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REPORT OF:
COMPLIANCE AND RELATIVE ACCURACY TESTING
TURBINE SCR INLET/OUTLET AND DIVERTER VALVE
DISTRICT PERMIT # 7418
GAVIOTA OIL AND GAS PROCESSING PLANT,
GAVIOTA, CALIFORNIA

Prepared for:

Chevron U.S.A. Production Company
17100 Calle Mariposa Reina
Goleta, California 93117

For Submittal to:

Santa Barbara County Air Pollution Control District
26 Castilian Drive, B-23
Goleta, California 93117

Test Dates:

May 11-14, 1993

Publication Date:

June 4, 1993

Prepared by:

Engineering-Science, Inc.
2520 Pegasus Drive
Bakersfield, California 93308
(805)393-0272

ES ENGINEERING-SCIENCE

The Point Arguello Companies
Point Arguello Pipeline Company
Point Arguello Natural Gas Line Company
17100 Calle Mariposa Reina, Goleta, CA 93117

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June 18, 1993

1993 COMPLIANCE AND RELATIVE ACCURACY TESTING-TURBINE SCR INLET/OUTLET AND DIVERTER VALVE
PTO 7418, CONDITION #21

Mr. Eric Peterson
County of Santa Barbara
Air Pollution Control District
26 Castilian Dr., B-23
Goleta, CA 93117

Dear Mr. Peterson:

Attached are the results of the 1993 Compliance and Relative Accuracy Testing for the turbine SCR inlet/outlet and diverter valve located at the Gaviota Cogeneration Facility. The tests took place during the week of May 11-14, 1993, and was witnessed by Mr. Dick Sun from the District . The tests were performed by Engineering-Science, Inc. of Bakersfield, California.

If you have any questions regarding the compliance testing, please contact Mr. Jim Ireton at (805)562-3611.

Sincerely,

K. W. Patterson

JFI/jfi

Attachment

BK062

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SECTION 1

INTRODUCTION

REPORT OF:
COMPLIANCE AND RELATIVE ACCURACY TESTING
TURBINE SCR INLET/OUTLET AND DIVERTER VALVE
DISTRICT PERMIT # 7418
GAVIOTA OIL AND GAS PROCESSING PLANT,
GAVIOTA, CALIFORNIA

SECTION 1

INTRODUCTION

The Gaviota Oil and Gas (onshore) Processing Facility is part of the Point Arguello Area. The facility is operated by Chevron U.S.A. Production Company.

The Gaviota Oil Plant is designed to remove free and emulsified water and suspended solids from the crude oil stream. The oil plant also stabilizes the crude by removing light hydrocarbons and Hydrogen Sulfide gas. The dry stabilized oil is then suitable for transportation to refineries.

The Gaviota Gas Plant processes sour natural gas from offshore production platforms plus a sour gas stream from the Gaviota Oil Plant's crude stabilizers. The objective of the gas plant is to produce sales quality natural gas along with salable liquid propane, liquid butane, natural gasoline liquids, and molten sulfur.

Facility processes which affect emissions from sources addressed by this report include the Selective Catalytic Reduction (SCR) unit servicing five gas turbines and the turbine diverter valves. A more complete plant description is included in Section 3, Facility and Emission Source Operation.

On May 11-14, 1993 Engineering-Science, Inc. (ES), Bakersfield, California, conducted source tests and relative accuracy (RA) tests of the SCR outlet, SCR inlet (RA only), and diverter valve (compliance only) of the turbines exhaust gas streams. Testing was performed to demonstrate compliance with Santa Barbara County Air Pollution Control District (District) Permit to Operate (PTO) # 7418. Table 1-1 summarizes the tests performed at each test location and includes sampling methods, number of test runs, and analytical procedures.

TABLE 1-1
SUMMARY OF COMPLIANCE AND RELATIVE ACCURACY TESTING
TURBINE PLANT SCR AND DIVERTER VALVE, DISTRICT PERMIT # 7418
GAVIOTA OIL AND GAS PROCESSING PLANT
GAVIOTA, CALIFORNIA
MAY 11-14, 1993

Source Test Parameters and Methodology								
SCR OUTLET					DIVERTER VALVE, TURBINE A [2]			SCR INLET
Nitrogen Oxides NO_x	Carbon Monoxide CO	Oxygen O_2	Ammonia, and Flow Rate NH_3, Qstd	Total Hydrocarbons THC	Nitrogen Oxides NO_x	Carbon Monoxide CO	Oxygen O_2	Nitrogen Oxides NO_x
Nine runs for compliance and relative accuracy.	Nine runs for compliance and relative accuracy.	Nine runs for relative accuracy.	Triplicate NH_3 30-minute runs for compliance. Five Qstd runs for relative accuracy.	Triplicate 30-minute runs for compliance.	Triplicate 45-minute runs for compliance.	Triplicate 45-minute runs for compliance.	Triplicate 45-minute runs.	Nine runs for relative accuracy.
Modified EPA Method 20 [1]	CARB Method 10 [1]	Modified EPA Method 20 [1]	BAAQMD Method ST-1b and EPA Methods 1-4	EPA Method 18	CARB Method 100	CARB Method 100	CARB Method 100	Modified EPA Method 20 [3]

[1] Three relative accuracy test runs of 48-minutes duration averaged for compliance. Sample points located according to EPA Method 1. Remaining 6 runs of 32-minute duration. Relative Accuracy calculations in accordance with Title 40 CFR, Part 60, Appendix B, Performance Specifications 2 (NO_x), 3 (O_2), and 4 (CO).

[2] Tests conducted on a single turbine diverter valve. Flow rates and flow meter calibrations supplied by Gaviota Oil and Gas Processing Plant.

[3] Initital 24 point traverse (48-minutes) of inlet duct. Four sample points for each of 6 ports. Subsequent 8 runs of 32-minute duration at 8 points of lowest O_2.

The test program consisted of Continuous Emission Monitoring (CEM) for Nitrogen Oxides (NO_x), Carbon Monoxide (CO), and Oxygen (O_2); total hydrocarbons (THC); flow; moisture; and ammonia slip (NH_3 slip). Testing procedures for NO_x, CO, and O_2 were conducted in accordance with EPA Methods published in 40 CFR, Part 60, Appendix A and Appendix B, dated July 1992, CARB Method 10, and CARB Method 100. NH_3 slip testing was conducted in accordance with BAAQMD Method ST-1b as published in the Bay Area Air Quality Management District Manual of Procedures. THC testing was conducted in accordance with EPA Method 18. Relative accuracy calculations are in accordance with 40 CFR, Part 60, Appendix B, Performance Specifications 2 (NO_x), 3 (O_2), and 4 (CO).

The SCR outlet testing was performed May 11, 1993. A modified EPA Method 20 procedure for NO_x and O_2 was used to allow traversing of the gas flow cross-sectional area to determine if gas stratification was present for the measured components. Sample points were determined according to EPA Method 1. CARB Method 10 was used for CO determination. The first three runs were 48-minutes duration and were used for both compliance and relative accuracy determination. Seven additional runs of 32-minute duration were performed at the 8 points of lowest oxygen concentration and were used for relative accuracy determination of the SCR outlet NO_x, CO, and O_2 analyzers only. Triplicate 30 minute duration ammonia slip test runs (BAAQMD Method ST-1b) and triplicate 30-minute hydrocarbon test runs (EPA Method 18) were also performed for compliance determination. EPA Methods 1-4 were used to determine exhaust stack flow.

The diverter valve testing was performed May 12, 1993 on Turbine A. Triplicate compliance CEM test runs of 45-minute duration were performed. CEM testing for NO_x, CO, and O_2 were conducted in accordance with CARB Method 100. Flow rates and flow meter calibration data were supplied by Gaviota.

The SCR inlet testing was performed May 13, 1993. A modified EPA Method 20 procedure for NO_X was performed to determine Relative Accuracy of the SCR inlet NO_X analyzer. The initial test consisted of a 24-point traverse of the duct. This traverse was conducted at 4 sample points in each of six access ports. The remaining 8 runs were conducted at the 8 points of lowest oxygen concentration, as prescribed by EPA Method 20.

In addition to the compliance and RA testing, a sample of fuel gas was collected and analyzed for Carbon (C), Hydrogen (H), Oxygen (O), Nitrogen (N), Sulfur (S), and heating value (Btu).

The test program was observed by Mr. Dick Sun of the District. Mssrs. Jim Ireton, Steve Dugger, and Ralph Nielson coordinated activities for the plant and were responsible for supplying ES with plant operating data. ES personnel consisted of Gary McRae (Project Manager), Troy Delfino, Jim Polhamus, Ken Kirkpatrick, Cesario Mangaoang, and Alex Tejeda.

SECTION 2

SUMMARY OF RESULTS

SECTION 2

SUMMARY OF RESULTS

The results of the testing program are summarized in Tables 2-1 through 2-7. Emission measurements of multiple parameters were made of the exhaust gases of the SCR Outlet and Diverter Valve, in addition to the SCR Inlet NO_x levels. Testing was conducted to determine compliance with District Permit # 7418.

Table 2-1 presents the measured emissions of NO_x, CO, THC, and NH_3 of the SCR Outlet gases. Emission results are expressed in units of parts per million (ppm), ppm @ 15% O_2, and pounds per hour (lb/hr). In addition, NO_x and CO emissions are reported in pounds per million British Thermal units (lb/MMBtu). Tables 2-2 through 2-5 present relative accuracy of the Gaviota SCR Outlet O_2, CO, NO_x, and flow monitors, repectively. A Cylinder Gas Audit (CGA) of the SCR Outlet NO_x monitor was used to determine Relative Accuracy, as approved by the District (Table 2-4).

Table 2-6 presents relative accuracy data for the Gaviota SCR Inlet NO_x monitor.

Table 2-7 presents the NO_x and CO emissions of the Diverter Valve in units of ppm, ppm @ 15% O_2, lb/hr, and lb/MMBtu.

TABLE 2-1
NO_x, CO, THC, and NH_3 COMPLIANCE DATA SUMMARY
SCR OUTLET, DISTRICT PERMIT # 7418
GAVIOTA OIL AND GAS PROCESSING PLANT
GAVIOTA, CALIFORNIA
MAY 11, 1993

PARAMETER	RUN # 1	RUN # 2	RUN # 3	AVG	LIMIT
Nitrogen Oxide (NO_x)					
ppm	5.22	5.25	6.85	5.77	
ppm @ 15% O_2	4.92	4.86	6.19	5.32	
lb/hr	2.41	2.43	3.16	2.66	14.0
lb/MMBtu	0.0181	0.0179	0.0228	0.0196	
Carbon Monoxide (CO)					
ppm	30.43	31.26	31.79	31.16	
ppm @ 15% O_2	28.70	28.90	28.70	28.77	
lb/hr	8.55	8.80	8.92	8.76	32.3
lb/MMBtu	0.0643	0.0648	0.0644	0.0645	
Oxygen (O_2)					
%	14.64	14.52	14.37	14.51	
Total Hydrocarbons (THC)					
ppm	12.10	11.50	13.30	12.30	
ppm @ 15% O_2	11.40	10.63	12.02	11.35	
lb/hr	1.95	1.85	2.14	1.98	6.12
lb/MMBtu	0.0146	0.0137	0.0158	0.0147	
Ammonia (NH_3)					
ppm	8.81	8.74	8.76	8.77	
ppm @ 15% O_2	8.31	8.08	7.92	8.10	
lb/hr	1.51	1.50	1.49	1.50	

TABLE 2-2
O_2 RELATIVE ACCURACY DATA SUMMARY
SCR OUTLET, DISTRICT PERMIT # 7418
GAVIOTA OIL AND GAS PROCESSING PLANT
GAVIOTA, CALIFORNIA
MAY 11, 1993

Run #	Reference Method (ES) Values %	Plant CEM Values %	Difference
1	14.64	14.65	0.01
2	14.52	14.68	0.16
3	14.37	14.76	0.39
4	14.71	14.99	0.28
5	14.20	14.40	0.20
6	14.35	14.40	0.05
7	13.86	14.33	0.47
8	13.95	14.22	0.27
9	*	*	*
10	14.09	14.23	0.14

RELATIVE ACCURACY = 2.34

* Run aborted due to NO_x value exceeding full scale value.

TABLE 2-3
CO RELATIVE ACCURACY DATA SUMMARY
SCR OUTLET, DISTRICT PERMIT # 7418
GAVIOTA OIL AND GAS PROCESSING PLANT
GAVIOTA, CALIFORNIA
MAY 11, 1993

Run #	Reference Method (ES) Values ppm	Plant CEM Values ppm	Difference
1	30.43	30.75	0.32
2	31.26	31.40	0.14
3	31.79	32.75	0.96
4	35.96	36.23	0.27
5	30.86	31.80	0.94
6	32.61	31.80	−0.81
7	28.46	30.26	1.80
8	26.66	27.22	1.00
9	*	*	*
10	25.69	27.27	1.58

RELATIVE ACCURACY = 4.29

* Run aborted due to NO_x value exceeding full scale value.

TABLE 2-4
CYLINDER GAS AUDIT
GAVIOTA OIL AND GAS PROCESSING PLANT
SCR OUTLET, NOx MONITOR
MAY 7, 1993

Audit Point	Reading #	CGA Value	CEM Response
1	1	6.365	6.10
	2	6.365	6.00
	3	6.365	6.00
	Average	6.365	6.03
RELATIVE ACCURACY = 5.26			
2	1	18.230	18.20
	2	18.230	18.10
	3	18.230	18.10
	Average	18.230	18.13
RELATIVE ACCURACY = 0.55			

TABLE 2-5
FLOW RELATIVE ACCURACY DATA SUMMARY
SCR OUTLET, DISTRICT PERMIT # 7418
GAVIOTA OIL AND GAS PROCESSING PLANT
GAVIOTA, CALIFORNIA
MAY 11, 1993

Run #	Reference Method (ES) Values MMdscfh	Plant CEM Values MMdscfh	Difference
1	3.81	3.84	0.03
2	3.81	3.81	0.00
3	3.78	3.81	0.03
4	3.78	3.82	0.04
5	3.73	3.82	0.09

RELATIVE ACCURACY = 2.08

TABLE 2-6
NO_x RELATIVE ACCURACY DATA SUMMARY
SCR INLET, DISTRICT PERMIT # 7418
GAVIOTA OIL AND GAS PROCESSING PLANT
GAVIOTA, CALIFORNIA
MAY 13, 1993

Run #	Reference Method (ES) Values ppm	Plant CEM Values ppm	Difference
1	36.20	36.20	0.00
2	36.59	34.50	−2.09
3	37.02	33.50	−3.52
4	37.94	34.86	−3.08
5	37.99	35.67	−2.32
6	38.09	35.96	−2.13
7	38.06	35.94	−2.12
8	37.68	35.80	−1.88
9	37.60	35.15	−2.45

RELATIVE ACCURACY = 7.80

TABLE 2-7
NO_x AND CO COMPLIANCE DATA SUMMARY
DIVERTER VALVE, DISTRICT PERMIT # 7418
GAVIOTA OIL AND GAS PROCESSING PLANT
GAVIOTA, CALIFORNIA
MAY 12, 1993

PARAMETER	RUN # 1	RUN # 2	RUN # 3	AVG
Nitrogen Oxide (NO_x)				
ppm	38.36	38.05	38.49	38.30
ppm @ 15% O_2	32.24	31.98	31.69	31.97
lb/hr	<0.01	<0.01	<0.01	<0.01
lb/MMBtu	0.1187	0.1178	0.1167	0.0077
Carbon Monoxide (CO)				
ppm	47.01	48.21	45.87	47.03
ppm @ 15% O_2	39.51	40.52	37.76	39.26
lb/hr	<0.01	<0.01	<0.01	<0.01
lb/MMBtu	0.0886	0.0908	0.0847	0.0880
Oxygen (O_2)				
%	13.88	13.88	13.73	13.83

SECTION 3

FACILITY AND EMISSION SOURCE OPERATION

SECTION 3

FACILITY AND EMISSION SOURCE OPERATION

The Gaviota Oil and Gas (onshore) Processing Facility is part of the Point Arguello Area. The facility is operated by Chevron U.S.A. Production Company.

The Gaviota Oil Plant is designed to remove free and emulsified water and suspended solids from the crude oil stream. The oil plant also stabilizes the crude by removing light hydrocarbons and Hydrogen Sulfide gas. The dry stabilized oil is then suitable for transportation to refineries.

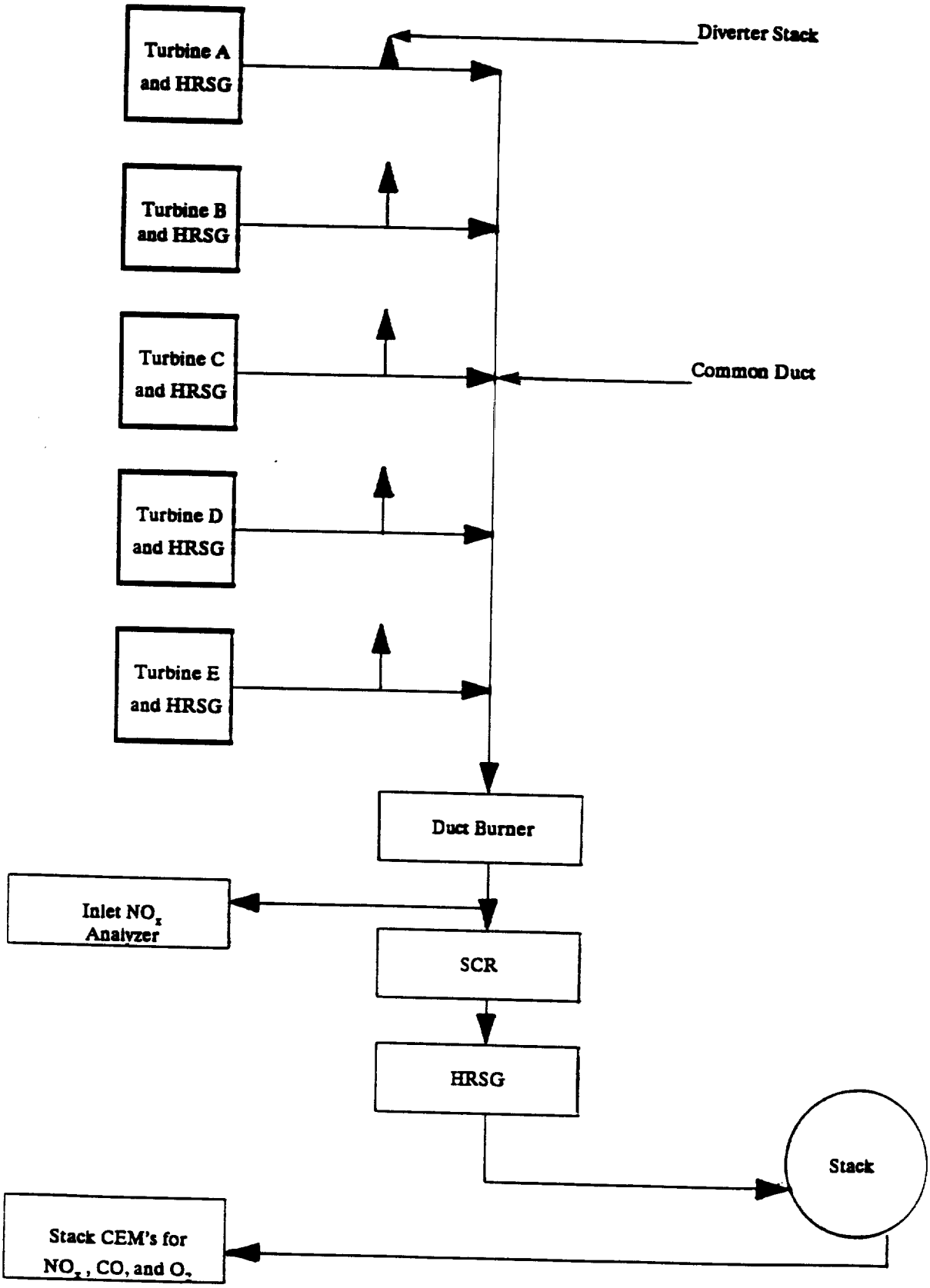
The Gaviota Gas Plant processes sour natural gas from offshore production platforms plus a sour gas stream from the Gaviota Oil Plant's crude stabilizers. The objective of the gas plant is to produce sales quality natural gas along with salable liquid propane, liquid butane, natural gasoline liquids, and molten sulfur.

The Facility has five natural gas fired turbines coupled with heat recovery steam generators (HRSG) to generate electricity and produce steam. Each gas turbine is a 3.5 megawatt (nominal) Allison Model K501 unit and is equipped with a diverter valve. A common duct carries the exhaust gases from all five turbines to a single Coen natural gas duct burner. The duct burner is installed between the common duct and the selective catalytic reduction (SCR) unit to increase the temperature between the turbine discharge and the SCR. Emissions from the duct burner are monitored by the SCR inlet NO_x analyzer prior to the SCR. The SCR is equipped with an HRSG prior to the ten foot (diameter) main exhaust outlet stack. Atmospheric emissions are monitored at the SCR/HRSG outlet stack by Continuous Emission Monitors (CEMS) for NO_x, CO, and O_2. A flow diagram of the Turbine plant is presented in Figure 3-1.

Figure 3-1

ES ENGINEERING-SCIENCE

Plant Diagram



SECTION 4

SAMPLING AND ANALYSIS PROCEDURES

SECTION 4

SAMPLING AND ANALYSIS PROCEDURES

Continuous Emissions Monitoring

Sample Extraction and Conditioning

Sampling is performed using a system which delivers a conditioned, continuous gas sample to the gas analyzers. The gas sample is extracted through a stainless steel probe, then passes through a heated (250°F) Teflon sample line, a sample condenser (for moisture removal), an in-line filter (for particulate removal), and a stainless steel pump. The clean, dry sample is then transported via unheated Teflon line to the analyzer manifold (located within the mobile van) for sample distribution to the continuous emissions monitors.

Continuous Emissions Monitors (CEMS)

Table 4-1 describes the CEMS used in the mobile van to analyze the exhaust gases. Calibrations of the CEMS are performed using EPA Protocol 1 or NIST certified calibration gases. Copies of gas certifications are included in the Report appendix.

Prior to performing the emissions testing, a leak check of the sample system is performed. A check of sampling system bias is performed by injecting calibration gas (for each parameter) at the sample probe and then observing instrument response. A response within $\pm$ 5 percent of instrument range is considered acceptable. The leak check is repeated at the conclusion of the test day to verify the validity of the tests.

Before each test run, an initial calibration of the analyzers is performed by introducing zero and span gases and making appropriate adjustments. During each test run, analyzer response data is recorded for each instrument. At the conclusion of the test run, a calibration check is performed to verify acceptable zero and span drift limits.

TABLE 4–1
CEM INSTRUMENT SPECIFICATIONS
CEM VAN # 3

PARAMETER	MANUFACTURER	MODEL NO.	ANALYZER PRINCIPLE	SENSITIVITY / ACCURACY	LINEARITY	SPECIAL NOTES	RESPONSE TIME	NOISE	PRECISION
O_2	MSA Instruments	4000	Electroconductivity Detection	+ – 0.01%	< 2%	Galvanic Fuel Cell	90% Full Scale in 20 sec.	+ – 1%	
CO_2	Infrared Industries	732	Non–Dispersive Infrared		< 2%		90% Full Scale in 20 sec.		
NO_x	Thermo Environmental Instruments Inc.	10	Chemiluminescent	0.05 ppm	+ – 1% from 0.05 to 10,000	High range has 0_2 feed.	Approx. 1.5 sec NO mode Approx. 1.7 sec NO_x mode	< 1% of Full Scale	
CO	Thermo Environmental Instruments Inc.	48	Gas Filter Correlation	0.1 ppm	< + – 1%		95% Full Scale in < 60 sec.	< 0.05 ppm	> + – 0.1ppm
Gas Dilution System	Environics, Inc.	Series 2000	Computerized Mass Flow Controllers	+ –0.05% Full Scale	NA	Operated between 10% and 90% of flow controller full scale operating range.	+ –2.0% of target flow in 30 seconds	NA	+ –0.2% Full Scale
CO_2 / High CO	Fuji – Milton Roy	ZRH	Non–Dispersive Infrared	2% of Full Scale / week	1% of Full Scale	CO_2 Range : 0–20 % CO Range : 0–1 %	90% Full Scale in 3 sec.	< 0.5% of Full Scale	CO_2: .5% Full Scale CO: 1% Full Scale

Ammonia (BAAQMD Method ST-1B)

General

Ammonia slip testing is required when pollutant emissions are being controlled by ammonia injection. Testing is conducted in accordance with BAAQMD Method ST-1b. Sample gas is collected in a solution of 0.1 Normal hydrochloric acid which absorbs the ammonia.

Sampling Train

The impinger train is kept in an icebath during the test run. Impingers 1 and 2 contain 100 milliliters of 0.1 N HCl, impinger 3 is empty, and impinger 4 contains a tared amount of silica gel. The impingers are weighed before and after sampling to allow calculation of percent moisture in the gas stream. The probe and sample box are connected to the control module using an umbilical line. The control module consists of a vacuum pump, a calibrated dry gas meter, and a calibrated orifice meter. The control module components measure pressure, temperature, and flowrate throughout the train.

Sampling Procedure

A leak check is performed before sampling begins by bringing the sample train to 15-inches of mercury vacuum. Leakage has to be less than 0.02 cfm or 4% of the average sampling rate prior to beginning a test. After sampling is complete, a final leak check is performed on the sampling train. This leak check is performed at 15-inches of mercury vacuum or at the highest vacuum achieved during the test. All pertinent data is recorded on field data sheets.

Sample Recovery

Each impinger is removed from the icebath, wiped dry, and weighed to allow calculation of percent moisture in the gas stream. A polyethylene bottle labeled as NH_3 is

used to collect the contents of the impingers and the distilled water rinses of the impingers and their connectors . A chain-of-custody form is filled out with sample numbers for tracking purposes.

Sample Analysis for Ammonia

The volume of the NH_3 sample bottle is measured and an aliquot is transferred to a 250 milliliter beaker using a 100 milliliter NBS class A pipet. A Teflon stir bar is carefully placed in the beaker and NH_3 ionic strength adjuster (ISA) solution is added until a blue color persists. The ammonia content is determined using a specific ion electrode. The electrode is rinsed with distilled water, immersed in the liquid, and allowed to reach a stable ppm (and millivolt) reading. The ion selective electrode (ISE) meter is calibrated with 1 ppm, 10 ppm and 100 ppm standards (3-point calibration) prior to sample analysis. Quality Control, duplicate, spike, and blank (0.1 N HCl impinger solution) samples are also analyzed.

Stack Gas Velocity and Volumetric Flow Rate (EPA Method 2)

Average gas velocity is determined from stack measurement of the velocity head values using an S-type (Stausscheibe) or Standard pitot tube. S-type pitot tubes are constructed to meet the dimensional criteria of EPA Method 2 and have a coefficient of 0.84. Standard pitot tubes are constructed by ASME design (EPA Method 2, Sec. 2.7) with a coefficient of 0.99. A differential pressure gauge is used for measurement of velocity head pressures. The gauge is either an inclined manometer or calibrated magnehelic gauge.

Stack temperature is measured using a thermocouple attached to the pitot tube in an interference-free arrangement. A calibrated digital temperature device is used for temperature readout. Stack pressure is determined by using the static tap of the Standard

type pitot tube or one leg of a S-type pitot tube with the face opening planes positioned parallel to the gas flow.

A leak check of the pitot/manometer assembly is performed by blowing through the pitot impact opening until at least 3 inches H_2O velocity pressure registers on the manometer, then closing off the impact opening. The pressure must remain stable for at least 15 seconds. This procedure is repeated for the static pressure side except suction is used to obtain the minimum of 3 inches H_2O displacement.

The manometer is leveled and zeroed prior to the test. During testing periodic checks are made of the level and zero due to vibrations and temperature. The velocity head and temperature readings are recorded at the traverse points specified by EPA Method 1.

Determination of Moisture Content (EPA Method 4)

A gas sample is extracted at a constant rate from the source. Moisture is then removed from the sample stream and determined gravimetrically.

The sample probe is constructed of stainless steel or glass tubing. The moisture condenser consists of four impingers connected in series. The first, third, and fourth impingers are of the modified Greenburg-Smith design with open ends. The second impinger is the Greenburg-Smith design with the standard tip. The first two impingers contain 100 ml of water, the third is empty, and the fourth contains approximately 200 grams of silica gel. An ice bath container and crushed ice are used to aid in condensing moisture. The metering system includes a vacuum gauge, leak-free pump, thermometers, and dry gas meter.

Prior to sampling a leak check of the system is conducted at 15 inches Hg vacuum. During sampling, a constant sample rate is maintained throughout the test run. A post-test leak check of the system is performed at the highest vacuum observed during the test to

validate the test run. Leakage rates must be less than 4 percent of the average sampling rate or 0.02 CFM, whichever is less, to be acceptable.

Total Hydrocarbons (EPA Method 18)

Integrated samples are collected through a 316 stainless steel probe and teflon line directly into a new Tedlar bag by utilizing an evacuated chamber to draw the exhaust gas into the bag. The Tedlar bags are purged twice with the exhaust gas before collecting each sample. At the conclusion of sampling, the Tedlar bag is closed off, labeled, and delivered to the laboratory along with a chain-of-custody form. The samples are analyzed for Total Hydrocarbons (THC) by Gas Chromatography equipped with Flame Ionization Detection (GC/FID).

Fuel Gas

A fuel gas sample is collected in a stainless steel gas sample cylinder, properly labeled, and delivered to the laboratory with an accompanying chain-of-custody form. Samples are analyzed by gas chromotography for CHONS (carbon, hydrogen, oxygen, nitrogen, and sulfur) and heating value in accordance with ASTM Method D-3588.

SECTION 5

CALCULATIONS

SECTION 5
CALCULATIONS

This section includes sample calculations used for determining emission rates and emission concentrations of the compounds tested. Emission calculations and source test parameters for each test run are included in the Appendices for each compound along with supporting field data. Emission calculations are specified in each test method and in the Source Test Protocol for this test program. A list of nomenclature terms are included in this Section along with the specified dimensional units used in calculations.

