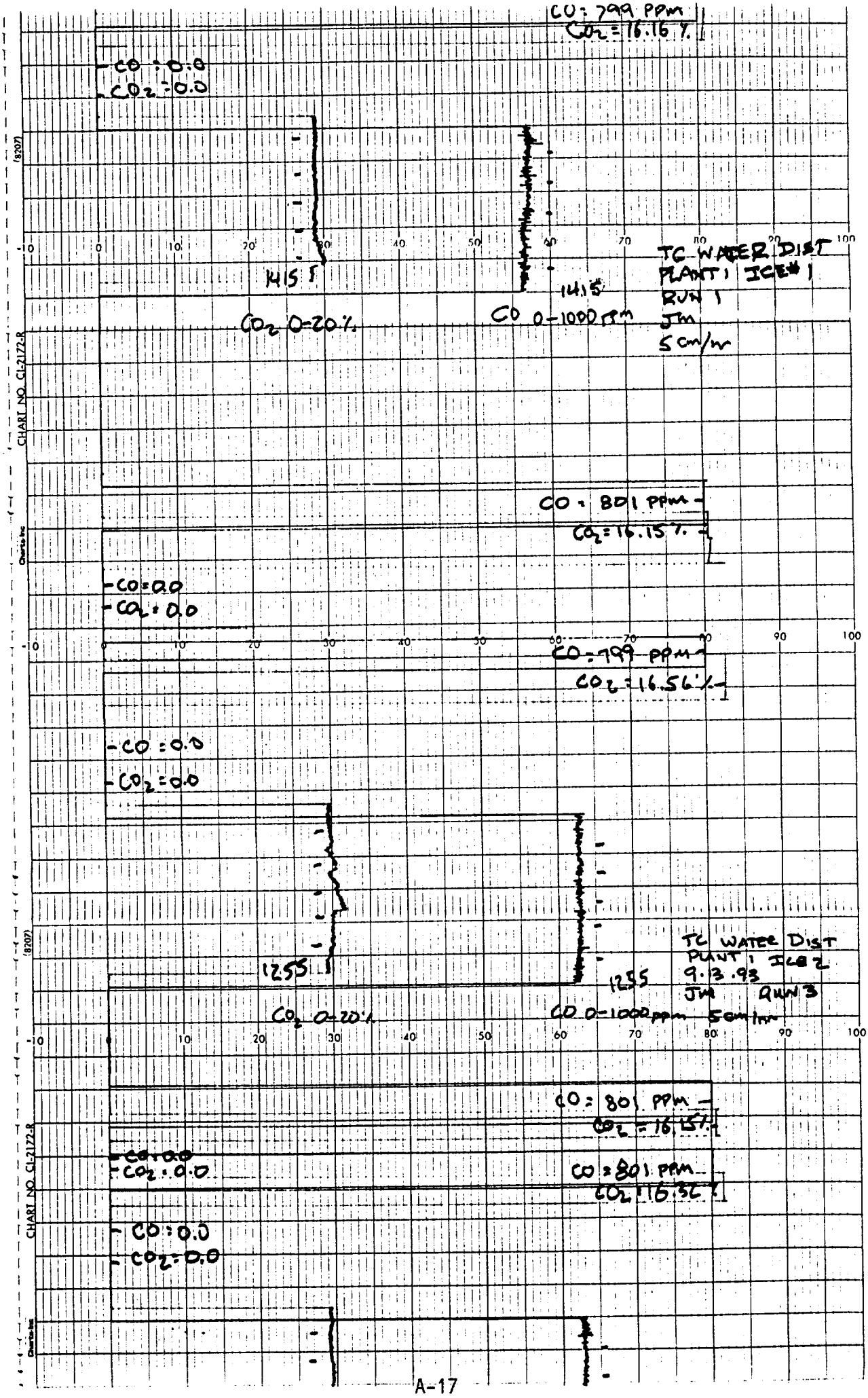
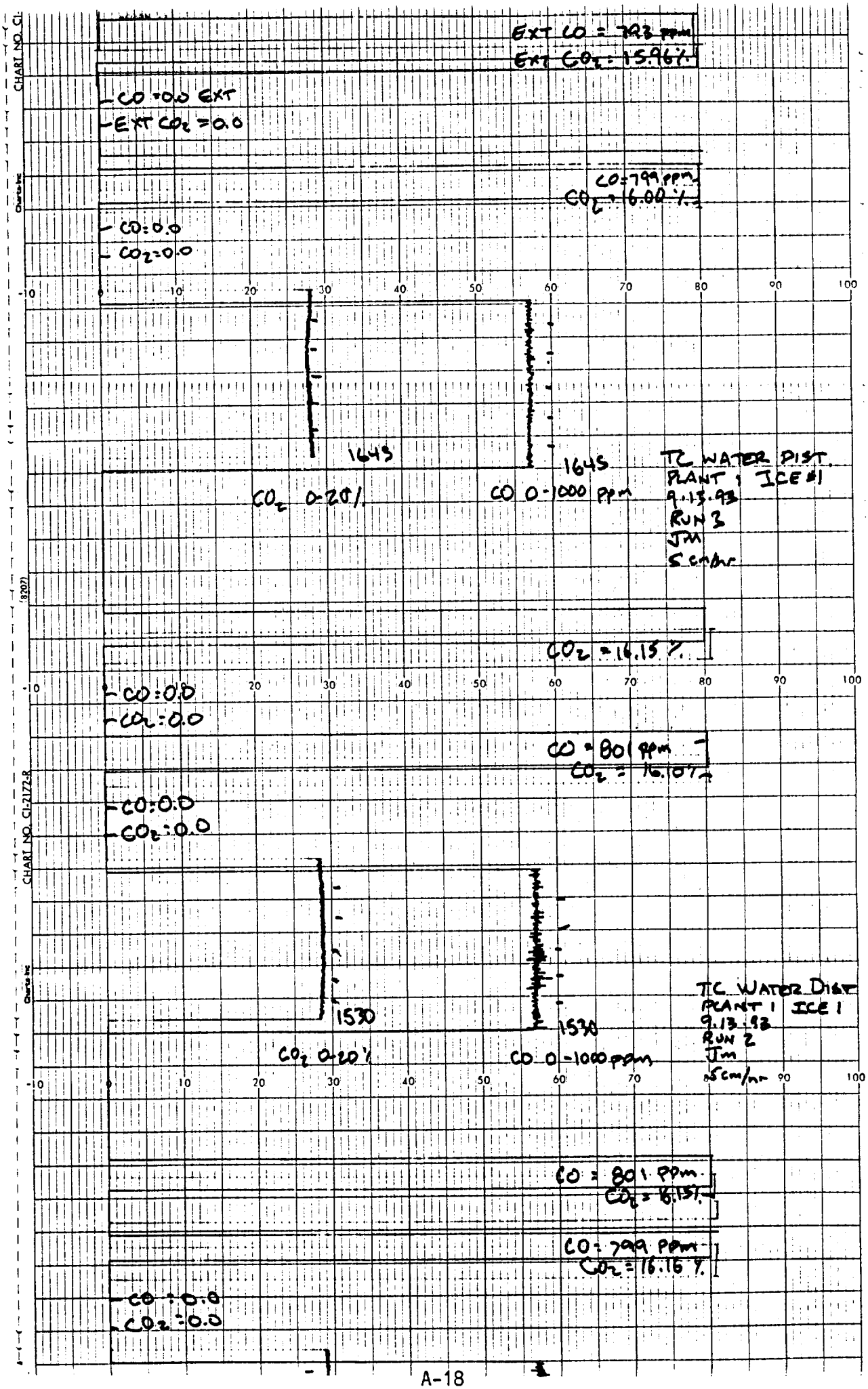
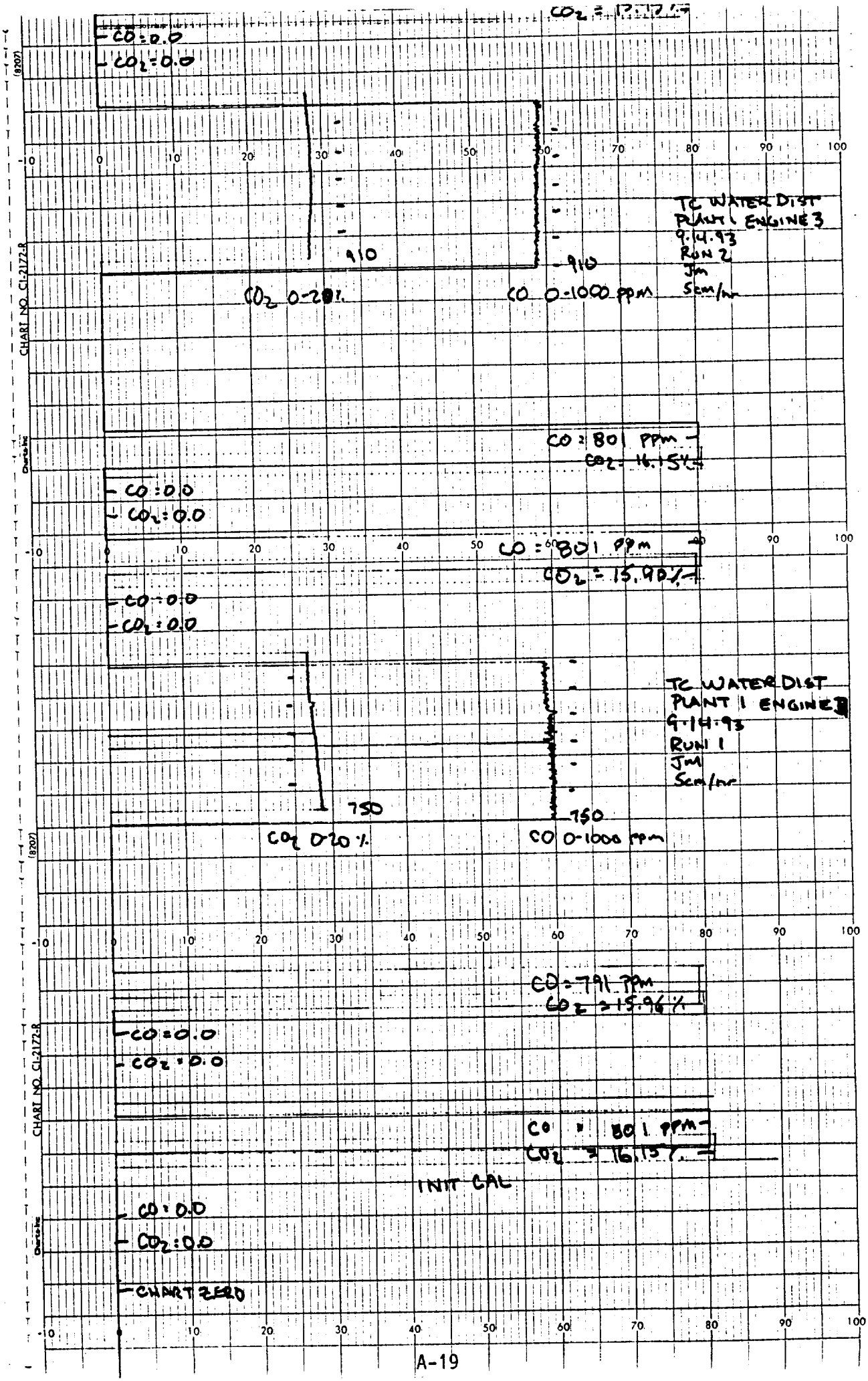


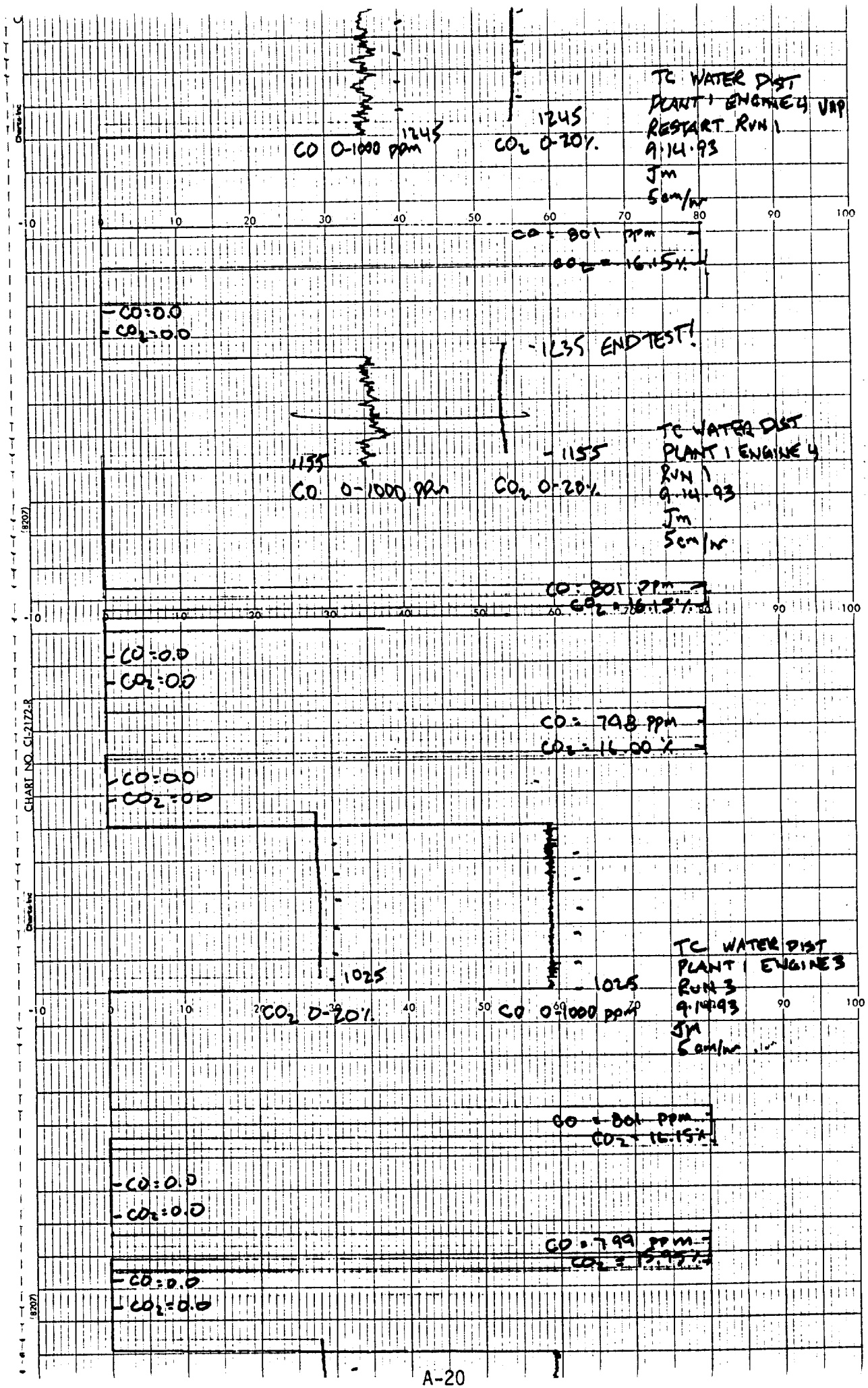
CHART NO.
EXT O2 = 4.26 %
EXT NOx 8085 ppm
QA LEAK ✓ = 0.04%
O2 = 0.05%
NOx = 0.0
EXTERNAL
O2 = 4.25 %
NOx = 8170 ppm
O2 = 0.0
NOx = 0.0
1505
1505
O2 0-5%
NOx 0-10,000 ppm
TC WATER DIST
PLANT 1 ENGINE 4
9.14.93 RUN 3
JM
5cm/hr
O2 = 4.27 %
NOx = 8130 ppm
O2 = 0.0
NOx = 0.0
O2 = 4.25 %
NOx = 8170 ppm
1355
1355
O2 0-5%
NOx = 0-10,000 ppm
TC WATER DIST
PLANT 1 ENGINE 4
9.14.93 RUN 2
JM
5cm/hr
O2 = 4.27 %
NOx = 8130 ppm
O2 = 0.0
NOx = 0.0
O2 = 4.25 %
NOx = 8125 ppm
O2 = 0.0
NOx = 0.0
CHART NO. CL-2172-R

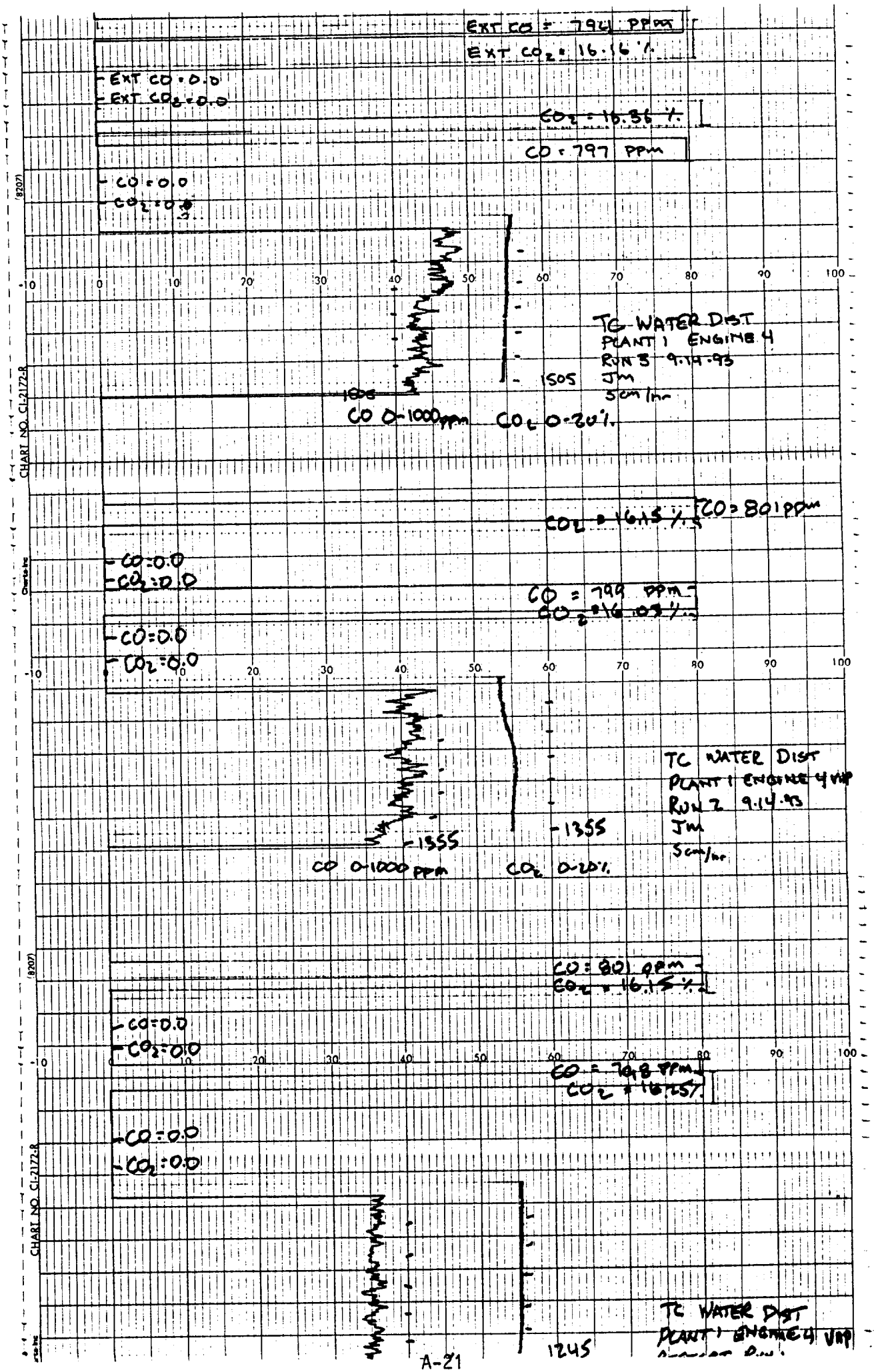

CO2 = 0.0
TC WATER DIST.
PLANT 1
ICE 2
9.13.93 RUN 2
JM
50m/hr
1140
1140
CO2 0-20%
CO 0-1000 ppm
CO = 801 ppm
CO2 = 16.15 %
CO = 0.0
CO2 = 0.0
CO = 801 ppm
CO2 = 16.10%
CO = 0.0
CO2 = 0.0
TC WATER DIST
PLANT 1 ICE 2
9.13.93
RUN 1
JM
5cm/hr
1025
1025
CO2 0-25%
CO 0-1000 ppm
EXT CO = 802 ppm
EXT. CO2 = 16.00 %
EXT CO = 0.0
EXT CO2 = 0.0
CO = 801 ppm
CO2 = 16.15%
CO = 0.0
CO2 = 0.0
INIT CAL
CHART ZERO
CHART NO. C1-2172-R


CO: 799 ppm
CO2 = 16.16 %
CO = 0.0
CO2 = 0.0
1415
1415
CO2 0-20%
CO 0-1000 ppm
TC WATER DIST
PLANT 1 ICE#1
RUN 1
JM
5 cm/m
CO = 801 ppm
CO2 = 16.15 %
CO = 0.0
CO2 = 0.0
CO = 799 ppm
CO2 = 16.56 %
CO = 0.0
CO2 = 0.0
1255
1255
CO2 0-20%
CO 0-1000 ppm
TC WATER DIST
PLANT 1 ICE 2
9.3.93
JM
RUN 3
5 cm/m
CO = 801 ppm
CO2 = 16.15 %
CO = 0.0
CO2 = 0.0
CO = 801 ppm
CO2 = 16.32 %
CO = 0.0
CO2 = 0.0
CHART NO. CI-2172-8
(8207)
Charts Inc


EXT CO = 793 ppm
EXT CO2 = 15.96%
CO = 0.0 EXT
EXT CO2 = 0.0
CO = 799 ppm
CO2 = 16.00 %
CO = 0.0
CO2 = 0.0
1645
1645
CO2 0-20%
CO 0-1000 ppm
TC WATER DIST.
PLANT 1 ICE #1
9.13.93
RUN 3
JM
5 cm/hr
CO2 = 16.15 %
CO = 0.0
CO2 = 0.0
CO = 801 ppm
CO2 = 16.10%
CO = 0.0
CO2 = 0.0
1530
1530
CO2 0-20%
CO 0-1000 ppm
TC WATER DIST
PLANT 1 ICE 1
9.13.93
RUN 2
JM
5 cm/hr
CO = 801 ppm
CO2 = 16.15%
CO = 799 ppm
CO2 = 16.16 %
CO = 0.0
CO2 = 0.0
CHART NO. CI-2172-R
(8207)


CO = 0.0
CO2 = 0.0
910
910
CO2 0-20%
CO 0-1000 ppm
TC WATER DIST
PLANT 1 ENGINE 3
9.14.93
RUN 2
JM
Scm/hr
CO = 801 ppm
CO2 = 16.15%
CO = 0.0
CO2 = 0.0
CO = 801 ppm
CO2 = 15.90%
CO = 0.0
CO2 = 0.0
750
750
CO2 0-20%
CO 0-1000 ppm
TC WATER DIST
PLANT 1 ENGINE 3
9.14.93
RUN 1
JM
Scm/hr
CO = 791 ppm
CO2 = 15.96%
CO = 0.0
CO2 = 0.0
CO = 801 ppm
CO2 = 16.15%
INIT CAL
CO = 0.0
CO2 = 0.0
CHART ZERO
CHART NO. CI-2172-R
(8207)
Charts Inc


TC WATER DIST
PLANT 1 ENGINE 4 VAP
RESTART RUN 1
9-14-93
JM
5cm/hr
1245
CO 0-1000 ppm
CO2 0-20%
CO = 801 ppm
CO2 = 16.15%
CO = 0.0
CO2 = 0.0
1135 END TEST!
TC WATER DIST
PLANT 1 ENGINE 4
RUN 1
9-14-93
JM
5cm/hr
1155
CO 0-1000 ppm
CO2 0-20%
CO = 801 ppm
CO2 = 16.15%
CO = 0.0
CO2 = 0.0
CO = 798 ppm
CO2 = 16.00%
CO = 0.0
CO2 = 0.0
TC WATER DIST
PLANT 1 ENGINE 3
RUN 3
9-14-93
JM
5cm/hr
1025
CO2 0-20%
CO 0-1000 ppm
CO = 801 ppm
CO2 = 16.15%
CO = 0.0
CO2 = 0.0
CO = 799 ppm
CO2 = 5.95%
CO = 0.0
CO2 = 0.0
CHART NO. C1-2172-R


EXT CO = 794 PPM
EXT CO2 = 16.16 %
EXT CO = 0.0
EXT CO2 = 0.0
CO2 = 16.36 %
CO = 797 PPM
CO = 0.0
CO2 = 0.0
TC WATER DIST
PLANT 1 ENGINE 4
RUN 3 9.14.93
JM
5cm/hr
1505
CO 0-1000ppm
CO2 0-20%
CO2 = 16.15 %
CO = 801 PPM
CO = 0.0
CO2 = 0.0
CO = 799 PPM
CO2 = 16.03 %
CO = 0.0
CO2 = 0.0
TC WATER DIST
PLANT 1 ENGINE 4 VAP
RUN 2 9.14.93
JM
5cm/hr
1355
CO 0-1000 PPM
CO2 0-20%
CO = 801 PPM
CO2 = 16.15 %
CO = 0.0
CO2 = 0.0
CO = 798 PPM
CO2 = 16.25 %
CO = 0.0
CO2 = 0.0
TC WATER DIST
PLANT 1 ENGINE 4 VAP
1245
CHART NO. CI-2172-R
(8207)

A. CALIBRATION AND CORRECTION DATA

Company : TEHACHAPI CUMMINGS WATER DISTRICT

Station : PLANT #1 ENG #1

Date : 9/13/93

Test Run : 1

Test Condition:

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
	A	B	A	B	A	B	A	B	A	B
Point #										
1	10.45	10.46	5.80	5.80	564.00	564.12			100.80	100.62
2	10.45	10.47	5.88	5.88	566.00	566.35			101.30	100.77
3	10.38	10.41	5.76	5.76	567.00	567.59			102.30	101.42
4	10.31	10.35	5.80	5.80	570.00	570.83			108.80	107.54
5	10.31	10.37	5.80	5.80	570.00	571.07			108.80	107.18
6	10.29	10.36	5.80	5.80	573.00	574.31			108.80	106.83
MEAN		10.40		5.80		569.05				104.06

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.00	0.00		1.25
Span Check	20.75	16.16	799.00		209.80
Cal. Gas	20.90	16.15	801.00		206.80
Scf	-0.00120	0.00010	-0.00042		0.00141
Zcf	0.00000	0.00000	0.00000		0.20833

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

A. CALIBRATION AND CORRECTION DATA

Company : TEHACHAPI CUMMINGS WATER DISTRICT

Station : PLANT #1 ENG #1

Date : 9/13/93

Test Run : 2

Test Condition:

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
	A	B	A	B	A	B	A	B	A	B
Point # 1	10.38	10.39	5.72	5.72	570.00				107.50	107.48
2	10.40	10.42	5.76	5.76	572.00				108.00	107.93
3	10.40	10.43	5.78	5.79	573.00				109.00	108.89
4	10.38	10.42	5.78	5.79	572.00				109.80	109.65
5	10.35	10.40	5.78	5.79	571.00				110.30	110.10
6	10.35	10.41	5.72	5.74	571.00				110.50	110.26
MEAN		10.41		5.77	571.50					109.05

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.00	0.00		0.00
Span Check	20.77	16.10	801.00		207.30
Cal. Gas	20.90	16.15	801.00		206.80
Scf	-0.00104	-0.00052			0.00040
Zcf	0.00000	0.00000			0.00000

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

A. CALIBRATION AND CORRECTION DATA

Company : TEHACHAPI CUMMINGS WATER DISTRICT

Station : PLANT #1 ENG #1

Date : 9/13/93

Test Run : 3

Test Condition:

Concentration : Drift Uncorrected (A) / Corrected (B)

Point #	%O2 A	%O2 B	%CO2 A	%CO2 B	ppm CO A	ppm CO B	ppm SO2 A	ppm SO2 B	ppm NOx A	ppm NOx B
1	10.33	10.33	5.60	5.60	570.00	570.12			107.50	107.48
2	10.38	10.39	5.56	5.57	570.00	570.36			108.00	107.93
3	10.33	10.35	5.54	5.56	570.00	570.59			109.30	109.19
4	10.31	10.34	5.52	5.55	571.00	571.83			109.50	109.35
5	10.31	10.35	5.56	5.60	570.00	571.07			109.50	109.30
6	10.31	10.36	5.60	5.65	570.00	571.31			109.50	109.26
MEAN		10.35		5.59		570.88				108.75