NOMENCLATURE

A_s	= Cross-sectional area of stack (ft^2)
A_n	= Cross-sectional area of nozzle (ft^2)
B_{ws}	= Water vapor in the gas stream, proportion by volume (dimensionless)
C_p	= Pitot tube coefficient (dimensionless)
dH	= Average pressure differential across the orifice meter (inches of water)
Md	= Dry molecular weight of stack gas (lb/lb-mole)
Ms	= Wet molecular weight of stack gas (lb/lb-mole)
N	= Normality of titrant (milliequivalents/ml)
dP	= Velocity pressure of stack gas (inches of water)
Pb	= Barometric pressure at sampling site (in. Hg)
Ps	= Absolute stack gas pressure (in. Hg)
Pstd	= Standard absolute pressure (29.92 in. Hg)
Qs(std)	= Dry volumetric stack gas flow rate, standard conditions (dscfm)
Ts	= Stack temperature (^oF)
Vm	= Dry gas volume as measured by dry gas meter (dcf)
Vm(std)	= Dry gas volume as measured by dry gas meter, corrected to standard conditions (dscf)
Vw(std)	= Volume of water vapor in the gas stream, corrected to standard conditions (scf)
Vlc	= Volume of water vapor condensed in impingers and silica gel (ml)
T(std)	= Standard temperature (^oF)
Tm	= Meter temperature (^oF)
SQ.RT.dP	= Square root of velocity pressure (dimensionless)
y	= Dry gas meter calibration factor (dimensionless)
Pstatic	= Static pressure of stack (in. H_2O)
Pstack	= Static pressure of stack (in. Hg)
I	= Isokinetic sample rate (percent)
vs	= Average velocity of the stack gas (ft/sec)
Qs	= Actual stack gas flow rate at stack conditions (ft^3/min)
Θ	= Total sampling time (min)
% O_2	= Percent oxygen by volume (dry basis)
% CO_2	= Percent carbon dioxide by volume (dry basis)
% CO	= Percent carbon monoxide by volume (dry basis)
% N_2	= Percent nitrogen by volume (dry basis)
Zcf	= Zero drift correction factor
Scf	= Span drift correction factor
Cz	= Zero correction concentration
MW	= Molecular weight (lb/lb-mole)
ppm	= Parts per million by volume

lb/MMBtu	= Emission concentration, pounds per million British thermal units
dscf/MMBtu	= Fuel factor, dry standard cubic feet per million British thermal units
gr/scf	= Emission concentration, grains per standard cubic foot
lb/hr	= Emission rate, pounds per hour
FHW	= Front Half Wash of sampling train
MF	= Mass Filter of sampling train
BHW	= Back Half Wash of Sampling train
gr/dscf	= Emission concentration, grains per dry standard cubic foot
ng	= Mass unit, nanograms
mg	= Mass unit, milligrams
g	= Mass unit, grams
ml	= Unit of volume, milliliters
L	= Unit of volume, liters
ul	= Unit of volume, microliters
H_2SO_4	= Chemical formula, sulfuric acid
$BaCl_2$	= Chemical formula, barium chloride
NaOH	= Chemical formula, sodium hydroxide
H_2S	= Chemical formula, hydrogen sulfide
FHS	= Front Half Sulfate of sampling train
BHS	= Back Half Sulfate of sampling train
F-Factor	= Fuel factor, volume of generated gases per unit of heat content (dscf/MMBtu)
^oF	= Degrees Fahrenheit
^oR	= Degrees Rankine
^oC	= Degrees Celsius
98.076	= Molecular weight of sulfuric acid
64.062	= Molecular weight of sulfur dioxide
46.006	= Molecular weight of nitrogen dioxide
28.010	= Molecular weight of carbon monoxide
60	= Conversion factor, minutes per hour
460	= Conversion factor, ^oF to ^oR
15.432	= Conversion factor, grains per gram
0.000143	= Converson factor, pounds per grain
32/98.076	= Conversion factor, equivalent weight of SO_2 to MW of H_2SO_4
1.60982	= Ideal Gas Law (lb-mole x dscf/ dscf/ ^oR x mg)
0.00000137	= Ideal Gas Law (lb-mole x $^oR/ft^3$)
0.280	= Molecular weight of N_2 or CO, divided by 100
0.320	= Molecular weight of O_2, divided by 100
0.440	= Molecular weight of CO_2, divided by 100
18.0	= Molecular weight of H_2O
32.064	= Equivalent weight of SO_2
85.49	= Pitot tube constant, ft/sec x $[(lb/lb\text{-}mole) \times (in.Hg)/((^oR) \times (in.H_2O))]^{0.5}$
8.223E-05	= Ideal gas constant (1.37E-06 lb-mole $^oR/ft^3$) x (60 min/hr)

EXAMPLE
SOURCE TEST CALCULATIONS

FIELD DATA FOR CALCULATIONS

Standard Temperature, T(std)	60	°F	Standard Pressure, Pstd	29.92	"Hg
Meter Temperature, Tm	86.4	°F	Static Pressure, Pstatic	0.30	"H2O
Stack Temperature, Ts	324.2	°F	Barometric Pressure, Pb	28.95	"Hg
SQ.RT. dP	0.9593		Condensate, Vlc	319.5	grams
Meter Orfice, dH	1.32	"H2O	Stack I.D.	169.38	inch
Meter Volume, Vm	168.678	ft3	Duct Length		inch
Meter Correction, y	1.005		Duct Width		inch
Stack Gas Oxygen	15.06	% O2	Stack Area, As	156.477	ft2
Stack Gas Carbon Dioxide	5.84	% CO2	Test Time, Ø	240.0	min.
Stack Gas Carbon Monoxide	0.00	% CO	Nozzle Diameter	0.223	inch
Stack Gas Nitrogen	79.10	% N2	Pitot Coefficient, Cp	0.84	

CALCULATIONS

Vm(std) = [T(std) + 460 / Pstd] x Vm x y x (Pb + (dH / 13.6)) / (Tm + 460)
= [60 + 460/29.92] x 168.678 x 1.005 x (28.95 + (1.32/13.6))/(86.40 + 460) = **156.624** dscf

Vw(std) = (0.04715 ft3/g) / 528 x [T(std) + 460] x Vlc
= 0.04715 / 528 x [60 + 460] x 319.5 = **14.836** scf

Bws = Vw(std) / [Vm(std) + Vw(std)]
= 14.836 / [156.624 + 14.836] = **0.087**

Md = (0.44 x %CO2)+(0.32 x %O2)+[0.28 x (%N2 + %CO)]
= (0.44 x 5.84) + (0.32 x 15.06) + [0.28 x (79.10 + 0.0)] = **29.54** lb/lb−mole

Ms = (Md x (1−Bws)) + (18.0 x Bws)
= (29.54 x (1 − 0.087)) + (18.0 x 0.087) = **28.54** lb/lb−mole

P(stack) = Pb + [Pstatic / 13.6]
= 28.95 + [0.30 / 13.6] = **28.97** " Hg

vs = 85.49 x Cp x (Sq.Rt. dP) x [Sq.Rt.((Ts + 460) / (Ms x P(stack)))]
= 85.49 x 0.84 x (0.9593) x [Sq.Rt.(324.2 + 460)/(28.54 x 28.97)] = **67.09** ft/sec

Qs = vs x As x 60
= 67.09 x 156.477 x 60 = **629,883** acfm

Qs(std) = Qs x (1 − Bws) x [(T(std) + 460) / (Ts + 460)] x (P(stack) / Pstd)
= 629883 x (1 − 0.087) x [(60 + 460)/(324.2 + 460)] x (28.97/29.92) = **369,444** dscfm

Area of sampling nozzle, An = [(Dn / 12) ^ 2 x Pi] / 4
= [(0.223/12) ^ 2 x 3.14159] / 4 = **0.000271** ft2

I = (Ts+460) x [(0.002669 x Vlc) + [Vm(std) / ((T(std) + 460) / Pstd)]] x 100 /
[Ø x P(stack) x An x vs x 60]

= (324.2 + 460) x [(0.002669 x 319.5) + [156.624 / ((60 + 460) / 29.92)]] x 100 /
[240.0 x 28.97 x 0.000271 x 67.09 x 60] = **101.90** %

EXAMPLE
EMISSION CALCULATIONS

TEST DATA FOR CALCULATIONS

Measured Oxygen	=	13.70 %	ppm	=	17.20 ppm
Oxygen Correction	=	15.0 %	ppb	=	323 ppb
F–Factor	=	8,502.03 dscf/MMBTU	ug of Sample	=	17.2 ug
Vm(std)	=	57.321 ft3	ng of Sample	=	421 ng
Molecular Weight, MW	=	46.00 lb/lb–mole	grams of sample	=	29.3 g
Qs(std)	=	427,315 dscfm	MMBTU/hr	=	3,015.62 MMBTU/hr

CALCULATIONS

EMISSION RATE, LB/HR

From ppm value :
lb/hr = (0.00000137 lb–mole °F/ft3) x 60 min/hr x Qs(std) x MW x ppm / [T(std) + 460]
= 0.00000137 x 60 x 427315 x 46.00 x 17.20 / [60 + 460] = **53.44** lb/hr

From ppb value :
lb/hr = (0.00000137 lb–mole °F/ft3) x 60 min/hr x Qs(std) x MW x (ppb/1000) / [T(std) + 460]
= 0.00000137 x 60 x 427315 x 46.00 x (323/1000) / [60 + 460] = **1.00** lb/hr

From ug of sample :
lb/hr = ug / (1E+06 ug/g) / (453.592 g/lb) x Qs(std) x (60 min/hr) / Vm(std)
= 17.2 / 1,000,000 / 453.592 x 427315 x 60 / 57.321 = **1.70E–02** lb/hr

From ng of sample :
lb/hr = ng / (1E+09 ng/g) / (453.592 g/lb) x Qs(std) x (60 min/hr) / Vm(std)
= 421.0 / 1E+09 / 453.592 x 427315 x 60 / 57.321 = **4.15E–04** lb/hr

ppm CORRECTED FOR OXYGEN (15 % O2 correction)

ppm corrected = ppm measured x [(20.9 – O2 Correction) / (20.9 – % O2 measured)]
= 17.20 x [(20.9 – 15.0) / (20.9 – 13.70)] = **14.09** ppm @ 15% O2

EMISSION CONCENTRATION, LB/MMBTU

From ppm value :
lb/MMBTU = F–Factor x MW x [(1.3711E–06 lb–mole °R/ft3) / (T(std) + 460)] x [20.9 / (20.9 – measured O2)] x ppm

= 8502.03 x 46.00 x [(1.3711E–06) / (60 + 460)] x [20.9 / (20.9 – 13.70)] x 17.20= **0.0515** lb/MMBTU

From Heat Input :
lb/MMBTU = (lb/hr) / (MMBTU/hr)
= 53.44 / 3015.62 = **0.0177** lb/MMBTU

Standard Temperature, T(std) = 60 °F

EXAMPLE
FUEL BASED CALCULATIONS

FUEL ANALYSIS DATA FOR CALCULATIONS

	Fuel Value (%), Moisture & Ash Free							
	Carbon	Hydrogen	Nitrogen	Oxygen	Sulfur	GCV* BTU/lb	ft3/lb	lb/gal
Fuel Gas	73.46	23.64	1.77	1.13	0.00	22,953	21.76	
Fuel Oil	84.96	14.85	0.02	0.13	0.06	19,240		6.50
Solid Fuel	73.46	23.64	1.77	1.13	0.00	22,953		

FUEL FLOWRATE AND STACK OXYGEN DATA FOR CALCULATIONS

	Stack Gas Oxygen %	Fuel Gas Flowrate lb/hr	Fuel Gas Flowrate ft3/hr	Fuel Oil Flowrate lb/hr	Fuel Oil Flowrate gal/hr	Solid Fuel lb/hr
Fuel Gas	14.95	40,446	880,105			
Fuel Oil	14.37			40,248	6,195	
Solid Fuel	14.95					40,446

CALCULATIONS

HEAT INPUT, MMBTU/HR

From Fuel Gas (lb/hr) = (lb/hr fuel gas) x BTU/lb x MM/1E+06
= 40446 x 22953 / 1,000,000 = **928.357** MMBTU/hr

From Fuel Gas (ft3/hr) = (ft3/hr fuel gas) x BTU/lb / (ft3/lb fuel gas) x MM/1E+06
= 880105 x 22953 / 21.76 / 1,000,000 = **928.357** MMBTU/hr

From Fuel Oil (lb/hr) = (lb/hr fuel oil) x BTU/lb x MM/1E+06
= 40248 x 19240 / 1,000,000 = **774.372** MMBTU/hr

From Fuel Oil (gal/hr) = (gal/hr fuel oil) x lb/gal x BTU/lb x MM/1E+06
= 6195 x 6.50 x 19240 / 1,000,000 = **774.747** MMBTU/hr

From Solid Fuel (lb/hr) = (lb/hr solid fuel) x BTU/lb x MM/1E+06
= 40446 x 22953 / 1,000,000 = **928.357** MMBTU/hr

F-FACTOR, DSCF/MMBTU

F-Factor, dscf/MMBTU = 1E+06 [(3.64 scf/lb)/% x %H + (1.53 scf/lb)/% x %C + (0.57 scf/lb)/% x %S + (0.14 scf/lb) /% x %N − (0.46 scf/lb)/% x %O2] / (BTU/lb) x [(Tstd + 460) / 528]
(Using fuel gas values)

= 1E+06 [(3.64 x 23.64) + (1.53 x 73.46) + (0.57 x 0.00) + (0.14 x 1.77 − (0.46 x 1.13)] / 22953 x [(60 + 460) / 528] = **8,502.98** dscf/MMBTU

FLOWRATE, DSCFM

Qs(std), dscfm = MMBTU/hr x [F-Factor x (20.9 / (20.9 − %O2)) x (hr / 60 min)]
(Using fuel gas values) = 928.357x [8502.98 x (20.9 / (20.9 − 14.95)) x (1/60)] = **462,130** dscfm

*GCV = Gross Calorific Value of fuel
Standard Temperature = 60°F

SECTION 6

QUALITY ASSURANCE

SECTION 6

QUALITY ASSURANCE

The report is reviewed for technical and editorial quality and for compliance with project requirements. Calculations are performed by computer programs designed for source testing. At least one set of calculations are performed manually to check results.

All equipment used in testing has been checked for proper maintenance and calibrated prior to testing. Test equipment calibrations are included in the Report appendix. The dry gas meter accuracy is expressed as gamma and is determined as the difference between the meter box dry gas meter and the wet test meter used for calibration. The results of the orifice calibration are expressed as the delta H@ (dH@) at various pressure drops (inches of water), as specified in EPA publication APTD-0576. EPA Quality Assurance Branch annual audits are performed with an orifice check of each of the dry gas meters used for volumetric sampling.

Exhaust gas, filter, meter and impinger temperatures are monitored using a type-K thermocouple connected to a digital readout. The temperature readout and thermocouples are calibrated against an NIST certified digital thermometer. The calibrations are performed every six months using the procedures specified in the EPA Quality Assurance Handbook For Air Pollution Measurement Systems, 600/4-77-027b, Volume III, Stationary Source Methods.

Exhaust gas velocity is monitored for establishing isokinetic sampling rates and volumetric flow using a S-type or Standard Pitot tube attached to the probe as specified in EPA Reference Method 2. An S-type Pitot tube calibration factor of 0.84 is used for calculating stack gas velocity. This standard reference number is applicable after the S-type Pitot tube passes a dimensional calibration test for construction specifications. Standard pitot tubes are constructed according to ASTM and EPA Method 2 design and are assigned a calibration factor of 0.99.

At the conclusion of each test run the sampling train is leak checked at a vacuum equal to or greater than the highest vacuum observed during the test. The sampling train is considered leak free if the leak rate is less than 0.02 CFM, or 4% of sampling rate, whichever is less.

The analyzers employed for continuous monitoring of NO_x, CO, SO_2, CO_2, O_2, and HC are California Air Resources Board (CARB) approved instruments. Sampling system bias checks of the continuous monitor sampling system are performed using either EPA protocol 1 or NIST certified calibration gases. Calibration certificates are included in the report. All other required checks of the continuous monitor system are also performed.

All field samples are labeled and logged in on a chain-of-custody sheet. Chain-of-custody sheets remain with samples and document sample movement. All laboratory data are recorded in bound laboratory notebooks. All analytical weights are conducted on a calibrated Sartorius digital balance. All particulate samples are conditioned and desiccated before weighing and a constant weight is defined as ± 0.5mg between consecutive weighings with an elapsed time between weighing greater than 6 hours. Wherever possible, duplicates and spikes are performed on the samples and a Quality Control check is performed. Applicable EPA Quality Assurance Branch audits such as SO_2 are performed. All analytical glassware used is NIST Class A. All reagents used in the field and in the laboratory are at least ACS reagent grade. Blanks of these reagents are evaluated for every set of tests.

SAMPLE SYSTEM BIAS CHECK

COMPANY CHEVRON GAVIOTA DATE 5-11-93

TEST LOCATION SCR OUTLET OPERATOR JP

COMMENTS :

Parameter	Instrument Full Scale	Span Gas Value	Scale	Internal Response	System Response	Percent Difference
O2 (%)	0-25	0.00	Zero	0.0		
		15.02	Upscale	15.02	14.98	-.16
CO2 (%)	0-20	0.00	Zero	0.0		
		15.95	Upscale	15.95	15.6	-1.75
NOx (ppm)	0-25	0.00	Zero	0.0		
		23.2	Upscale	23.13	23.63	2.0
CO (ppm)	0-50	0.00	Zero	0.0		
		41.48	Upscale	41.48	41.0	-.96
SO2 (ppm)		0.00	Zero			
			Upscale			
HC (ppm)		0.00	Zero			
			Upscale			
		0.00	Zero			
			Upscale			

Percent Difference = [(System Response – Internal Response) / Instrument Full Scale] x 100

SAMPLE SYSTEM BIAS CHECK

COMPANY CHEVRON GAVIOTA DATE 5-13-93

TEST LOCATION SCR INLET OPERATOR JP

COMMENTS :

Parameter	Instrument Full Scale	Span Gas Value	Scale	Internal Response	System Response	Percent Difference
O2		0.00	Zero	0.0		
(%)	0-25	15.02	Upscale	15.02	15.02	0.0
CO2		0.00	Zero			
(%)			Upscale			
NOx		0.00	Zero	0.0		
(ppm)	0-100	84.22	Upscale	84.0	81.9	-2.1
CO		0.00	Zero			
(ppm)			Upscale			
SO2		0.00	Zero			
(ppm)			Upscale			
HC		0.00	Zero			
(ppm)			Upscale			
		0.00	Zero			
			Upscale			

Percent Difference = [(System Response – Internal Response) / Instrument Full Scale] x 100

SAMPLE SYSTEM BIAS CHECK

COMPANY CHEVRON Gaviota DATE 5-12-93

TEST LOCATION UNIT "A" Diverter Valve OPERATOR JP

COMMENTS:

Parameter	Instrument Full Scale	Span Gas Value	Scale	Internal Response	System Response	Percent Difference
O2 (%)	0-25	0.00	Zero	0.0		
		15.02	Upscale	15.1	15.25	.60
CO2 (%)	0-20	0.00	Zero	0.0		
		15.95	Upscale	15.95	15.60	-1.75
NOx (ppm)	0-100	0.00	Zero	0.0		
		84.22	Upscale	83.3	81.0	-2.30
CO (ppm)	0-100	0.00	Zero	0.0		
		84.71	Upscale	84.71	80.0	-4.71
SO2 (ppm)		0.00	Zero			
			Upscale			
HC (ppm)		0.00	Zero			
			Upscale			
		0.00	Zero			
			Upscale			

Percent Difference = [(System Response – Internal Response) / Instrument Full Scale] x 100

ENGINEERING–SCIENCE, INC.
CEM FIELD DATA SHEET

PLANT: CHEVRON GAVIOTA
TEST LOCATION: SCR OUTLET
CEM VAN NO.: 3
DATE: 5-11-93
OPERATOR: JP

O2, % 0-25
Calibration Gases :

High	20.9	Cyl. #	
Mid	15.02	Cyl. #	AAL12850
Low	8.017	Cyl. #	ALM008255

CO2, % 0-20
Calibration Gases :

High	15.95	Cyl. #	ALM008255
Mid	7.862	Cyl. #	ALM42850
Low	.	Cyl. #	

NOx, ppm
Calibration Gases :

High	84.22	Cyl. #	ALM008231
Mid	51.10	Cyl. #	ALM005581
Low	23.2	Cyl. #	AAL2534
	8.46		ALM022850

CO, ppm
Calibration Gases :

High	84.71	Cyl. #	ALM008231
Mid	41.48	Cyl. #	ALM005581
Low	18.56	Cyl. #	AAL2534

SO2, ppm
Calibration Gases :

High		Cyl. #	
Mid		Cyl. #	
Low		Cyl. #	

Calibration Gases :

High		Cyl. #	
Mid		Cyl. #	
Low		Cyl. #	

TIME	SAMPLE POINT	O2 (%)	CO2 (%)	NOx (ppm)	CO (ppm)	SO2 (ppm)		COMMENTS / RUN #
		20.9	15.95	84.22	84.71			Span gas values used for test.
								CARB MET
								CALIBRATION
		0.0	0.0	0.0	0.0			ZERO
		20.9	15.95	84.22	84.71			SPAN
								LINEARITY ✓
		20.9	15.95	84.22	84.71			HIGH
		15.25	8.0	52.0	40.2			MID
		8.2	—	23.2	17.8			LOW
		0.0	0.0	0.0	0.0			ZERO
		0.0	0.0	0.0	0.0			INTERFERENCE ✓
								LEAK ✓ @ 15" HG = 0.0
				20.0				CONVERTOR ✓ = 95.2%

PART NO. LO/80MES

CONVERTER CHECK 5/11/93

0900 — CONVERTER EFF = 95.2%

0830 — CONVERTER ✓ CHART SPEED @ 20CM/HR

LINEARITY

O_2 = 8.2 %

O_2 = 15.25%

O_2 = 20.9%

O_2 LINEARITY ✓

O_2 = 20.9%

O_2 CALIBRATION

O_2 = 0

NOX = 0 INTERFERENCE ✓

CO INTERFERENCE ✓

NOX = 23.2 PPM

NOX = 52 PPM

NOX = 84.72 PPM

NOX LINEARITY ✓

NOX = 0-100 PPM

NOX = 84.72 PPM

NOX = 0

-10 0 10 20 30 40 50 60 70 80 90 100

Scott Specialty Gases, Inc.

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

CERTIFICATE OF ANALYSIS

ENGINEERING SCIENCE
ATTN: JIM POLHAMUS
2520 PEGASUS

BAKERSFIELD CA 93308

PROJECT #: 02-21550
PO#: BFI0008
ITEM #: 02023124 1AL
DATE: 9/25/92

CYLINDER #: ALM005600
FILL PRESSURE: 2000 PSIG

ANALYTICAL ACCURACY: +/-4%

COMPONENT	REQUESTED GAS CONC MOLES		ANALYSIS (MOLES)	
NITROGEN DIOXIDE	20.	PPM	21.	PPM
NITROGEN		BAL		BAL

ENGINEERING SCIENCE 9/25
CERTIFIED TO HAVE BEEN BLENDED
AND VERIFIED TO BE CORRECT BY
ANALYSIS.

GRAVIMETRIC MASTER GAS -
AGAINST NIST CERTIFIED WEIGHTS
INDEPENDENT LABORATORY
BIN#10

ANALYST: GEORGE KING

APPROVED BY: DR ARMAND LANGE PH D

Scott Specialty Gases, Inc.

2600 CAJON BOULEVARD, SAN BERNARDINO, CA 92411 (909) 887-2571 FAX: (909) 887-0549

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
ENGINEERING SCIENCE
2520 PEGASUS
BAKERSFIELD, CA 93308-2200

Assay Laboratory
Scott Specialty Gases
2600 Cajon Boulevard
San Bernardino, CA 92411

Purchase Order BK034
Scott Project # 23659

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol 1 Procedure #G1, Section Number 3.0.4

Cylinder Number ALM-008231 **Certification Date** 2/1/93 **Expiration Date** 8/1/93
Cylinder Pressure 2000psig **Previous Certification Dates**

[illegible]YZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
[illegible]c Oxide	82.43ppm Nitric Oxide 84.22ppm NOX	± 1 % NIST Traceable
C[illegible] Monoxide	84.71ppm Carbon Monoxide	± 1% NIST Traceable
Ba[illegible] Gas: Nitrogen		

*[illegible]al uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

[illegible]ERENCE STANDARD

Ty[illegible]	Expiration Date	Cylinder Number	Concentration
GM[illegible]	3/93	ALM-3364	96.50ppm Nitric Oxide
GM[illegible]	3/93	ALM-026614	96.23ppm Carbon Monoxide

[illegible]STRUMENTATION

[illegible]ment/Model/Serial #	Last Date Calibrated	Analytical Principle
T[illegible] / 10AR / 14853-150	10/1/92	Chemi-Luminescent
Ho[illegible] / OPE-135D / 56565502	10/20/92	NDIR

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

[illegible]ponents — **First Triad Analysis** — **Second Triad Analysis** — **Calibration Curve**

[illegible]de

First Triad Analysis			Second Triad Analysis		
Date:1/22/93	Response Units: mv		Date:2/1/93	Response Units: mv	
Z1= 0.00	R1= 96.10	T1= 82.15	Z1= 0.00	R1= 96.00	T1= 81.94
R2= 96.07	Z2= 0.04	T2= 82.08	R2= 95.75	Z2= 0.03	T2= 81.80
Z3= 0.04	T3= 82.05	R3= 96.02	Z3= 0.03	T3= 81.77	R3= 95.77
Avg. Conc. of Cust Cyl.		82.46ppm	Avg. Conc. of Cust Cyl.		82.40ppm

Calibration Curve: Concentration= Ax^2+Bx+C
A =-0.000504296
B =1.0489880
C =-0.292506

Carbon [illegible]oxide

First Triad Analysis			Second Triad Analysis		
Date:1/25/93	Response Units: mv		Date:2/1/93	Response Units: mv	
Z1= 0.00	R1= 97.0	T1= 86.1	Z1= 0.00	R1= 97.0	T1= 85.9
R2= 97.0	Z2= 0.00	T2= 85.8	R2= 97.0	Z2= 0.00	T2= 85.8
Z3= 0.00	T3= 85.8	R3= 97.0	Z3= 0.00	T3= 85.8	R3= 97.0
Avg. Conc. of Cust Cyl.		84.74ppm	Avg. Conc. of Cust Cyl.		84.67ppm

Calibration Curve: Concentration= $Ax^4+Bx^3+Cx^2+DX+E$
A =0.000000006893
B =-0.00000020348
C =0.000671679
D =0.939371919
E =0.00475494

First Triad Analysis			Second Triad Analysis		
Date:	Response Units:		Date:	Response Units:	
Z1=	R1=	T1=	Z1=	R1=	T1=
R2=	Z2=	T2=	R2=	Z2=	T2=
Z3=	T3=	R3=	Z3=	T3=	R3=
Avg. Conc. of Cust Cyl.			Avg. Conc. of Cust Cyl.		

Calibration Curve: Concentration=

Special Notes

Analyst Joseph De La Torre

Scott Specialty Gases, Inc.

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CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

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2520 PEGASUS
BAKERSFIELD, CA 93308-2200

Assay Laboratory
Scott Specialty Gases
2600 Cajon Boulevard
San Bernardino, CA 92411

Purchase Order BK034
Scott Project # 23659.003

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol 1 Procedure #G1, Section Number 3.0.4

Cylinder Number ALM022850 **Certification Date** 02-03-93 **Expiration Date** 08-93
Cylinder Pressure 1900psig **Previous Certification Dates** NONE

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
Carbon Monoxide	8.352 ppm	± 1 % NIST Traceable
Nitric Oxide	8.338 ppm	± 2 % NIST Traceable

Balance Gas: Nitrogen

NOX 8.46 ppm

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type	Expiration Date	Cylinder Number	Concentration
SRM1677	10-93	CAL5078	9.900 ppm
GMIS	03-93	ALM6975	22.52 ppm

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
Horiba / OPE-135D / 56565502	06-03-92	NDIR
TECO / 10AR / 14853-150	10-29-92	Chemi-Luminescent

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components | **First Triad Analysis** | **Second Triad Analysis** | **Calibration Curve**

Carbon Monoxide

First Triad: Date:01-27-93 Response Units:MV
Z1= 0.00 R1= 19.5 T1= 16.5
R2= 19.5 Z2= 0.04 T2= 16.5
Z3= 00.7 T3= 16.5 R3= 19.5
Avg. Conc. of Cust Cyl. 8.352 ppm

Second Triad: Date:02-03-93 Response Units:MV
Z1= 0.00 R1= 19.5 T1= 16.5
R2= 19.5 Z2= 0.00 T2= 16.5
Z3= 0.00 T3= 16.5 R3= 19.5
Avg. Conc. of Cust Cyl. 8.352 ppm

Calibration Curve: Concentration= Ax^2+Bx+C
A =0.00005011
B =0.5059
C =-0.01002

Nitric Oxide

First Triad: Date:01-22-93 Response Units:MV
Z1= 0.02 R1= 89.87 T1= 33.46
R2= 90.41 Z2= 0.18 T2= 33.57
Z3= 0.20 T3= 33.57 R3= 90.45
Avg. Conc. of Cust Cyl. 8.347 ppm

Second Triad: Date:02-02-93 Response Units:MV
Z1= 0.00 R1= 90.40 T1= 33.49
R2= 90.42 Z2= 0.00 T2= 33.42
Z3= 0.00 T3= 33.39 R3= 90.40
Avg. Conc. of Cust Cyl. 8.328 ppm

Calibration Curve: Concentration= Ax^2+Bx+C
A =-0.000504296
B =1.0489880
C =-0.292506

Date: Response Units:
Z1= R1= T1=
R2= Z2= T2=
Z3= T3= R3=
Avg. Conc. of Cust Cyl.

Date: Response Units:
Z1= R1= T1=
R2= Z2= T2=
Z3= T3= R3=
Avg. Conc. of Cust Cyl.

Concentration=

Special Notes

Analyst Joseph De La Torre

Scott Specialty Gases, Inc.

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CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

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San Bernardino, CA 92411

Purchase Order BK042
Scott Project # 0223658

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol 1 Procedure #G1, Section Number 3.0.4

Cylinder Number AAL 2534 **Certification Date** 2/2/93 **Expiration Date** 8/2/93
Cylinder Pressure 1900 psig **Previous Certification Dates**

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
Carbon Monoxide	18.56 ppm	± 1 % NIST Traceable
Nitric Oxide	22.75 ppm	
Balance Gas: Nitrogen		
NOX	23.2 ppm	

*Analytical uncertainty is inclusive of usual known error sources which at least include reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type	Expiration Date	Cylinder Number	Concentration
NTRM 1678	2/94	AAL-5970	47.20 ppm Carbon Monoxide
NIGMIS	3/93	ALM 006975	22.52 ppm Nitric Oxide

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
Horiba / OPE-135D / 56565502	12/17/92	NDIR
TECO / 10AR / 14853-150	1/20/93	Chemi-Luminescent

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components: Nitric Oxide

First Triad Analysis			Second Triad Analysis			Calibration Curve
Date: 1/26/93	Response Units: mv		Date: 2/1/93	Response Units: mv		Concentration= Ax^2+Bx+C
Z1= 0.02	R1= 89.55	T1= 90.54	Z1= 0.00	R1= 89.26	T1= 90.78	A =-0.00008618
R2= 90.03	Z2= 0.13	T2= 90.60	R2= 89.16	Z2= -0.23	T2= 90.14	B =0.25997
Z3= 0.12	T3= 90.63	R3= 90.12	Z3= -0.20	T3= 90.12	R3= 89.25	C =-0.019484
Avg. Conc. of Cust Cyl.		22.69 ppm	Avg. Conc. of Cust Cyl.		22.80 ppm	

Components: Carbon Monoxide

First Triad Analysis			Second Triad Analysis			Calibration Curve
Date: 1/26/93	Response Units: mv		Date: 2/2/93	Response Units: mv		Concentration= $Ax^4+Bx^3+Cx^2+DX+E$
Z1= 0.00	R1= 20.9	T1= 8.40	Z1= 0.00	R1= 20.9	T1= 8.40	A =0.00000000689
R2= 20.9	Z2= 0.00	T2= 8.30	R2= 20.9	Z2= 0.00	T2= 8.40	B =-0.000002084
Z3= 0.00	T3= 8.33	R3= 20.9	Z3= 0.00	T3= 8.30	R3= 20.9	C =0.0006717
Avg. Conc. of Cust Cyl.		18.52 ppm	Avg. Conc. of Cust Cyl.		18.59 ppm	D =0.93997
						E =0.004753

Components: [illegible]

First Triad Analysis			Second Triad Analysis			Calibration Curve
Date:	Response Units:		Date:	Response Units:		Concentration=
Z1=	R1=	T1=	Z1=	R1=	T1=	
R2=	Z2=	T2=	R2=	Z2=	T2=	
Z3=	T3=	R3=	Z3=	T3=	R3=	
Avg. Conc. of Cust Cyl.			Avg. Conc. of Cust Cyl.			

Special Notes

Analyst: Joseph De La Torre

Scott Specialty Gases, Inc.

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CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

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Purchase Order BK042
Project # 23951.001

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol 1 Procedure #G1, Section Number 3.0.4

Cylinder Number ALM005581 **Certification Date** 02-15-93 **Expiration Date** 08-15-93
Cylinder Pressure 2000psig **Previous Certification Dates**

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
Carbon Monoxide	41.48ppm	± 1 % NIST Traceable
Nitric Oxide	49.72ppm	
Balance Gas: Nitrogen		
NOX	51.10ppm	

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

	Expiration Date	Cylinder Number	Concentration
CRM1678	02-94	AAL5970	47.20 ppm
CRM1684b	09-94	ALM24490	95.30 ppm

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
HORIBA OPE-135D / 56565502	12-17-92	NDIR
[illegible] / 10AR / 14853-150	01-20-93	Chemi-Luminescent

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components	First Trial Analysis	Second Trial Analysis	Calibration Curve
Carbon Monoxide	Date:02-08-93 Response Units: mv Z1= 0.00 R1= 20.9 T1= 18.4 R2= 20.9 Z2= 0.00 T2= 18.4 Z3= 0.00 T3= 18.4 R3= 20.9 Avg. Conc. of Cust Cyl. 41.60ppm	Date:02-15-93 Response Units: mv Z1= 0.00 R1= 20.9 T1= 18.3 R2= 20.9 Z2= 0.00 T2= 18.3 Z3= 0.00 T3= 18.3 R3= 20.9 Avg. Conc. of Cust Cyl. 41.36ppm	Concentration= Ax^3+Bx^2+Cx+D A =-0.0000007531 B =0.003772 C =2.192076 D =-0.012037
Nitric Oxide	Date:02-08-93 Response Units: mv Z1= 0.00 R1= 95.39 T1= 49.98 R2= 96.20 Z2= 0.00 T2= 50.04 Z3= 0.00 T3= 50.07 R3= 96.10 Avg. Conc. of Cust Cyl. 49.72ppm	Date: Response Units: mv Z1= 0.00 R1= 95.32 T1= 49.40 R2= 95.15 Z2= 0.00 T2= 49.80 Z3= 0.00 T3= 49.80 R3= 95.20 Avg. Conc. of Cust Cyl. 49.71ppm	Concentration= Ax^2+Bx+C A =-0.000504296 B =1.0489880 C =-0.292506
	Date: Response Units: Z1= R1= T1= R2= Z2= T2= Z3= T3= R3= Avg. Conc. of Cust Cyl.	Date: Response Units: Z1= R1= T1= R2= Z2= T2= Z3= T3= R3= Avg. Conc. of Cust Cyl.	Concentration=

Special Notes

Analyst Joseph De La Torre

PROTOCOL

Scott Specialty Gases, Inc.

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CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

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San Bernardino, CA 92411

Purchase Order WA346
Project # 24273.001

ANALYTICAL INFORMATION

Certified to exceed the ~~minimum~~ specifications of EPA Protocol 1 Procedure #G1, Section Number 3.0.4

Cylinder Number ALM008255 **Certification Date** 03/01/93 **Expiration Date** 09/01/93
Cylinder Pressure 1900 psig **Previous Certification Dates** NONE

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
CARBON DIOXIDE	15.95 %	± 1 % NIST Traceable
OXYGEN	8.018 %	

Balance Gas: Nitrogen

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type	Expiration Date	Cylinder Number	Concentration
CRM1675	10/93	ALM001136	14.02 %
CRM2658	05/94	ALM015888	9.656 %

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
Horiba / OPE-135C / 56553902	09/17/92	NDIR
Horiba / OPE-335 / 850557042	12/29/92	Magnetopneumatic

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components — Carbon Dioxide

First Triad Analysis	Second Triad Analysis	Calibration Curve
Date: 03/01/93 Response Units: mv Z1= 0.00 R1= 82.7 T1= 88.7 R2= 82.7 Z2= 0.00 T2= 88.7 Z3= 0.00 T3= 88.7 R3= 82.7 Avg. Conc. of Cust Cyl. 15.95 %	Date: Response Units: mv Z1= R1= T1= R2= Z2= T2= Z3= T3= R3= Avg. Conc. of Cust Cyl.	Concentration= $Ax^4+Bx^3+Cx^2+DX+E$ A =0.00000008 B =-0.00000895 C =0.001340700 D =0.0729330838 E =0.0027195015

Components — Oxygen

First Triad Analysis	Second Triad Analysis	Calibration Curve
Date: 03/01/93 Response Units: mv Z1= 0.00 R1= 95.7 T1= 80.3 R2= 95.1 Z2= 0.00 T2= 80.3 Z3= 0.00 T3= 80.3 R3= 95.7 Avg. Conc. of Cust Cyl. 8.018 %	Date: Response Units: mv Z1= R1= T1= R2= Z2= T2= Z3= T3= R3= Avg. Conc. of Cust Cyl.	Concentration= Ax + B A =0.99865981 B =-0.00162902

First Triad Analysis	Second Triad Analysis	Calibration Curve
Date: Response Units: Z1= R1= T1= R2= Z2= T2= Z3= T3= R3= Avg. Conc. of Cust Cyl.	Date: Response Units: Z1= R1= T1= R2= Z2= T2= Z3= T3= R3= Avg. Conc. of Cust Cyl.	Concentration=

Special Notes

Analyst Joseph De La Torre

Scott Specialty Gases, Inc.

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CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

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San Bernardino, CA 92411

Purchase Order WA346
Project # 24273.002

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol 1 Procedure #G1, Section Number 3.0.4

Cylinder Number AAL12850 **Certification Date** 03/01/93 **Expiration Date** 09/01/93
Cylinder Pressure 2000 psig **Previous Certification Dates** NONE

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
CARBON DIOXIDE	7.862 %	± 1 % NIST Traceable
OXYGEN	15.02 %	

Balance Gas: Nitrogen

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type	Expiration Date	Cylinder Number	Concentration
CRM1675	10/93	ALM001136	14.02 %
CRM2659	05/94	ALM017573	20.63 %

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
Horiba / OPE-135C / 56553902	08/19/92	NDIR
Horiba / OPE-335 / 850557042	12/28/92	Magnetopneumatic

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components — Carbon Dioxide

First Triad Analysis

Date: 03/01/93 Response Units: mv

Z1=	0.00	R1=	82.7	T1=	57.6
R2=	82.7	Z2=	0.00	T2=	57.6
Z3=	0.00	T3=	57.6	R3=	82.7

Avg. Conc. of Cust Cyl. 7.862 %

Second Triad Analysis

Date: Response Units: mv

Z1=		R1=		T1=	
R2=		Z2=		T2=	
Z3=		T3=		R3=	

Avg. Conc. of Cust Cyl.