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.00	0.00		0.00
Span Check	20.80	16.00	799.00		207.30
Cal. Gas	20.90	16.15	801.00		206.80
Scf	-0.00080	-0.00155	-0.00042		0.00040
Zcf	0.00000	0.00000	0.00000		0.00000

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

A. CALIBRATION AND CORRECTION DATA

Company : TEHACHAPI CUMMINGS WATER DISTRICT

Station : PLANT #1 ENG #2

Date : 9/13/93

Test Run : 1

Test Condition:

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
	A	B	A	B	A	B	A	B	A	B
Point # 1	10.08	10.08	5.90	5.90	632.00				124.50	124.27
2	10.05	10.05	5.88	5.88	630.00				129.30	128.58
3	10.03	10.02	5.92	5.93	630.00				130.00	128.81
4	10.12	10.11	5.92	5.93	630.00				130.70	129.03
5	10.12	10.11	5.86	5.87	630.00				130.00	127.87
6	10.12	10.10	5.80	5.82	629.00				130.70	128.09
MEAN		10.08		5.89	630.17					127.77

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.00	0.00		0.00
Span Check	20.94	16.10	801.00		211.40
Cal. Gas	20.90	16.15	801.00		206.80
Scf	0.00032	-0.00052			0.00371
Zcf	0.00000	0.00000			0.00000

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

A. CALIBRATION AND CORRECTION DATA

Company : TEHACHAPI CUMMINGS WATER DISTRICT

Station : PLANT #1 ENG #2

Date : 9/13/93

Test Run : 2

Test Condition:

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
	A	B	A	B	A	B	A	B	A	B
Point #										
1	10.20		5.96	5.95	626.00				124.30	124.22
2	10.20		5.96	5.94	628.00				126.50	126.27
3	10.15		5.88	5.85	629.00				125.70	125.32
4	10.10		5.88	5.84	629.00				125.70	125.17
5	10.10		5.84	5.79	630.00				125.50	124.82
6	10.10		5.86	5.80	628.00				125.50	124.67
MEAN	10.14			5.87	628.33					125.08

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.00	0.00		0.00
Span Check	20.90	16.32	801.00		208.30
Cal. Gas	20.90	16.15	801.00		206.80
Scf		0.00175			0.00121
Zcf		0.00000			0.00000

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

A. CALIBRATION AND CORRECTION DATA

Company : TEHACHAPI CUMMINGS WATER DISTRICT

Station : PLANT #1 ENG #2

Date : 9/13/93

Test Run : 3

Test Condition:

Concentration : Drift Uncorrected (A) / Corrected (B)

Point #	%O2 A	%O2 B	%CO2 A	%CO2 B	ppm CO A	ppm CO B	ppm SO2 A	ppm SO2 B	ppm NOx A	ppm NOx B
1	10.10	10.10	5.90	5.89	626.00	626.13			125.50	125.35
2	10.10	10.10	6.00	5.96	629.00	629.39			127.30	126.84
3	10.08	10.08	6.16	6.10	630.00	630.66			127.30	126.54
4	10.70	10.71	6.08	5.99	629.00	629.92			128.30	127.22
5	10.05	10.06	5.94	5.83	628.00	629.18			128.70	127.31
6	10.05	10.06	5.90	5.77	628.00	629.44			129.50	127.80
MEAN		10.18		5.92		629.12				126.84

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.00	0.00		0.00
Span Check	20.88	16.56	799.00		209.80
Cal. Gas	20.90	16.15	801.00		206.80
Scf	-0.00016	0.00423	-0.00042		0.00242
Zcf	0.00000	0.00000	0.00000		0.00000

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

A. CALIBRATION AND CORRECTION DATA

Company : TEHACHAPI CUMMINGS WATER DISTRICT

Station : PLANT #1 ENG #3

Date : 9/14/93

Test Run : 1

Test Condition:

Concentration : Drift Uncorrected (A) / Corrected (B)

Point #	%O2 A	%O2 B	%CO2 A	%CO2 B	ppm CO A	ppm CO B	ppm SO2 A	ppm SO2 B	ppm NOx A	ppm NOx B
1	10.25	10.25	5.64	5.65	598.00				113.00	112.95
2	10.25	10.24	5.60	5.62	597.00				110.80	110.64
3	10.30	10.28	5.58	5.62	596.00				107.50	107.24
4	10.40	10.37	5.50	5.55	595.00				107.00	106.64
5	10.50	10.45	5.44	5.50	592.00				107.00	106.54
6	10.50	10.45	5.38	5.46	589.00				107.00	106.43
MEAN		10.34		5.57	594.50					108.41

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.00	0.00		0.00
Span Check	21.02	15.90	801.00		208.00
Cal. Gas	20.90	16.15	801.00		206.80
Scf	0.00096	-0.00258			0.00097
Zcf	0.00000	0.00000			0.00000

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

A. CALIBRATION AND CORRECTION DATA

Company : TEHACHAPI CUMMINGS WATER DISTRICT

Station : PLANT #1 ENG #3

Date : 9/14/93

Test Run : 2

Test Condition:

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
	A	B	A	B	A	B	A	B	A	B
Point #										
1	10.38		5.62	5.63	588.00	588.12			104.50	104.49
2	10.38		5.64	5.66	588.00	588.37			104.50	104.47
3	10.35		5.70	5.73	589.00	589.61			104.50	104.46
4	10.35		5.68	5.72	590.00	590.86			104.00	103.94
5	10.30		5.64	5.69	590.00	591.11			103.30	103.23
6	10.30		5.62	5.68	590.00	591.35			103.30	103.21
MEAN	10.34			5.69		589.90				103.97

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.00	0.00		0.00
Span Check	20.90	15.95	799.00		207.00
Cal. Gas	20.90	16.15	801.00		206.80
Scf		-0.00206	-0.00042		0.00016
Zcf		0.00000	0.00000		0.00000

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

A. CALIBRATION AND CORRECTION DATA

Company : TEHACHAPI CUMMINGS WATER DISTRICT

Station : PLANT #1 ENG #3

Date : 9/14/93

Test Run : 3

Test Condition:

Concentration : Drift Uncorrected (A) / Corrected (B)

Point #	%O2 A	%O2 B	%CO2 A	%CO2 B	ppm CO A	ppm CO B	ppm SO2 A	ppm SO2 B	ppm NOx A	ppm NOx B
1	10.38	10.39	5.60	5.60	591.00	591.18			102.00	101.96
2	10.38	10.40	5.60	5.61	590.00	590.55			102.00	101.88
3	10.38	10.41	5.60	5.62	590.00	590.92			101.30	101.10
4	10.38	10.42	5.60	5.63	590.00	591.29			101.30	101.02
5	10.38	10.44	5.56	5.60	590.00	591.66			101.30	100.93
6	10.38	10.45	5.56	5.61	588.00	590.03			101.30	100.85
MEAN		10.42		5.61		590.94				101.29

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.00	0.00		0.00
Span Check	20.75	16.00	798.00		207.80
Cal. Gas	20.90	16.15	801.00		206.80
Scf	-0.00120	-0.00155	-0.00062		0.00081
Zcf	0.00000	0.00000	0.00000		0.00000

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

A. CALIBRATION AND CORRECTION DATA

Company : TEHACHAPI CUMMINGS WATER DISTRICT

Station : PLANT #1 ENG #4

Date : 9/14/93

Test Run : 1

Test Condition:

Concentration : Drift Uncorrected (A) / Corrected (B)

Point #	%O2 A	%O2 B	%CO2 A	%CO2 B	ppm CO A	ppm CO B	ppm SO2 A	ppm SO2 B	ppm NOx A	ppm NOx B
1	1.25	1.25	11.02	11.01	350.00	350.11			4590.00	4590.24
2	1.24	1.24	11.04	11.02	355.00	355.33			4590.00	4590.71
3	1.24	1.24	11.04	11.01	355.00	355.55			4580.00	4581.17
4	1.24	1.24	11.04	11.00	357.00	357.78			4580.00	4581.64
5	1.24	1.24	11.05	11.00	354.00	355.00			4580.00	4582.11
6	1.23	1.24	11.06	11.00	360.00	361.24			4580.00	4582.58
MEAN		1.24		11.01		355.84				4584.74

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.00	0.00		0.00
Span Check	4.25	16.25	798.00		8125.00
Cal. Gas	4.27	16.15	801.00		8130.00
Scf	-0.00078	0.00103	-0.00062		-0.00010
Zcf	0.00000	0.00000	0.00000		0.00000

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

A. CALIBRATION AND CORRECTION DATA

Company : TEHACHAPI CUMMINGS WATER DISTRICT

Station : PLANT #1 ENG #4

Date : 9/14/93

Test Run : 2

Test Condition:

Concentration : Drift Uncorrected (A) / Corrected (B)

Point #	%O2 A	%O2 B	%CO2 A	%CO2 B	ppm CO A	ppm CO B	ppm SO2 A	ppm SO2 B	ppm NOx A	ppm NOx B
1	1.22	1.22	11.00	11.01	373.00	373.08			4580.00	4578.12
2	1.21	1.21	11.02	11.04	402.00	402.25			4550.00	4544.41
3	1.20	1.20	11.07	11.10	411.00	411.43			4565.00	4555.66
4	1.20	1.20	10.98	11.03	410.00	410.60			4580.00	4566.89
5	1.19	1.19	10.80	10.86	420.00	420.79			4560.00	4543.24
6	1.19	1.20	10.72	10.79	409.00	409.94			4560.00	4539.53
MEAN		1.20		10.97		404.68				4554.64

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.00	0.00		0.00
Span Check	4.25	16.03	799.00		8170.00
Cal. Gas	4.27	16.15	801.00		8130.00
Scf	-0.00078	-0.00124	-0.00042		0.00082
Zcf	0.00000	0.00000	0.00000		0.00000

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

A. CALIBRATION AND CORRECTION DATA

Company : TEHACHAPI CUMMINGS WATER DISTRICT

Station : PLANT #1 ENG #4

Date : 9/14/93

Test Run : 3

Test Condition:

Concentration : Drift Uncorrected (A) / Corrected (B)

Point #	%O2 A	%O2 B	%CO2 A	%CO2 B	ppm CO A	ppm CO B	ppm SO2 A	ppm SO2 B	ppm NOx A	ppm NOx B
1	1.19	1.19	10.94	10.93	425.00	425.18			4540.00	4538.14
2	1.19	1.19	10.96	10.92	435.00	435.54			4525.00	4519.44
3	1.19	1.19	11.00	10.94	431.00	431.90			4530.00	4520.73
4	1.18	1.18	11.02	10.94	445.00	446.30			4520.00	4507.06
5	1.17	1.17	11.04	10.93	459.00	460.73			4520.00	4503.38
6	1.17	1.18	11.08	10.95	471.00	473.17			4530.00	4509.66
MEAN		1.18		10.94		445.47				4516.40

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.00	0.00		0.00
Span Check	4.25	16.36	797.00		8170.00
Cal. Gas	4.27	16.15	801.00		8130.00
Scf	-0.00078	0.00217	-0.00083		0.00082
Zcf	0.00000	0.00000	0.00000		0.00000

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

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : TEHACHAPI CUMMINGS W Date : 9/13/93

Station : PLANT #1 ENG #1

Run 1	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	20.90	16.15	801.00		206.80
Measured Span	20.75	16.16	799.00		209.80
Zero Drift	0.00	0.00	0.00		1.25
Final, Actual Span	20.75	16.16	799.00		208.55
Percent Drift	-0.7	0.1	-0.2	*********	0.8
**********	*********	*********	*********		*********

Run 2	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	20.90	16.15	801.00		206.80
Measured Span	20.77	16.10	801.00		207.30
Zero Drift	0.00	0.00	0.00		0.00
Final, Actual Span	20.77	16.10	801.00		207.30
Percent Drift	-0.6	-0.3	0.0	*********	0.2
**********	*********	*********	*********		*********

Run 3	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	20.90	16.15	801.00		206.80
Measured Span	20.80	16.00	799.00		207.30
Zero Drift	0.00	0.00	0.00		0.00
Final, Actual Span	20.80	16.00	799.00		207.30
Percent Drift	-0.5	-0.9	-0.2		0.2

Final, Actual Span = Measured Span - Zero Drift

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

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : TEHACHAPI CUMMINGS W Date : 9/13/93

Station : PLANT #1 ENG #2

Run 1	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	20.90	16.15	801.00		206.80
Measured Span	20.94	16.10	801.00		211.40
Zero Drift	0.00	0.00	0.00		0.00
Final, Actual Span	20.94	16.10	801.00		211.40
Percent Drift	0.2	-0.3	0.0	*********	2.2

Run 2	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	20.90	16.15	801.00		206.80
Measured Span	20.90	16.32	801.00		208.30
Zero Drift	0.00	0.00	0.00		0.00
Final, Actual Span	20.90	16.32	801.00		208.30
Percent Drift	0.0	1.1	0.0	*********	0.7

Run 3	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	20.90	16.15	801.00		206.80
Measured Span	20.88	16.56	799.00		209.80
Zero Drift	0.00	0.00	0.00		0.00
Final, Actual Span	20.88	16.56	799.00		209.80
Percent Drift	-0.1	2.5	-0.2		1.5

Final, Actual Span = Measured Span - Zero Drift

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

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : TEHACHAPI CUMMINGS W Date : 9/14/93

Station : PLANT #1 ENG #3

Run 1	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	20.90	16.15	801.00		206.80
Measured Span	21.02	15.90	801.00		208.00
Zero Drift	0.00	0.00	0.00		0.00
Final, Actual Span	21.02	15.90	801.00		208.00
Percent Drift	0.6	-1.5	0.0	*********	0.6
**********	*********	*********	*********		*********

Run 2	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	20.90	16.15	801.00		206.80
Measured Span	20.90	15.95	799.00		207.00
Zero Drift	0.00	0.00	0.00		0.00
Final, Actual Span	20.90	15.95	799.00		207.00
Percent Drift	0.0	-1.2	-0.2	*********	0.1
**********	*********	*********	*********		*********

Run 3	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	20.90	16.15	801.00		206.80
Measured Span	20.75	16.00	798.00		207.80
Zero Drift	0.00	0.00	0.00		0.00
Final, Actual Span	20.75	16.00	798.00		207.80
Percent Drift	-0.7	-0.9	-0.4		0.5

Final, Actual Span = Measured Span - Zero Drift

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

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : TEHACHAPI CUMMINGS W Date : 9/14/93

Station : PLANT #1 ENG #4

Run 1	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	4.27	16.15	801.00		8130.00
Measured Span	4.25	16.25	798.00		8125.00
Zero Drift	0.00	0.00	0.00		0.00
Final, Actual Span	4.25	16.25	798.00		8125.00
Percent Drift	-0.5	0.6	-0.4		-0.1

Run 2	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	4.27	16.15	801.00		8130.00
Measured Span	4.25	16.03	799.00		8170.00
Zero Drift	0.00	0.00	0.00		0.00
Final, Actual Span	4.25	16.03	799.00		8170.00
Percent Drift	-0.5	-0.7	-0.2		0.5

Run 3	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	4.27	16.15	801.00		8130.00
Measured Span	4.25	16.36	797.00		8170.00
Zero Drift	0.00	0.00	0.00		0.00
Final, Actual Span	4.25	16.36	797.00		8170.00
Percent Drift	-0.5	1.3	-0.5		0.5

Final, Actual Span = Measured Span - Zero Drift

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

Steiner Environmental, Inc.

Date: 9.14.93

Test Location: TC WATER DIST
PLANT 1 ENGINES 1-4

SAMPLE HANDLING/LOG-IN

NO	SAMPLE TYPE	VOLUME	COMMENTS
1	36822 18 (Meth) HC (Sample) 1 (Test)		
2	36823 18 (Meth) HC (Sample) 2 (Test)		
3	36824 18 (Meth) HC (Sample) 3 (Test)		
4	36825 ASTM (Meth) NG (Sample) ALL (Test)		
5	36826 18 (Meth) HC (Sample) 1 (Test)		
6	36827 18 (Meth) HC (Sample) 2 (Test)		
7	36828 18 (Meth) HC (Sample) 3 (Test)		
8	36829 ASTM (Meth) NG (Sample) ALL (Test)		
9	36830 18 (Meth) HC (Sample) 1 (Test)		
10	36831 18 (Meth) HC (Sample) 2 (Test)		
11	36832 18 (Meth) HC (Sample) 3 (Test)		
12	36833 ASTM (Meth) NG (Sample) ALL (Test)		

CHAIN-OF-CUSTODY

Signature	Date/Time	Signature	Date/Time
James E McEnery	9.14.93/1800		

Steiner Environmental, Inc.

Date: 9.14.93

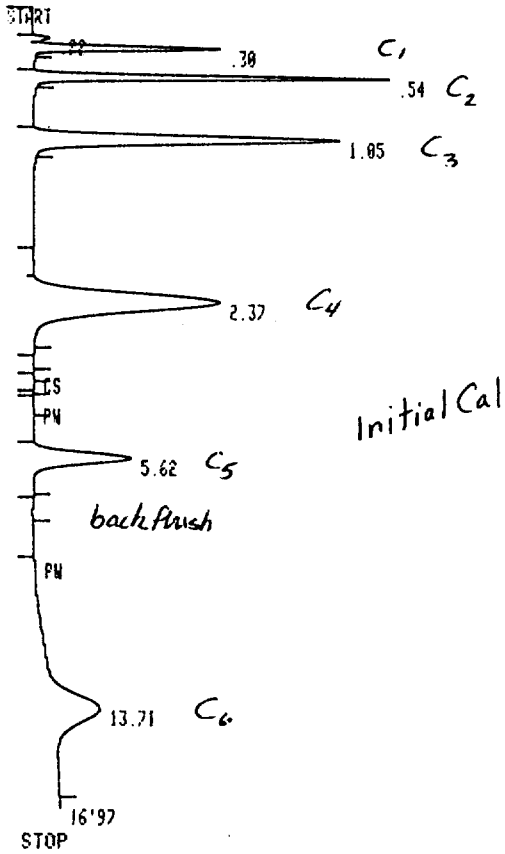
Test Location: TC WATER DIST PLANT 1 ENGINES 1-4

SAMPLE HANDLING/LOG-IN

NO	SAMPLE TYPE	VOLUME	COMMENTS
1	36834 18 (Meth) HC (Sample) 1 (Test)		
2	36835 18 (Meth) HC (Sample) 2 (Test)		
3	36836 18 (Meth) HC (Sample) 3 (Test)		
4	36837 ASTM (Meth) NG (Sample) ALL (Test)		
5			
6			
7			
8			
9			
10			
11			
12			

CHAIN-OF-CUSTODY

Signature	Date/Time	Signature	Date/Time
James E. M. Emery	9.14.93/1800		



RUN # 2 SEP/16/93 12:31:03

AREA%

RT	AREA	TYPE	AR/HT	AREA%	
0.22	330	BV	0.036	0.339	
0.30	4415	VB	0.043	4.539	C_1
0.54	8606	PB	0.044	8.847	
1.05	13082	BB	0.078	13.448	
2.37	18140	VB	0.177	18.648	
5.62	22757	PB	0.428	23.395	
13.71	29945	PB	1.134	30.784	

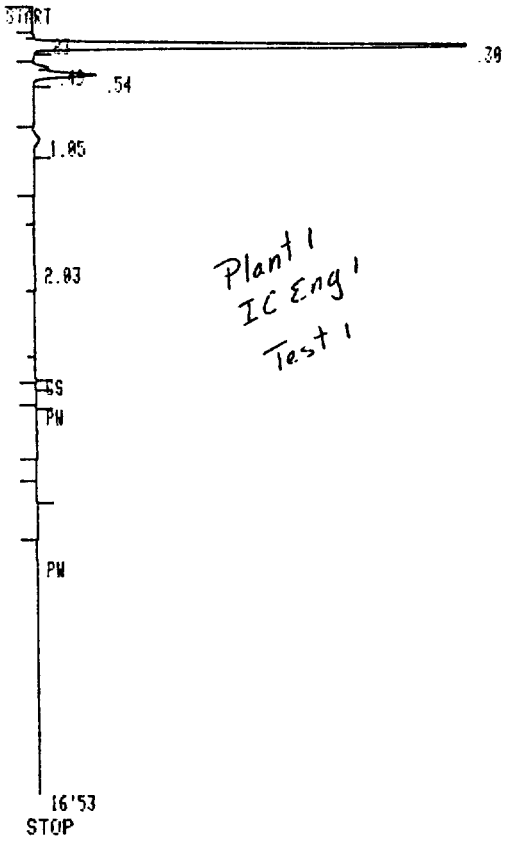
TOTAL AREA= 97275
MUL FACTOR= 1.0000E+00

RUN # 2 SEP/16/93 12:31:03

ESTD

RT	AREA	TYPE	CAL#	ppm AMOUNT	
0.22	330	BV	2	1.000	
0.30	4415	VB	1R	20.770	C_1
0.54	8606	PB		40.486	
1.05	13082	BB		61.543	
2.37	18140	VB		85.338	
5.62	22757	PB		107.068	
13.71	29945	PB		140.870	

TOTAL AREA= 97275
MUL FACTOR= 1.0000E+00

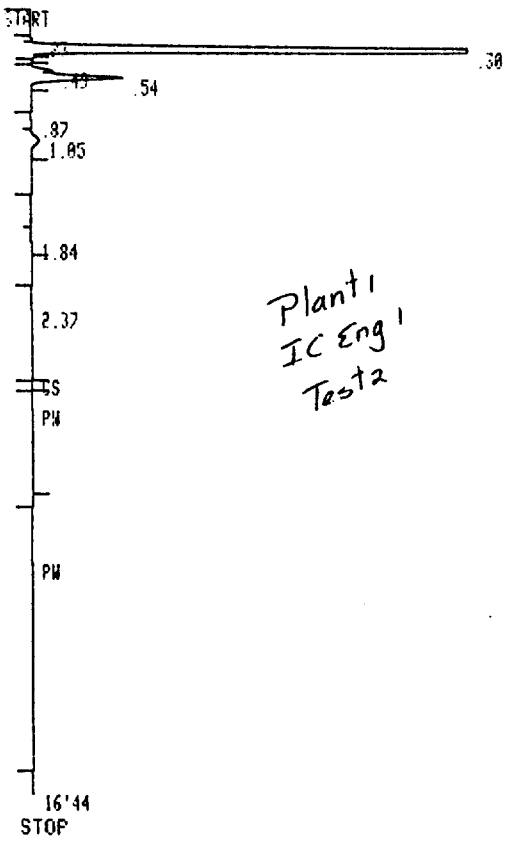


RUN # 10 SEP/17/93 09:24:46
ID 36826

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.23	284	PV	2	0.861	
0.30	194820	VB	1R	916.530	C_1
0.49	4424	BV		20.812	
0.54	24798	VB		116.660	C_2
1.05	4228	BB		19.890	$>C_2$
2.03	759	VV		3.571	

TOTAL AREA= 229320
MUL FACTOR= 1.0000E+00

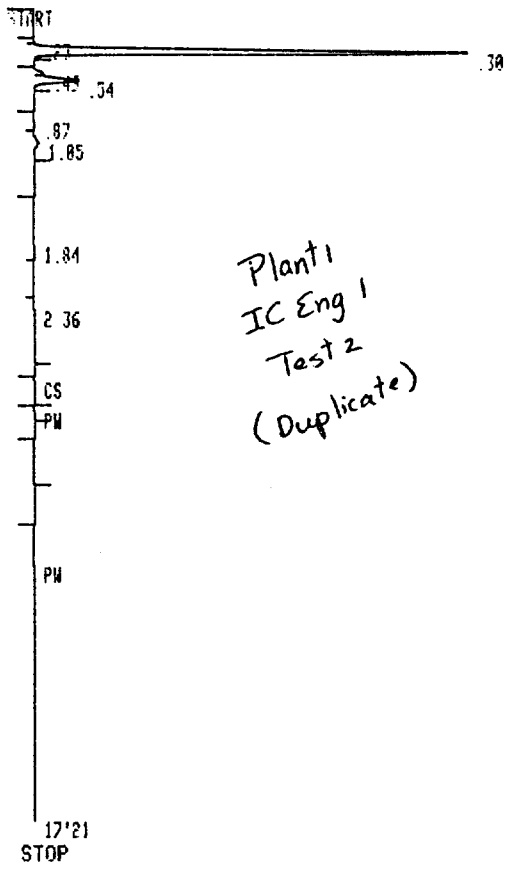


RUN # 11 SEP/17/93 09:44:29
ID 36827

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.23	245	PY	2	0.742	
0.30	329600	VB	1R	1550.600	C_1
0.49	5982	BV		28.142	
0.54	36213	VB		170.360	C_2
0.87	225	PY		1.059	
1.05	5747	VB		27.036	$>C_2$
1.84	116	PB		0.546	
2.37	309	BB		1.454	

TOTAL AREA= 378440
MUL FACTOR= 1.0000E+00

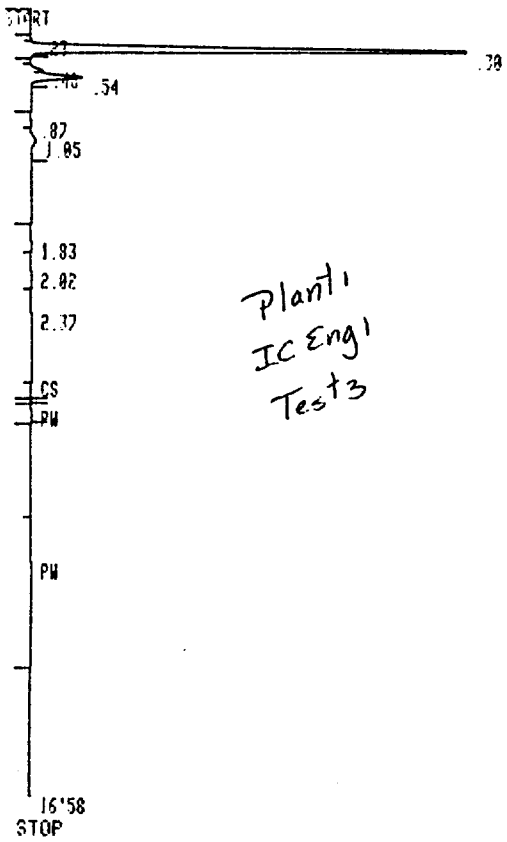


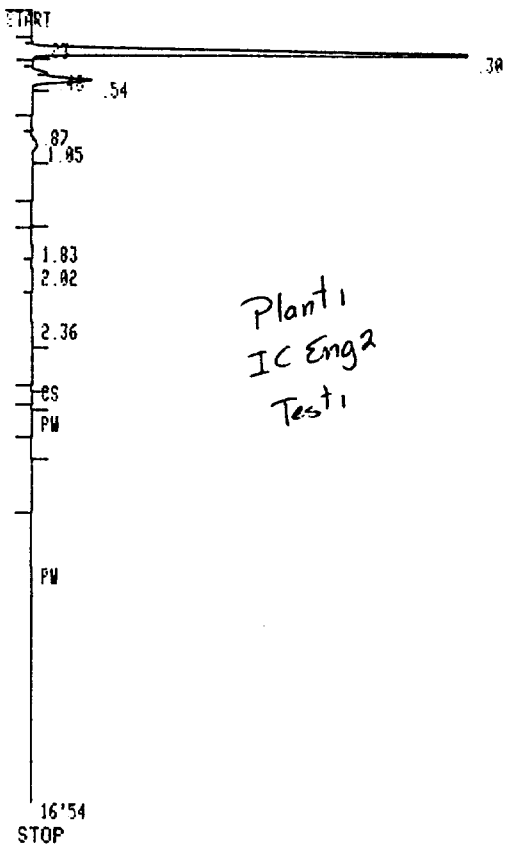
RUN # 12 SEP/17/93 13:36:45
ID 36827

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.23	111	PY	2	0.336	
0.30	319090	VB	1R	1501.100	C_1
0.49	5869	PY		27.610	
0.54	35292	VB		166.030	C_2
0.87	280	PY		1.317	
1.05	5691	VB		26.773	$>C_2$
1.84	630	BV		2.964	
2.36	486	VB		2.286	