Calibration Curve

Concentration= $Ax^4+Bx^3+Cx^2+DX+E$

A =0.000000083
B =-0.000008955
C =0.001340700
D =0.072933083
E =0.0027195015

Components — Oxygen

First Triad Analysis

Date: 03/01/93 Response Units: mv

Z1=	0.00	R1=	82.6	T1=	60.1
R2=	82.6	Z2=	0.00	T2=	60.1
Z3=	0.00	T3=	60.1	R3=	82.6

Avg. Conc. of Cust Cyl. 15.02 %

Second Triad Analysis

Date: Response Units: mv

Z1=		R1=		T1=	
R2=		Z2=		T2=	
Z3=		T3=		R3=	

Avg. Conc. of Cust Cyl.

Calibration Curve

Concentration= Ax - B
A =0.249921410
B =-0.004490785

Date: Response Units:

Z1=		R1=		T1=	
R2=		Z2=		T2=	
Z3=		T3=		R3=	

Avg. Conc. of Cust Cyl.

Date: Response Units:

Z1=		R1=		T1=	
R2=		Z2=		T2=	
Z3=		T3=		R3=	

Avg. Conc. of Cust Cyl.

Concentration=

Special Notes

Analyst Joseph De La Torre

DRY GAS METER AND ORIFICE CALIBRATION

Meter Box # Brown IV Barometric Press. 29.38 IN. HG.

Date 18-Jan-93 Performed by T. Delfino

Calibration Meter Y 1.00014

	RUN 1	RUN 2	RUN 3	RUN 4	RUN 5	RUN 6
VACUUM ("Hg)	3	5	5	5	5	5
dHw ("H2O)	0.00	0.00	0.00	0.00	0.00	0.00
dHd ("H2O)	0.50	1.00	1.50	2.00	3.00	4.00
INITIAL WTM	866.883	873.433	931.482	833.099	947.264	977.798
FINAL WTM	873.178	931.327	946.881	866.342	977.357	1011.223
INITIAL DGM	918.813	925.631	986.853	884.158	3.643	36.108
FINAL DGM	925.371	986.665	1003.242	918.243	35.647	71.736
TEMP. WTM (°F)	62.0	58.0	58.0	59.0	57.0	57.0
TEMP. DGM (°F)	75.0	82.0	83.0	76.0	87.0	88.0
TEST TIME (MIN.)	15.0	101.0	22.0	41.0	31.0	30.0
CALCULATIONS :						
NET VOLUME WTM (Vw)	6.296	57.902	15.401	33.248	30.097	33.430
NET VOLUME DGM (Vd)	6.558	61.034	16.389	34.085	32.004	35.628
Y	0.983	0.990	0.981	1.002	0.988	0.985
ACCEPTABLE Y RANGE = 0.968 TO 1.008						
dH@	1.56	1.63	1.63	1.65	1.68	1.70
ACCEPTABLE dH@ RANGE = 1.49 TO 1.79						

AVERAGE Y = 0.988

AVERAGE dH@ = 1.64

CALCULATIONS :

Y = (Vw (Pb − (dHw / 13.6)) x (Td + 460)) / (Vd (Pb + (dHd / 13.6)) x (Tw + 460)

dH@ = 0.0317 x dHd / (Pb (Td + 460)) x ((Tw + 460) x time) / Vw) ^ 2

POST TEST METER CALIBRATION

Meter Box # Box No. BR IV Barometric Press. 29.94 IN. HG.

Date 5-25-93 Performed by J.POLHAMUS

	RUN 1	RUN 2	RUN 3
VACUUM ("Hg)	7	7	7
dHw ("H2O)	0.00	0.00	0.00
dHd ("H2O)	1.50	1.50	1.50
INITIAL WTM	357.679	367.774	377.844
FINAL WTM	367.774	377.844	387.871
INITIAL DGM	363.843	374.648	385.443
FINAL DGM	374.648	385.443	396.220
TEMP. WTM (°F)	74.0	74.0	75.0
TEMP. DGM (°F)	81.0	83.0	85.0
TEST TIME (MIN.)	15.0	15.0	15.0
CALCULATIONS :			
NET VOLUME WTM (Vw)	10.095	10.070	10.027
NET VOLUME DGM (Vd)	10.805	10.795	10.777
Y	0.943	0.945	0.944

AVERAGE Y = 0.944

PRETEST Y = 0.988

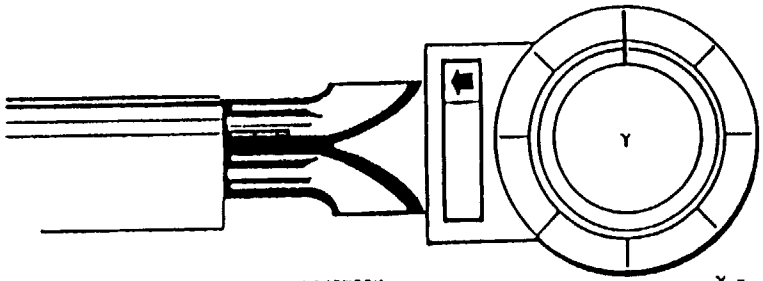
DIFFERENCE, % = 4.5%

WHERE :

Y = (Vw (Pb – (dHw / 13.6)) x (Td + 460)) / (Vd (Pb + (dHd / 13.6)) x (Tw + 460)

Pitot Tube Calibration

Serial No. BK010 Calibrated by G. McRae Date 6/18/92

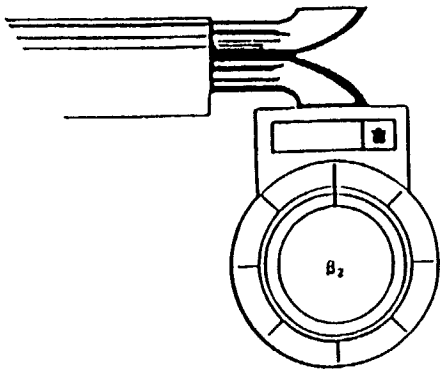


DEGREE INDICATING LEVEL POSITION FOR DETERMINING Y, THEN CALCULATING Z.

Y = 1.5 °

A = DISTANCE BETWEEN TIPS, (P_a + P_b), cm. = 2.41.

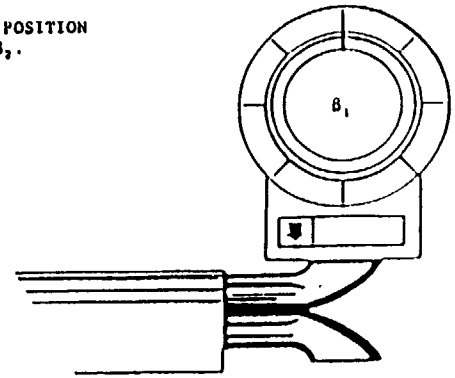
Z = A sin Y = 0.06 cm; (<0.32 cm).



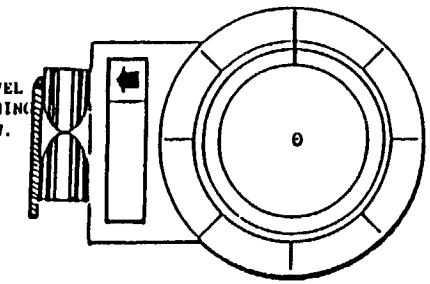
DEGREE INDICATING LEVEL POSITION FOR DETERMINING β_1 and β_2.

β_1 = 1.5 °(<5°)

β_2 = 1.0 °(<5°)

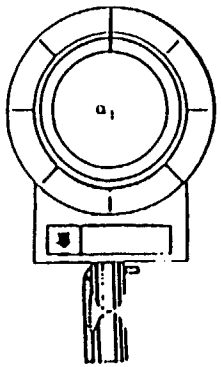


DEGREE INDICATING LEVEL POSITION FOR DETERMINING Θ, THEN CALCULATING W.



Θ = 1.0 °

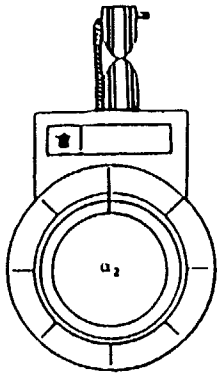
W = A sin Θ = 0.04 cm; (<0.08 cm).

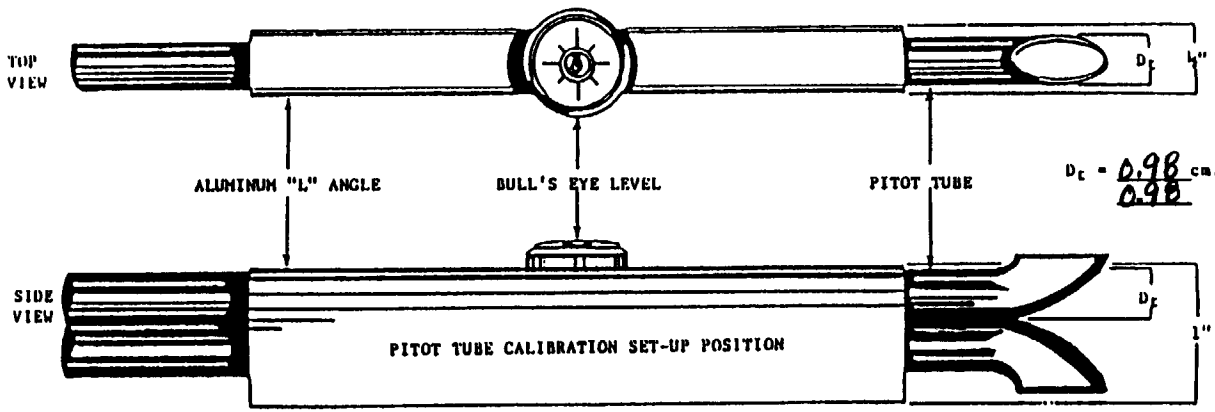


DEGREE INDICATING LEVEL POSITION FOR DETERMINING α_1 and α_2.

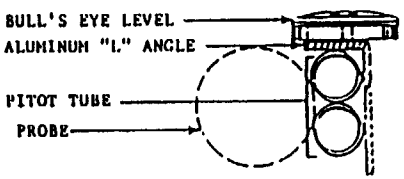
α_1 = 1.0 °(<10°)

α_2 = 1.5 °(<10°)



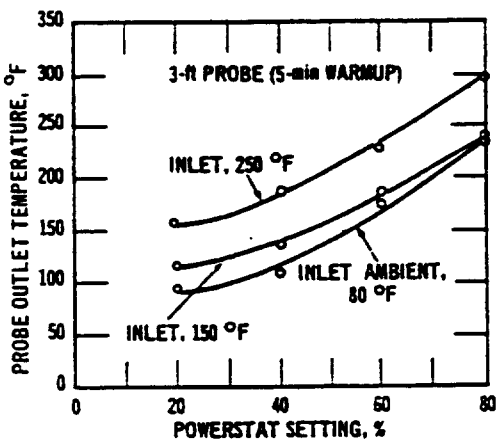


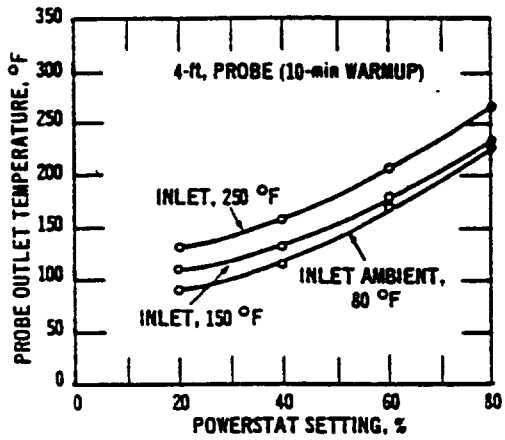
D_t = 0.98 cm. A
0.98 B

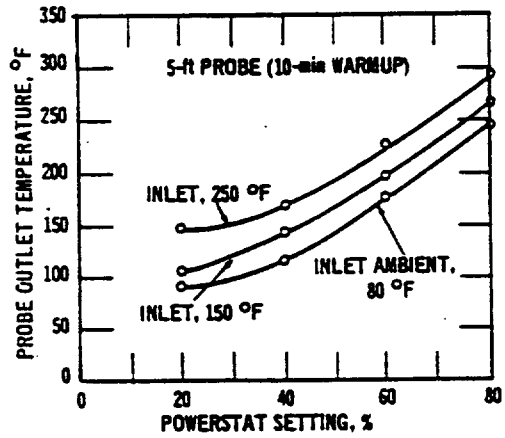


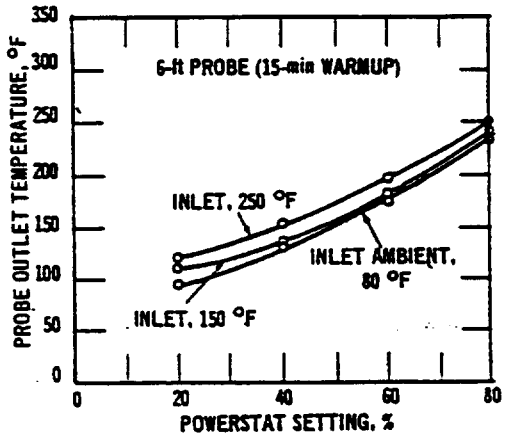
PROBE HEAT CALIBRATION

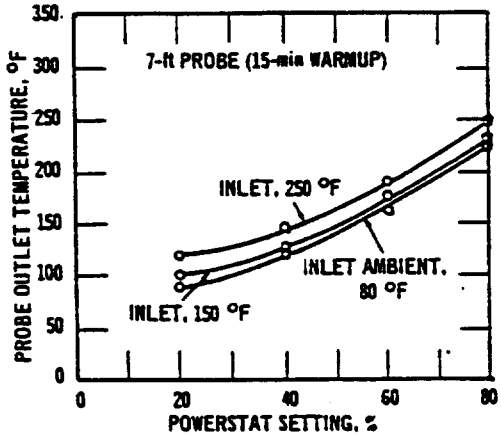
Sample probes are constructed as outlined in EPA publication PB–209 022 "Maintenance, Calibration, and Operation of Isokinetic Source Sampling Equipment". The Figures below from this publication are used to determine probe heat settings to maintain a probe temperature of 250 °F.











NOTE: Flow rate held constant at 0.75; 50% change in flow rate has little effect on probe temperature.

ENGINEERING SCIENCE, INC.
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(805) 393-0272

CHAIN OF CUSTODY RECORD

Project No.	Project Name	Project Manager	Samples Sent To:	Analysis Required
BK062	Gaviota SCR	G. McRae	ES Laboratory Bakersfield, CA By: Courier	NH_3
Samples Collected By: C. Mangoang	Regulatory Agency (EPA, CARB, SCAQMD, etc.): Santa Barbara County			

ES Lab Control No.	Test Date	Field Sample ID (Method-Run#-Sample Source)	Sample Amount	Sample Medium	Comments	NH_3				
BK9305100	5/11/93	BAAQMD ST-1b, NH_3, BLANK	Marked	0.1N HCL		X				
BK9305101		" " Run #1	Marked			X				
BK9305102		" " Run #2	Marked			X				
BK9305103		" " Run #3	Marked			X				

Relinquished By: (Sign & Print)	Date/Time	Received By: (Sign & Print)	Comments:
G. W. McRae Phone: (805) 393-0272	5/12/93 0700	Linda McRae Of: ES	
Linda McRae Phone: (805) 393-0272	5/12/93 0915	Troy DeFino Of: Tri Refi / Eng. Sci.	
Relinquished By: (Sign & Print) Phone:	Date/Time	Received By: (Sign & Print) Of:	

ENGINEERING SCIENCE, INC.
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Bakersfield, CA 93308
(805) 393-0272

CHAIN OF CUSTODY RECORD

Project No.	Project Name	Project Manager	Samples Sent To:	Analysis Required
BK062	Gaviota SCR	G. McRae	Oilwell Research	THC, CHONS, Heat Value
Samples Collected By: C. Mangoang	Regulatory Agency (EPA, CARB, SCAQMD, etc.): Santa Barbara County APCD		By: Courier	

ES Lab Control No.	Test Date	Field Sample ID (Method-Run#-Sample Source)	Sample Amount	Sample Medium	Comments	THC	CHONS	Heat Value		
BK9305104	5/11/93	EPA Method 18, Run #1	10 l	Tedlar Bag	Samples Collected w/ lung Sampler	X				
BK9305105		Run #2	10 l			X				
BK9305106		Run #3	10 l			X				
BK9305107	5/11/93	Fuel Gas Sample + Back up Cylinder		SS Cylinder			X	X		

Relinquished By: (Sign & Print)	Date/Time	Received By: (Sign & Print)	Comments:
G. W. McRae Phone: (805) 393-0272	5/12/93 0700	Linda McRae Of: ES	
Linda McRae Phone: (805) 393-0272	5/12/93 0915	Heather West Of: UP	
Relinquished By: (Sign & Print) Phone:	Date/Time	Received By: (Sign & Print) Of:	

APPENDIX A

SCR OUTLET, CONTINUOUS EMISSION MONITORING

RELATIVE ACCURACY CALCULATIONS – O2 (%)

GAVIOTA OIL AND GAS PLANT 11–May–93
SCR OUTLET

Run No.	RM Test Values		Plant CEM Values		Difference d
	Runs not Used for RA	Runs Used for RA	Runs not Used for RA	Runs Used for RA	
1		14.64		14.65	0.01
2		14.52		14.68	0.16
3		14.37		14.76	0.39
4		14.71		14.99	0.28
5		14.20		14.40	0.20
6		14.35		14.40	0.05
7		13.86		14.33	0.47
8		13.95		14.22	0.27
9					
10		14.09		14.23	0.14
11					
12					

$\overline{RM}$: 14.30 $\overline{d}$: 0.22

Standard Deviation (Std.Dev.) : 0.15

t–VALUES TABLE			
n	t0.975	n	t0.975
2	12.706	10	2.262
3	4.303	11	2.228
4	3.182	12	2.201
5	2.776	13	2.179
6	2.571	14	2.160
7	2.447	15	2.145
8	2.365	16	2.131
9	2.306		

CONFIDENCE COEFFICIENT

CC = t0.975 x [Std.Dev. / (Sq.Rt. n)] = 0.12

Where : CC = 2.5 percent error Confidence Coefficient.

n , number of valid test runs = 9

t0.975, t–Value from table = 2.306

RELATIVE ACCURACY

RA (%) = ($|\overline{d}|$ + |CC|) / $\overline{RM}$ x 100 = **2.34**

RELATIVE ACCURACY CALCULATIONS – CO (ppm)

GAVIOTA OIL AND GAS PLANT
SCR OUTLET

11–May–93

Run No.	RM Test Values		Plant CEM Values		Difference d
	Runs not Used for RA	Runs Used for RA	Runs not Used for RA	Runs Used for RA	
1		30.43		30.75	0.32
2		31.26		31.40	0.14
3		31.79		32.75	0.96
4		35.96		36.23	0.27
5		30.86		31.80	0.94
6		32.61		31.80	–0.81
7		28.46		30.26	1.80
8		26.22		27.22	1.00
9					
10		25.69		27.27	1.58
11					
12					

$\overline{RM}$: 30.36

$\overline{d}$: 0.69

Standard Deviation (Std.Dev.) : 0.80

t–VALUES TABLE			
n	t0.975	n	t0.975
2	12.706	10	2.262
3	4.303	11	2.228
4	3.182	12	2.201
5	2.776	13	2.179
6	2.571	14	2.160
7	2.447	15	2.145
8	2.365	16	2.131
9	2.306		

CONFIDENCE COEFFICIENT

CC = t0.975 x [Std.Dev. / (Sq.Rt. n)]= 0.62

Where : CC = 2.5 percent error Confidence Coefficient.

n , number of valid test runs = 9

t0.975, t–Value from table = 2.306

RELATIVE ACCURACY

RA (%) = ($|\overline{d}|$ + |CC|) / $\overline{RM}$ x 100 = **4.29**

RELATIVE ACCURACY CALCULATIONS – NOx (ppm)

GAVIOTA OIL AND GAS PLANT
SCR OUTLET

11–May–93

Run No.	RM Test Values		Plant CEM Values		Difference d
	Runs not Used for RA	Runs Used for RA	Runs not Used for RA	Runs Used for RA	
1		5.22		4.46	−0.76
2		5.25		4.38	−0.87
3		6.85		4.46	−2.39
4		7.14		4.17	−2.97
5		6.82		4.49	−2.33
6		7.25		4.17	−3.08
7		7.92		4.35	−3.57
8		8.05		4.53	−3.52
9					
10		7.88		4.22	−3.66
11					
12					

$\overline{RM}$: 6.93

$\overline{d}$: −2.57

Standard Deviation (Std.Dev.) : 1.10

Applicable standard. 22.2 ppm @ 0% O_2 uncorrected

t–VALUES TABLE

n	t0.975	n	t0.975
2	12.706	10	2.262
3	4.303	11	2.228
4	3.182	12	2.201
5	2.776	13	2.179
6	2.571	14	2.160
7	2.447	15	2.145
8	2.365	16	2.131
9	2.306		

CONFIDENCE COEFFICIENT

CC = t0.975 x [Std.Dev. / (Sq.Rt. n)] = 0.85

Where : CC = 2.5 percent error Confidence Coefficient.

n , number of valid test runs = 9

t0.975, t–Value from table = 2.306

RELATIVE ACCURACY

RA (%) = ($|\overline{d}|$ + |CC|) / $\overline{RM}$ x 100 = **49.36**

using Applicable standard = 15.41% RA > 10% RM

EMISSION CALCULATIONS
GAS COMPONENTS

GAVIOTA OIL AND GAS PLANT
SCR OUTLET

DATA :

	Run 1	Run 2	Run 3	Average
Date	11-May-93	11-May-93	11-May-93	
Oxygen (%)	14.64	14.52	14.37	14.51
Qs(std), dscfm	63,442	63,579	63,332	63,451
F-Factor, dscf/MMBtu	8,570.00	8,570.00	8,570.00	8,570.00
NOx, ppm	5.22	5.25	6.85	5.77
CO, ppm	30.43	31.26	31.79	31.16
SO2, ppm				
HC (non-methane), ppm				

CALCULATIONS :

NOx, lb/hr	2.41	2.43	3.16	2.66
NOx, ppm @ 15 %O2	4.92	4.86	6.19	5.32
NOx, lb/MMBtu	0.0181	0.0179	0.0228	0.0196
CO, lb/hr	8.55	8.80	8.92	8.76
CO, ppm @ 15 %O2	28.70	28.90	28.70	28.77
CO, lb/MMBtu	0.0643	0.0648	0.0644	0.0645
SO2, lb/hr				
SO2, ppm @ 15 %O2				
SO2, lb/MMBtu				
HC, lb/hr				
HC, ppm @ 15 %O2				
HC, lb/MMBtu				

EQUATIONS :

lb/hr = (0.00000137 Lb-Mole °R / ft3) x 60 min/hr x Qs(std) x MW x ppm / [T(std) + 460]

ppm @ 15 %O2 = ppm measured x [(20.9 - 15 %O2) / (20.9 - %O2 measured)]

lb/MMBtu = F-Factor x MW x [(1.3711E-6 Lb-Mole °R / ft3) / (T(std) + 460)] x [20.9 / (20.9 - O2%)] x ppm

CONSTANTS :

Standard Temp. T(std): 60 °F
Oxygen Correction : 15 % O2

NOx, MW = 46.005 lb/lb-mole
CO, MW = 28.010 lb/lb-mole
SO2, MW = 64.058 lb/lb-mole
HC, MW = 16.043 lb/lb-mole

GAS ANALYZER DATA

GAVIOTA OIL AND GAS PLANT
SCR OUTLET

Date : 05/11/93
Run No. : 1

	O2, %		CO2, %		NOx, ppm		CO, ppm		SO2, ppm	
	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading
Point #										
1	14.67	14.67	3.62	3.62	5.03	5.03	30.08	30.08		
2	14.71	14.71	3.60	3.60	4.22	4.22	30.26	30.26		
3	14.64	14.64	3.62	3.61	4.45	4.45	30.04	30.04		
4	14.65	14.65	3.64	3.63	4.35	4.36	29.54	29.54		
5	14.56	14.56	3.65	3.64	4.63	4.64	31.10	31.10		
6	14.67	14.67	3.63	3.62	4.20	4.21	31.52	31.52		
7	14.51	14.51	3.75	3.73	4.32	4.33	32.75	32.75		
8	14.62	14.62	3.68	3.66	4.33	4.34	32.93	32.93		
9	14.45	14.45	3.74	3.72	8.27	8.30	28.16	28.16		
10	14.52	14.52	3.74	3.71	8.33	8.37	28.47	28.47		
11	14.43	14.43	3.76	3.73	8.31	8.35	29.75	29.75		
12	14.56	14.56	3.72	3.69	8.25	8.29	30.38	30.38		
13	14.53	14.53	3.74	3.71	7.76	7.80	28.93	28.93		
14	14.89	14.89	3.58	3.54	2.49	2.50	30.59	30.59		
15	14.87	14.87	3.57	3.53	2.28	2.29	29.94	29.94		
16	15.01	15.01	3.48	3.44	1.97	1.98	32.46	32.46		
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
MEAN :		14.64		3.64		5.22		30.43		

Zero Check	0.00	0.00	0.00	0.00
Span Check	15.02	16.14	8.40	41.48
Initial Span Value	15.02	15.95	8.46	41.48
Drift, Percent	0.0	1.2	−0.7	0.0
Zero Drift, Zcf	0.00000	0.00000	0.00000	0.00000
Span Drift, Scf	0.00000	0.00074	−0.00044	0.00000

Drift, Percent = [(Span Check − Zero Check) − Calib. Gas] / Calib. Gas x 100

Zero Drift Correction Factor, Zcf = Zero Check / # of Readings

Span Drift Correction Factor, Scf = (% Drift / 100) / # of Readings

Cz, Zero Corr. Concentration = measured value − [Zcf x (Point # − 0.5)]

Drift Corrected Reading = Cz / [1 + (Scf x (Point # − 0.5))]

GAS ANALYZER DATA

GAVIOTA OIL AND GAS PLANT
SCR OUTLET

Date : 05/11/93
Run No. : 2

	O2, %		CO2, %		NOx, ppm		CO, ppm		SO2, ppm	
	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading
Point #										
1	14.50	14.50	3.62	3.62	8.89	8.89	31.85	31.85		
2	14.58	14.58	3.59	3.59	8.86	8.86	34.22	34.22		
3	14.50	14.49	3.60	3.60	8.80	8.80	32.78	32.78		
4	14.53	14.52	3.62	3.62	8.23	8.23	32.10	32.10		
5	14.73	14.72	3.48	3.48	2.80	2.80	34.81	34.81		
6	14.59	14.57	3.56	3.56	2.57	2.57	31.85	31.85		
7	14.50	14.48	3.59	3.59	2.22	2.22	29.90	29.90		
8	14.60	14.58	3.55	3.55	2.15	2.15	29.10	29.10		
9	14.46	14.43	3.62	3.62	5.02	5.02	30.00	30.00		
10	14.51	14.48	3.62	3.62	4.97	4.97	29.75	29.75		
11	14.55	14.52	3.62	3.62	5.39	5.39	29.62	29.62		
12	14.41	14.38	3.67	3.67	5.28	5.28	29.08	29.08		
13	14.32	14.28	3.74	3.74	5.36	5.36	28.03	28.03		
14	14.59	14.55	3.60	3.60	4.33	4.33	31.53	31.53		
15	14.55	14.51	3.61	3.61	4.68	4.68	32.39	32.39		
16	14.76	14.71	3.50	3.50	4.49	4.49	33.12	33.12		
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
MEAN :		14.52		3.60		5.25		31.26		

Zero Check	0.00	0.00	0.00	0.00
Span Check	15.07	15.95	8.46	41.48
Initial Span Value	15.02	15.95	8.46	41.48
Drift, Percent	0.3	0.0	0.0	0.0
Zero Drift, Zcf	0.00000	0.00000	0.00000	0.00000
Span Drift, Scf	0.00021	0.00000	0.00000	0.00000

Drift, Percent = [(Span Check − Zero Check) − Calib. Gas] / Calib. Gas x 100

Zero Drift Correction Factor, Zcf = Zero Check / # of Readings

Span Drift Correction Factor, Scf = (% Drift / 100) / # of Readings

Cz, Zero Corr. Concentration = measured value − [Zcf x (Point # − 0.5)]

Drift Corrected Reading = Cz / [1 + (Scf x (Point # − 0.5))]

GAS ANALYZER DATA

GAVIOTA OIL AND GAS PLANT
SCR OUTLET

Date : 05/11/93
Run No. : 3

	O2, %		CO2, %		NOx, ppm		CO, ppm		SO2, ppm	
	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading
Point #										
1	14.16	14.14	3.76	3.76	9.27	9.28	29.72	29.72		
2	14.34	14.29	3.72	3.72	9.48	9.50	28.14	28.14		
3	14.31	14.23	3.71	3.71	9.42	9.45	29.66	29.66		
4	14.20	14.09	3.79	3.79	8.45	8.49	27.94	27.94		
5	14.41	14.27	3.67	3.67	6.39	6.42	29.43	29.43		
6	14.51	14.34	3.59	3.59	3.65	3.67	30.01	30.01		
7	14.59	14.39	3.59	3.59	3.62	3.65	29.70	29.70		
8	14.58	14.35	3.57	3.56	3.68	3.71	30.25	30.25		
9	15.20	14.94	3.24	3.23	6.92	6.99	25.76	25.76		
10	14.62	14.33	3.62	3.61	7.94	8.03	30.85	30.85		
11	14.85	14.53	3.50	3.49	7.71	7.81	34.81	34.81		
12	14.83	14.48	3.49	3.48	7.32	7.42	34.95	34.95		
13	14.76	14.38	3.50	3.49	6.86	6.96	35.44	35.44		
14	14.70	14.29	3.53	3.52	6.28	6.38	35.88	35.88		
15	14.74	14.30	3.56	3.55	6.05	6.16	37.97	37.97		
16	14.91	14.44	3.45	3.44	5.58	5.68	38.05	38.05		
17										
18										
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20										
21										
22										
23										
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25										
26										
27										
28										
29										
30										
MEAN :		14.37		3.58		6.85		31.79		

Zero Check	0.50	0.00	0.00	0.00
Span Check	15.50	16.00	8.30	41.48
Initial Span Value	15.02	15.95	8.46	41.48
Drift, Percent	−0.1	0.3	−1.9	0.0
Zero Drift, Zcf	0.03125	0.00000	0.00000	0.00000
Span Drift, Scf	−0.00008	0.00020	−0.00118	0.00000

Drift, Percent = [(Span Check − Zero Check) − Calib. Gas] / Calib. Gas x 100

Zero Drift Correction Factor, Zcf = Zero Check / # of Readings

Span Drift Correction Factor, Scf = (% Drift / 100) / # of Readings

Cz, Zero Corr. Concentration = measured value − [Zcf x (Point # − 0.5)]

Drift Corrected Reading = Cz / [1 + (Scf x (Point # − 0.5))]

GAS ANALYZER DATA

GAVIOTA OIL AND GAS PLANT
SCR OUTLET

Date : 05/11/93
Run No. : 4

	O2, %		CO2, %		NOx, ppm		CO, ppm		SO2, ppm	
	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading
Point #										
1	14.98	14.96	3.43	3.43	5.77	5.78	37.12	37.12		
2	14.94	14.89	3.43	3.43	5.51	5.53	36.09	36.09		
3	14.85	14.76	3.44	3.44	5.37	5.40	35.47	35.47		
4	14.88	14.76	3.45	3.45	5.09	5.13	38.50	38.50		
5	14.79	14.63	3.48	3.48	9.18	9.25	34.62	34.62		
6	14.78	14.59	3.48	3.48	9.17	9.25	35.00	35.00		
7	14.77	14.54	3.49	3.49	8.82	8.91	35.47	35.47		
8	14.78	14.52	3.50	3.50	7.80	7.90	35.41	35.41		
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29										
30										
MEAN :		14.71		3.46		7.14		35.96		

Zero Check	0.30	0.00	−0.05	0.00
Span Check	15.30	15.95	8.35	41.48
Initial Span Value	15.02	15.95	8.46	41.48
Drift, Percent	−0.1	0.0	−0.7	0.0
Zero Drift, Zcf	0.03750	0.00000	−0.00625	0.00000
Span Drift, Scf	−0.00017	0.00000	−0.00089	0.00000

Drift, Percent = [(Span Check − Zero Check) − Calib. Gas] / Calib. Gas x 100

Zero Drift Correction Factor, Zcf = Zero Check / # of Readings

Span Drift Correction Factor, Scf = (% Drift / 100) / # of Readings

Cz, Zero Corr. Concentration = measured value − [Zcf x (Point # − 0.5)]

Drift Corrected Reading = Cz / [1 + (Scf x (Point # − 0.5))]

GAS ANALYZER DATA

GAVIOTA OIL AND GAS PLANT
SCR OUTLET

Date : 05/11/93
Run No. : 5

	O2, %		CO2, %		NOx, ppm		CO, ppm		SO2, ppm	
	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading
Point #										
1	14.60	14.60	3.59	3.59	4.69	4.69	35.91	35.91		
2	14.55	14.55	3.62	3.62	4.78	4.78	35.56	35.56		
3	13.91	13.91	4.02	4.03	5.14	5.14	33.60	33.60		
4	14.21	14.21	3.87	3.88	4.81	4.81	32.45	32.45		
5	14.05	14.05	3.92	3.94	9.07	9.07	26.62	26.62		
6	14.00	14.00	3.93	3.95	9.12	9.12	26.65	26.65		
7	14.12	14.12	3.85	3.87	8.99	8.99	27.12	27.12		
8	14.16	14.16	3.81	3.83	7.94	7.94	28.98	28.98		
9										
10										
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25										
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27										
28										
29										
30										
MEAN :		14.20		3.84		6.82		30.86		

Zero Check	0.00	0.00	0.00	0.00
Span Check	15.02	15.84	8.46	41.48
Initial Span Value	15.02	15.95	8.46	41.48
Drift, Percent	0.0	−0.7	0.0	0.0
Zero Drift, Zcf	0.00000	0.00000	0.00000	0.00000
Span Drift, Scf	0.00000	−0.00086	0.00000	0.00000

Drift, Percent = [(Span Check − Zero Check) − Calib. Gas] / Calib. Gas x 100

Zero Drift Correction Factor, Zcf = Zero Check / # of Readings

Span Drift Correction Factor, Scf = (% Drift / 100) / # of Readings

Cz, Zero Corr. Concentration = measured value − [Zcf x (Point # − 0.5)]

Drift Corrected Reading = Cz / [1 + (Scf x (Point # − 0.5))]