TOTAL AREA= 367450
MUL FACTOR= 1.0000E+00





RUN # 13 SEP/17/93 14:01:56
ID 36828

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.23	0	PV	2	0.000	
0.30	392960	VB	1R	1848.600	C_1
0.48	6921	PV		32.559	
0.54	41360	VB		194.570	C_2
0.87	242	BV		1.139	
1.05	6524	VB		30.691	
1.83	362	PV		1.703	$>C_2$
2.02	628	VV		2.954	
2.37	501	VP		2.357	

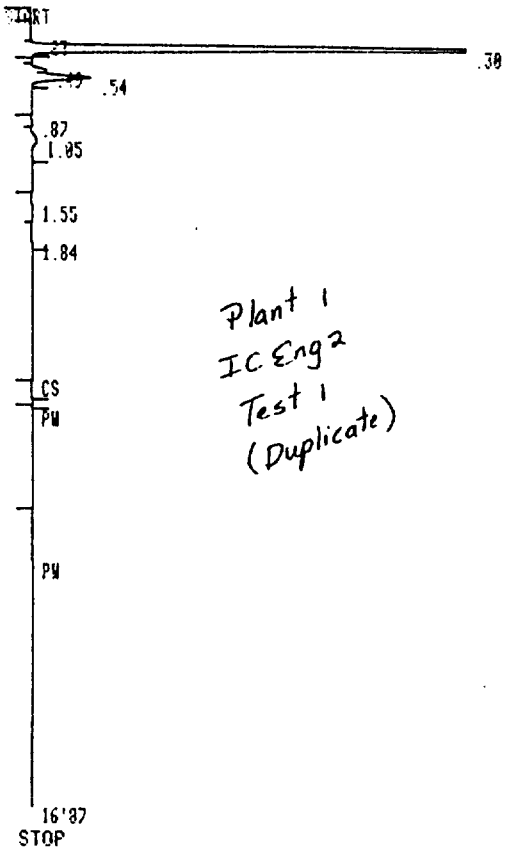
TOTAL AREA= 449490
MUL FACTOR= 1.0000E+00

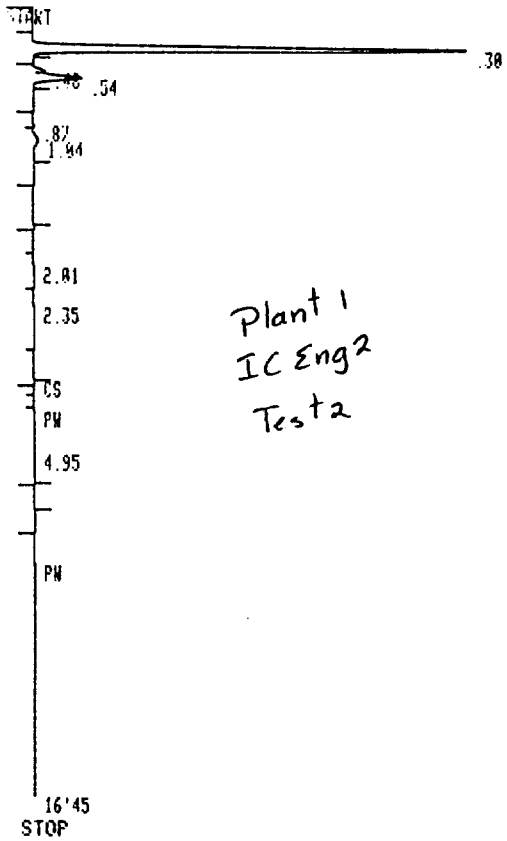
RUN # 38 SEP/17/93 15:29:54
ID 36822

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.23	191	PV	2	0.579	
0.30	445460	VB	1R	2095.700	C_1
0.48	8969	PV		42.194	
0.54	47599	VB		223.920	C_2
0.87	155	PV		0.729	
1.05	7985	VB		37.565	
1.83	343	BV		1.614	$>C_2$
2.02	793	VV		3.731	
2.36	701	VB		3.298	

TOTAL AREA= 512200
MUL FACTOR= 1.0000E+00





RUN # 39 SEP/17/93 15:48:28
ID 36822

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.23	0	PP	2	0.000	
0.30	445070	PB	1R	2093.800	C_1
0.49	8971	PV		42.203	
0.54	47711	VB		224.450	C_2
0.87	172	BV		0.809	$>C_2$
1.05	8020	VB		37.729	
1.55	256	BP		1.204	
1.84	111	PB		0.522	

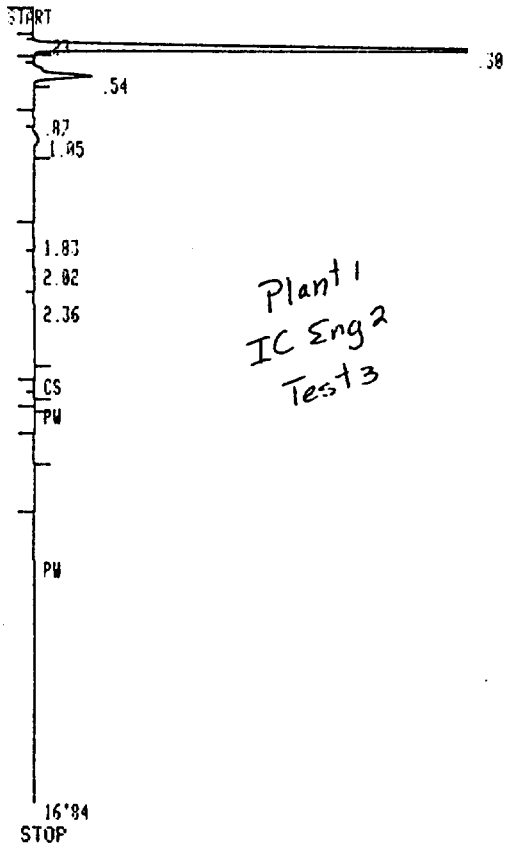
TOTAL AREA= 510310
MUL FACTOR= 1.0000E+00

RUN # 44 SEP/18/93 08:02:41
ID 36823

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.30	319460	PB	1R	1502.900	C_1
0.48	6385	BV		30.038	
0.54	38845	VB		182.740	C_2
0.87	233	BV		1.096	$>C_2$
1.04	6792	VB		31.952	
2.01	697	VV		3.279	
2.35	659	VP		3.100	
4.95	1841	PB		8.661	

TOTAL AREA= 374920
MUL FACTOR= 1.0000E+00

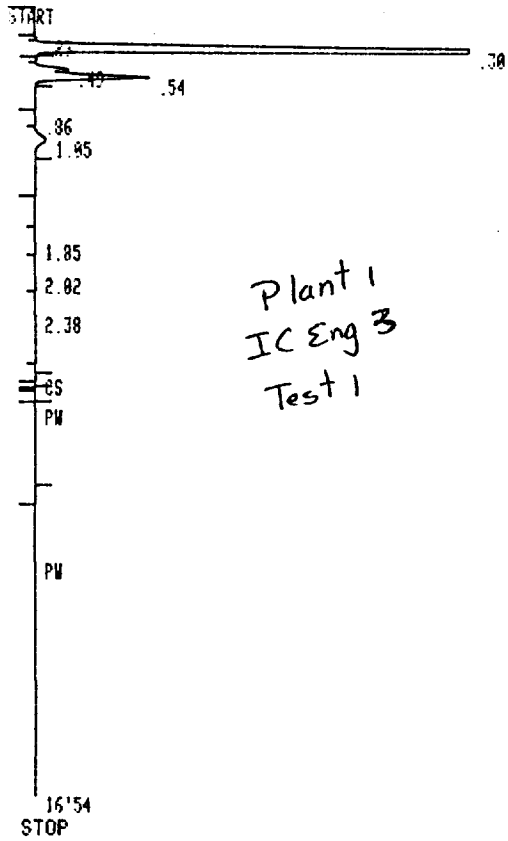


RUN # 14 SEP/17/93 14:20:53
ID 36824

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.23	145	PV	2	0.439	
0.30	436490	VB	1R	2053.400	C_1
0.54	51727	PB		243.340	C_2
0.87	249	BV		1.171	
1.05	7854	VB		36.948	
1.83	379	PV		1.783	
2.02	793	VV		3.731	$>C_2$
2.36	579	VB		2.724	

TOTAL AREA= 498220
MUL FACTOR= 1.0000E+00

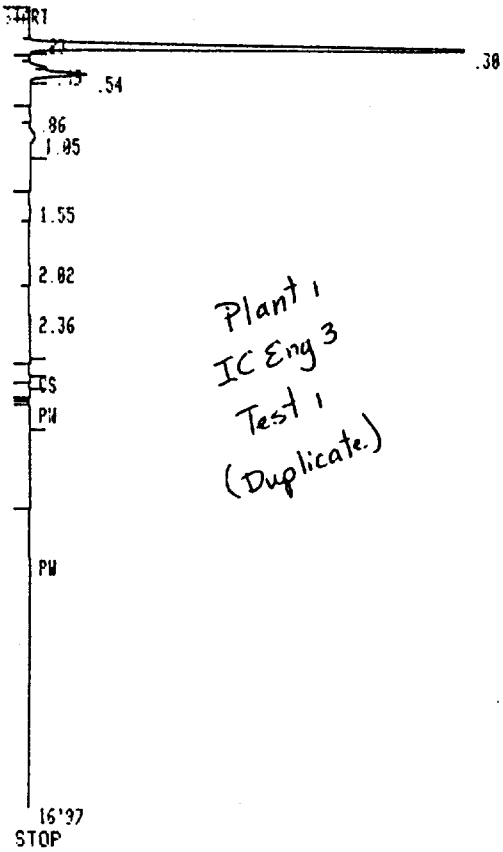


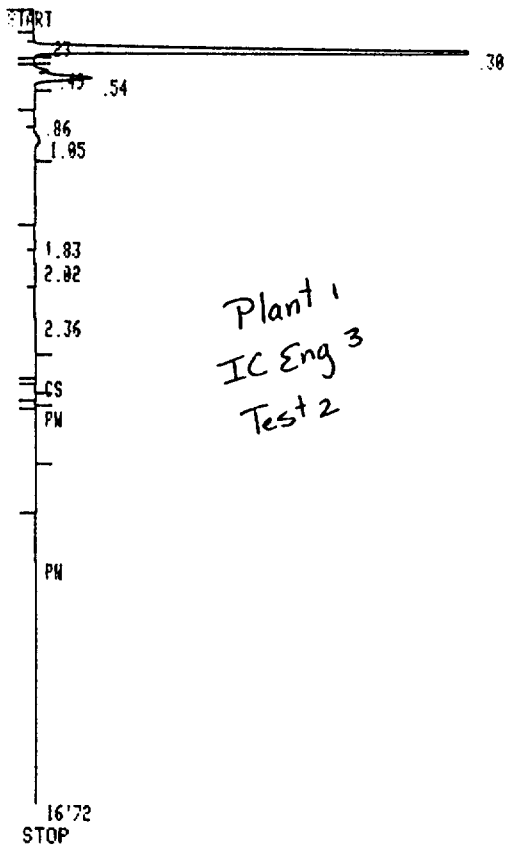
RUN # 4 SEP/16/93 13:22:58
ID 36830

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.23	257	PV	2	0.779	
0.30	398980	VB	1R	1877.000	C_1
0.49	10075	PV		47.397	
0.54	45290	VB		213.060	C_2
0.86	421	BV		1.981	
1.05	7813	VB		36.755	
1.85	303	VV		1.425	
2.02	790	VV		3.717	$>C_2$
2.38	703	VP		3.307	

TOTAL AREA= 464640
MUL FACTOR= 1.0000E+00





RUN # 5 SEP/16/93 13:42:08
ID 36830

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.23	0	PV	2	0.000	
0.30	398640	VB	1R	1875.300	C_1
0.49	10066	PV		47.354	
0.54	45125	VB		212.290	C_2
0.86	433	PV		2.037	
1.05	7871	VB		37.028	
1.55	269	BV		1.266	$>C_2$
2.02	1125	VV		5.293	
2.36	721	VB		3.392	

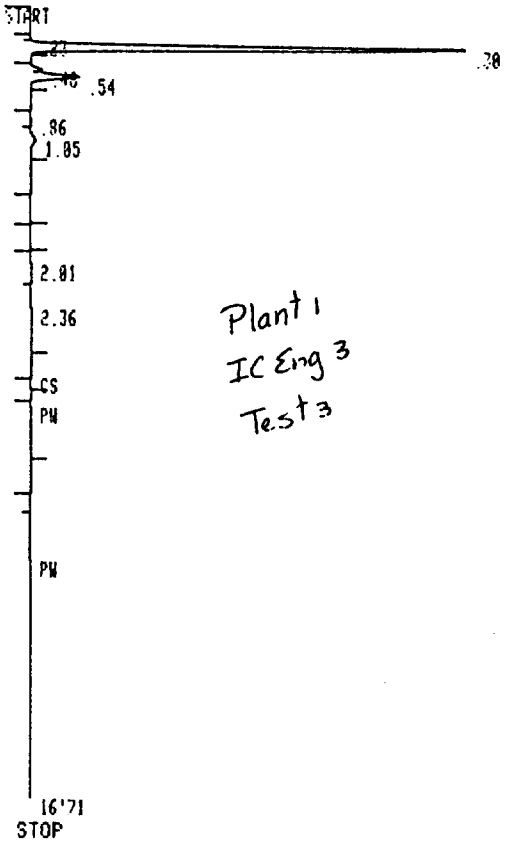
TOTAL AREA= 464250
MUL FACTOR= 1.0000E+00

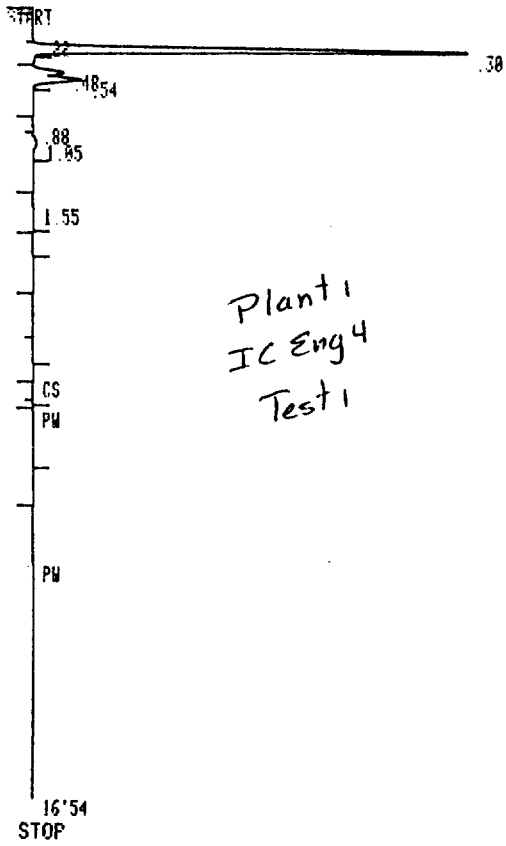
RUN # 6 SEP/16/93 14:02:09
ID 36831

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.23	37	PV	2	0.112	
0.30	416750	VB	1R	1960.600	C_1
0.49	8543	PV		40.190	
0.54	45257	VB		212.910	C_2
0.86	446	PV		2.098	
1.05	8001	VB		37.640	
1.83	301	PV		1.416	$>C_2$
2.02	772	VV		3.632	
2.36	718	VB		3.378	

TOTAL AREA= 480830
MUL FACTOR= 1.0000E+00





RUN # 7 SEP/16/93 14:20:58
ID 36832

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.23	290	PV	2	0.879	
0.30	332010	VB	1R	1561.900	C_1
0.48	6481	BV		30.489	
0.54	38666	VB		181.900	C_2
0.86	406	BV		1.910	
1.05	6961	VB		32.747	$>C_2$
2.01	421	BP		1.981	
2.36	507	PB		2.385	

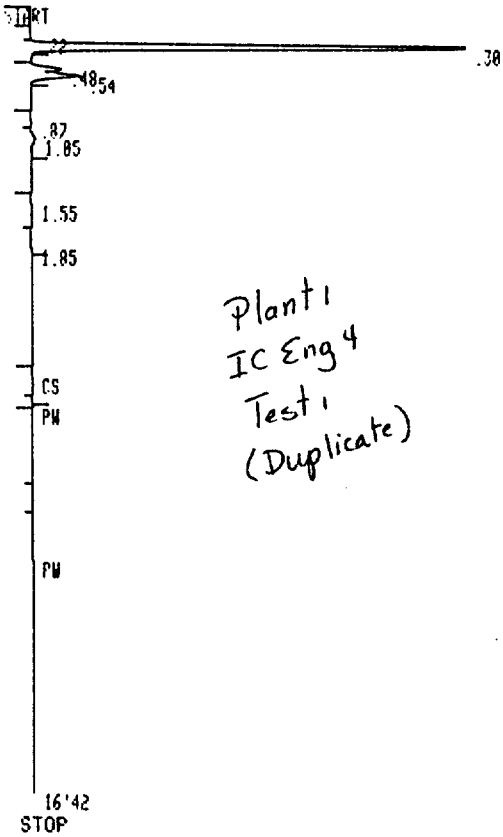
TOTAL AREA= 385740
MUL FACTOR= 1.0000E+00

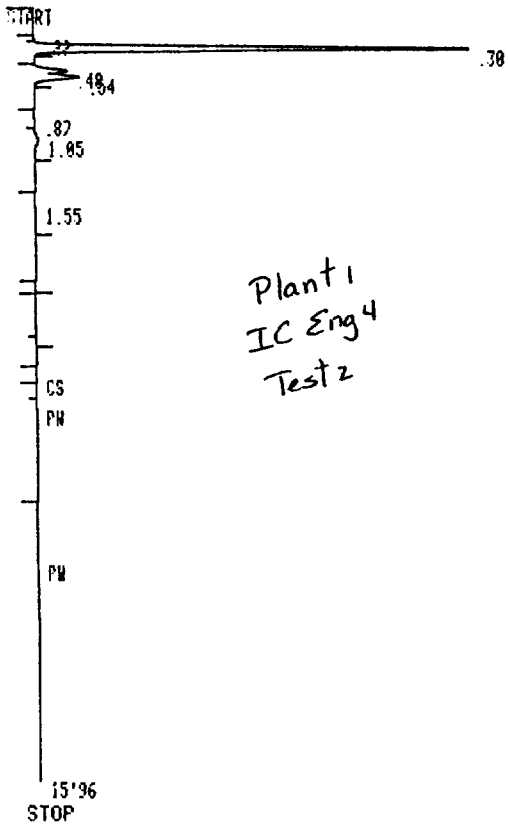
RUN # 46 SEP/18/93 08:44:24
ID 36834

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.22	0	PP	2	0.000	
0.30	185990	PB	1R	874.970	C_1
0.48	10560	PV		49.678	
0.54	19558	VB		92.009	C_2
0.88	179	BV		0.842	
1.05	2663	VB		12.528	$>C_2$
1.55	738	PB		3.472	

TOTAL AREA= 219690
MUL FACTOR= 1.0000E+00





RUN # 47 SEP/18/93 09:02:39
ID 36834

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.22	0	PP	2	0.000	
0.30	185900	PB	1R	874.560	C_1
0.48	10636	BV		50.036	
0.54	19538	VB		91.915	C_2
0.87	200	BV		0.941	
1.05	2722	VB		12.805	$>C_2$
1.55	790	BP		3.717	
1.85	137	PB		0.645	

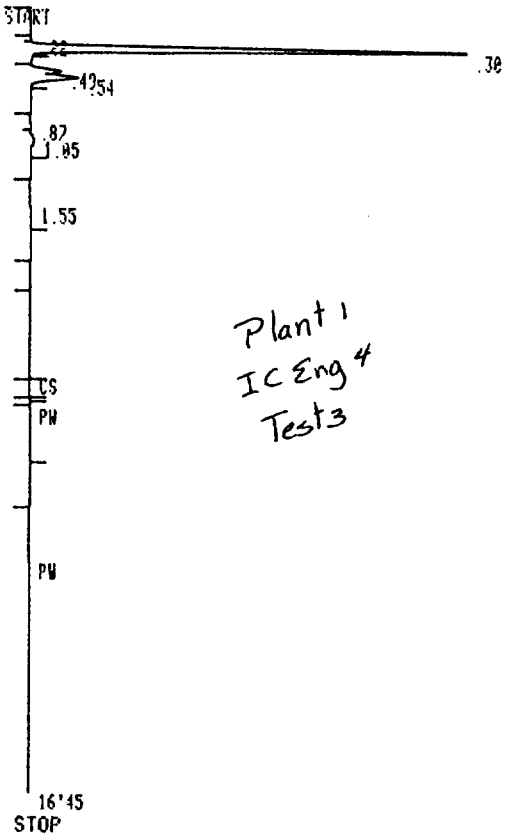
TOTAL AREA= 219920
MUL FACTOR= 1.0000E+00

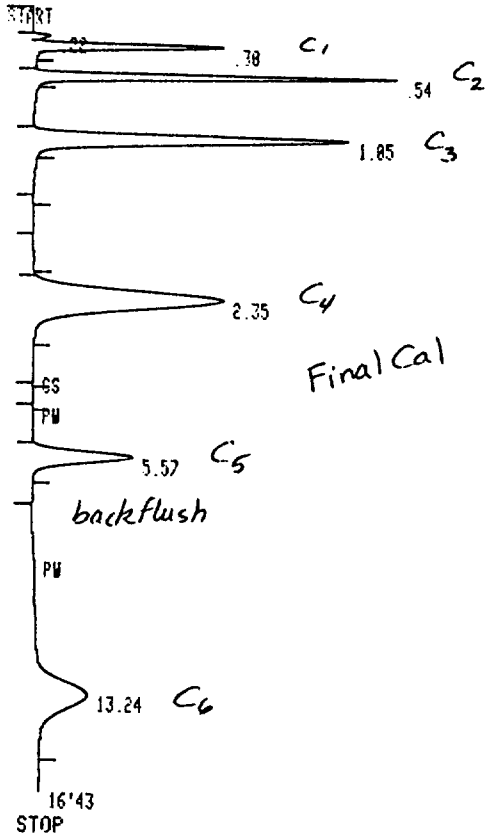
RUN # 48 SEP/18/93 09:21:12
ID 36835

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.22	136	PV	2	0.412	
0.30	168050	VB	1R	790.580	C_1
0.48	11676	BV		54.929	
0.54	17606	VB		82.826	C_2
0.87	442	BV		2.079	
1.05	2694	VB		12.674	$>C_2$
1.55	622	BB		2.926	

TOTAL AREA= 201230
MUL FACTOR= 1.0000E+00





RUN # 49 SEP/18/93 09:39:26
ID 36836

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.22	165	PV	2	0.500	
0.30	177570	VB	1R	835.370	C_1
0.49	10581	BV		49.777	
0.54	19065	VB		89.689	C_2
0.87	177	BV		0.833	
1.05	2583	VB		12.151	$>C_2$
1.55	722	PB		3.397	

TOTAL AREA= 210860
MUL FACTOR= 1.0000E+00

RUN # 50 SEP/18/93 10:03:39
ID 36836

ESTD

RT	AREA	TYPE	CAL#	AMOUNT	
0.22	314	PV	2	0.952	
0.30	4506	VB	1R	21.198	C_1
0.54	8790	PB		41.352	
1.05	13425	BB		63.157	
2.35	18621	BB		87.601	
5.57	23369	BB		109.940	
13.24	33376	PB		157.010	

TOTAL AREA= 102400
MUL FACTOR= 1.0000E+00

E. HYDROCARBON DATA

PLANT : TEHACHAPI CUMMINGS WATER DISDATE : 9/13/93
SOURCE : PLANT #1 ENG #1

CALIBRATIONS

Methane Calibration gas = 20.77 ppm

	Area Count	ppm	
Initial Cal.	4415	20.77	C1
Final Cal. Check	4506	21.20	C1

% cal. diff. = 2.06
ppm/area count = 4.70E-03

SAMPLES

	AREA COUNTS			ppm		
Run. No.	1	2	3	1	2	3
HC C1	194820	329600	392960	916.51	1550.58	1848.65
HC >C1 ¦	4228	225	242	19.89	1.06	1.14
" ¦	759	5747	6524	3.57	27.04	30.69
" ¦		116	362		0.55	1.70
" ¦		309	628		1.45	2.95
" ¦			501			2.36
Total HC >C1 =	4987	6397	8257	23.46	30.09	38.84

lb/hr

Run. No.	1	2	3
HC C1	4.48	7.58	8.98
HC >C1 ¦	0.10	0.01	0.01
" ¦	0.02	0.13	0.15
" ¦		0.00	0.01
" ¦		0.01	0.01
" ¦			0.01
Total HC >C1 =	0.11	0.15	0.19

E. HYDROCARBON DATA

PLANT : TEHACHAPI CUMMINGS WATER DISDATE : 9/13/93
SOURCE : PLANT #1 ENG #2

CALIBRATIONS

Methane Calibration gas = 20.77 ppm

	Area Count	ppm	
Initial Cal.	4415	20.77	C1
Final Cal. Check	4506	21.20	C1

% cal. diff. = 2.06
ppm/area count = 4.70E-03

SAMPLES

	AREA COUNTS			ppm		
Run. No.	1	2	3	1	2	3
HC C1	445460	319460	436490	2095.63	1502.87	2053.43
HC >C1 ¦	155	233	249	0.73	1.10	1.17
" ¦	7985	6792	7854	37.56	31.95	36.95
" ¦	343	697	379	1.61	3.28	1.78
" ¦	793	659	793	3.73	3.10	3.73
" ¦	701	1841	579	3.30	8.66	2.72
Total HC >C1 =	9977	10222	9854	46.94	48.09	46.36

lb/hr

Run. No.	1	2	3
HC C1	9.94	7.17	9.83
HC >C1 ¦	0.00	0.01	0.01
" ¦	0.18	0.15	0.18
" ¦	0.01	0.02	0.01
" ¦	0.02	0.01	0.02
" ¦	0.02	0.04	0.01
Total HC >C1 =	0.22	0.23	0.22

E. HYDROCARBON DATA

PLANT : TEHACHAPI CUMMINGS WATER DISDATE : 9/14/93
SOURCE : PLANT #1 ENG #3

CALIBRATIONS

Methane Calibration gas = 20.77 ppm

	Area Count	ppm	
Initial Cal.	4415	20.77	C1
Final Cal. Check	4506	21.20	C1

% cal. diff. = 2.06
ppm/area count = 4.70E-03

SAMPLES

	AREA COUNTS			ppm		
Run. No.	1	2	3	1	2	3
HC C1	398980	416750	392960	1876.97	1960.57	1848.65
HC >C1 ¦	421	446	332010	1.98	2.10	1561.91
" ¦	7813	8001	406	36.76	37.64	1.91
" ¦	303	301	6961	1.43	1.42	32.75
" ¦	790	772	421	3.72	3.63	1.98
" ¦	703	718	507	3.31	3.38	2.39
Total HC >C1 =	10030	10238	340305	47.19	48.16	1600.94

lb/hr

Run. No.	1	2	3
HC C1	9.26	9.67	9.19
HC >C1 ¦	0.01	0.01	7.76
" ¦	0.18	0.19	0.01
" ¦	0.01	0.01	0.16
" ¦	0.02	0.02	0.01
" ¦	0.02	0.02	0.01
Total HC >C1 =	0.23	0.24	7.95

E. HYDROCARBON DATA

PLANT : TEHACHAPI CUMMINGS WATER DISDATE : 9/14/93
SOURCE : PLANT #1 ENG #4

CALIBRATIONS

Methane Calibration gas = 20.77 ppm

	Area Count	ppm	
Initial Cal.	4415	20.77	C1
Final Cal. Check	4506	21.20	C1

% cal. diff. = 2.06
ppm/area count = 4.70E-03

SAMPLES

	AREA COUNTS			ppm		
Run. No.	1	2	3	1	2	3
HC C1	185990	168050	177570	874.97	790.58	835.36
HC >C1 ¦	179	442	177	0.84	2.08	0.83
" ¦	2663	2694	2583	12.53	12.67	12.15
" ¦	738	622	722	3.47	2.93	3.40
" ¦						
" ¦						
Total HC >C1 =	3580	3758	3482	16.84	17.68	16.38

lb/hr

Run. No.	1	2	3
HC C1	2.31	2.08	2.20
HC >C1 ¦	0.00	0.01	0.00
" ¦	0.03	0.03	0.03
" ¦	0.01	0.01	0.01
" ¦			
" ¦			
Total HC >C1 =	0.04	0.05	0.04

FUEL / FLOWRATE CALCULATIONS

PLANT ..... TEHACHAPI CUMMINGS WATER DISTRICT
SOURCE ..... ENG #1 Temp. Std.: 60
DATE ..... SEPT 13,1993 Press. Std: 29.92