GAS ANALYZER DATA

GAVIOTA OIL AND GAS PLANT
SCR OUTLET

Date : 05/11/93
Run No. : 6

	O2, %		CO2, %		NOx, ppm		CO, ppm		SO2, ppm	
	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading
Point #										
1	14.37	14.37	3.72	3.72	6.42	6.42	32.69	32.69		
2	14.34	14.34	3.77	3.77	5.68	5.69	29.47	29.47		
3	14.38	14.38	3.77	3.77	4.91	4.92	32.57	32.57		
4	14.30	14.30	3.80	3.80	4.91	4.93	33.32	33.32		
5	14.33	14.33	3.82	3.82	9.32	9.36	31.84	31.84		
6	14.36	14.36	3.77	3.77	9.38	9.43	32.96	32.96		
7	14.37	14.37	3.77	3.77	8.93	8.98	34.08	34.08		
8	14.31	14.31	3.80	3.80	8.20	8.25	33.95	33.95		
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28										
29										
30										
MEAN :		14.35		3.78		7.25		32.61		

Zero Check	0.00	0.00	0.00	0.00
Span Check	15.02	15.95	8.40	41.48
Initial Span Value	15.02	15.95	8.46	41.48
Drift, Percent	0.0	0.0	−0.7	0.0
Zero Drift, Zcf	0.00000	0.00000	0.00000	0.00000
Span Drift, Scf	0.00000	0.00000	−0.00089	0.00000

Drift, Percent = [(Span Check − Zero Check) − Calib. Gas] / Calib. Gas x 100

Zero Drift Correction Factor, Zcf = Zero Check / # of Readings

Span Drift Correction Factor, Scf = (% Drift / 100) / # of Readings

Cz, Zero Corr. Concentration = measured value − [Zcf x (Point # − 0.5)]

Drift Corrected Reading = Cz / [1 + (Scf x (Point # − 0.5))]

GAS ANALYZER DATA

GAVIOTA OIL AND GAS PLANT
SCR OUTLET

Date : 05/11/93
Run No. : 7

	O2, %		CO2, %		NOx, ppm		CO, ppm		SO2, ppm	
	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading
Point #										
1	12.03	12.03	3.24	3.24	7.94	7.93	25.50	25.50		
2	14.05	14.05	3.94	3.94	7.14	7.12	28.95	28.95		
3	14.02	14.02	3.94	3.94	6.29	6.26	28.24	28.24		
4	14.29	14.29	3.80	3.80	5.36	5.33	33.01	33.01		
5	14.12	14.12	3.93	3.93	9.50	9.42	27.16	27.16		
6	14.11	14.11	3.91	3.91	9.61	9.52	28.04	28.04		
7	14.21	14.21	3.87	3.87	9.31	9.20	29.56	29.56		
8	14.04	14.04	3.95	3.95	8.65	8.54	27.24	27.24		
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30										
MEAN :		13.86		3.82		7.92		28.46		

Zero Check	0.00	0.00	0.00	0.00
Span Check	15.02	15.95	8.58	41.48
Initial Span Value	15.02	15.95	8.46	41.48
Drift, Percent	0.0	0.0	1.4	0.0
Zero Drift, Zcf	0.00000	0.00000	0.00000	0.00000
Span Drift, Scf	0.00000	0.00000	0.00177	0.00000

Drift, Percent = [(Span Check – Zero Check) – Calib. Gas] / Calib. Gas x 100

Zero Drift Correction Factor, Zcf = Zero Check / # of Readings

Span Drift Correction Factor, Scf = (% Drift / 100) / # of Readings

Cz, Zero Corr. Concentration = measured value – [Zcf x (Point # – 0.5)]

Drift Corrected Reading = Cz / [1 + (Scf x (Point # – 0.5))]

GAS ANALYZER DATA

GAVIOTA OIL AND GAS PLANT
SCR OUTLET

Date : 05/11/93
Run No. : 8

	O2, %		CO2, %		NOx, ppm		CO, ppm		SO2, ppm	
	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading
Point #										
1	14.26	14.26	3.75	3.75	7.12	7.12	28.62	28.62		
2	14.19	14.19	3.79	3.79	7.12	7.13	28.43	28.43		
3	13.90	13.90	3.95	3.95	7.44	7.46	27.06	27.06		
4	14.03	14.03	3.91	3.91	5.74	5.76	28.89	28.89		
5	13.75	13.75	4.02	4.02	9.35	9.40	24.81	24.81		
6	13.80	13.80	4.03	4.03	9.32	9.38	24.12	24.12		
7	13.83	13.83	4.01	4.01	9.03	9.10	24.38	24.38		
8	13.81	13.81	4.02	4.02	8.96	9.04	23.47	23.47		
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30										
MEAN :		13.95		3.94		8.05		26.22		

Zero Check	0.00	0.00	0.00	0.00
Span Check	15.02	15.95	8.38	41.48
Initial Span Value	15.02	15.95	8.46	41.48
Drift, Percent	0.0	0.0	−0.9	0.0
Zero Drift, Zcf	0.00000	0.00000	0.00000	0.00000
Span Drift, Scf	0.00000	0.00000	−0.00118	0.00000

Drift, Percent = [(Span Check − Zero Check) − Calib. Gas] / Calib. Gas x 100

Zero Drift Correction Factor, Zcf = Zero Check / # of Readings

Span Drift Correction Factor, Scf = (% Drift / 100) / # of Readings

Cz, Zero Corr. Concentration = measured value − [Zcf x (Point # − 0.5)]

Drift Corrected Reading = Cz / [1 + (Scf x (Point # − 0.5))]

GAS ANALYZER DATA

GAVIOTA OIL AND GAS PLANT
SCR OUTLET

Date : 05/11/93
Run No. : 10

	O2, %		CO2, %		NOx, ppm		CO, ppm		SO2, ppm	
	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading
Point #										
1	13.92	13.92	3.96	3.96	6.52	6.52	27.24	27.24		
2	14.15	14.15	3.87	3.87	6.07	6.07	25.41	25.41		
3	14.19	14.19	3.82	3.82	5.30	5.31	26.05	26.05		
4	14.10	14.10	3.88	3.88	5.46	5.47	27.57	27.57		
5	14.52	14.52	3.97	3.97	10.55	10.57	24.67	24.67		
6	13.93	13.93	3.96	3.96	9.92	9.94	25.33	25.33		
7	13.98	13.98	3.94	3.94	9.83	9.85	25.31	25.31		
8	13.93	13.93	4.03	4.03	9.29	9.32	23.96	23.96		
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30										
MEAN :		14.09		3.93		7.88		25.69		

Zero Check	0.00	0.00	0.00	0.00
Span Check	15.02	15.95	23.13	41.48
Initial Span Value	15.02	15.95	23.20	41.48
Drift, Percent	0.0	0.0	−0.3	0.0
Zero Drift, Zcf	0.00000	0.00000	0.00000	0.00000
Span Drift, Scf	0.00000	0.00000	−0.00038	0.00000

Drift, Percent = [(Span Check − Zero Check) − Calib. Gas] / Calib. Gas x 100

Zero Drift Correction Factor, Zcf = Zero Check / # of Readings

Span Drift Correction Factor, Scf = (% Drift / 100) / # of Readings

Cz, Zero Corr. Concentration = measured value − [Zcf x (Point # − 0.5)]

Drift Corrected Reading = Cz / [1 + (Scf x (Point # − 0.5))]

ENGINEERING–SCIENCE, INC.
CEM FIELD DATA SHEET

PLANT: CHEVRON GAVIOTA
TEST LOCATION: SCR OUTLET
CEM VAN NO.: 3
DATE: 5-11-93
OPERATOR: JP

O2, % 0-25
Calibration Gases :

High	20.9	Cyl. #	
Mid	15.02	Cyl. #	AAL12850
Low	8.017	Cyl. #	ALM008255

CO2, % 0-20
Calibration Gases :

High	15.95	Cyl. #	ALM008255
Mid	7.862	Cyl. #	ALM42850
Low	.	Cyl. #	

NOx, ppm
Calibration Gases :

High	84.22	Cyl. #	ALM008231
Mid	51.10	Cyl. #	ALM005581
Low	23.2	Cyl. #	AAL2534
	8.46		ALM022850

CO, ppm
Calibration Gases :

High	84.71	Cyl. #	ALM008231
Mid	41.48	Cyl. #	ALM005581
Low	18.56	Cyl. #	AAL2534

SO2, ppm
Calibration Gases :

High		Cyl. #	
Mid		Cyl. #	
Low		Cyl. #	

Calibration Gases :

High		Cyl. #	
Mid		Cyl. #	
Low		Cyl. #	

TIME	SAMPLE POINT	O2 (%)	CO2 (%)	NOx (ppm)	CO (ppm)	SO2 (ppm)		COMMENTS / RUN #
		20.9	15.95	84.22	84.71			Span gas values used for test.
								CARB MET
								CALIBRATION
		0.0	0.0	0.0	0.0			ZERO
		20.9	15.95	84.22	84.71			SPAN
								LINEARITY ✓
		20.9	15.95	84.22	84.71			HIGH
		15.25	8.0	52.0	40.2			MID
		8.2	—	23.2	17.8			LOW
		0.0	0.0	0.0	0.0			ZERO
		0.0	0.0	0.0	0.0			INTERFERENCE ✓
								LEAK ✓ @ 15" HG = 0.0
				20.0				CONVERTOR ✓ = 95.2%

ENGINEERING–SCIENCE, INC.
CEM FIELD DATA SHEET

PLANT: Chevron Gaviota
TEST LOCATION: SCR OUTLET
CEM VAN NO.: 3
DATE: 5-11-93
OPERATOR: JP

TIME	SAMPLE POINT	O2 (%)	CO2 (%)	NOx (ppm)	CO (ppm)	SO2 (ppm)		COMMENTS / RUN #
		15.02	15.95	8.46	41.48			Span gas values used for test.
		14.88	3.5	4.0	30.0			IN STACK Values
								Change CO Range to 0-50ppm
								Change NOX Range to 0-10ppm
								NOX Cals Gas 8.46ppm ALM022250
								CO cal Gas 41.48ppm
								Calibration
				0.0	0.0			ZERO
				8.46	41.48			SPAN
0927-0930	EAST PORT 1	14.67	3.62	5.03	30.08			START RUN 1
0930-0933	2	14.71	3.60	4.22	30.26			EAST PORT
0933-0936	3	14.64	3.62	4.45	30.04			
0936-0939	4	14.65	3.64	4.35	29.54			
0939-0942	5	14.56	3.65	4.63	31.10			
0942-0945	6	14.67	3.63	4.20	31.52			
0945-0948	7	14.51	3.75	4.32	32.75			
0948-0951	8	14.62	3.68	4.33	32.93			
0954-0957	SOUTH PORT 1	14.45	3.74	8.27	28.16			South Port
0957-1000	2	14.52	3.74	8.33	28.47			
1000-1003	3	14.43	3.76	8.31	29.75			
1003-1006	4	14.56	3.72	8.25	30.38			
1006-1009	5	14.53	3.74	7.76	28.93			
1009-1012	6	14.89	3.58	2.49	30.59			
1012-1015	7	14.87	3.57	2.28	29.94			
1015-1018	8	15.61	3.48	1.97	32.46			END RUN 1
Calibrate		0.0	0.0	0.0	0.0			ZERO
		15.02	16.14	8.4	41.48			SPAN

ENGINEERING–SCIENCE, INC.
CEM FIELD DATA SHEET

PLANT Chevron Gaviota CEM VAN NO. 3 DATE 5-11-93
TEST LOCATION SCR OUTLET OPERATOR JP

TIME	SAMPLE POINT	O2 (%)	CO2 (%)	NOx (ppm)	CO (ppm)	SO2 (ppm)		COMMENTS / RUN #
		15.02	15.95	8.46	41.48			Span gas values used for test.
			15.95	8.46				CAL ADJ
1042-1045	SOUTH PORT 1	14.50	3.62	8.89	31.85			START RUN 2 South Port
1045-1048	2	14.58	3.59	8.86	34.22			
1048-1051	3	14.50	3.60	8.80	32.78			
1051-1054	4	14.53	3.62	8.23	32.10			
1054-1057	5	14.73	3.48	2.80	34.81			
1057-1100	6	14.59	3.56	2.57	31.85			
1100-1103	7	14.50	3.59	2.22	29.90			
1103-1106	8	14.60	3.55	2.15	29.10			
1109-1112	EAST PORT 1	14.46	3.62	5.02	30.00			EAST PORT
1112-1115	2	14.51	3.62	4.97	29.75			
1115-1118	3	14.55	3.62	5.39	29.62			
1118-1121	4	14.41	3.67	5.28	29.08			
1121-1124	5	14.32	3.74	5.36	28.03			
1124-1127	6	14.59	3.60	4.33	31.53			
1127-1130	7	14.55	3.61	4.68	32.39			
1130-1133	8	14.76	3.50	4.49	33.12			
Calibrate		0.0	0.0	0.0	0.0			ZERO
		15.07	15.95	8.46	41.48			SPAN
		15.07						CAL ADJ
1151-1154	SOUTH PORT 1	14.16	3.76	9.27	29.72			START RUN 3 South Port
1154-1157	2	14.34	3.72	9.48	28.14			
1157-1200	3	14.31	3.71	9.42	29.66			
1200-1203	4	14.20	3.79	8.45	27.94			
1203-1206	5	14.41	3.67	6.39	29.43			
1206-1209	6	14.51	3.59	3.65	30.01			

ENGINEERING–SCIENCE, INC.
CEM FIELD DATA SHEET

PLANT: CHEVRON GAVIOTA — CEM VAN NO. 3 — DATE: 5-11-93

TEST LOCATION: SCR OUTLET — OPERATOR: JP

TIME	SAMPLE POINT	O2 (%)	CO2 (%)	NOx (ppm)	CO (ppm)	SO2 (ppm)		COMMENTS / RUN #
		15.02	15.95	8.46	41.48			Span gas values used for test.
1209-1212	South Port 7	14.59	3.59	3.62	29.70			
1212-1215	8	14.58	3.57	3.68	30.25			PORT CHANGE
1218-1221	EAST PORT 1	15.20	3.24	6.92	25.76			EAST PORT
1221-1224	2	14.62	3.62	7.94	30.85			
1224-1227	3	14.85	3.50	7.71	34.81			
1227-1230	4	14.83	3.49	7.32	34.95			
1230-1233	5	14.76	3.50	6.86	35.44			
1233-1236	6	14.70	3.53	6.28	35.88			
1236-1239	7	14.74	3.56	6.05	37.97			
1239-1242	8	14.91	3.45	5.58	38.05			END of RUN 3
Calibrate		.5	0.0	0.0	0.0			ZERO ✓
		15.5	16.0	8.3	41.48			SPAN ✓
		15.02	15.95	8.46				CGL ADJ
1328-1332	EAST PORT 1	14.98	3.43	5.77	37.12			START RUN 4 EAST PORT
1332-1336	2	14.94	3.43	5.51	36.09			
1336-1340	3	14.85	3.44	5.37	35.47			
1340-1344	4	14.88	3.45	5.09	38.50			PORT CHANGE
1348-1352	SOUTH PORT 1	14.79	3.48	9.18	34.62			SOUTH PORT
1352-1356	2	14.78	3.48	9.17	35.00			
1356-1400	3	14.77	3.49	8.82	35.47			
1400-1404	4	14.78	3.50	7.80	35.41			
Calibrate		.3	0.0	-.05	0.0			ZERO ✓
		15.3	15.95	8.35	41.48			SPAN ✓
		15.02		8.46				Cal ADJ

ENGINEERING–SCIENCE, INC.
CEM FIELD DATA SHEET

PLANT Chevron Gaviota CEM VAN NO. 3 DATE 5-11-93
TEST LOCATION SCR OUTLET OPERATOR JP

TIME	SAMPLE POINT	O2 (%)	CO2 (%)	NOx (ppm)	CO (ppm)	SO2 (ppm)		COMMENTS / RUN #
		15.02	15.95	8.46	41.48			Span gas values used for test.
1448-1452	EAST PORT 1	14.60	3.59	4.69	35.91			START RUN 5 EAST PORT
1452-1456	2	14.55	3.62	4.78	35.36			
1456-1500	3	13.91	4.02	5.14	33.60			
1500-1504	4	14.21	3.87	4.81	32.45			PORT CHANGE
1508-1512	SOUTH PORT 1	14.05	3.92	9.07	26.62			SOUTH PORT
1512-1516	2	14.00	3.93	9.12	26.65			
1516-1520	3	14.12	3.85	8.99	27.12			
1520-1524	4	14.16	3.81	7.94	28.98			
Calibrate		0.0	0.0	0.0	0.0			ZERO
		15.02	15.84	8.46	41.48			SPAN
			15.95					Cal ADJ
1540-1544	EAST PORT 1	14.37	3.72	6.42	32.69			START RUN 6 EAST PORT
1544-1548	2	14.34	3.77	5.68	29.47			
1548-1552	3	14.38	3.77	4.91	32.57			
1552-1556	4	14.30	3.80	4.91	33.32			PORT CHANGE
1600-1604	SOUTH PORT 1	14.33	3.82	9.32	31.84			SOUTH PORT
1604-1608	2	14.36	3.77	9.38	32.96			
1608-1612	3	14.37	3.77	8.93	34.08			
1612-1616	4	14.31	3.80	8.20	33.95			
Calibrate		0.0	0.0	0.0	0.0			ZERO
		15.02	15.95	8.40	41.48			SPAN
				8.46				Cal ADJ
1632-1636	EAST PORT 1	12.03	3.24	7.94	25.50			START RUN 7 EAST PORT
1636-1640	2	14.05	3.94	7.14	28.95			
1640-1644	3	14.02	3.94	6.29	28.24			
1644-1648	4	14.29	3.80	5.36	29.01			PORT CHANGE

ENGINEERING–SCIENCE, INC.
CEM FIELD DATA SHEET

PLANT: CHEVRON GAVIOTA
TEST LOCATION: SCR OUTLET
CEM VAN NO.: 3
DATE: 5-11-93
OPERATOR: JP

TIME	SAMPLE POINT	O2 (%)	CO2 (%)	NOx (ppm)	CO (ppm)	SO2 (ppm)		COMMENTS / RUN #
		15.02	15.95	8.46	41.48			Span gas values used for test.
1652-1656	SOUTH PORT 1	14.12	3.93	9.50	27.16			
1656-1700	2	14.11	3.91	9.61	28.04			
1704-1708	3	14.21	3.87	9.31	29.56			
1708-1712	4	14.04	3.95	8.65	27.24			
Calibrate		0.0	0.0	0.0	0.0			ZERO
		15.02	15.95	8.58	41.48			SPAN
				8.46				Calibrate ADJ
1728-1732	EAST PORT 1	14.26	3.75	7.12	28.62			START RUN 8 EAST PORT
1732-1736	2	14.19	3.79	7.12	28.43			
1736-1740	3	13.90	3.95	7.44	27.06			
1740-1744	4	14.03	3.91	5.74	28.89			PORT CHANGE
1748-1752	SOUTH PORT 1	13.75	4.02	9.35	24.81			SOUTH PORT
1752-1756	2	13.80	4.03	9.32	24.12			
1756-1800	3	13.83	4.01	9.03	24.38			
1800-1804	4	13.81	4.02	8.96	23.47			
Calibrate		0.0	0.0	0.0	0.0			ZERO ✓
		15.02	15.95	8.38	41.48			SPAN ✓
				8.46				Cal ADJ
1824-1828	EAST PORT 1	14.26	3.92	6.70	26.87			START RUN 9 EAST PORT
1828-1832	2	14.43	3.84	7.01	27.02			
1832-1836	3	14.06	3.92	7.20	26.56			
1836-1840	4	14.03	3.95	5.86	28.54			PORT CHANGE
1844-1848								SOUTH PORT NOX off scale
								ABORTED - CHANGE NOX RANGE
								TO 0-25 PPM

ENGINEERING–SCIENCE, INC.
CEM FIELD DATA SHEET

PLANT: CHEVRON Gaviota
TEST LOCATION: SCR OUT LET
CEM VAN NO.: 3
DATE: 5-11-93
OPERATOR: JP

TIME	SAMPLE POINT	O2 (%)	CO2 (%)	NOx (ppm)	CO (ppm)	SO2 (ppm)		COMMENTS / RUN #
		15.02	15.95	23.2	41.48			Span gas values used for test.
								NOx RANGE = 0-25 PPM
								Cal ✓
		0.0	0.0	0.0	0.0			ZERO
		15.02	15.95	23.2	41.48			SPAN
1904-1908	EAST PORT 1	13.92	3.96	6.52	27.24			START RUN 10 EAST PORT
1908-1912	2	14.15	3.87	6.07	25.41			
1912-1916	3	14.19	3.82	5.30	26.05			
1916-1920	4	14.16	3.88	5.46	27.57			PORT CHANGE
1924-1928	South Port 1	14.52	3.97	10.55	24.67			South Port.
1928-1932	2	13.93	3.96	9.92	25.33			
1932-1936	3	13.98	3.94	9.83	25.31			
1936-1940	4	13.93	4.03	9.29	23.96			
Calibrate		0.0	0.0	0.0	0.0			ZERO
		15.02	15.95	23.13	41.48			SPAN
		14.98	15.6	23.63	41.0			System Bias ✓
								Response ✓
								upscale / DOWNscale
								1 65 sec / 1 82 sec
								2 60 sec / 2 82 sec
								3 61 sec / 3 85 sec
								AVG 62 sec / AVG 83 sec

SCR Outlet
ES Data Acquisition System
5/11/93

09:27:00 05/11/93
#01 14.59 % #02 4.33 PPM #03 3.71 % #04 29.06 PPM
CHEVRON GAVIOTA
START RUN 1
09:30:00 05/11/93
#01 14.67 % #02 5.03 PPM #03 3.62 % #04 30.08 PPM
09:33:00 05/11/93
#01 14.71 % #02 4.22 PPM #03 3.60 % #04 30.26 PPM
09:36:00 05/11/93
#01 14.64 % #02 4.45 PPM #03 3.62 % #04 30.04 PPM
09:39:00 05/11/93
#01 14.65 % #02 4.35 PPM #03 3.64 % #04 29.54 PPM
09:42:00 05/11/93
#01 14.56 % #02 4.63 PPM #03 3.65 % #04 31.10 PPM
09:45:00 05/11/93
#01 14.67 % #02 4.20 PPM #03 3.63 % #04 31.52 PPM
09:48:00 05/11/93
#01 14.51 % #02 4.32 PPM #03 3.75 % #04 32.75 PPM
09:51:00 05/11/93
#01 14.62 % #02 4.33 PPM #03 3.68 % #04 32.93 PPM
PORT CHANGE
09:54:00 05/11/93
#01 17.20 % #02 2.73 PPM #03 2.11 % #04 25.08 PPM
SOUTH PORT
09:57:00 05/11/93
#01 14.45 % #02 8.27 PPM #03 3.74 % #04 28.16 PPM
10:00:00 05/11/93
#01 14.52 % #02 8.33 PPM #03 3.74 % #04 28.47 PPM
10:03:00 05/11/93
#01 14.43 % #02 8.31 PPM #03 3.76 % #04 29.75 PPM
10:06:00 05/11/93
#01 14.56 % #02 8.25 PPM #03 3.72 % #04 30.38 PPM
10:09:00 05/11/93
#01 14.53 % #02 7.76 PPM #03 3.74 % #04 28.93 PPM
10:12:00 05/11/93
#01 14.89 % #02 2.49 PPM #03 3.58 % #04 30.59 PPM
10:15:00 05/11/93
#01 14.87 % #02 2.28 PPM #03 3.57 % #04 29.94 PPM
10:18:00 05/11/93
#01 15.01 % #02 1.97 PPM #03 3.48 % #04 32.46 PPM
END RUN 1
10:21:00 05/11/93
#01 10.42 % #02 1.36 PPM #03 2.36 % #04 25.86 PPM
10:24:00 05/11/93
#01 0.02 % #02 8.44 PPM #03 -0.00 % #04 6.68 PPM
10:27:00 05/11/93
#01 10.34 % #02 0.29 PPM #03 13.98 % #04 0.80 PPM
10:30:00 05/11/93
#01 5.26 % #02 ---- PPM #03 9.38 % #04 11.10 PPM
10:33:00 05/11/93
#01 0.11 % #02 ---- PPM #03 -0.01 % #04 20.43 PPM
10:36:00 05/11/93
#01 0.02 % #02 -0.72 PPM #03 -0.01 % #04 6.21 PPM
10:39:00 05/11/93
#01 4.44 % #02 3.79 PPM #03 8.79 % #04 5.72 PPM
10:42:00 05/11/93
#01 14.55 % #02 8.88 PPM #03 3.63 % #04 31.05 PPM
START RUN 2
SOUTH PORT
10:45:00 05/11/93
#01 14.50 % #02 8.98 PPM #03 3.62 % #04 31.85 PPM
10:48:00 05/11/93
#01 14.58 % #02 8.86 PPM #03 3.59 % #04 34.22 PPM
10:51:00 05/11/93

#01 14.53 % #02 8.23 PPM #03 3.62 % #04 32.10 PPM
10:57:00 05/11/93
#01 14.73 % #02 2.80 PPM #03 3.48 % #04 34.81 PPM
11:00:00 05/11/93
#01 14.59 % #02 2.57 PPM #03 3.56 % #04 31.85 PPM
11:03:00 05/11/93
#01 14.50 % #02 2.22 PPM #03 3.59 % #04 29.90 PPM
11:06:00 05/11/93
#01 14.60 % #02 2.15 PPM #03 3.55 % #04 29.10 PPM
PORT CHANGE
11:09:00 05/11/93
#01 17.31 % #02 2.13 PPM #03 2.01 % #04 18.06 PPM
~~SOUTH PORT~~
EAST PORT
11:12:00 05/11/93
#01 14.46 % #02 5.02 PPM #03 3.62 % #04 30.00 PPM
11:15:00 05/11/93
#01 14.51 % #02 4.97 PPM #03 3.62 % #04 29.75 PPM
11:18:00 05/11/93
#01 14.55 % #02 5.39 PPM #03 3.62 % #04 29.62 PPM
11:21:00 05/11/93
#01 14.41 % #02 5.28 PPM #03 3.67 % #04 29.08 PPM
11:24:00 05/11/93
#01 14.32 % #02 5.36 PPM #03 3.74 % #04 28.03 PPM
11:27:00 05/11/93
#01 14.59 % #02 4.33 PPM #03 3.60 % #04 31.53 PPM
11:30:00 05/11/93
#01 14.55 % #02 4.68 PPM #03 3.61 % #04 32.39 PPM
11:33:00 05/11/93
#01 14.76 % #02 4.49 PPM #03 3.50 % #04 33.12 PPM
END RUN 2
11:36:00 05/11/93
#01 14.44 % #02 4.06 PPM #03 3.51 % #04 31.47 PPM
11:39:00 05/11/93
#01 0.14 % #02 -0.10 PPM #03 0.00 % #04 -0.01 PPM
11:42:00 05/11/93
#01 15.12 % #02 -0.00 PPM #03 7.95 % #04 3.58 PPM
11:45:00 05/11/93
#01 8.77 % #02 ---- PPM #03 4.46 % #04 13.88 PPM
11:48:00 05/11/93
#01 4.99 % #02 -0.90 PPM #03 9.40 % #04 9.31 PPM
11:51:00 05/11/93
#01 4.86 % #02 ---- PPM #03 3.77 % #04 6.73 PPM
START RUN 3
SOUTH PORT
11:54:00 05/11/93
#01 14.16 % #02 9.27 PPM #03 3.76 % #04 29.72 PPM
11:57:00 05/11/93
#01 14.34 % #02 9.48 PPM #03 3.72 % #04 28.14 PPM
12:00:00 05/11/93
#01 14.31 % #02 9.42 PPM #03 3.71 % #04 29.66 PPM
12:03:00 05/11/93
#01 14.20 % #02 8.45 PPM #03 3.79 % #04 27.94 PPM
12:06:00 05/11/93
#01 14.41 % #02 6.39 PPM #03 3.67 % #04 29.43 PPM
12:09:00 05/11/93
#01 14.51 % #02 3.65 PPM #03 3.59 % #04 30.01 PPM
12:12:00 05/11/93
#01 14.59 % #02 3.62 PPM #03 3.59 % #04 29.70 PPM
12:15:00 05/11/93
#01 14.58 % #02 3.68 PPM #03 3.57 % #04 30.25 PPM
12:18:00 05/11/93
#01 17.06 % #02 5.15 PPM #03 2.17 % #04 16.46 PPM Port change
12:21:00 05/11/93

#01	14.62 %	#02	7.94 PPM	#03	3.62 %	#04	30.85 PPM
12:27:00 05/11/93							
#01	14.85 %	#02	7.71 PPM	#03	3.50 %	#04	34.81 PPM
12:30:00 05/11/93							
#01	14.83 %	#02	7.32 PPM	#03	3.49 %	#04	34.95 PPM
12:33:00 05/11/93							
#01	14.76 %	#02	6.86 PPM	#03	3.50 %	#04	35.44 PPM
12:36:00 05/11/93							
#01	14.70 %	#02	6.28 PPM	#03	3.53 %	#04	35.88 PPM
12:39:00 05/11/93							
#01	14.74 %	#02	6.05 PPM	#03	3.56 %	#04	37.97 PPM
12:42:00 05/11/93							
#01	14.91 %	#02	5.58 PPM	#03	3.45 %	#04	38.05 PPM
12:45:00 05/11/93							
#01	13.03 %	#02	3.56 PPM	#03	2.38 %	#04	19.12 PPM

END RUN 3

END RUN 3

12:48:00 05/11/93							
#01	0.00 %	#02	-0.01 PPM	#03	0.07 %	#04	-0.00 PPM
12:51:00 05/11/93							
#01	6.61 %	#02	0.10 PPM	#03	3.56 %	#04	1.23 PPM
12:54:00 05/11/93							
#01	0.04 %	#02	8.35 PPM	#03	0.04 %	#04	8.08 PPM
12:57:00 05/11/93							
#01	14.96 %	#02	0.02 PPM	#03	7.98 %	#04	3.60 PPM
13:00:00 05/11/93							
#01	17.43 %	#02	0.09 PPM	#03	5.04 %	#04	1.70 PPM
13:03:00 05/11/93							
#01	0.08 %	#02	++++ PPM	#03	0.00 %	#04	39.18 PPM
13:06:00 05/11/93							
#01	4.63 %	#02	---- PPM	#03	8.93 %	#04	18.33 PPM
13:09:00 05/11/93							
#01	12.65 %	#02	4.49 PPM	#03	3.56 %	#04	21.18 PPM
13:12:00 05/11/93							
#01	14.38 %	#02	4.90 PPM	#03	3.75 %	#04	28.39 PPM
13:15:00 05/11/93							
#01	14.46 %	#02	4.81 PPM	#03	3.70 %	#04	28.05 PPM
13:18:00 05/11/93							
#01	14.54 %	#02	4.86 PPM	#03	3.64 %	#04	28.66 PPM
13:21:00 05/11/93							
#01	14.79 %	#02	4.82 PPM	#03	3.52 %	#04	31.55 PPM
13:28:00 05/11/93							
#01	14.97 %	#02	5.80 PPM	#03	3.43 %	#04	36.64 PPM

START RUN 4 EAST PORT

13:32:00 05/11/93							
#01	14.98 %	#02	5.77 PPM	#03	3.43 %	#04	37.12 PPM
13:36:00 05/11/93							
#01	14.94 %	#02	5.51 PPM	#03	3.43 %	#04	36.09 PPM
13:40:00 05/11/93							
#01	14.85 %	#02	5.37 PPM	#03	3.44 %	#04	35.47 PPM
13:44:00 05/11/93							
#01	14.88 %	#02	5.09 PPM	#03	3.45 %	#04	38.50 PPM
13:48:00 05/11/93							
#01	18.56 %	#02	3.83 PPM	#03	1.38 %	#04	3.02 PPM

PORT CHANGE

13:52:00 05/11/93							
#01	14.79 %	#02	9.18 PPM	#03	3.48 %	#04	34.62 PPM
13:56:00 05/11/93							
#01	14.78 %	#02	9.17 PPM	#03	3.48 %	#04	35.00 PPM
14:00:00 05/11/93							
#01	14.77 %	#02	8.82 PPM	#03	3.49 %	#04	35.47 PPM
14:04:00 05/11/93							
#01	14.78 %	#02	7.80 PPM	#03	3.50 %	#04	35.41 PPM

END RUN 4

14:08:00 05/11/93							
#01	0.01 %	#02	-0.05 PPM	#03	0.02 %	#04	-0.00 PPM

14:16:00 05/11/93
#01 7.18 % #02 ++++ PPM #03 3.70 % #04 5.42 PPM
14:20:00 05/11/93
#01 2.18 % #02 4.04 PPM #03 1.21 % #04 3.77 PPM
14:24:00 05/11/93
#01 12.17 % #02 -0.28 PPM #03 9.62 % #04 3.38 PPM
14:28:00 05/11/93
#01 -0.01 % #02 ++++ PPM #03 -0.01 % #04 41.52 PPM
14:32:00 05/11/93
#01 -0.02 % #02 ++++ PPM #03 -0.01 % #04 41.59 PPM
14:36:00 05/11/93
#01 -0.02 % #02 ++++ PPM #03 -0.01 % #04 41.42 PPM
14:40:00 05/11/93
#01 -0.03 % #02 ++++ PPM #03 -0.01 % #04 41.61 PPM
14:44:00 05/11/93
#01 -0.01 % #02 ++++ PPM #03 -0.01 % #04 41.61 PPM
14:48:00 05/11/93
#01 14.57 % #02 4.87 PPM #03 3.58 % #04 36.14 PPM
START RUN 5 EAST PORT
14:52:00 05/11/93
#01 14.60 % #02 4.69 PPM #03 3.59 % #04 35.91 PPM
14:56:00 05/11/93
#01 14.55 % #02 4.78 PPM #03 3.62 % #04 35.36 PPM
15:00:00 05/11/93
#01 13.91 % #02 5.14 PPM #03 4.02 % #04 33.60 PPM
15:04:00 05/11/93
#01 14.21 % #02 4.81 PPM #03 3.87 % #04 32.45 PPM
PORT CHANGE
15:08:00 05/11/93
#01 20.72 % #02 0.72 PPM #03 0.09 % #04 0.77 PPM
SOUTH PORT
15:12:00 05/11/93
#01 14.05 % #02 9.07 PPM #03 3.92 % #04 26.62 PPM
15:16:00 05/11/93
#01 14.00 % #02 9.12 PPM #03 3.93 % #04 26.65 PPM
15:20:00 05/11/93
#01 14.12 % #02 8.99 PPM #03 3.85 % #04 27.12 PPM
15:24:00 05/11/93
#01 14.16 % #02 7.94 PPM #03 3.81 % #04 28.98 PPM
END RUN 5
15:28:00 05/11/93
#01 4.98 % #02 0.12 PPM #03 2.72 % #04 0.24 PPM
15:32:00 05/11/93
#01 0.02 % #02 8.37 PPM #03 -0.04 % #04 8.20 PPM
15:36:00 05/11/93
#01 3.62 % #02 ---- PPM #03 7.01 % #04 15.62 PPM
15:40:00 05/11/93
#01 7.03 % #02 0.54 PPM #03 7.90 % #04 14.20 PPM
START RUN 6 EAST PORT
15:44:00 05/11/93
#01 14.37 % #02 6.42 PPM #03 3.72 % #04 32.69 PPM
15:48:00 05/11/93
#01 14.34 % #02 5.68 PPM #03 3.77 % #04 29.47 PPM
15:52:00 05/11/93
#01 14.38 % #02 4.91 PPM #03 3.77 % #04 32.57 PPM
15:56:00 05/11/93
#01 14.30 % #02 4.91 PPM #03 3.80 % #04 33.32 PPM
PORT CHANGE SOUTH PORT
16:00:00 05/11/93
#01 17.05 % #02 4.04 PPM #03 2.22 % #04 19.07 PPM
SOUTH PORT
16:04:00 05/11/93
#01 14.33 % #02 9.32 PPM #03 3.82 % #04 31.84 PPM
16:08:00 05/11/93

#01 14.37 % #02 8.93 PPM #03 3.77 % #04 34.08 PPM
16:16:00 05/11/93
#01 14.31 % #02 8.20 PPM #03 3.80 % #04 33.95 PPM
END RUN 6
16:20:00 05/11/93
#01 0.25 % #02 0.08 PPM #03 0.10 % #04 4.27 PPM
16:24:00 05/11/93
#01 7.52 % #02 4.33 PPM #03 3.83 % #04 4.94 PPM
16:28:00 05/11/93
#01 1.18 % #02 0.90 PPM #03 2.35 % #04 3.23 PPM
16:32:00 05/11/93
#01 -0.01 % #02 ---- PPM #03 -0.00 % #04 19.49 PPM
START RUN 7 EAST PORT
16:36:00 05/11/93
#01 12.03 % #02 7.94 PPM #03 3.24 % #04 25.50 PPM
16:40:00 05/11/93
#01 14.05 % #02 7.14 PPM #03 3.94 % #04 28.95 PPM
16:44:00 05/11/93
#01 14.02 % #02 6.29 PPM #03 3.94 % #04 28.24 PPM
16:48:00 05/11/93
#01 14.29 % #02 5.36 PPM #03 3.80 % #04 33.01 PPM
PORT CHANGE
16:52:00 05/11/93
#01 13.92 % #02 9.56 PPM #03 4.02 % #04 26.60 PPM
SOUTH PORT
16:56:00 05/11/93
#01 14.12 % #02 9.50 PPM #03 3.93 % #04 27.16 PPM
17:00:00 05/11/93
#01 14.11 % #02 9.61 PPM #03 3.91 % #04 28.04 PPM
17:04:00 05/11/93
#01 14.21 % #02 9.31 PPM #03 3.87 % #04 29.56 PPM
17:08:00 05/11/93
#01 14.04 % #02 8.65 PPM #03 3.95 % #04 27.24 PPM
END RUN 7
17:12:00 05/11/93
#01 -0.02 % #02 0.01 PPM #03 0.02 % #04 -0.01 PPM
17:16:00 05/11/93
#01 8.08 % #02 -0.41 PPM #03 4.29 % #04 1.94 PPM
17:20:00 05/11/93
#01 0.78 % #02 7.64 PPM #03 1.65 % #04 8.13 PPM
17:24:00 05/11/93
#01 0.06 % #02 ++++ PPM #03 0.00 % #04 33.96 PPM
17:28:00 05/11/93
#01 14.12 % #02 7.12 PPM #03 3.83 % #04 28.06 PPM
START RUN 8 EAST PORT
17:32:00 05/11/93
#01 14.26 % #02 7.12 PPM #03 3.75 % #04 28.62 PPM
17:36:00 05/11/93
#01 14.19 % #02 7.12 PPM #03 3.79 % #04 28.43 PPM
17:40:00 05/11/93
#01 13.90 % #02 7.44 PPM #03 3.95 % #04 27.06 PPM
17:44:00 05/11/93
#01 14.03 % #02 5.74 PPM #03 3.91 % #04 28.89 PPM
PORT CHANGE
17:48:00 05/11/93
#01 13.94 % #02 9.35 PPM #03 3.95 % #04 22.80 PPM
SOUTH PORT
17:52:00 05/11/93
#01 13.75 % #02 9.35 PPM #03 4.02 % #04 24.81 PPM
17:56:00 05/11/93
#01 13.80 % #02 9.32 PPM #03 4.03 % #04 24.12 PPM
18:00:00 05/11/93
#01 13.83 % #02 9.03 PPM #03 4.01 % #04 24.38 PPM
18:04:00 05/11/93

18:08:00 05/11/93

#01 0.01 % #02 0.02 PPM #03 0.02 % #04 0.03 PPM

18:12:00 05/11/93

#01 14.99 % #02 0.02 PPM #03 7.95 % #04 3.62 PPM

18:16:00 05/11/93

#01 2.99 % #02 6.79 PPM #03 1.48 % #04 6.68 PPM

18:20:00 05/11/93

#01 3.63 % #02 0.60 PPM #03 6.87 % #04 9.23 PPM

18:24:00 05/11/93

#01 11.51 % #02 5.88 PPM #03 3.21 % #04 17.47 PPM

START RUN 9 EAST PORT

18:28:00 05/11/93

#01 14.26 % #02 6.70 PPM #03 3.92 % #04 26.87 PPM

18:32:00 05/11/93

#01 14.43 % #02 7.01 PPM #03 3.84 % #04 27.02 PPM

18:36:00 05/11/93

#01 14.06 % #02 7.20 PPM #03 3.92 % #04 26.56 PPM

18:40:00 05/11/93

#01 14.03 % #02 5.86 PPM #03 3.95 % #04 28.54 PPM

PORT CHANGE

18:44:00 05/11/93

#01 14.96 % #02 8.13 PPM #03 3.38 % #04 22.18 PPM

18:48:00 05/11/93

#01 13.94 % #02 10.15 PPM #03 3.99 % #04 25.79 PPM

18:52:00 05/11/93

#01 0.00 % #02 0.02 PPM #03 0.00 % #04 0.06 PPM

ABORTED RUN 9

18:56:00 05/11/93

#01 0.19 % #02 ---- PPM #03 0.31 % #04 5.94 PPM

19:00:00 05/11/93

#01 10.01 % #02 ---- PPM #03 7.97 % #04 6.35 PPM

DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

DDDDDDDDDDDDD

Channel No.: 1 2 3 4

Color: — — — —

DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

DDDDDDDDDDDDD

1: O2 0 ... 25 % 3: CO2 0 ... 20 %

2: NOX 0 ... 25 PPM 4: CO 0 ... 50 PPM

19:04:00 05/11/93

#01 8.14 % #02 2.94 PPM #03 2.21 % #04 18.22 PPM

START RUN 10 EAST PORT

19:08:00 05/11/93

#01 13.92 % #02 6.52 PPM #03 3.96 % #04 27.24 PPM

19:12:00 05/11/93

#01 14.15 % #02 6.07 PPM #03 3.87 % #04 25.41 PPM

19:16:00 05/11/93

#01 14.19 % #02 5.30 PPM #03 3.82 % #04 26.05 PPM

19:20:00 05/11/93

#01 14.10 % #02 5.46 PPM #03 3.88 % #04 27.57 PPM

19:24:00 05/11/93

#01 14.52 % #02 9.09 PPM #03 3.58 % #04 24.21 PPM PORT CHANGE

19:28:00 05/11/93

#01 13.93 % #02 10.55 PPM #03 3.97 % #04 24.67 PPM

19:32:00 05/11/93

#01 13.98 % #02 9.92 PPM #03 3.96 % #04 25.33 PPM

19:36:00 05/11/93

#01 13.93 % #02 9.83 PPM #03 3.94 % #04 25.31 PPM

19:40:00 05/11/93

#01 13.82 % #02 9.29 PPM #03 4.03 % #04 23.96 PPM

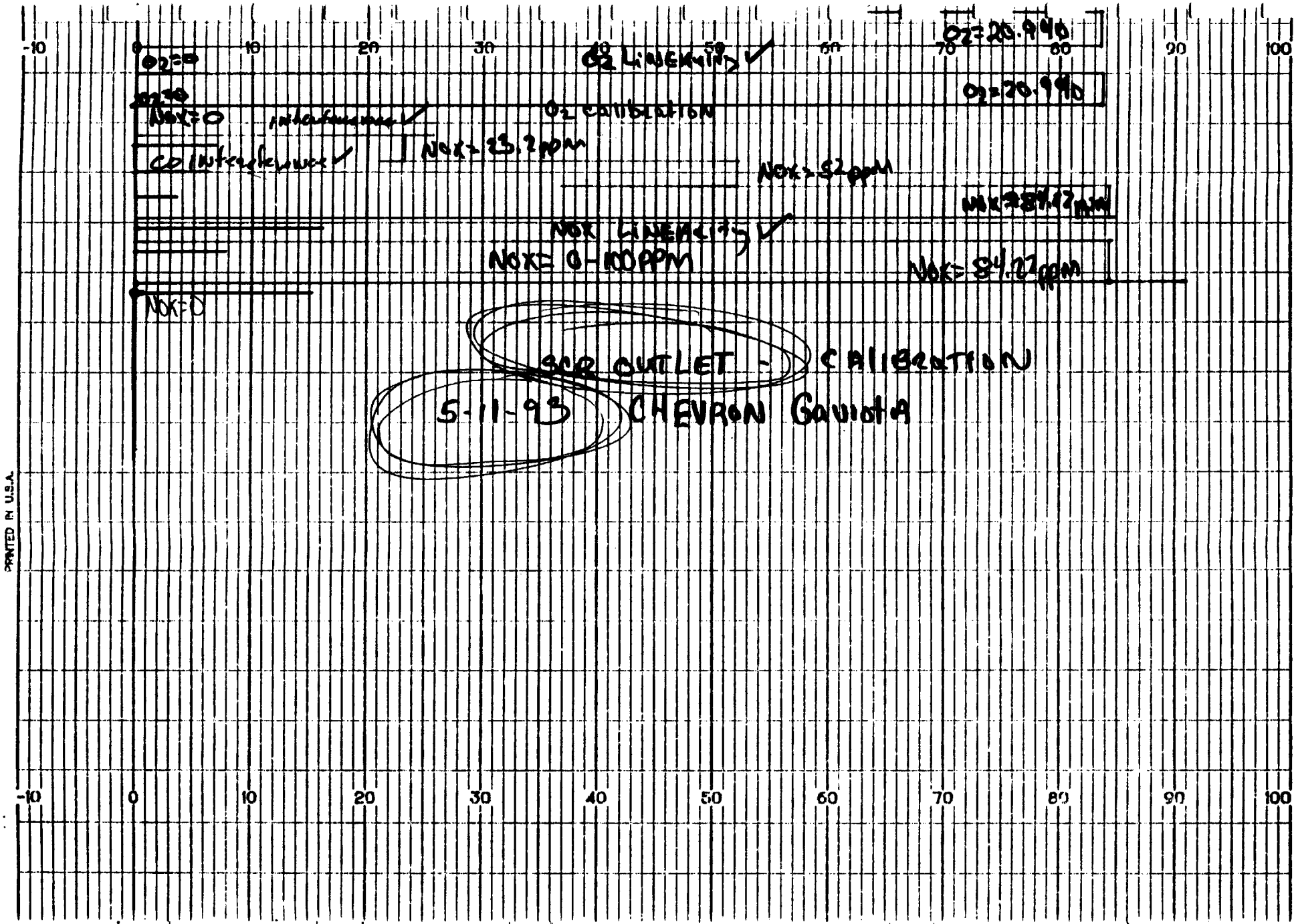
END RUN 10

19:44:00 05/11/93

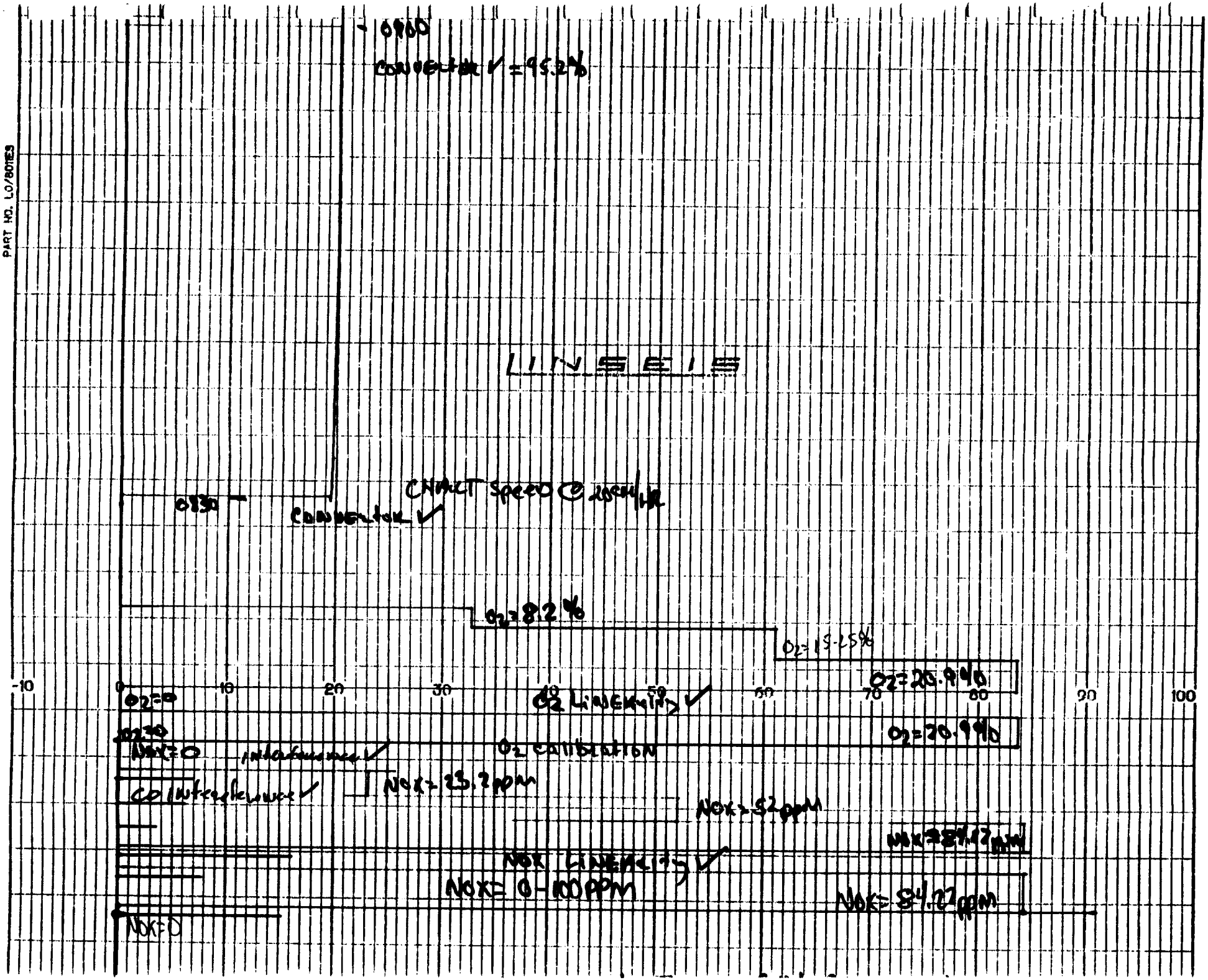
#01 0.13 % #02 0.18 PPM #03 0.01 % #04 1.38 PPM

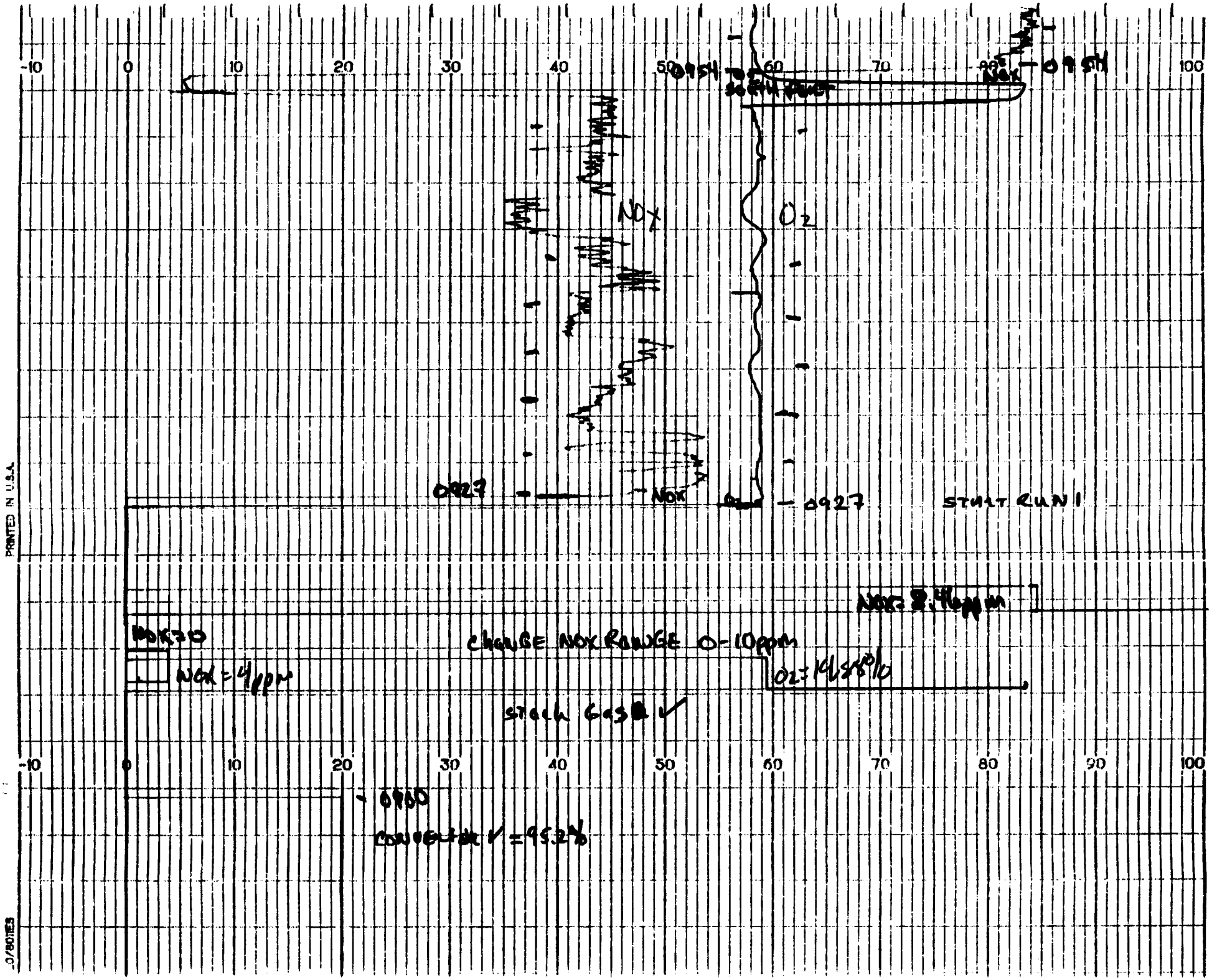
19:48:00 05/11/93

#01	0.43 %	#02	++++ PPM	#03	0.02 %	#04	35.85 PPM
19:54:00 05/11/93							
#01	0.47 %	#02	++++ PPM	#03	0.10 %	#04	37.89 PPM
19:55:00 05/11/93							
#01	2.48 %	#02	++++ PPM	#03	3.99 %	#04	33.43 PPM
19:56:00 05/11/93							
#01	3.69 %	#02	---- PPM	#03	6.50 %	#04	26.83 PPM
19:57:00 05/11/93							
#01	1.64 %	#02	22.05 PPM	#03	0.69 %	#04	6.69 PPM
19:58:00 05/11/93							
#01	0.79 %	#02	23.00 PPM	#03	0.35 %	#04	13.05 PPM
19:59:00 05/11/93							
#01	2.03 %	#02	21.19 PPM	#03	0.92 %	#04	14.82 PPM
20:00:00 05/11/93							
#01	5.52 %	#02	16.08 PPM	#03	2.80 %	#04	12.65 PPM
20:01:00 05/11/93							
#01	7.55 %	#02	13.11 PPM	#03	3.89 %	#04	10.72 PPM
20:02:00 05/11/93							
#01	6.28 %	#02	17.27 PPM	#03	1.35 %	#04	4.77 PPM
20:03:00 05/11/93							
#01	2.93 %	#02	15.60 PPM	#03	0.59 %	#04	10.91 PPM
20:04:00 05/11/93							
#01	1.90 %	#02	10.27 PPM	#03	0.39 %	#04	7.67 PPM
20:05:00 05/11/93							
#01	1.39 %	#02	7.79 PPM	#03	0.30 %	#04	5.61 PPM
20:06:00 05/11/93							
#01	1.11 %	#02	6.35 PPM	#03	0.24 %	#04	4.42 PPM
20:07:00 05/11/93							
#01	12.03 %	#02	3.13 PPM	#03	0.03 %	#04	0.14 PPM
20:08:00 05/11/93							
#01	10.50 %	#02	3.58 PPM	#03	0.66 %	#04	0.35 PPM
20:09:00 05/11/93							
#01	11.82 %	#02	5.89 PPM	#03	1.90 %	#04	7.37 PPM
20:10:00 05/11/93							
#01	12.54 %	#02	6.82 PPM	#03	2.39 %	#04	11.92 PPM
20:11:00 05/11/93							
#01	13.22 %	#02	6.43 PPM	#03	1.92 %	#04	11.76 PPM
20:12:00 05/11/93							
#01	7.98 %	#02	15.91 PPM	#03	0.03 %	#04	10.42 PPM
20:13:00 05/11/93							
#01	7.92 %	#02	15.90 PPM	#03	0.02 %	#04	10.95 PPM
20:14:00 05/11/93							
#01	7.61 %	#02	16.22 PPM	#03	0.02 %	#04	11.12 PPM
20:15:00 05/11/93							
#01	5.64 %	#02	18.31 PPM	#03	0.01 %	#04	12.33 PPM
20:16:00 05/11/93							
#01	4.44 %	#02	19.48 PPM	#03	0.01 %	#04	13.59 PPM


-10
0
10
20
30
40
50
60
70
80
90
100
O2=20.9%
O2 LINEARITY ✓
O2=20.9%
O2 CALIBRATION
NOX=0
interference ✓
CO interference ✓
NOX=23.2PPM
NOX=52PPM
NOX=88.42PPM
NOX LINEARITY ✓
NOX= 0-100PPM
NOX=84.27PPM
NOX=0
SCR OUTLET - CALIBRATION
5-11-93 CHEVRON Gaviota
PRINTED IN U.S.A.

PART NO. LO/80MES





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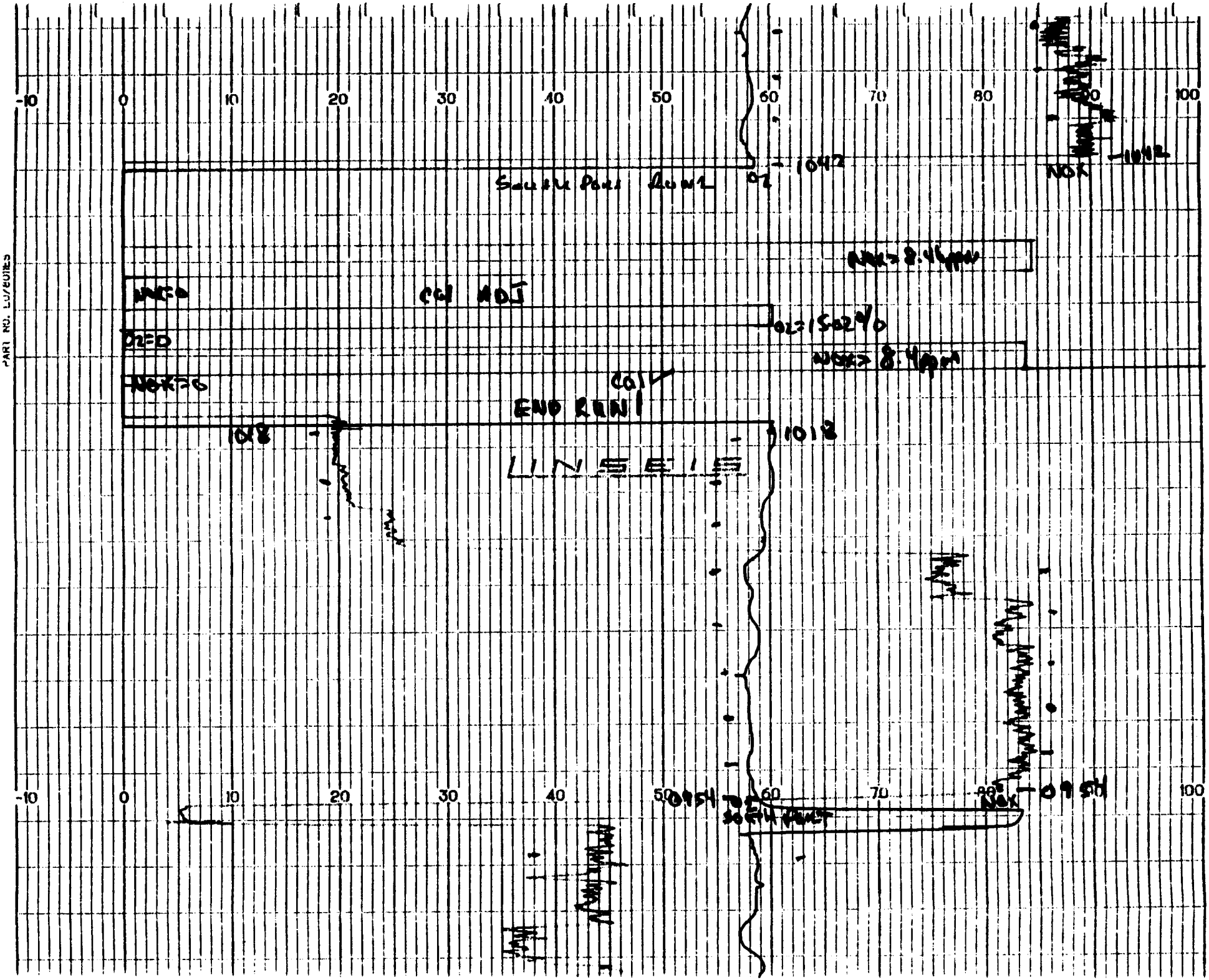
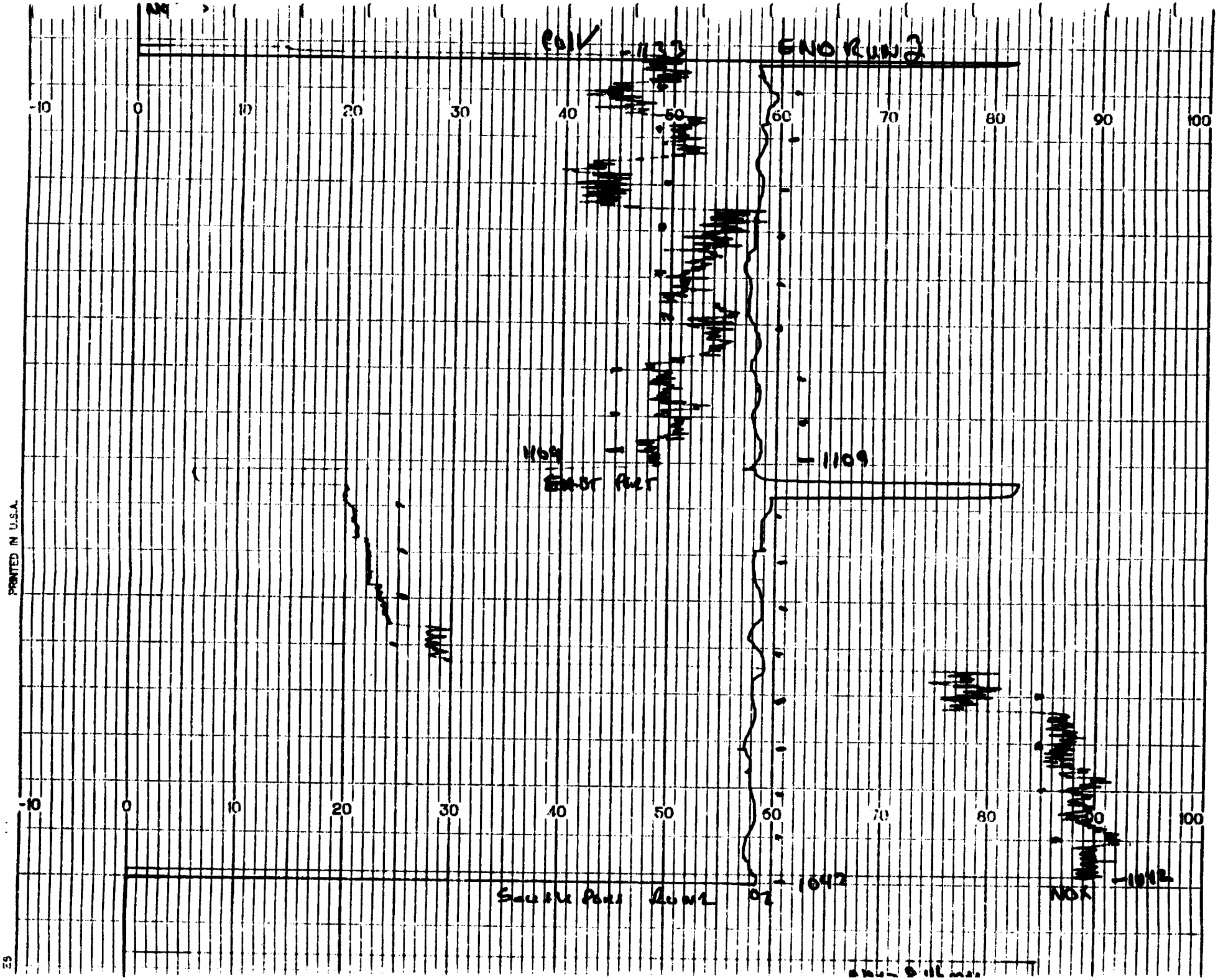


PART NO. LO/BOXES



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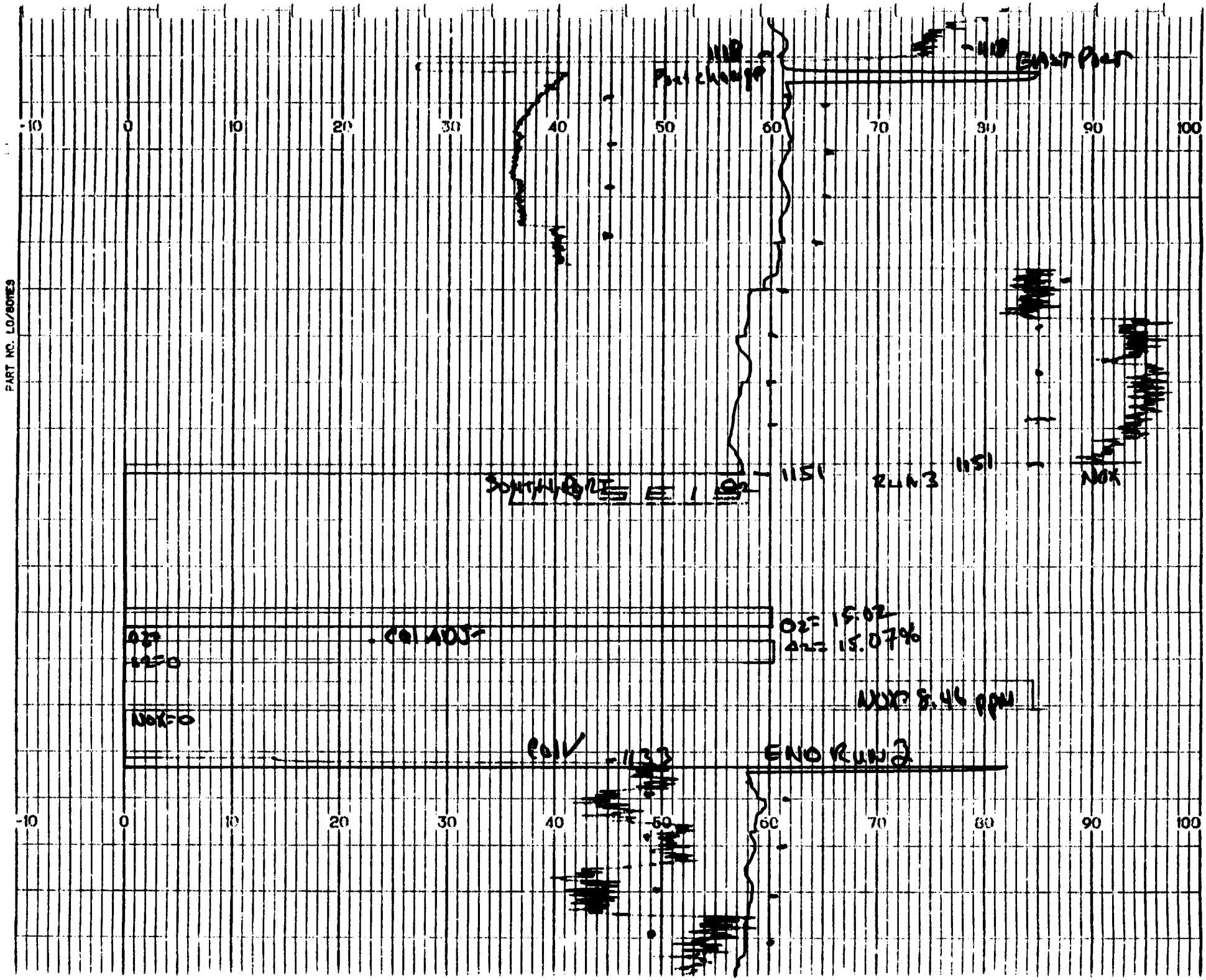
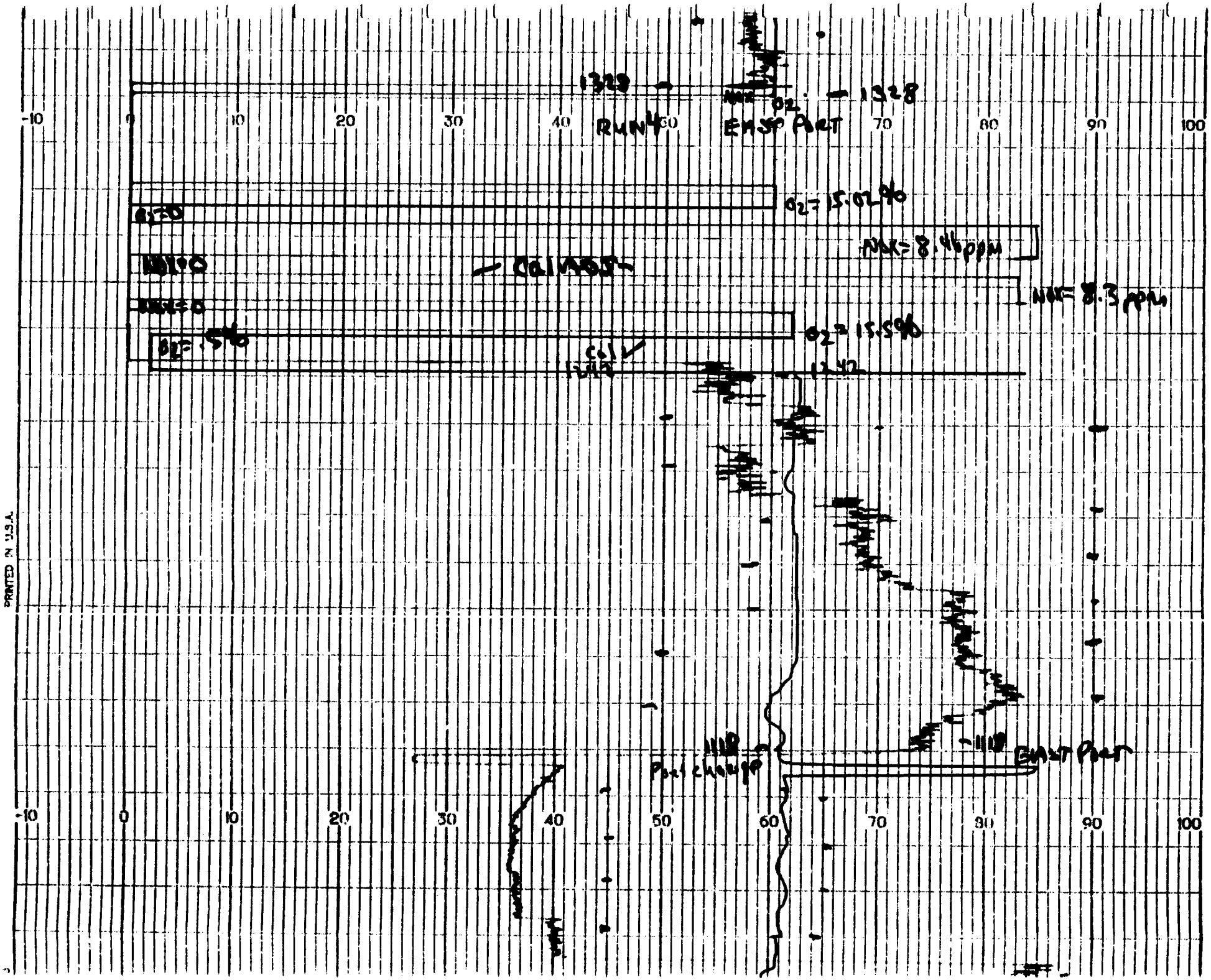