FUEL FLOWRATE DATA :

	RUN 1	RUN 2	RUN 3
Barometric Press., in.Hg..	29.08	29.10	29.10
Brake Horsepower			
Fuel Flow, scfh	6493.75	6493.75	6493.75
Oxygen, %	10.40	10.41	10.35
Fuel Flow, acfh			
Fuel Press, psig			
" " psia			
Fuel Temp, dF			

FUEL ANALYSIS DATA :

	RUN 1	RUN 2	RUN 3
Btu/scf, Gross Cal. Value:	1050.00	1050.00	1050.00
Btu/lb, Gross Cal. Value :	22878.00	22878.00	22878.00
Hydrogen, Wt.% :	23.58	23.58	23.58
Carbon, Wt.% :	73.31	73.31	73.31
Sulfur, Wt.% :	0.00	0.00	0.00
Nitrogen, Wt.% :	1.86	1.86	1.86
Oxygen, Wt.% :	1.25	1.25	1.25

CALCULATIONS :

	RUN 1	RUN 2	RUN 3	AVERAGE
F-Factor,dscf/MMBtu :	8,509.74	8,509.74	8,509.74	8,509.74
Fuel Rate, scfh :	6493.75	6493.75	6493.75	6493.75
Heat Rate, MMBtu/hr :	6.818	6.818	6.818	6.818
Flue gas flowrate, dscfm :	1924.89	1926.73	1915.77	1922.46

* F-Factor = 10E6 x [3.64(%H) + 1.53(%C) + 0.57(%S) + 0.14(%N) - 0.46(%O2)] / (Btu/lb) x [(Tstd + 460) / 528]

* scfh = fuel acfh x [Pb + (P,psig x 2.036 in.Hg/psi) / (T fuel + 460)] x [(Tstd + 460) / Pstd]
  where: psig = psia - 14.7

* MMBtu/hr = scfh x (Btu/scf) / 10E6

* dscfm = MMBtu/hr x dscf/MMBtu x (1hr/60min) x [20.9 / (20.9- %O2)]

FUEL / FLOWRATE CALCULATIONS

PLANT ..... TEHACHAPI CUMMINGS WATER DISTRICT
SOURCE ..... ENG #2 Temp. Std.: 60
DATE ..... SEPT 13,1993 Press. Std: 29.92

FUEL FLOWRATE DATA :

	RUN 1	RUN 2	RUN 3
Barometric Press., in.Hg..	29.08	29.10	29.10
Brake Horsepower			
Fuel Flow, scfh	6493.75	6493.75	6493.75
Oxygen, %	10.08	10.14	10.18
Fuel Flow, acfh			
Fuel Press, psig			
" " psia			
Fuel Temp, dF			

FUEL ANALYSIS DATA :

	RUN 1	RUN 2	RUN 3
Btu/scf, Gross Cal. Value:	1050.00	1050.00	1050.00
Btu/lb, Gross Cal. Value :	22897.00	22897.00	22897.00
Hydrogen, Wt.% :	23.61	23.61	23.61
Carbon, Wt.% :	73.42	73.42	73.42
Sulfur, Wt.% :	0.00	0.00	0.00
Nitrogen, Wt.% :	1.75	1.75	1.75
Oxygen, Wt.% :	1.21	1.21	1.21

CALCULATIONS :

	RUN 1	RUN 2	RUN 3	AVERAGE
F-Factor,dscf/MMBtu :	8,514.74	8,514.74	8,514.74	8,514.74
Fuel Rate, scfh :	6493.75	6493.75	6493.75	6493.75
Heat Rate, MMBtu/hr :	6.818	6.818	6.818	6.818
Flue gas flowrate, dscfm :	1869.06	1879.49	1886.50	1878.35

* F-Factor = 10E6 x [3.64(%H) + 1.53(%C) + 0.57(%S) + 0.14(%N) - 0.46(%O2)] / (Btu/lb) x [(Tstd + 460) / 528]

* scfh = fuel acfh x [Pb + (P,psig x 2.036 in.Hg/psi) / (T fuel + 460)] x [(Tstd + 460) / Pstd]
  where: psig = psia - 14.7

* MMBtu/hr = scfh x (Btu/scf) / 10E6

* dscfm = MMBtu/hr x dscf/MMBtu x (1hr/60min) x [20.9 / (20.9- %O2)]

FUEL / FLOWRATE CALCULATIONS

PLANT ..... TEHACHAPI CUMMINGS WATER DISTRICT
SOURCE ..... ENG #3 Temp. Std.: 60
DATE ..... SEPT 14,1993 Press. Std: 29.92

FUEL FLOWRATE DATA :

	RUN 1	RUN 2	RUN 3
Barometric Press., in.Hg..	29.24	29.23	29.21
Brake Horsepower			
Fuel Flow, scfh	6581.25	6581.25	6581.25
Oxygen, %	10.34	10.34	10.42
Fuel Flow, acfh			
Fuel Press, psig			
" " psia			
Fuel Temp, dF			

FUEL ANALYSIS DATA :

	RUN 1	RUN 2	RUN 3
Btu/scf, Gross Cal. Value:	1052.00	1052.00	1052.00
Btu/lb, Gross Cal. Value :	22964.00	22964.00	22964.00
Hydrogen, Wt.% :	23.67	23.67	23.67
Carbon, Wt.% :	73.56	73.56	73.56
Sulfur, Wt.% :	0.00	0.00	0.00
Nitrogen, Wt.% :	1.71	1.71	1.71
Oxygen, Wt.% :	1.07	1.07	1.07

CALCULATIONS :

	RUN 1	RUN 2	RUN 3	AVERAGE
F-Factor,dscf/MMBtu :	8,510.97	8,510.97	8,510.97	8,510.97
Fuel Rate, scfh :	6581.25	6581.25	6581.25	6581.25
Heat Rate, MMBtu/hr :	6.923	6.923	6.923	6.923
Flue gas flowrate, dscfm :	1943.72	1943.72	1958.56	1948.67

* F-Factor = 10E6 x [3.64(%H) + 1.53(%C) + 0.57(%S) + 0.14(%N) - 0.46(%O2)] / (Btu/lb) x [(Tstd + 460) / 528]

* scfh = fuel acfh x [Pb + (P,psig x 2.036 in.Hg/psi) / (T fuel + 460)] x [(Tstd + 460) / Pstd]
  where: psig = psia - 14.7

* MMBtu/hr = scfh x (Btu/scf) / 10E6

* dscfm = MMBtu/hr x dscf/MMBtu x (1hr/60min) x [20.9 / (20.9- %O2)]

FUEL / FLOWRATE CALCULATIONS

PLANT ..... TEHACHAPI CUMMINGS WATER DISTRICT
SOURCE ..... ENG #4 Temp. Std.: 60
DATE ..... SEPT 14,1993 Press. Std: 29.92

FUEL FLOWRATE DATA :

	RUN 1	RUN 2	RUN 3
Barometric Press., in.Hg..	29.24	29.23	29.21
Brake Horsepower			
Fuel Flow, scfh	6581.25	6581.25	6581.25
Oxygen, %	1.24	1.20	1.18
Fuel Flow, acfh			
Fuel Press, psig			
" " psia			
Fuel Temp, dF			

FUEL ANALYSIS DATA :

	RUN 1	RUN 2	RUN 3
Btu/scf, Gross Cal. Value:	1049.00	1049.00	1049.00
Btu/lb, Gross Cal. Value :	22817.00	22817.00	22817.00
Hydrogen, Wt.% :	23.52	23.52	23.52
Carbon, Wt.% :	73.16	73.16	73.16
Sulfur, Wt.% :	0.00	0.00	0.00
Nitrogen, Wt.% :	2.05	2.05	2.05
Oxygen, Wt.% :	1.26	1.26	1.26

CALCULATIONS :

	RUN 1	RUN 2	RUN 3	AVERAGE
F-Factor,dscf/MMBtu :	8,514.10	8,514.10	8,514.10	8,514.10
Fuel Rate, scfh :	6581.25	6581.25	6581.25	6581.25
Heat Rate, MMBtu/hr :	6.904	6.904	6.904	6.904
Flue gas flowrate, dscfm :	1041.44	1039.33	1038.27	1039.68

* F-Factor = 10E6 x [3.64(%H) + 1.53(%C) + 0.57(%S) + 0.14(%N) - 0.46(%O2)] / (Btu/lb) x [(Tstd + 460) / 528]

* scfh = fuel acfh x [Pb + (P,psig x 2.036 in.Hg/psi) / (T fuel + 460)] x [(Tstd + 460) / Pstd]
  where: psig = psia - 14.7

* MMBtu/hr = scfh x (Btu/scf) / 10E6

* dscfm = MMBtu/hr x dscf/MMBtu x (1hr/60min) x [20.9 / (20.9- %O2)]

EMISSION RATE CALCULATIONS

PLANT : TEHACHAPI CUMMINGS WATER DISTRICT
SOURCE : ENG #1
DATE : SEPT 13,1993

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

	RUN 1	RUN 2	RUN 3	AVERAGE
Oxygen (%)	10.40	10.41	10.35	10.39
Qs(std), dscfm	1924.89	1926.73	1915.77	1922.46
NOx, ppm	104.06	109.05	108.75	107.29
CO, ppm	569.05	571.50	570.88	570.48
HC, ppm	23.46	30.10	38.84	30.80
F-Factor	8509.74	8509.74	8509.74	8509.74
NOx, MW = 46.005				
NOx, lb/hr	1.46	1.53	1.52	1.50
NOx, ppm @ O2	58.47	61.33	60.82	60.21
NOx, lb/MMBtu	0.2138	0.2243	0.2224	0.2202
CO, MW = 28.010				
CO, lb/hr	4.85	4.88	4.84	4.86
CO, ppm @ O2	319.75	321.43	319.26	320.15
CO, lb/MMBtu	0.7119	0.7156	0.7108	0.7128
HC, MW = 16.043				
HC, lb/hr	0.11	0.15	0.19	0.15
HC, ppm @ O2	13.18	16.93	21.72	17.28
HC, lb/MMBtu	0.0168	0.0216	0.0277	0.0220

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

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

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

* g/HP-hr = lb/hr x (453.59 g/lb) / HP

EMISSION RATE CALCULATIONS

PLANT : TEHACHAPI CUMMINGS WATER DISTRICT
SOURCE : ENG #2
DATE : SEPT 13,1993

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

	RUN 1	RUN 2	RUN 3	AVERAGE
Oxygen (%)	10.08	10.14	10.18	10.13
Qs(std), dscfm	1869.06	1879.49	1886.50	1878.35
NOx, ppm	127.77	125.08	126.84	126.56
CO, ppm	630.17	628.33	629.12	629.21
HC, ppm	46.94	48.09	46.36	47.13
F-Factor	8514.74	8514.74	8514.74	8514.74
NOx, MW = 46.005				
NOx, lb/hr	1.74	1.71	1.74	1.73
NOx, ppm @ O2	69.67	68.58	69.81	69.36
NOx, lb/MMBtu	0.2549	0.2509	0.2554	0.2538
CO, MW = 28.010				
CO, lb/hr	5.22	5.23	5.26	5.23
CO, ppm @ O2	343.62	344.53	346.25	344.80
CO, lb/MMBtu	0.7655	0.7675	0.7713	0.7681
HC, MW = 16.043				
HC, lb/hr	0.22	0.23	0.22	0.22
HC, ppm @ O2	25.59	26.37	25.51	25.83
HC, lb/MMBtu	0.0327	0.0336	0.0326	0.0330

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

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

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

* g/HP-hr = lb/hr x (453.59 g/lb) / HP

EMISSION RATE CALCULATIONS

PLANT : TEHACHAPI CUMMINGS WATER DISTRICT
SOURCE : ENG #3
DATE : SEPT 14,1993

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

	RUN 1	RUN 2	RUN 3	AVERAGE
Oxygen (%)	10.34	10.34	10.42	10.37
Qs(std), dscfm	1943.72	1943.72	1958.56	1948.67
NOx, ppm	108.41	103.97	101.29	104.56
CO, ppm	594.50	589.90	590.94	591.78
HC, ppm	47.19	48.16	39.02	44.79
F-Factor	8510.97	8510.97	8510.97	8510.97
NOx, MW = 46.005				
NOx, lb/hr	1.53	1.47	1.44	1.48
NOx, ppm @ O2	60.57	58.09	57.02	58.56
NOx, lb/MMBtu	0.2215	0.2124	0.2085	0.2142
CO, MW = 28.010				
CO, lb/hr	5.12	5.08	5.13	5.11
CO, ppm @ O2	332.15	329.58	332.69	331.47
CO, lb/MMBtu	0.7396	0.7339	0.7408	0.7381
HC, MW = 16.043				
HC, lb/hr	0.23	0.24	0.19	0.22
HC, ppm @ O2	26.36	26.91	21.97	25.08
HC, lb/MMBtu	0.0336	0.0343	0.0280	0.0320

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

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

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

* g/HP-hr = lb/hr x (453.59 g/lb) / HP

EMISSION RATE CALCULATIONS

PLANT : TEHACHAPI CUMMINGS WATER DISTRICT
SOURCE : ENG #4
DATE : SEPT 14,1993

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

	RUN 1	RUN 2	RUN 3	AVERAGE
Oxygen (%)	1.24	1.20	1.18	1.21
Qs(std), dscfm	1041.44	1039.33	1038.27	1039.68
NOx, ppm	4584.74	4554.64	4516.40	4551.93
CO, ppm	355.84	404.68	445.47	402.00
HC, ppm	16.84	17.68	16.38	16.97
F-Factor	8514.10	8514.10	8514.10	8514.10
NOx, MW = 46.005				
NOx, lb/hr	34.74	34.44	34.11	34.43
NOx, ppm @ O2	1375.89	1364.08	1351.26	1363.74
NOx, lb/MMBtu	5.0337	4.9905	4.9436	4.9893
CO, MW = 28.010				
CO, lb/hr	1.64	1.86	2.05	1.85
CO, ppm @ O2	106.79	121.20	133.28	120.42
CO, lb/MMBtu	0.2379	0.2700	0.2969	0.2682
HC, MW = 16.043				
HC, lb/hr	0.04	0.05	0.04	0.04
HC, ppm @ O2	5.05	5.29	4.90	5.08
HC, lb/MMBtu	0.0064	0.0068	0.0063	0.0065

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

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

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

* g/HP-hr = lb/hr x (453.59 g/lb) / HP

SCOTT-MARRIN, INC.
6531 BOX SPRINGS BLVD. • RIVERSIDE, CA 92507
TELEPHONE (714) 653-6780 • FAX (714) 653-2430

REPORT OF ANALYSIS
EPA PROTOCOL GAS MIXTURES

STEI01

TO:

DATE : 06/23/92

SUE POWERS
STEINER ENVIRONMENTAL, INC.
4930 BOYLAN STREET
BAKERSFIELD, CA 93308-

CUSTOMER ORDER NUMBER: SP-2750-90 R.61

PAGE 1

COMPONENT	CONCENTRATION(v/v)	REFERENCE STANDARD	ANALYZER MAKE,MODEL,S/N,DETECTION	EXPIRATION DATE	REPLICATE ANALYSIS DATA	
CYLINDER NO.: CC68618						
			Monitor Labs Model 8440		06/11/92	06/22/92
Nitric Oxide	206.8 ± 2.1 ppm	GMIS	S/N 136	12/22/93	206.8 ppm	206.8 ppm
NOx	206.8 ppm	Cylinder #	Continuous		206.7 ppm	206.9 ppm
Nitrogen,O2-Free Balance		CC28709	Chemiluminescence		206.8 ppm	206.5 ppm
Cylinder Pressure: 2000 psig		@ 252.6 ppm	Last Cal Date: 06/02/92	Mean:	206.8 ppm	206.7 ppm
CYLINDER NO.: CC40135						
			Monitor Labs Model 8440		06/11/92	06/22/92
Nitric Oxide	205.1 ± 2.1 ppm	GMIS	S/N 136	12/22/93	205.6 ppm	204.0 ppm
NOx	205.1 ppm	Cylinder #	Continuous		205.8 ppm	206.2 ppm
Nitrogen,O2-Free Balance		CC28709	Chemiluminescence		205.4 ppm	203.3 ppm
Cylinder Pressure: 2000 psig		@ 252.6 ppm	Last Cal Date: 06/02/92	Mean:	205.6 ppm	204.5 ppm
CYLINDER NO.: CC12139						
			Monitor Labs Model 8440		06/15/92	06/22/92
Nitric Oxide	818 ± 8 ppm	GMIS	S/N 136	12/22/93	818 ppm	818 ppm
NOx	818 ppm	Cylinder #	Continuous		817 ppm	816 ppm
Nitrogen,O2-Free Balance		CC78162	Chemiluminescence		819 ppm	817 ppm
Cylinder Pressure: 2000 psig		@ 1025 ppm	Last Cal Date: 06/02/92	Mean:	818 ppm	817 ppm

ppm = umole/mole % = mole-%

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

Analyst: M.J. Monson

Approved: J.T. Marrin

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

STANDARD CALIBRATION GASES IN ALUMINUM CYLINDERS

SCOTT-MARRIN, INC.

6531 BOX SPRINGS BLVD. • RIVERSIDE, CA 92507
TELEPHONE (714) 653-6780 • FAX (714) 653-2430

REPORT OF ANALYSIS
NIST TRACEABLE GAS MIXTURES

STEI01

TO:

SUE POWERS
STEINER ENVIRONMENTAL
4930 BOYLAN ST
BAKERSFIELD, CA 93308-

DATE: 10/30/92

CUSTOMER ORDER NUMBER: SP275090REL77

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CYLINDER NUMBER	COMPONENT	CONCENTRATION(v/v)	NIST TRACEABLE REFERENCE STANDARD
CC719	Nitric Oxide	8130 ± 81 ppm	SRM 2631
	Nitrogen,O2-Free	Balance	
	Cylinder Pressure:	1800 psig	
CC86353	Carbon Dioxide	41.2 ± 0.4 %	VOLUMETRIC
	Nitrogen	Balance	
	Cylinder Pressure:	650 psig	

ppm = umole/mole % = mole-%

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

Analyst: M.S. Calhoun

Approved: J.T. Marrin

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

STANDARD CALIBRATION GASES IN ALUMINUM CYLINDERS

SCOTT-MARRIN, INC.
6531 BOX SPRINGS BLVD. • RIVERSIDE, CA 92507
TELEPHONE (714) 653-6780 • FAX (714) 653-2430

REPORT OF ANALYSIS
EPA PROTOCOL GAS MIXTURES

STEI01

TO:

Sue Powers
Steiner Environmental, Inc.
4930 Boylan St.
Bakersfield, CA 93308-

DATE : 03/16/92

CUSTOMER ORDER NUMBER: SP2750-90REL.53

PAGE 1

COMPONENT	CONCENTRATION(v/v)	REFERENCE STANDARD	ANALYZER MAKE,MODEL,S/N,DETECTION	EXPIRATION DATE	REPLICATE ANALYSIS DATA	
CYLINDER NO.: CC12843						
			Varian Model 1200		03/02/92	03/13/92
Carbon Monoxide	804 ± 8 ppm	GMIS	S/N None	09/13/93	803 ppm	806 ppm
		Cylinder #	Methanation/FID		801 ppm	799 ppm
Nitrogen	Balance	L382	Gas Chromatography		809 ppm	803 ppm
Cylinder Pressure: 2000 psig		@ 1048 0	Last Cal Date: 02/28/92	Mean:	805 ppm	803 ppm
CYLINDER NO.: CC63451						
			Varian Model 1200		03/02/92	03/13/92
Carbon Monoxide	801 ± 8 ppm	GMIS	S/N None	09/13/93	811 ppm	798 ppm
		Cylinder #	Methanation/FID		799 ppm	799 ppm
Nitrogen	Balance	L382	Gas Chromatography		801 ppm	798 ppm
Cylinder Pressure: 2000 psig		@ 1048 0	Last Cal Date: 02/28/92	Mean:	804 ppm	798 ppm

ppm = umole/mole % = mole-%

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

Analyst: Steve Kozy
S.B. Kozy

Approved: J.T. Marrin

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

STANDARD CALIBRATION GASES IN ALUMINUM CYLINDERS

SCOTT-MARRIN, INC.
6531 BOX SPRINGS BLVD. • RIVERSIDE, CA 92507
TELEPHONE (714) 653-6780 • FAX (714) 653-2430

REPORT OF ANALYSIS
NIST TRACEABLE GAS MIXTURES

STEI01

TO:

SUE POWERS
STEINER ENVIRONMENTAL
4930 BOYLAN STREET
BAKERSFIELD, CA 93308-

DATE: 11/20/92

CUSTOMER ORDER NUMBER: SP 2750 90 R.79

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CYLINDER NUMBER	COMPONENT	CONCENTRATION (v/v)	NIST TRACEABLE REFERENCE STANDARD
CC117979	Carbon Dioxide	8.18 ± 0.08 %	SRM 1674b
	Oxygen	10.83 ± 0.11 %	SRM 2658a
	Nitrogen	Balance	
sent back for recert 8/25/93 Release 105			
CC117986	Carbon Dioxide	8.17 ± 0.08 %	SRM 1674b
	Oxygen	10.59 ± 0.11 %	SRM 2658a
	Nitrogen	Balance	
sent back for recert 6/14/93 Release 99			Use New Cert dtd 6/29/93
CC105493	Carbon Dioxide	16.15 ± 0.16 %	SRM 1675b
	Oxygen	4.27 ± 0.04 %	SRM 2658a
	Nitrogen	Balance	

ppm = umole/mole % = mole-%

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

Analyst: [signature]
M.S. Calhoun

Approved: [signature]
J.T. Marrin

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

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REPORT OF ANALYSIS
CALIBRATION GAS MIXTURES

STEIØ1

TO:

SUE POWERS
STEINER ENVIRONMENTAL INC
4930 BOYLAN ST
BAKERSFIELD, CA 93308-

DATE : 09/15/92

CUSTOMER ORDER NUMBER: SP 2750 90 R.68

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CYLINDER NO.: CC108780

COMPONENT	CONCENTRATION(v/v)
Methane	20.77 ± 0.21 ppm
Ethane	20.53 ± 0.21 ppm
Propane	20.14 ± 0.20 ppm
n-Butane	20.16 ± 0.20 ppm
n-Pentane	20.40 ± 0.41 ppm
n-Hexane	19.69 ± 0.39 ppm
Nitrogen	Balance

CYLINDER NO.:

COMPONENT	CONCENTRATION(v/v)

ppm = umole/mole   % = mole-%

Analyst: M.S. Calhoun

Approved: J.T. Marrin

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

STANDARD CALIBRATION GASES IN ALUMINUM CYLINDERS

APPENDIX B

ENGINE OPERATING DATA

FUEL USAGE 9/13/93 - ENGINES #1 & #2

Time	MCF Corrected
10:02	61800.8
1:00	61839.5
4:03	61878.8
6:03	61904.7
8 hours	103.9×10^3

= 103,900 ft^3/8 hr for 2 engines

= 12,987.5 ft^3/hr for 2 engines

= 6,493.75 ft^3/hr per engine

FUEL USAGE 9/14/93 - ENGINES #3 & #4

Time	MCF Corrected
8:06	62101.2
11:08	62141.0
12:06	62154.1
2:07	62180.2
4:07	62206.5
8 hours	105.3×10^3

= 105,300 ft^3/8 hr for 2 engines

= 13,162.5 ft^3/hr for 2 engines

= 6,581.25 ft^3/hr per engine

Steiner Environmental, Inc.

INTERNAL COMBUSTION ENGINE
COMPLIANCE DATA
CHECK LIST

COMPANY NAME: TEHACHAPI-CUMMINGS WATER DIST.	DATE: 9.13.93
MANUFACTURER: WAUKESHA	TEST LOCATION: PLANT 1 ENGINE #1 STACK
UNIT NO: IC ENGINE #1	TYPE OF CONTROL DEVICE:
UNIT MODEL NO: L5790GL	CONTROL DEVICE MODEL NO:

Fuel Flow	NA		
Fuel Flow Units			
Fuel Gas Pressure			
Fuel Gas Pressure Units			
Fuel Gas Temperature (°F)			
Wet Bulb Temperature (°F)	65	65	65
Dry Bulb Temperature (°F)	88	89	89
Relative Humidity (%)	27%	26%	26%
Barometric Pressure ("Hg)	29.09	29.10	29.09
Brake Horse Power (Rated)	1060 STAMPED ON PLATE		
Brake Horse Power (Actual)			
Kilowatts (Rated)	1060 STAMPED ON PLATE		
Kilowatts (Actual)			
Revolutions Per Minute (Rated) 1200	1200		
Revolutions Per Minute (Actual)	1000	1000	1000

COMMENTS: _____

ICE-CK.LST.F1A

Steiner Environmental, Inc.

INTERNAL COMBUSTION ENGINE
COMPLIANCE DATA
CHECK LIST

COMPANY NAME: TEHACHAPI CUMMINGS WATER DIST.	DATE: 9.13.93
MANUFACTURER: WAUKESHA	TEST LOCATION: PLANT #1 ENGINE #2
UNIT NO: IC ENGINE #2	TYPE OF CONTROL DEVICE:
UNIT MODEL NO: L5790 GL	CONTROL DEVICE MODEL NO:

	RUN 1	RUN 2	RUN 3
Fuel Flow	NA		
Fuel Flow Units			
Fuel Gas Pressure			
Fuel Gas Pressure Units			
Fuel Gas Temperature (°F)			
Wet Bulb Temperature (°F)	65	65	65
Dry Bulb Temperature (°F)	80	81	85
Relative Humidity (%)	45%	43%	35%
Barometric Pressure ("Hg)	29.08	29.10	29.10
Brake Horse Power (Rated)	973 STAMPED ON PLATE		
Brake Horse Power (Actual)			
Kilowatts (Rated)	973 STAMPED ON PLATE		
Kilowatts (Actual)			
Revolutions Per Minute (Rated) GOVERNED 1200			
Revolutions Per Minute (Actual)	1000	1000	1000

COMMENTS: NA - NOT AVAILABLE

ICE-CK.LST.F1A

Steiner Environmental, Inc.

INTERNAL COMBUSTION ENGINE
COMPLIANCE DATA
CHECK LIST

COMPANY NAME: TEHACHAPI CUMMINGS WATER DIST	DATE: 9.14.93
MANUFACTURER: WAUKESHA	TEST LOCATION: PLANT 1 ENGINE 3
UNIT NO: IC ENGINE #3	TYPE OF CONTROL DEVICE:
UNIT MODEL NO: 5790GL	CONTROL DEVICE MODEL NO:

Fuel Flow	NA		
Fuel Flow Units			
Fuel Gas Pressure			
Fuel Gas Pressure Units			
Fuel Gas Temperature (°F)			
Wet Bulb Temperature (°F)	58	60	63
Dry Bulb Temperature (°F)	70	74	78
Relative Humidity (%)	48%	45%	43%
Barometric Pressure ("Hg)			
Brake Horse Power (Rated)	973		
Brake Horse Power (Actual)			
Kilowatts (Rated)			
Kilowatts (Actual)			
Revolutions Per Minute (Rated)			
Revolutions Per Minute (Actual)	990	990	985

COMMENTS: _____

ICE-CK.LST

Steiner Environmental, Inc.

INTERNAL COMBUSTION ENGINE
COMPLIANCE DATA
CHECK LIST

COMPANY NAME: TEHACHAPI CUMMINGS WATER DIST	DATE: 9.14.93
MANUFACTURER: WAUKESHA	TEST LOCATION: PLANT 1 ENGINE 4
UNIT NO: IC ENGINE #4	TYPE OF CONTROL DEVICE:
UNIT MODEL NO: 5790 G	CONTROL DEVICE MODEL NO:

Fuel Flow	NA		
Fuel Flow Units			
Fuel Gas Pressure			
Fuel Gas Pressure Units			
Fuel Gas Temperature (°F)			
Wet Bulb Temperature (°F)	65	67	67
Dry Bulb Temperature (°F)	86	89	91
Relative Humidity (%)	32%	30%	28%
Barometric Pressure ("Hg)	29.24	29.23	29.21
Brake Horse Power (Rated)			
Brake Horse Power (Actual)			
Kilowatts (Rated)			
Kilowatts (Actual)			
Revolutions Per Minute (Rated)	1200		
Revolutions Per Minute (Actual)	1007	1007	1007

COMMENTS: STACK TEMP 810°F

ICE-CK.LST