-10
0
10
20
30
40
50
60
70
80
90
100
BURST PLOT
RUN 3
1151
NOX
O2= 15.02
15.07%
NOX 8.46 ppm
END RUN 2
PART NO. LO/80TE3



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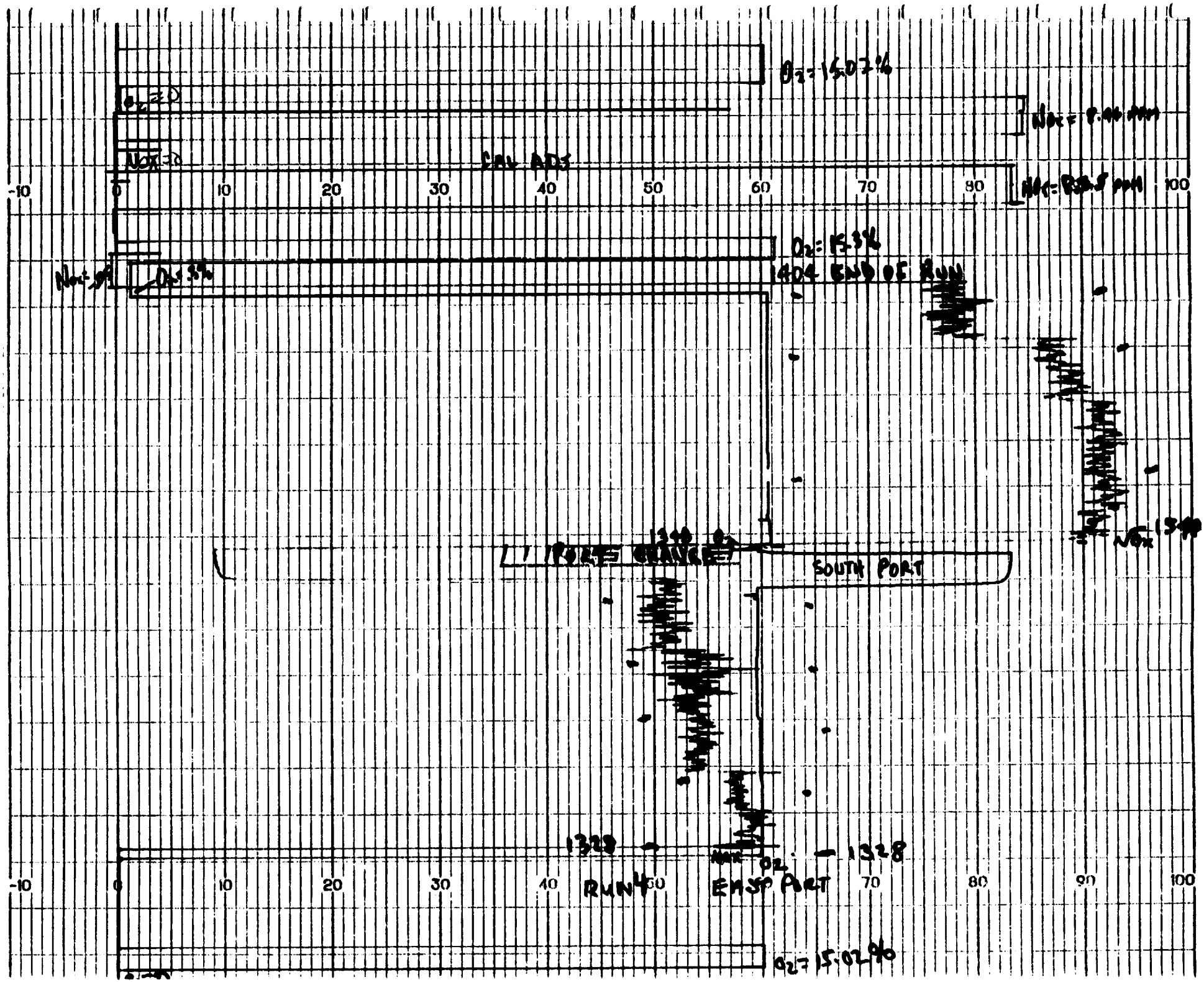
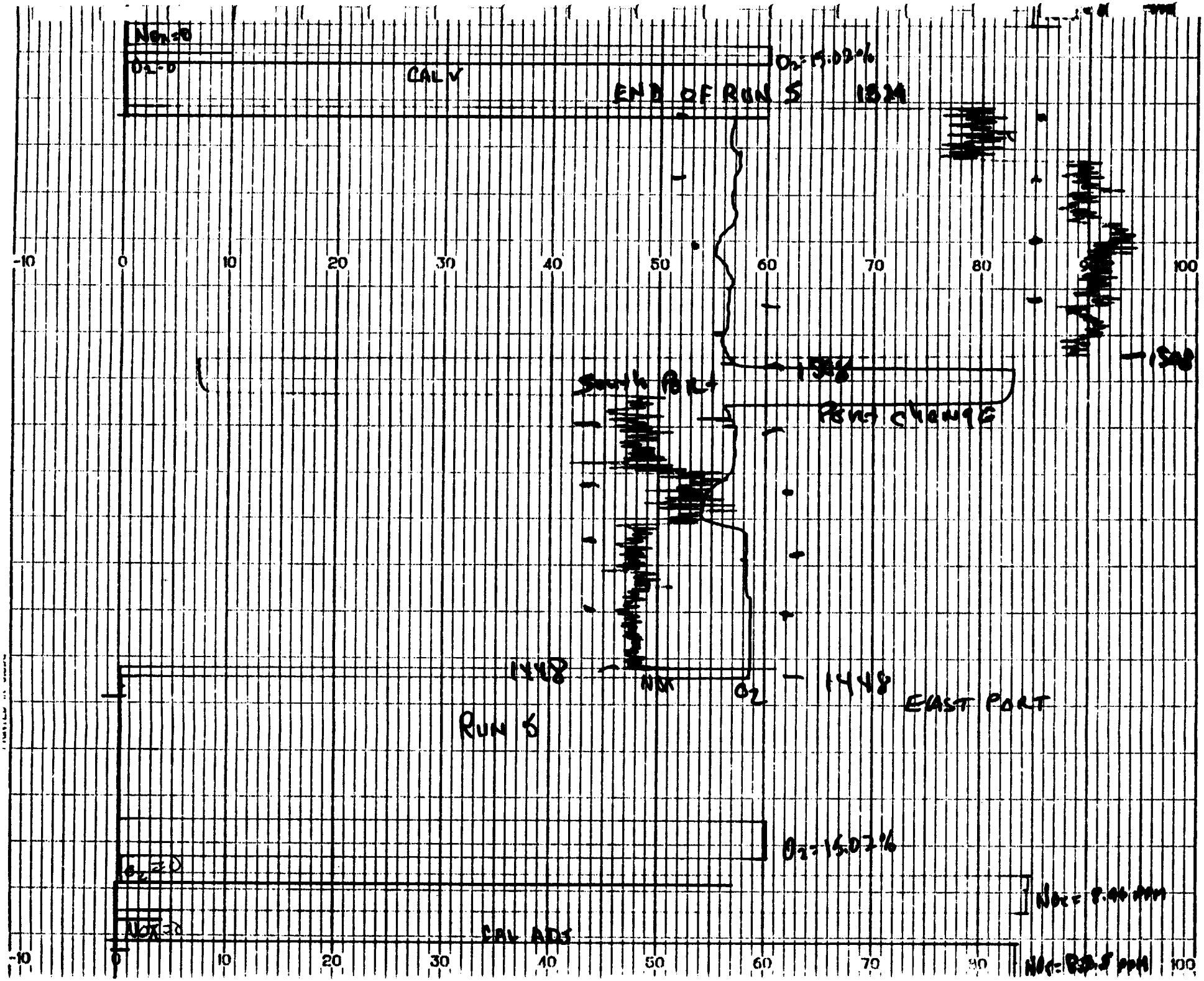
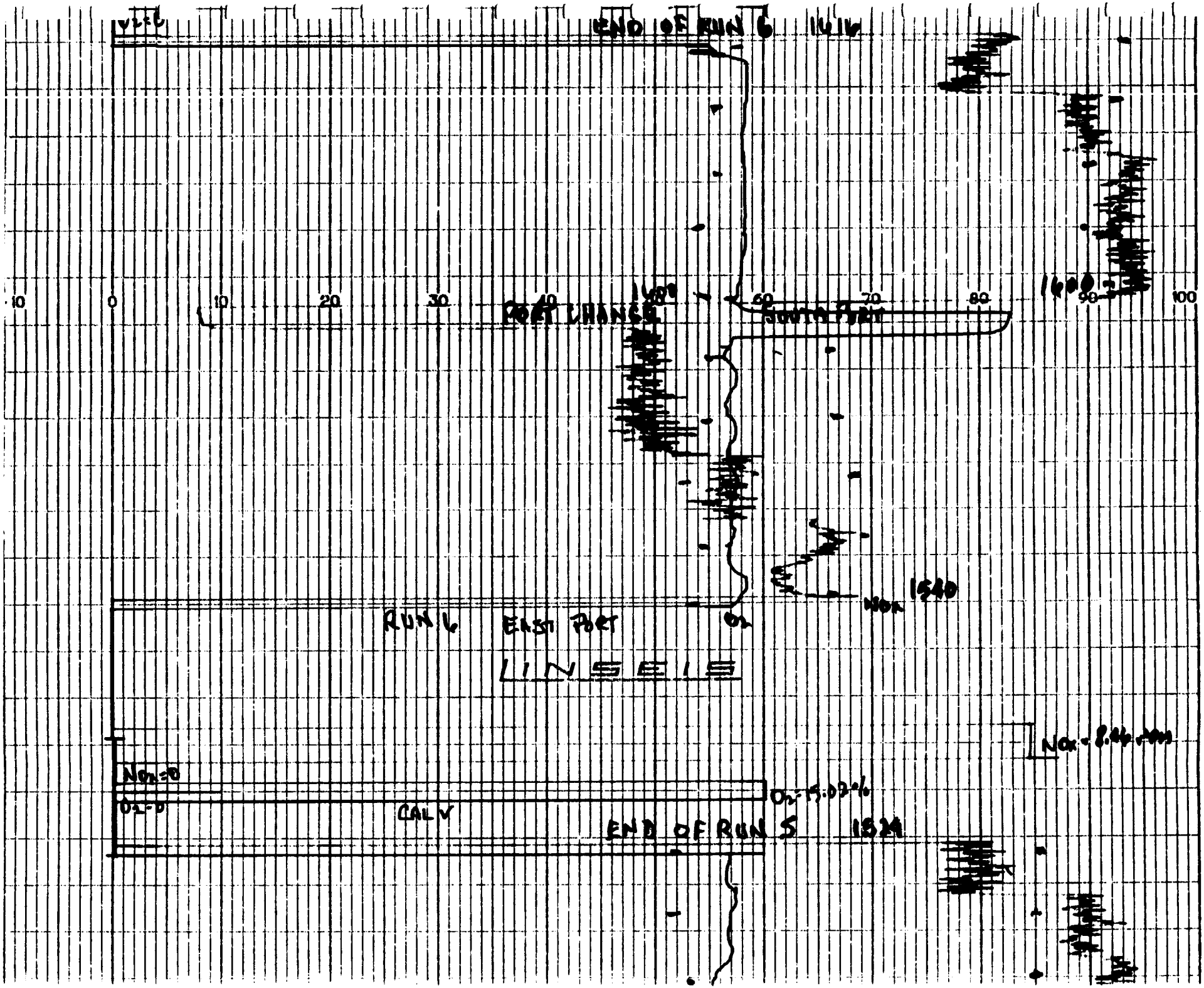
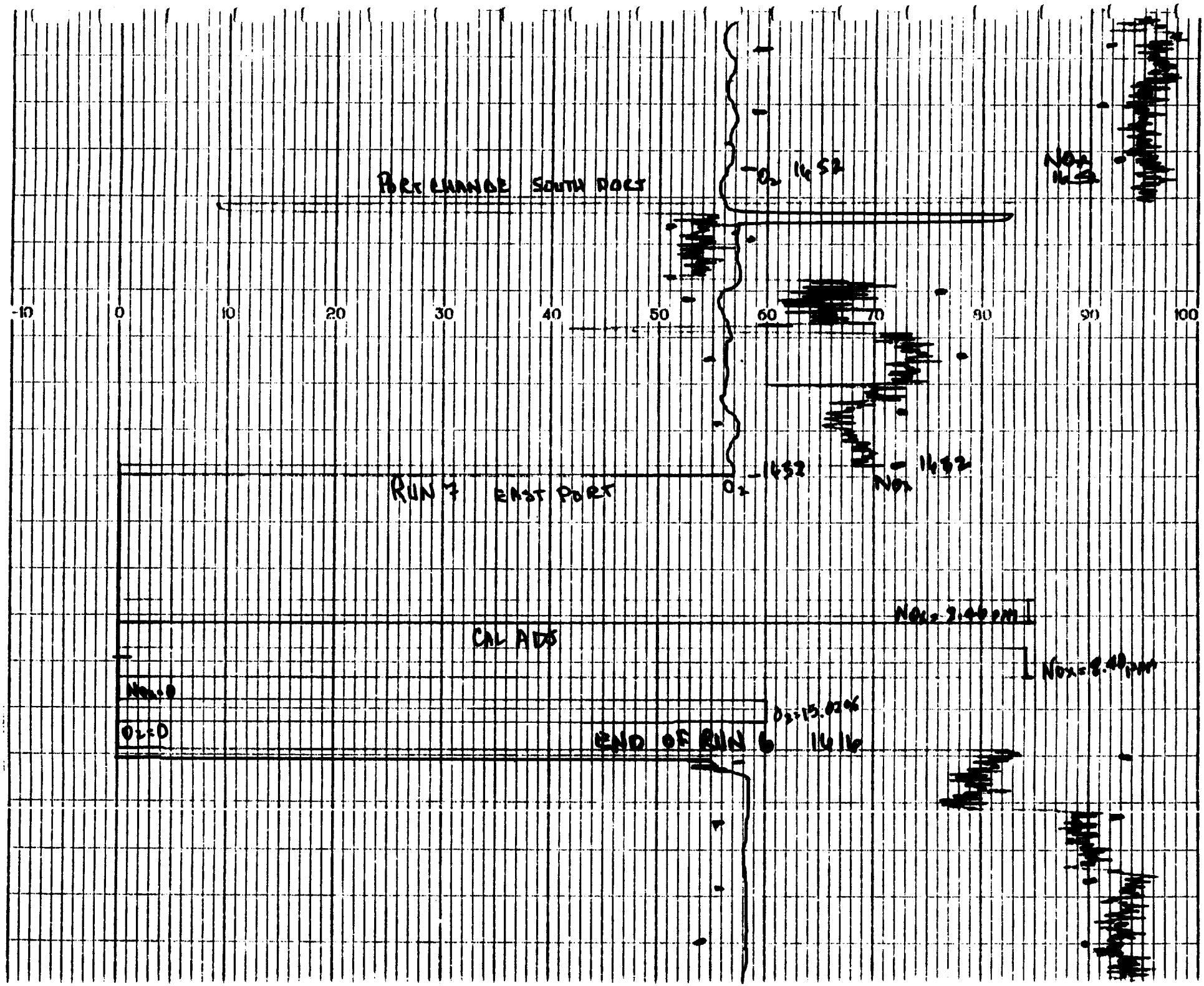
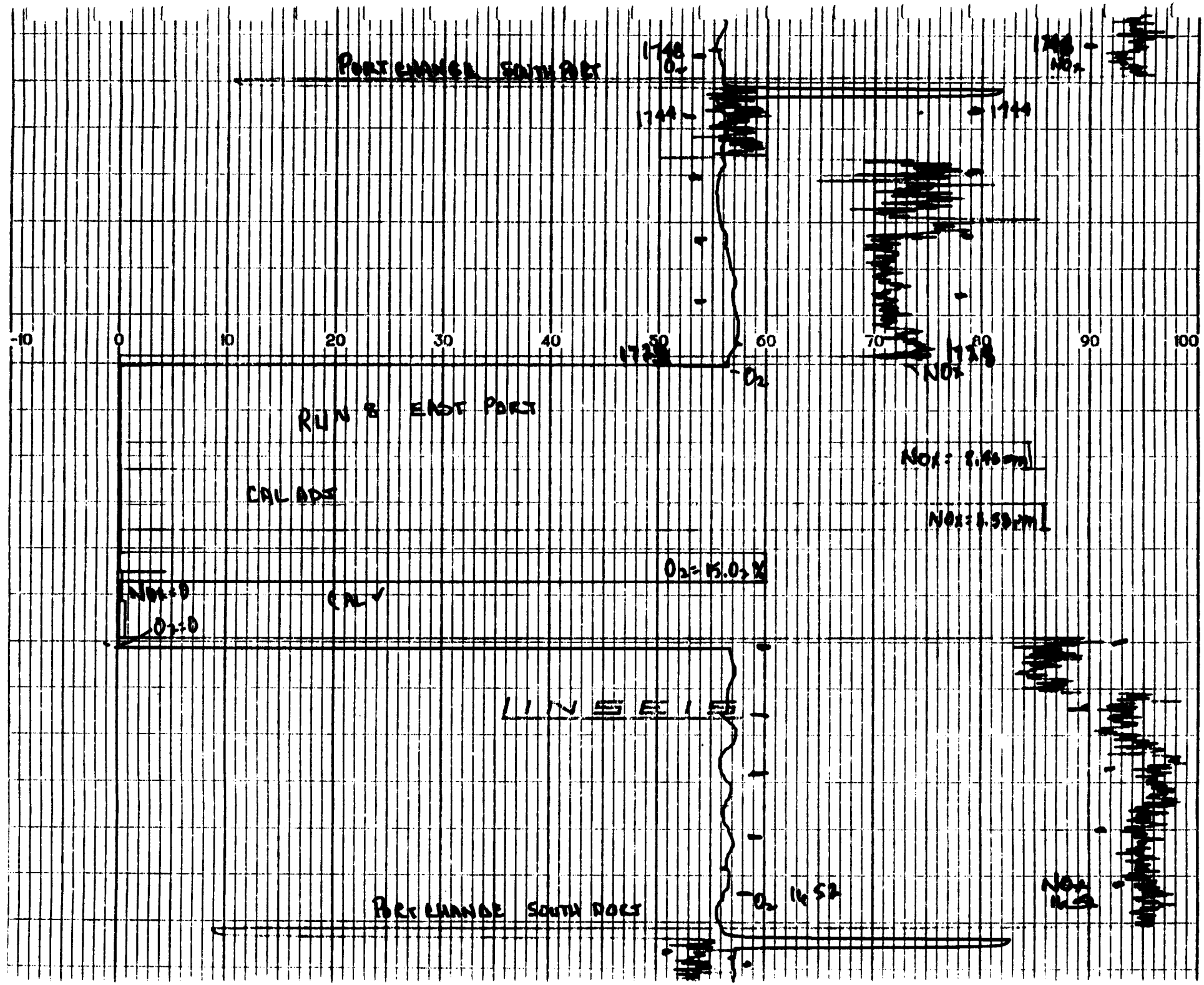
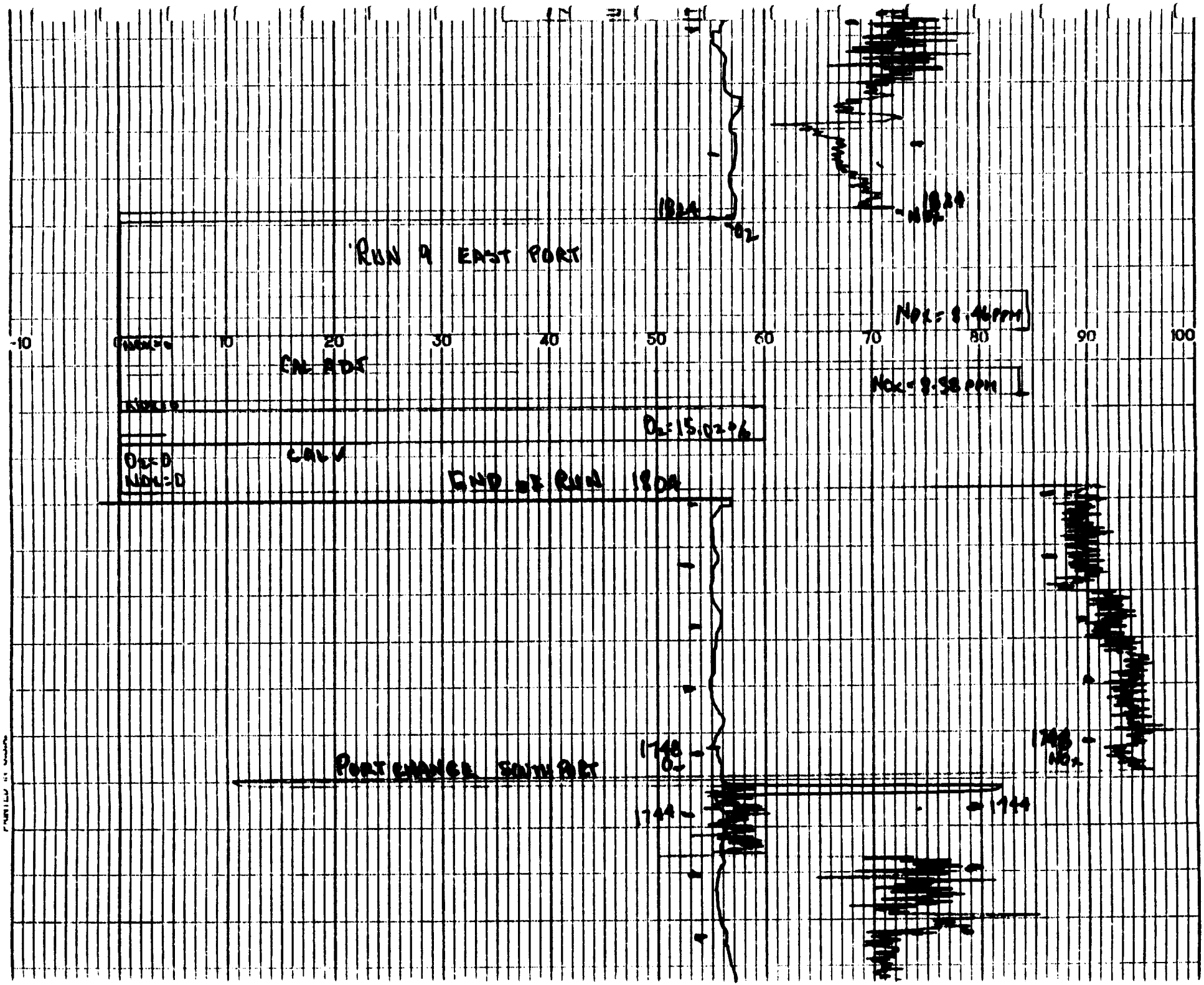

O2=14.07%
NOx=
CAL ADJ
NOx=
O2=15.3%
1404 END OF RUN
NOx
SOUTH PORT
1328
O2
1328
RUN4
EAST PORT
O2=15.02%
-10
0
10
20
30
40
50
60
70
80
90
100

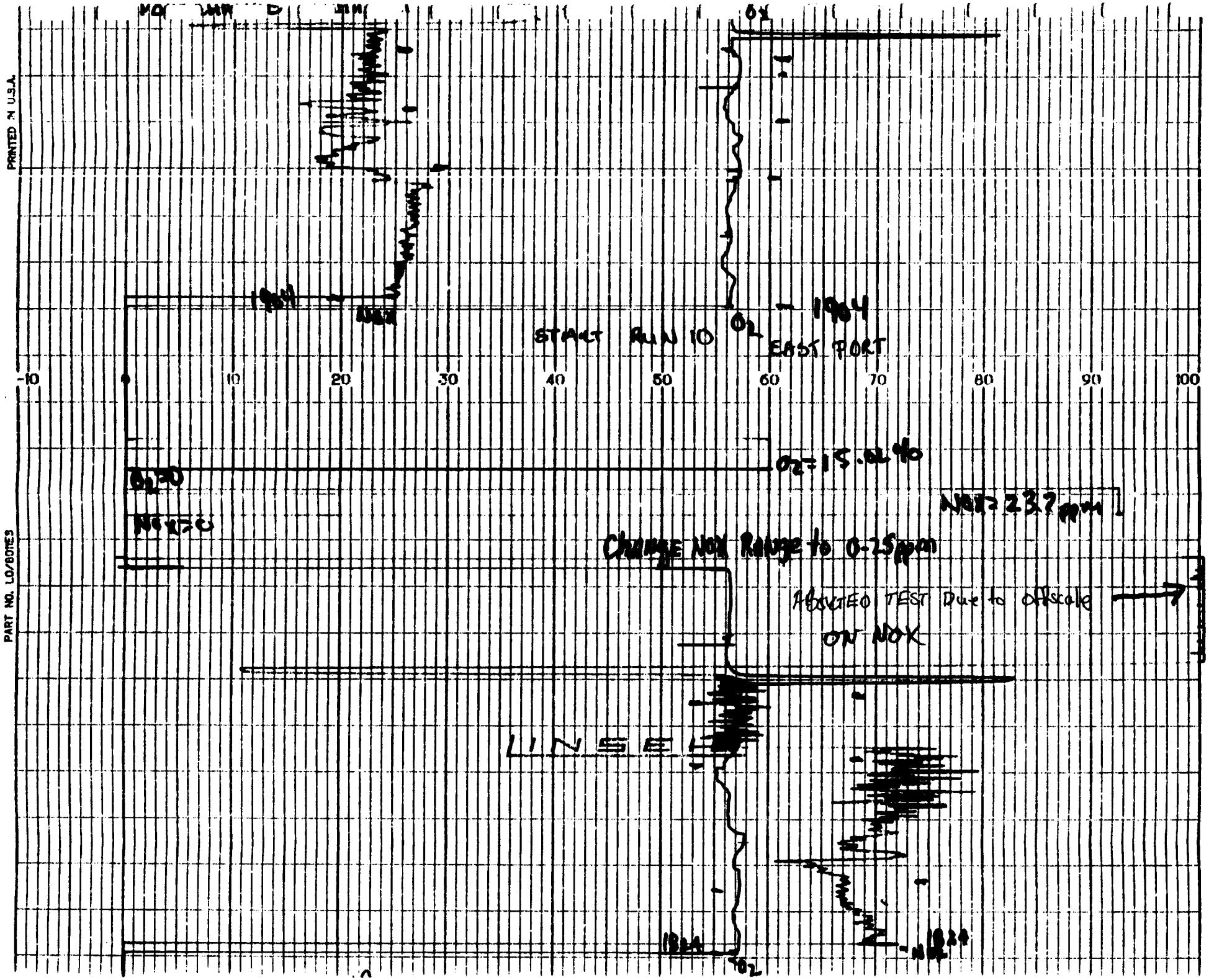

NOx=0
O2=0
CAL V
O2=15.02%
END OF RUN 5
1834
-10
0
10
20
30
40
50
60
70
80
90
100
1348
South Port
Port change
1448
NOx
O2
1448
East Port
Run 5
O2=15.07%
O2=0
NOx=8.44 ppm
NOx=0
CAL ADS
NOx=83.8 ppm


END OF RUN 6 1616
10
0
10
20
30
40
50
60
70
80
90
100
PORT CHANGE
SOUTH PORT
1540
NOx
RUN 6 EAST PORT
LINSEIS
NOx = 8.44 ppm
NOx = 0
O2 = 0
O2 = 15.03%
CAL V
END OF RUN 5 1524


PORT CHANDLE SOUTH DOCK
O2 1452
NOx 1452
-10
0
10
20
30
40
50
60
70
80
90
100
RUN 7 EAST PORT
O2 1452
NOx 1452
CAL ADJ
NOx=2.44 ppm
NOx=8.40 ppm
NOx=0
O2=0
O2=15.02%
END OF RUN 6 1416


PORT CHANGE SOUTH DOCK
1746 O2
1744
1744
NOx
-10
0
10
20
30
40
50
60
70
80
90
100
1748
O2
1748
NOx
RUN 8 EAST PORT
NOx: 8.46 ppm
CAL GAS
NOx: 5.59 ppm
O2: 15.07 %
NOx: 0
O2: 0
CAL V
LINSEIS
O2 1452
NOx
PORT CHANGE SOUTH DOCK


RUN 9 EAST PORT
1824
O2
1824
NOx
NOx = 9.46 PPM
NOx = 9.38 PPM
-10
0
10
20
30
40
50
60
70
80
90
100
CAL ADJ
O2 = 15.02 %
CAL ✓
O2 = 0
NOx = 0
END OF RUN 1804
PORT CHANGE SOUTH PORT
1748
O2
1744
1744
1748
NOx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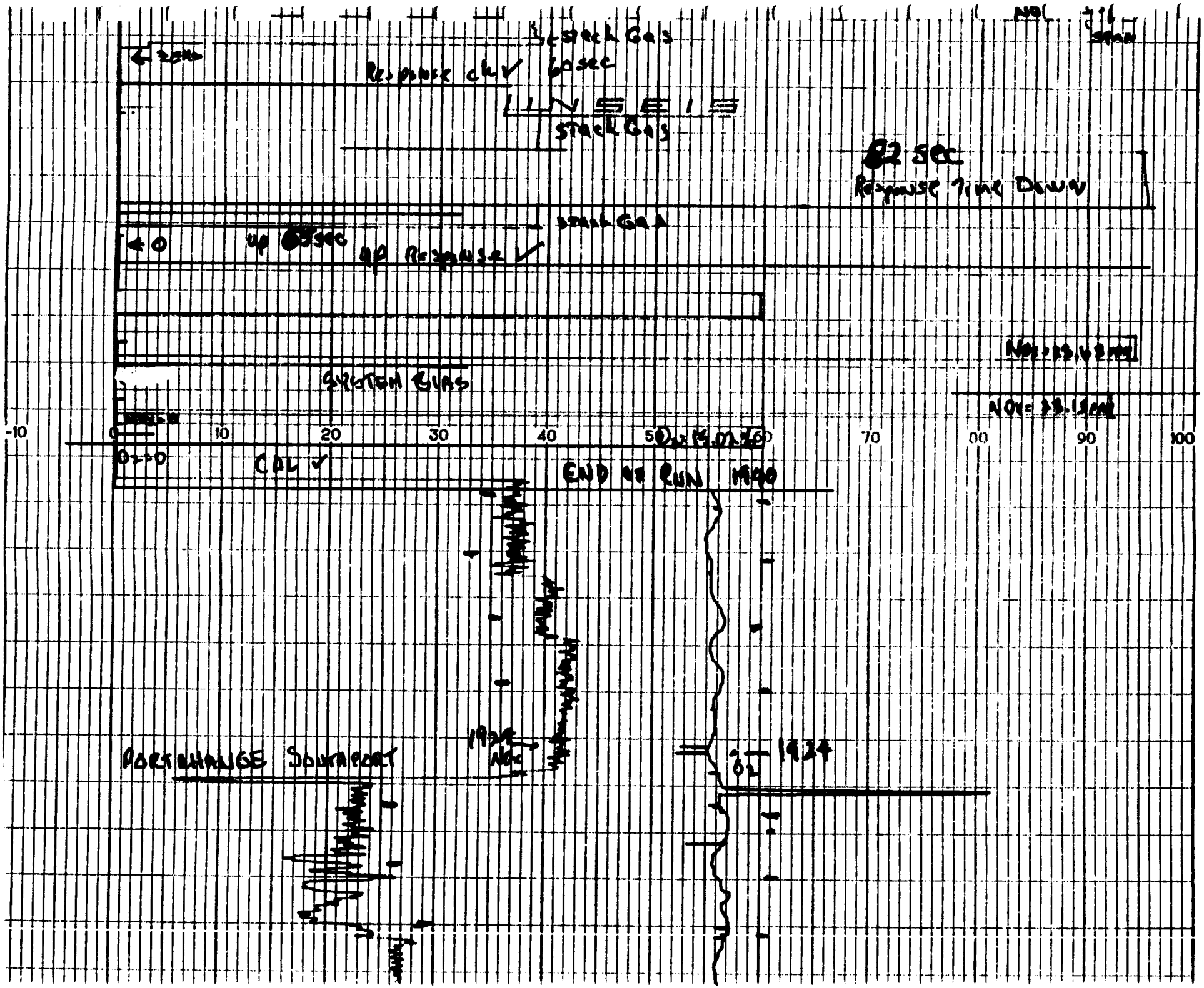
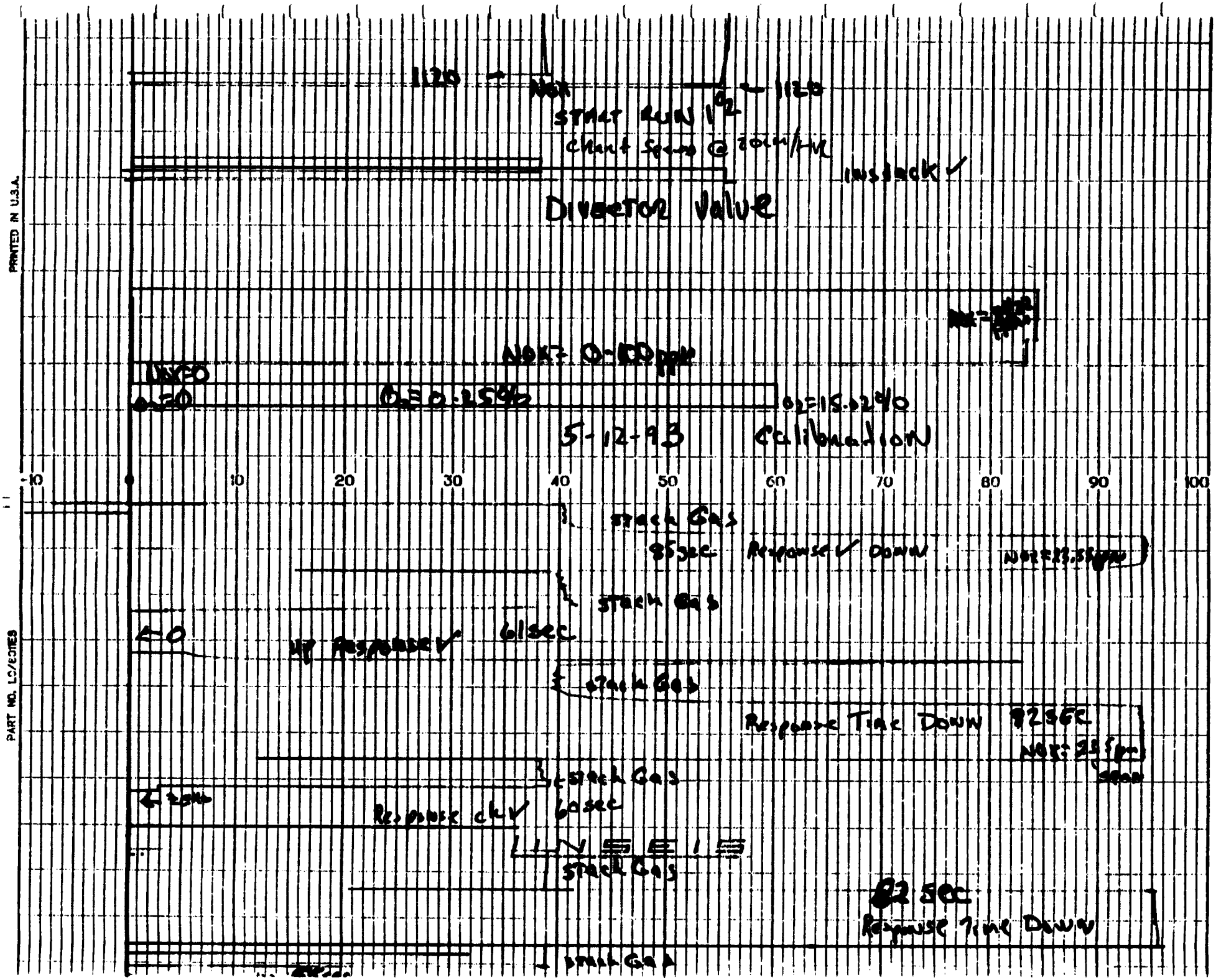
PART NO. LO/BOTES
START RUN 10
EAST PORT
-10
0
10
20
30
40
50
60
70
80
90
100
O2=15.02%
NOX=237 ppm
CHANGE NOX Range to 0-25ppm
ABORTED TEST Due to offscale
ON NOX
LINSEL


Stack Gas
Response ck ✓ 60sec
LINE
Stack Gas
.02 sec
Response Time Down
Stack Gas
up .05sec
up Response ✓
System Bias
NO2 = 23.42 mg
NO = 23.15 mg
-10
0
10
20
30
40
50
60
70
80
90
100
CAL ✓
END OF RUN 1420
1424
NO
1424
O2
PORTSMOUTH SOUTHPORT



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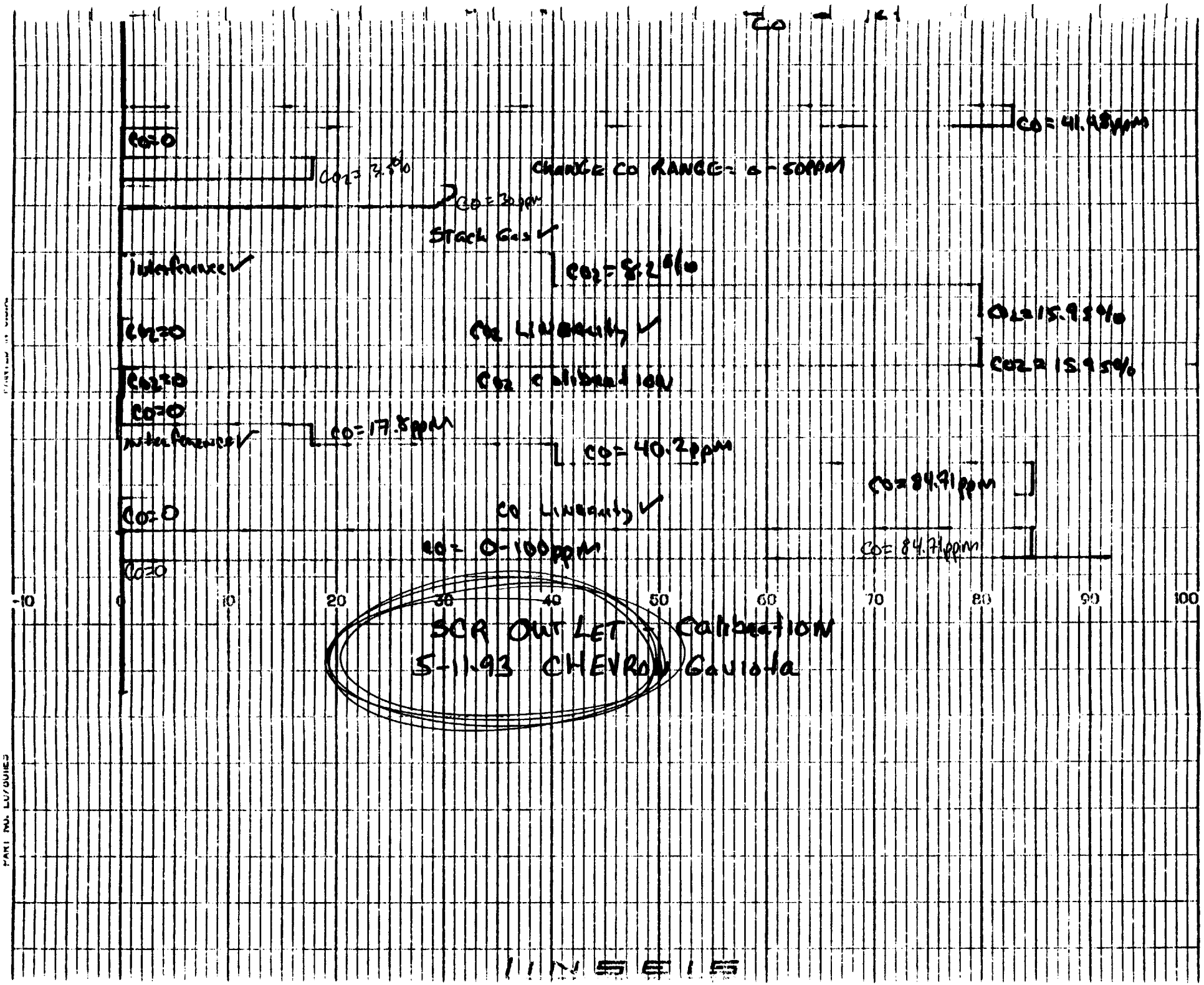
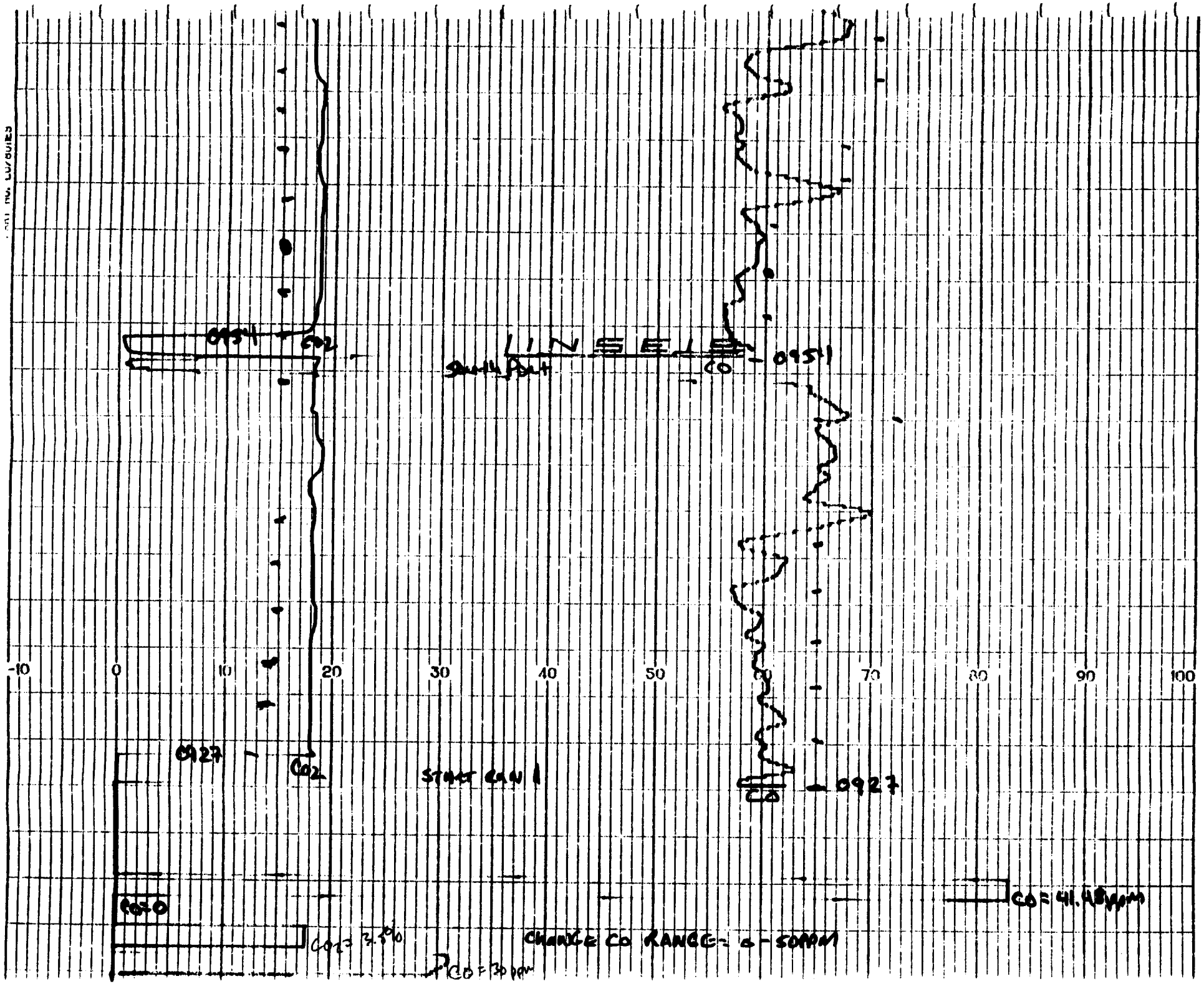
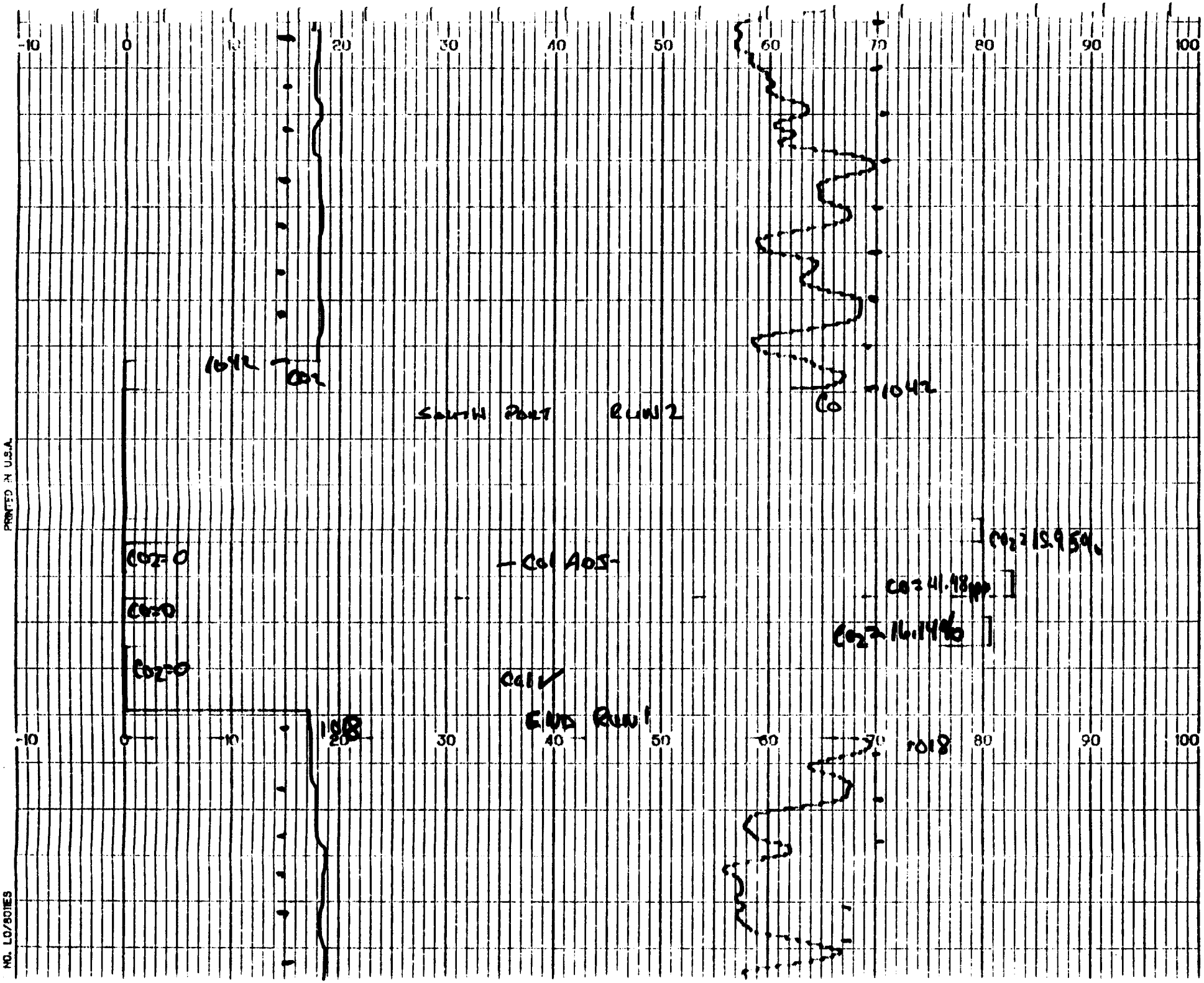
PART NO. LC/COMES


CO = 41.98 ppm
CO = 0
CO2 = 7.5%
CHANGE CO RANGE = 0 - 50PPM
CO = 30 ppm
STACK GAS ✓
Interference ✓
CO2 = 8.2%
O2 = 15.95%
CO2 = 0
CO LINEARITY ✓
CO2 = 15.95%
CO2 = 0
CO2 CALIBRATION
CO = 0
CO = 17.8 ppm
Interference ✓
CO = 40.2 ppm
CO = 84.91 ppm
CO = 0
CO LINEARITY ✓
CO = 0-100 ppm
CO = 84.71 ppm
CO = 0
-10
0
10
20
30
40
50
60
70
80
90
100
SCR OUT LET - Calibration
5-11-93 CHEVRON Gaviota


-10
0
10
20
30
40
50
60
70
80
90
100
0954
CO2
LINSELL
South Point
CO
0951
0927
CO2
START CAN 1
CO
0927
CO=0
CO2 3.8%
CO=30 ppm
CHANGE CO RANGE= 0-50PPM
CO=41.4ppm



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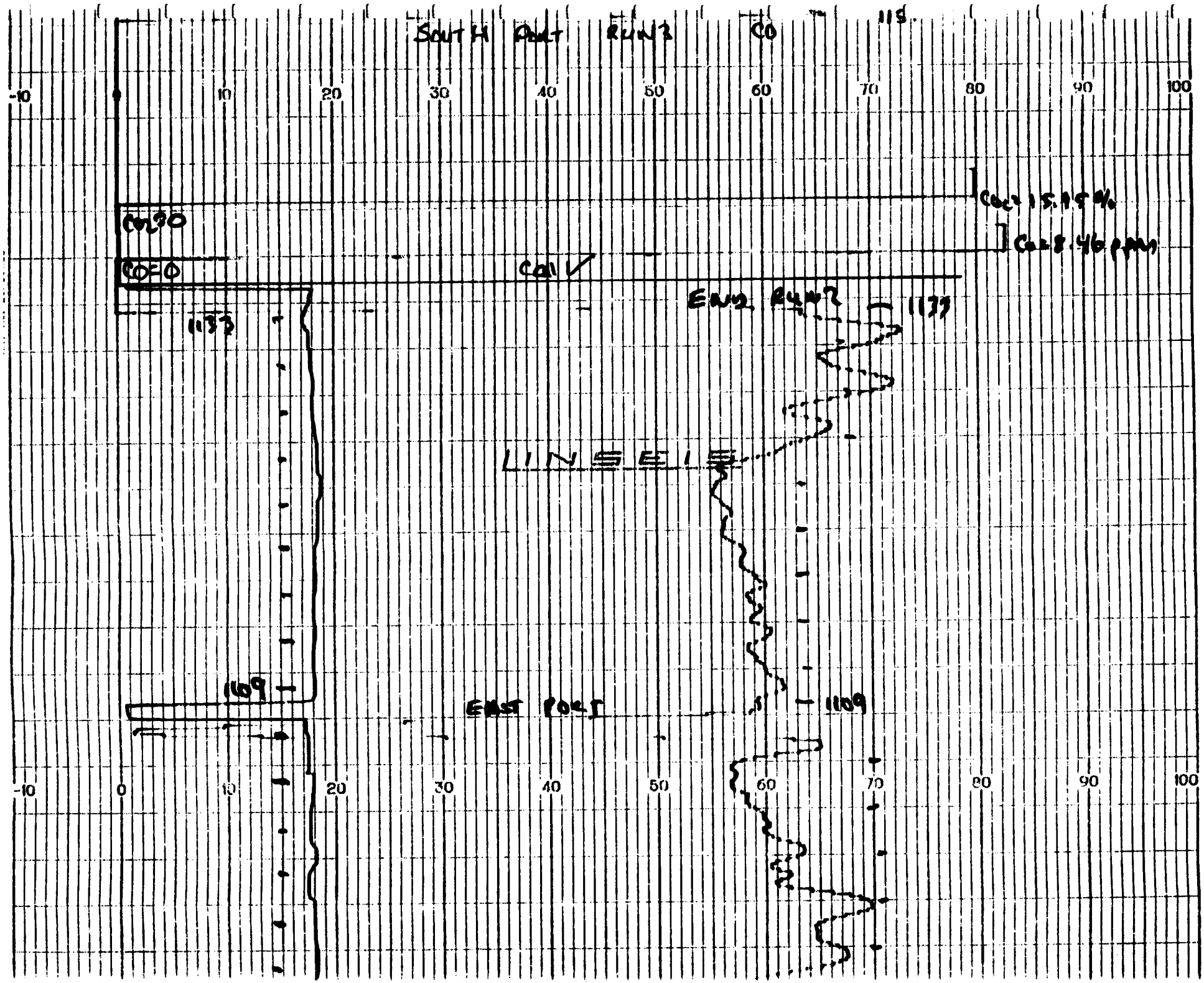
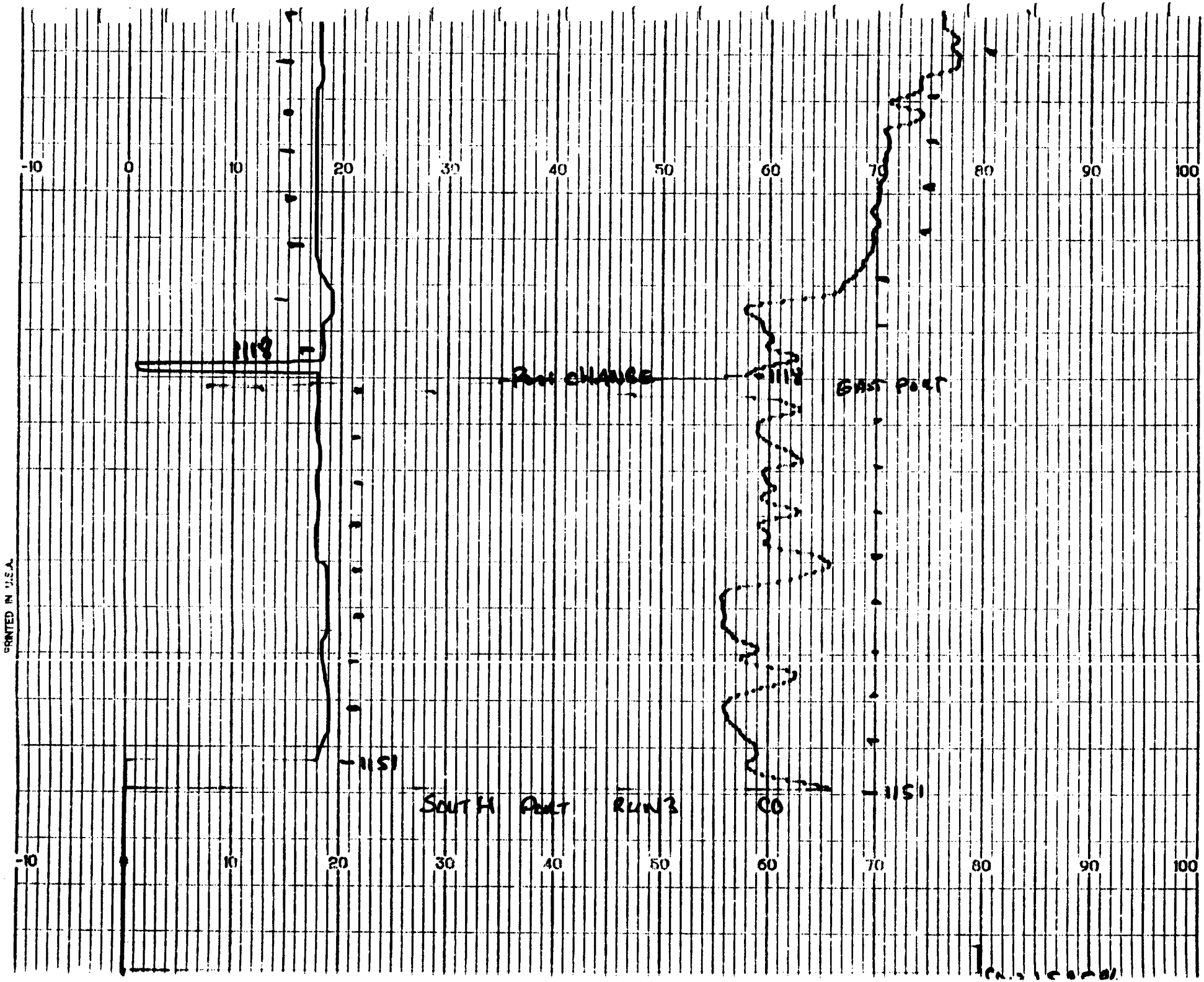
NO. LO/80IES


SOUTH PORT RUN 3 CO
115
-10
0
10
20
30
40
50
60
70
80
90
100
Cal 20
CO=0
Cal
1133
169
ENV. RUN 2
1177
LINSEIS
EAST PORT
1109



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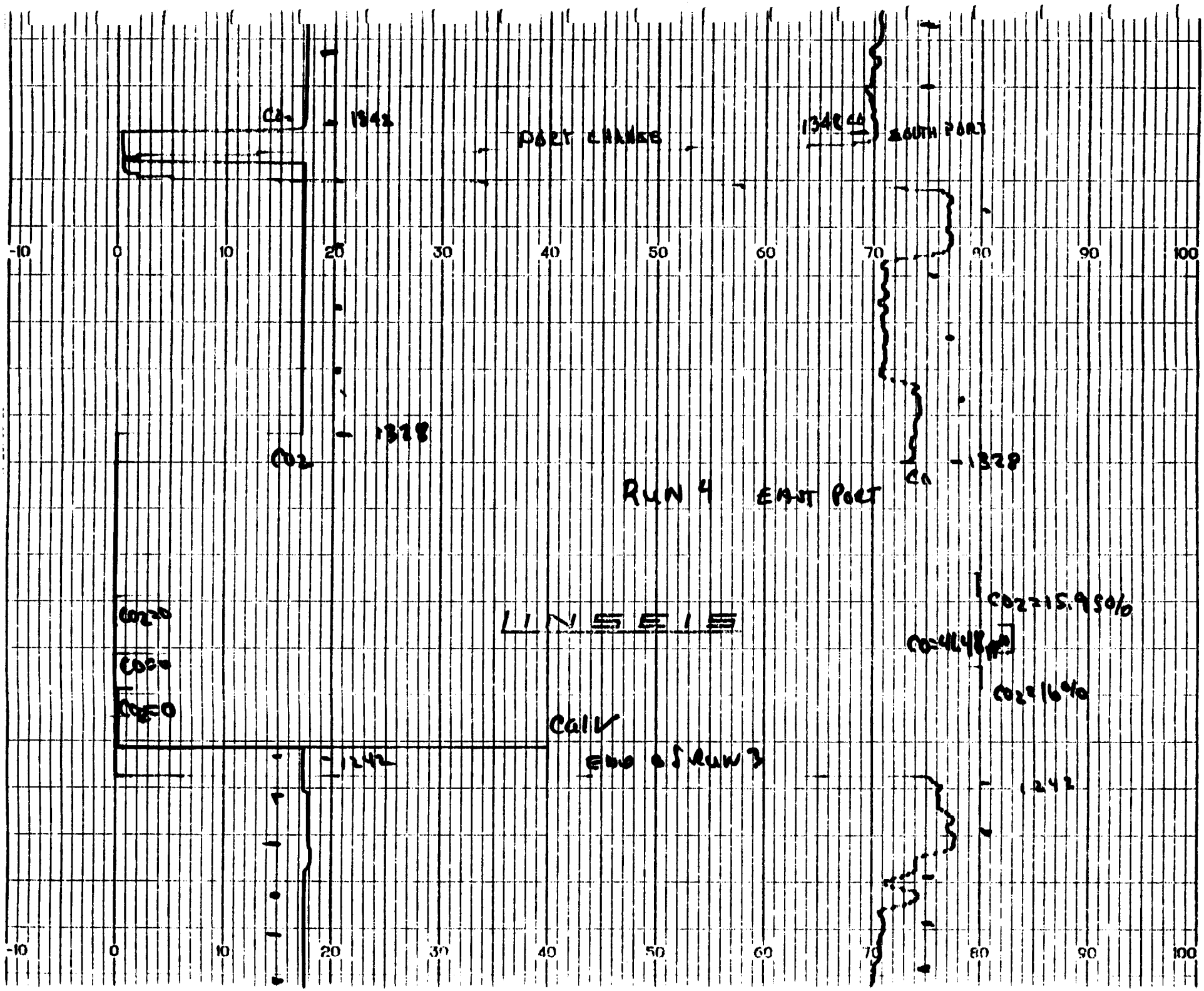
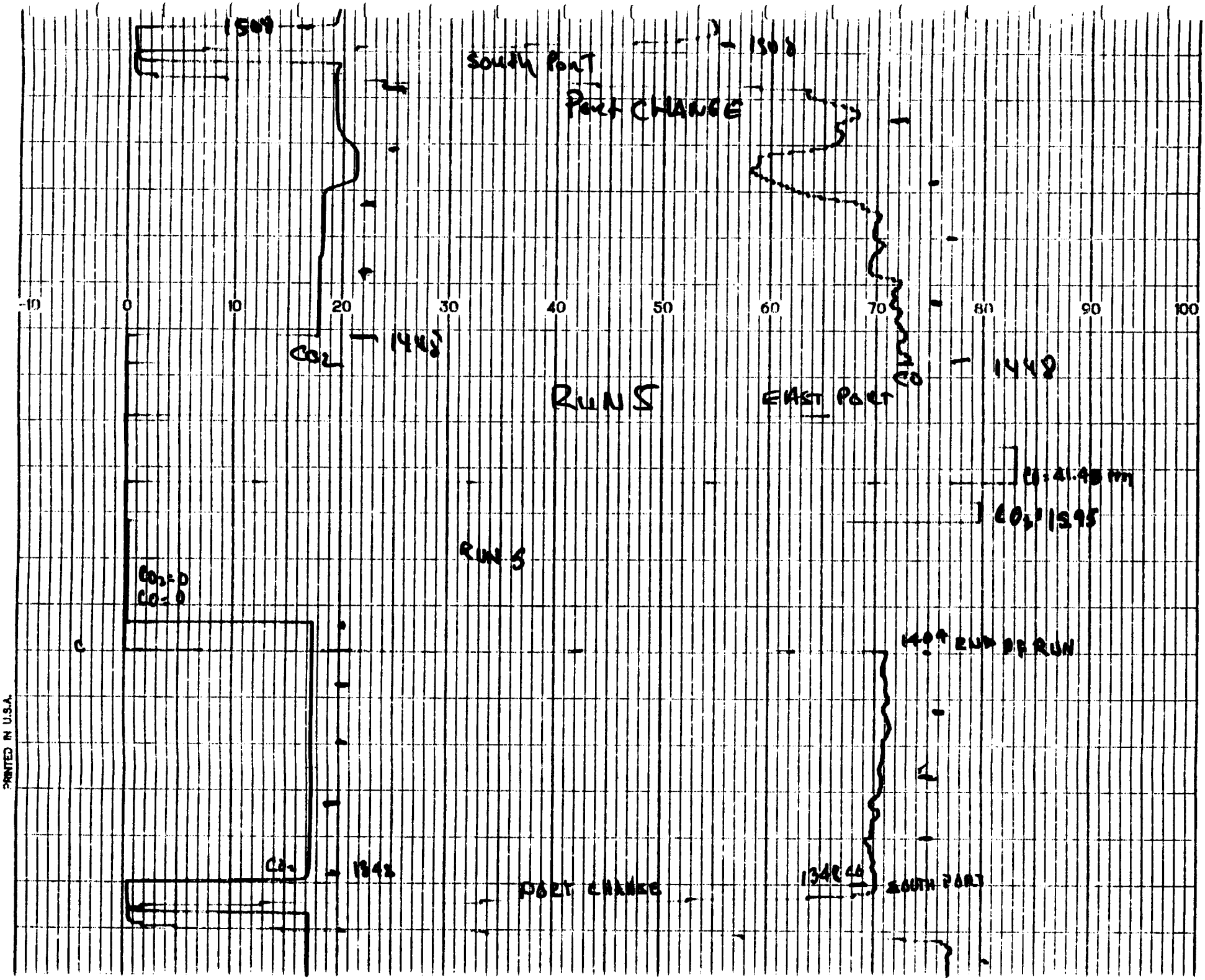

-10
0
10
20
30
40
50
60
70
80
90
100
Ca
1342
PORT CHANGE
1348 44
SOUTH PORT
1328
CO2
1328
Ca
RUN 4 EAST PORT
CO2=15.95%
CO=4.48%
CO2=16%
LINSEIS
CO2=0
CO=0
CO=0
CaIV
END OF RUN 3
1242
1242



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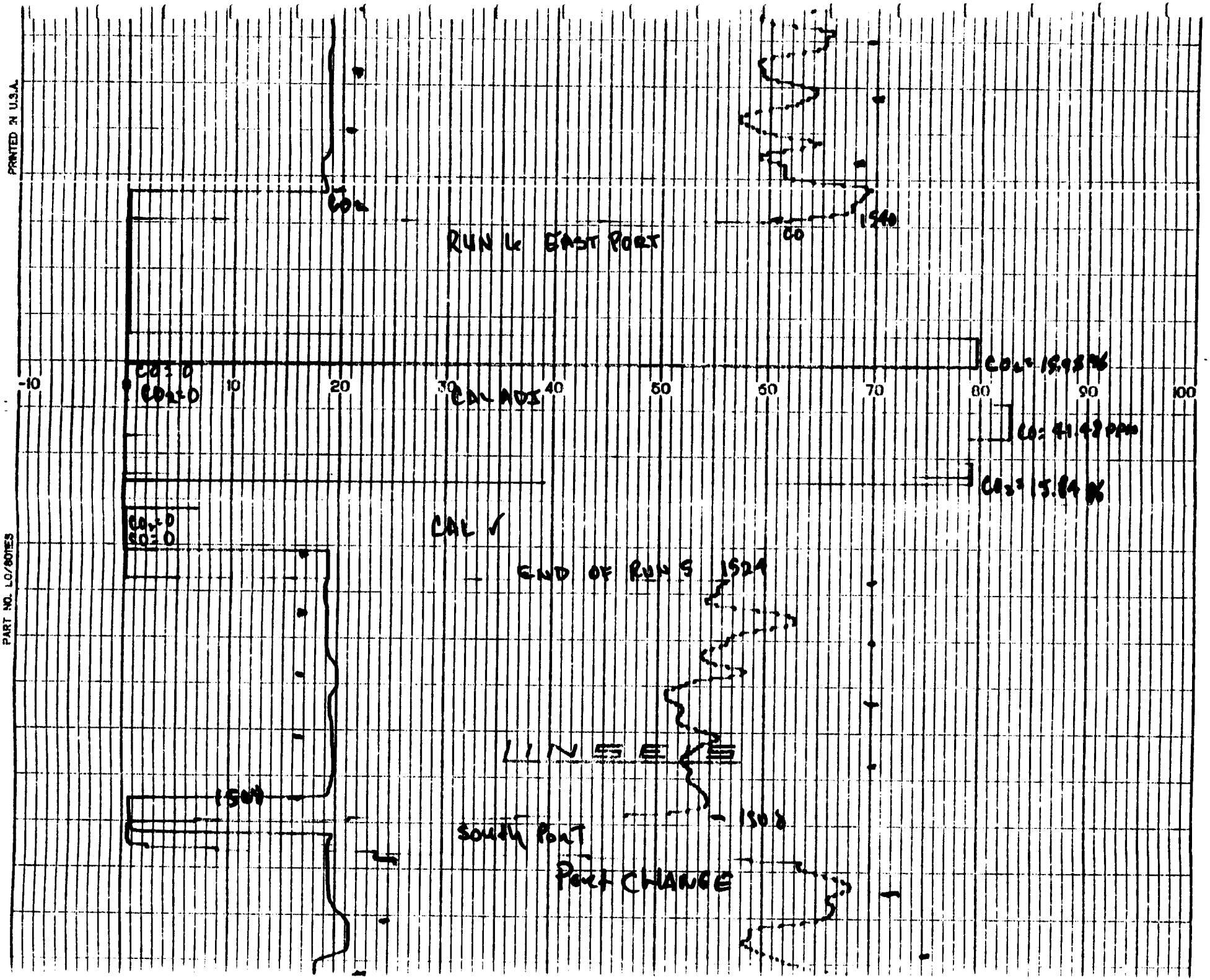
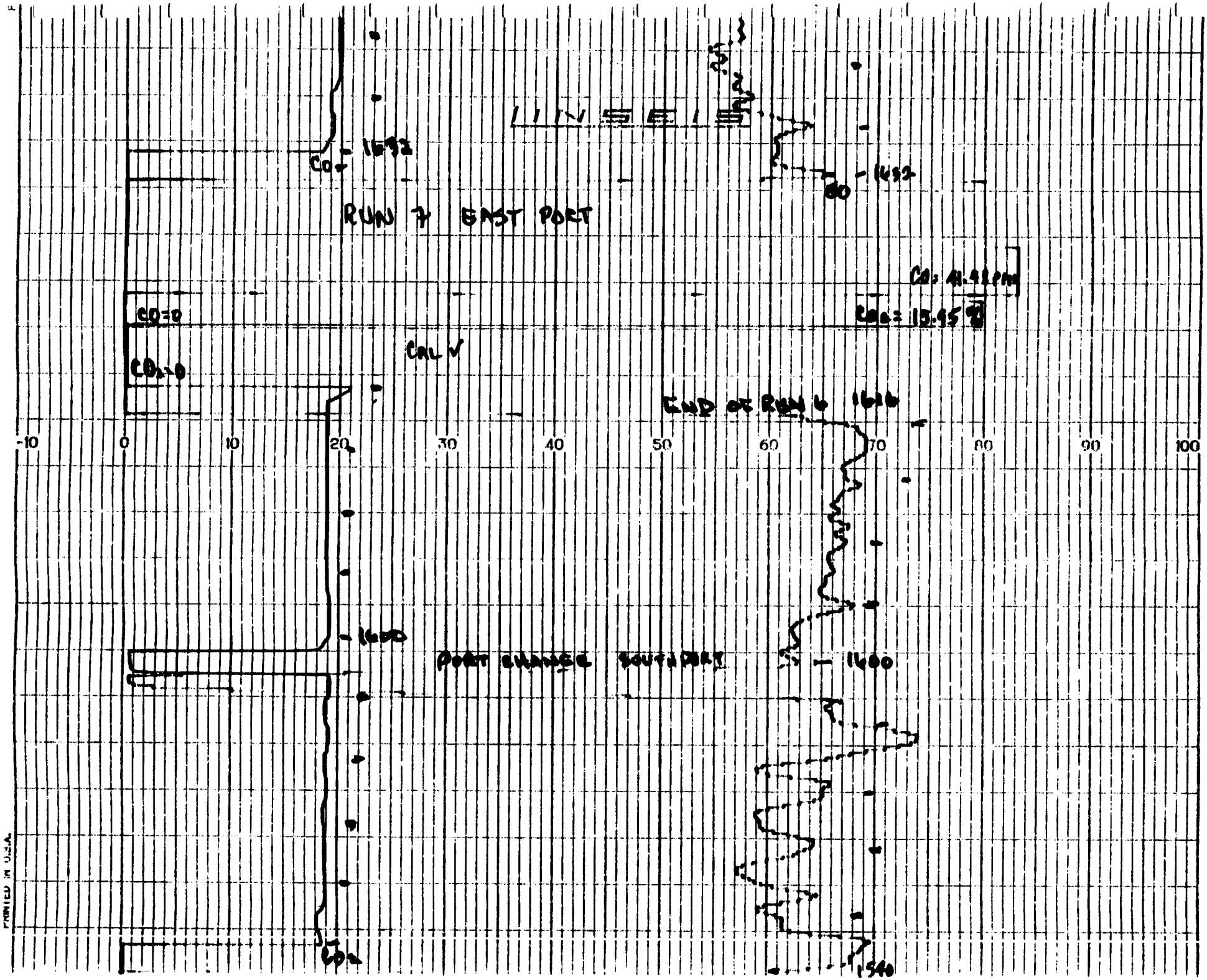

PRINTED IN U.S.A.
PART NO. LO/80TES
-10
10
20
30
40
50
60
70
80
90
100
CO2
RUN 16 EAST PORT
1540
CO2 = 15.95%
CO = 41.42 PPM
CO2 = 5.84%
CO2 = 0
CO = 0
CAL ✓
END OF RUN 5 1524
LINES
1508
SOUTH PORT
PORT CHANGE



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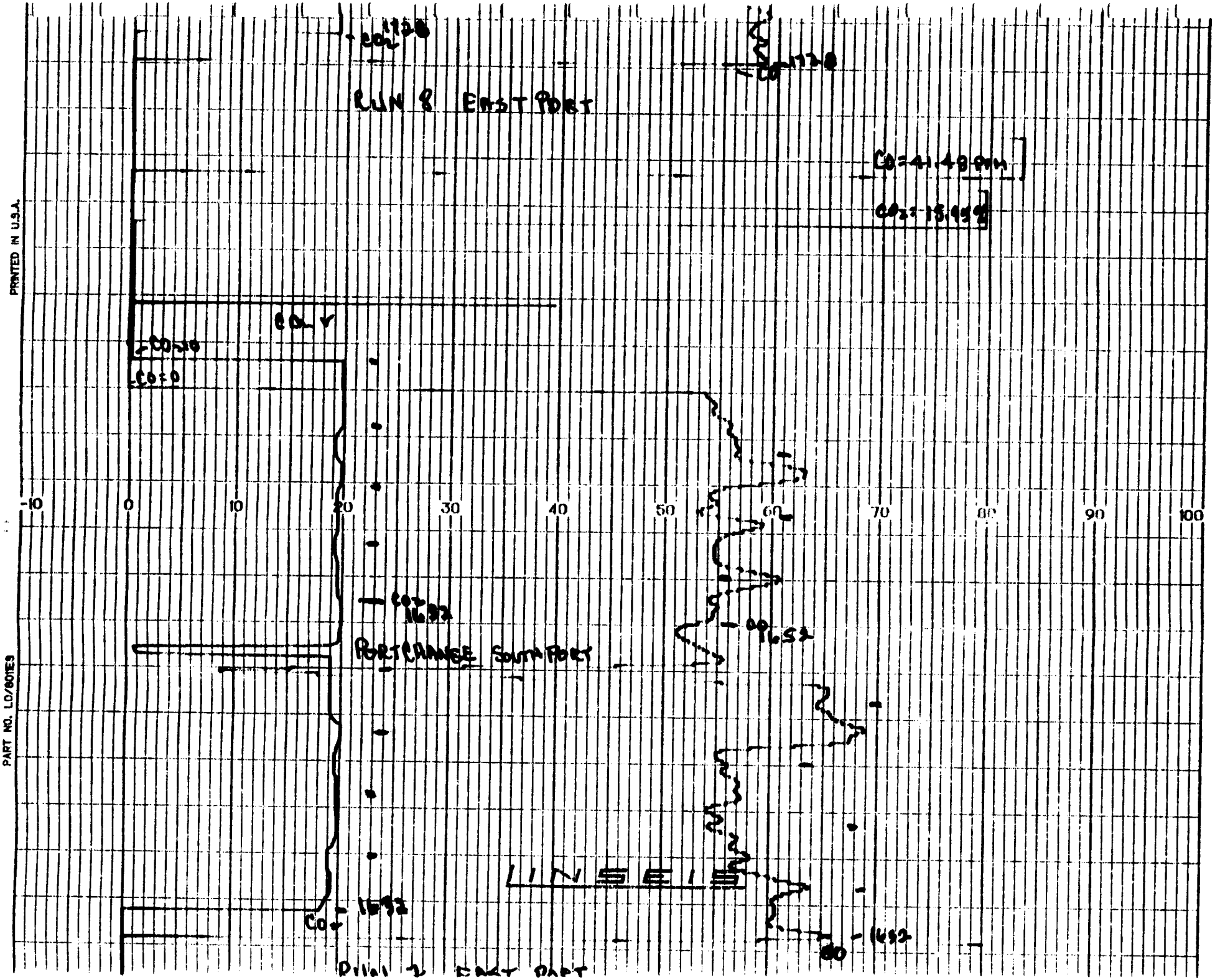
RUN 8 EAST PORT
CO=41.49 ppm
CO2=15.95%
EQ-Y
CO=10
CO=0
CO2 1652
PORTCHANGE SOUTH PORT
CO 1652
CO 1652
CO 1652
CO 1652
-10
0
10
20
30
40
50
60
70
80
90
100

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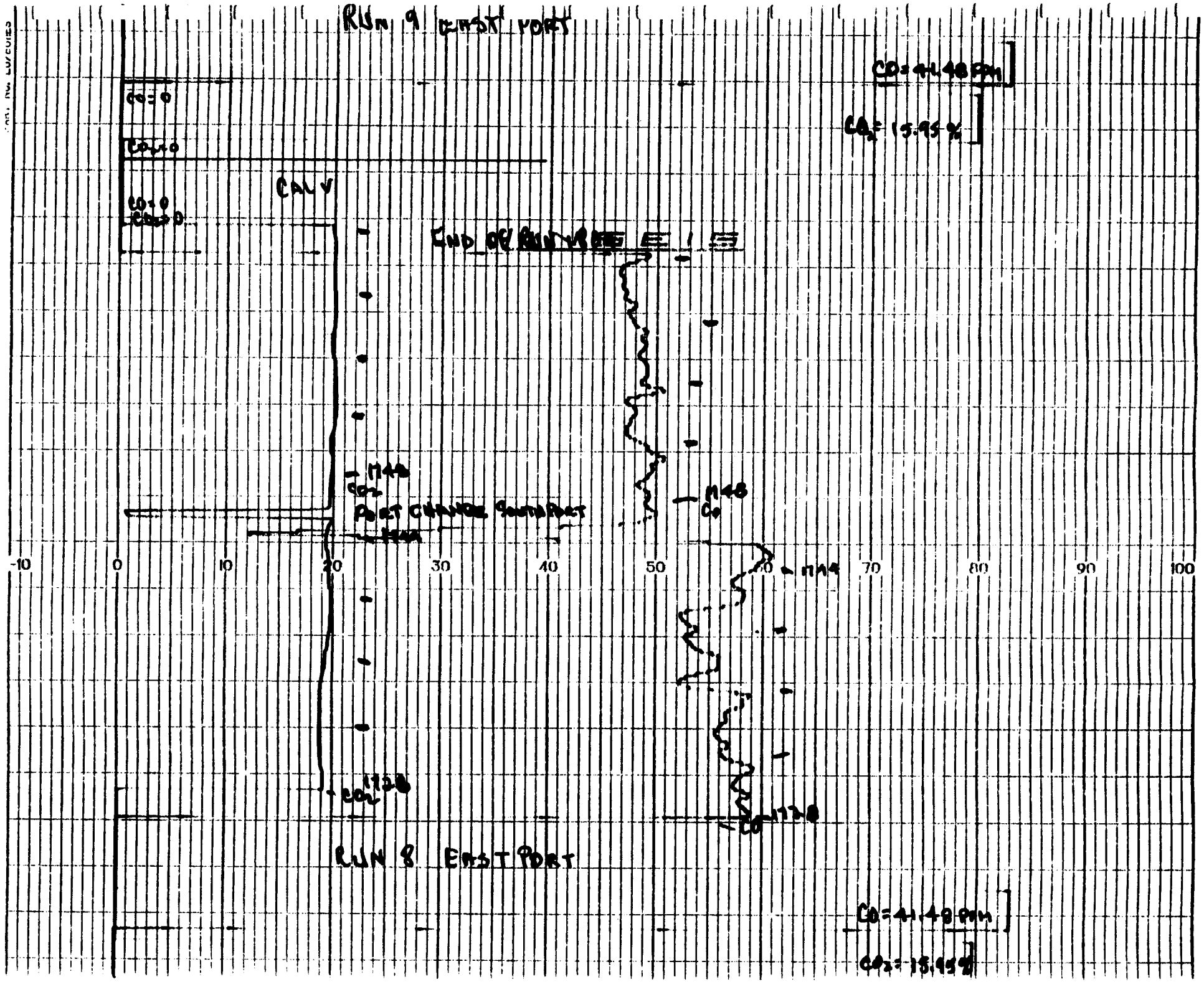
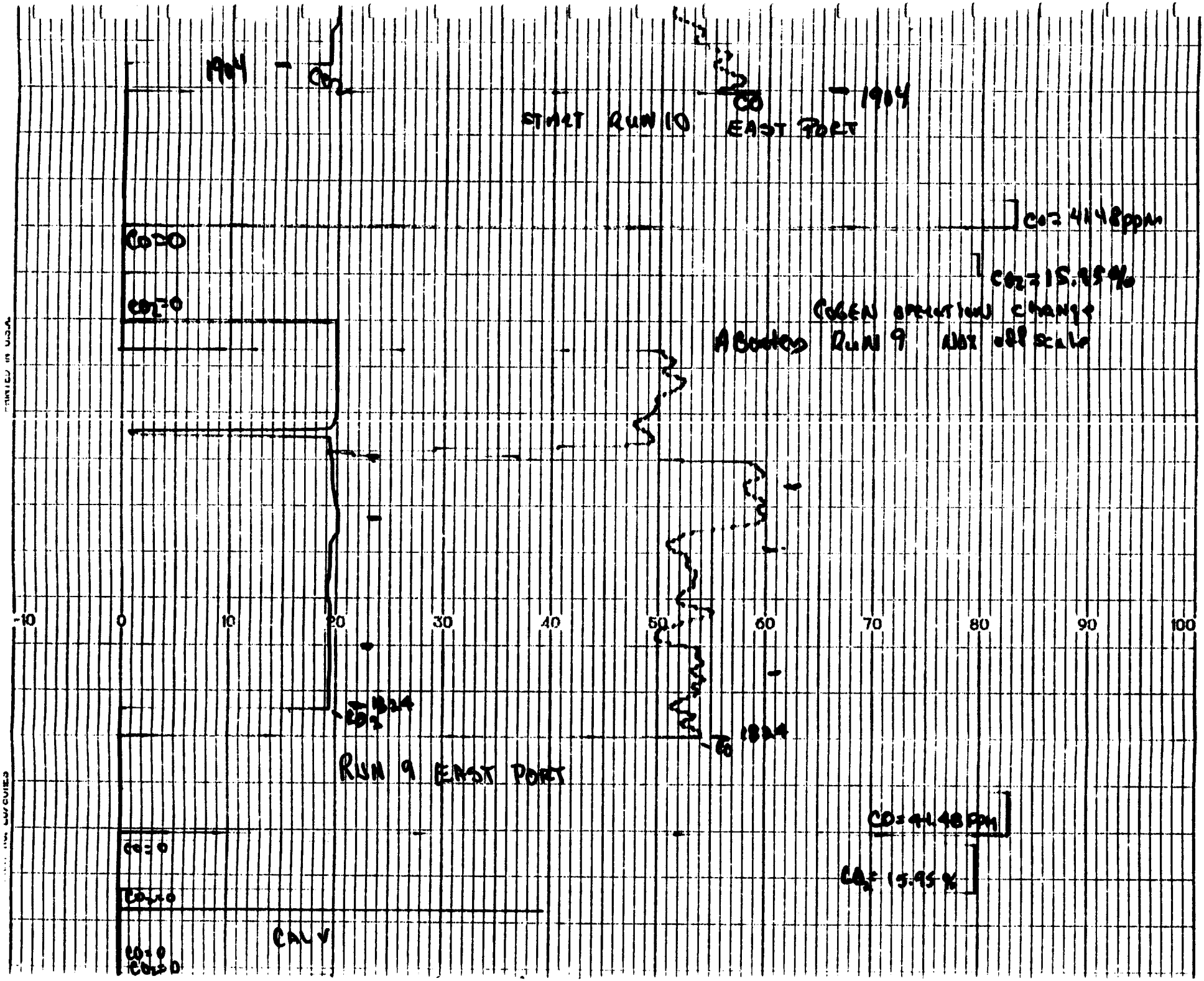
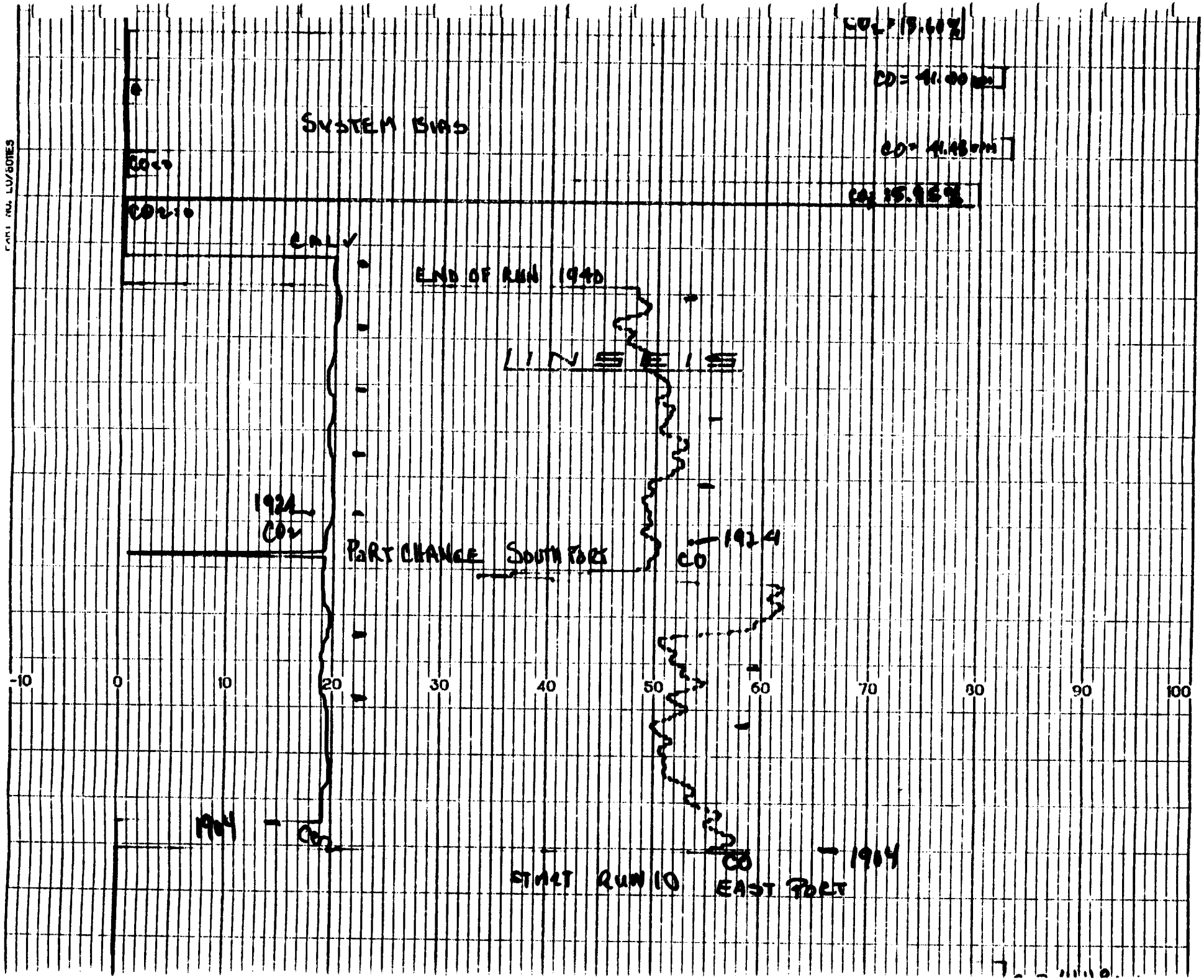
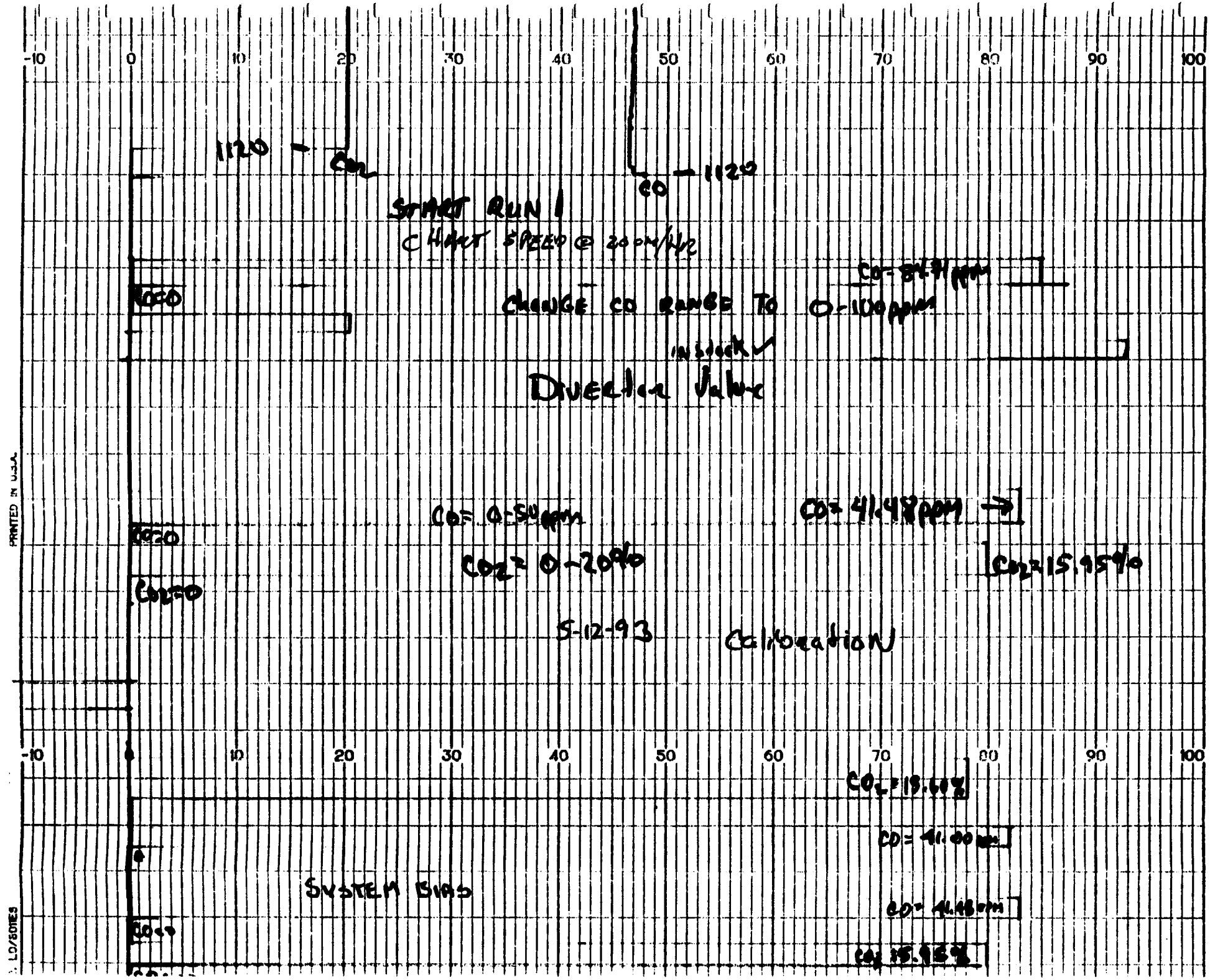
PART NO. LO/80IE3


RUN 9 EAST PORT
CO = 0
CO2 = 0
CALV
CO = 0
CO2 = 0
END OF RUN
CO = 41.48 PPM
CO2 = 15.95 %
1148
CO2
POST CHANGE SOUTH PORT
1148
CO
-10
0
10
20
30
40
50
60
70
80
90
100
1148
1128
CO2
CO
1128
RUN 8 EAST PORT
CO = 41.48 PPM
CO2 = 15.95 %


1904 — CO_2
1904 — CO
START RUN 10 EAST PORT
CO=44.48ppm
CO_2=15.95%
CO=0
CO_2=0
OXYGEN OPERATIONS CHANGE
ABOARD RUN 9 ADJ OFF SCALE
-10
0
10
20
30
40
50
60
70
80
90
100
CO_2 1324
CO 1324
RUN 9 EAST PORT
CO=44.48PPM
CO_2=15.95%
CO=0
CO_2=0
CALV
CO=0
CO_2=0


SYSTEM BIAS
END OF RUN 1940
LINSEIS
1924
CO2
PART CHANGE SOUTH PORT
CO
1924
1904
CO2
CO
1904
START RUN 10 EAST PORT
-10
0
10
20
30
40
50
60
70
80
90
100



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LD/60TES

OXYGEN TRAVERSE DATA SHEET

COMPANY CHEVRON

DATE 5-11-92

TEST LOCATION SCR OUTLET

TEST CONDITION

	Time : 0927-1018		Time : 1042-1133		Time : 1151-1242		AVG. Time :		
	SAMPLE POINT #	OXYGEN (%)	SAMPLE POINT #	OXYGEN (%)	SAMPLE POINT #	OXYGEN (%)	SAMPLE POINT #	OXYGEN (%) AVG	
	1	14.67	1	14.46	1	15.20	1	14.7	
	2	14.71	2	14.51	2	14.62	2	14.6	*
	3	14.64	3	14.55	3	14.85	3	14.68	
EAST PORT	4	14.65	4	14.41	4	14.83	4	14.63	*
	5	14.56	5	14.32	5	14.76	5	14.55	*
	6	14.67	6	14.59	6	14.70	6	14.65	
	7	14.51	7	14.55	7	14.74	7	14.60	*
	8	14.62	8	14.76	8	14.91	8	14.76	
	1	14.45	1	14.50	1	14.16	1	14.37	*
	2	14.52	2	14.58	2	14.34	2	14.48	*
	3	14.43	3	14.50	3	14.31	3	14.41	*
SOUTH PORT	4	14.56	4	14.53	4	14.20	4	14.43	*
	5	14.53	5	14.73	5	14.41	5	14.56	
	6	14.89	6	14.59	6	14.51	6	14.66	
	7	14.87	7	14.50	7	14.59	7	14.65	
	8	15.01	8	14.66	8	14.58	8	14.73	

SAMPLE POINT RELOCATION :

* 8 LOWEST O2 PTS

SITE IDENTIFIER: GAVY

05/11/93 10:28

Data dump for the following variables:

Variable 21 -	COGEN.	STACK CO	PPM
Variable 24 -	COGEN.	STACK NOx	PPM
Variable 27 -	COGEN.	FUEL GAS FLOW	MSCFH
Variable 28 -	COGEN.	STACK O2	PCT
Variable 42 -	COGEN.	ANNUB FLOW MEAS (DRY)	MMSCFH
Variable 52 -	COGEN.	ANNUB FLOW MEAS (WET)	MMSCFH

SCR Outlet
5/11/93
Plant Data

Date	Time	CO Var. 21	NOX Var. 24	Fuel gas flow Var. 27	O2 Var. 28	Var. 42	Var. 52	
5/11/93	9:15	30.61	3.77	111.74	14.68	3.86	4.31	
	9:16	30.06	3.76	110.95	14.62	3.86	4.32	
	9:17	30.29	3.84	111.67	14.61	3.85	4.31	
	9:18	30.03	3.87	114.71	14.59	3.87	4.33	
	9:19	30.32	3.91	110.49	14.47	3.86	4.32	
	9:20	30.42	4.01	108.48	14.53	3.84	4.29	
	9:21	31.73	4.06	111.13	14.75	3.85	4.31	
	9:22	30.16	4.18	109.23	14.66	3.85	4.31	
	9:23	30.94	4.28	109.10	14.70	3.87	4.32	
	9:24	30.89	4.33	113.80	14.72	3.87	4.33	
	9:25	30.29	4.38	113.34	14.54	3.85	4.31	
	9:26	29.91	4.48	111.03	14.47	3.84	4.30	
	9:27	29.69	4.44	109.07	14.55	3.85	4.31	RUN 1
	9:28	30.56	4.43	111.40	14.70	3.84	4.29	
	9:29	29.48	4.44	110.59	14.61	3.84	4.30	
	9:30	29.52	4.38	108.69	14.63	3.84	4.29	
	9:31	30.39	4.36	110.99	14.68	3.84	4.30	
	9:32	29.85	4.45	111.45	14.65	3.85	4.32	
	9:33	29.85	4.42	109.92	14.62	3.84	4.29	
	9:34	29.80	4.50	112.55	14.64	3.86	4.33	
	9:35	29.73	4.49	113.85	14.58	3.85	4.30	
	9:36	30.10	4.51	111.17	14.46	3.85	4.30	
	9:37	29.82	4.49	110.70	14.56	3.83	4.29	Run #1
	9:38	30.29	4.47	111.87	14.68	3.84	4.30	
	9:39	29.52	4.57	109.84	14.59	3.84	4.30	
	9:40	30.29	4.50	109.37	14.64	3.85	4.31	NO_x = 4.46 ppm
	9:41	31.76	4.41	110.59	14.74	3.84	4.30	CO = 30.75 ppm
	9:42	30.66	4.43	110.39	14.70	3.82	4.27	
	9:43	31.17	4.41	106.04	14.65	3.82	4.29	O_2 = 14.65 %
	9:44	33.86	4.46	109.57	14.83	3.83	4.29	
	9:45	32.30	4.48	116.88	14.81	3.86	4.32	
	9:46	31.50	4.60	115.38	14.44	3.84	4.30	
	9:47	30.46	4.48	109.96	14.36	3.83	4.28	
	9:48	30.77	4.48	109.28	14.64	3.83	4.28	
	9:49	30.55	4.52	110.51	14.70	3.82	4.29	
	9:50	30.21	4.45	109.26	14.67	3.82	4.28	
	9:51	31.03	4.47	110.96	14.72	3.83	4.28	
	9:52	29.92	4.54	113.78	14.64	3.83	4.29	
	9:53	29.90	4.58	112.37	14.51	3.83	4.28	PORT CHANGE
	9:54	29.73	4.46	108.95	14.53	3.82	4.28	
	9:55	31.00	4.41	109.88	14.72	3.82	4.29	
	9:56	29.49	4.51	112.89	14.67	3.83	4.28	
	9:57	29.32	4.49	111.32	14.59	3.84	4.30	
	9:58	29.52	4.48	110.46	14.60	3.84	4.28	

SITE IDENTIFIER: GAVY

Date	Time	Var. 21	Var. 24	Var. 27	Var. 28	Var. 42	Var. 52
5/11/93	10:00	29.92	4.46	112.42	14.61	3.85	4.30
	10:01	30.57	4.49	112.65	14.59	3.84	4.31
	10:02	30.59	4.48	113.93	14.57	3.84	4.31
	10:03	30.48	4.50	111.74	14.49	3.84	4.30
	10:04	30.20	4.38	108.29	14.55	3.83	4.30
	10:05	33.70	4.32	108.01	14.77	3.83	4.29
	10:06	33.02	4.39	112.71	14.81	3.84	4.30
	10:07	30.27	4.55	111.30	14.63	3.82	4.28
	10:08	30.02	4.52	112.71	14.60	3.85	4.30
	10:09	29.82	4.54	114.57	14.57	3.83	4.29
	10:10	29.78	4.49	111.17	14.46	3.82	4.28
	10:11	29.88	4.38	108.97	14.62	3.83	4.29
	10:12	31.33	4.38	110.90	14.74	3.84	4.30
	10:13	29.95	4.44	111.33	14.67	3.83	4.28
	10:14	29.94	4.43	108.04	14.63	3.82	4.27
	10:15	33.48	4.43	107.19	14.79	3.84	4.30
	10:16	33.89	4.45	109.21	14.85	3.83	4.30
	10:17	32.38	4.50	108.38	14.76	3.83	4.29
	10:18	33.94	4.44	107.80	14.81	3.83	4.29
	10:19	33.95	4.46	112.13	14.88	3.84	4.29
	10:20	30.79	4.44	112.57	14.66	3.85	4.31
	10:21	30.34	4.48	109.03	14.56	3.83	4.29
	10:22	32.06	4.41	110.39	14.71	3.84	4.30
	10:23	30.98	4.38	114.35	14.70	3.84	4.31
	10:24	30.71	4.48	113.26	14.51	3.84	4.30

Data dump for the following variables:

Variable 21 -	COGEN.	STACK CO	PPM
Variable 24 -	COGEN.	STACK NOx	PPM
Variable 27 -	COGEN.	FUEL GAS FLOW	MSCFH
Variable 28 -	COGEN.	STACK O2	PCT
Variable 42 -	COGEN.	ANNUB FLOW MEAS (DRY)	MMSCFH
Variable 52 -	COGEN.	ANNUB FLOW MEAS (WET)	MMSCFH

Date	Time	Var. 21	Var. 24	Var. 27	Var. 28	Var. 42	Var. 52
5/11/93	9:15	30.61	3.77	111.74	14.68	3.86	4.31
	9:16	30.06	3.76	110.95	14.62	3.86	4.32
	9:17	30.29	3.84	111.67	14.61	3.85	4.31
	9:18	30.03	3.87	114.71	14.59	3.87	4.33
	9:19	30.32	3.91	110.49	14.47	3.86	4.32
	9:20	30.42	4.01	108.48	14.58	3.84	4.29
	9:21	31.73	4.06	111.13	14.75	3.85	4.31
	9:22	30.16	4.18	109.23	14.66	3.85	4.31
	9:23	30.94	4.28	109.10	14.70	3.87	4.32
	9:24	30.89	4.33	113.80	14.72	3.87	4.33
	9:25	30.29	4.38	113.34	14.54	3.85	4.31
	9:26	29.91	4.48	111.03	14.47	3.84	4.30
	9:27	29.69	4.44	109.07	14.55	3.85	4.31
	9:28	30.56	4.43	111.40	14.70	3.84	4.29
	9:29	29.48	4.44	110.59	14.61	3.84	4.30
	9:30	29.52	4.38	108.69	14.63	3.84	4.29
	9:31	30.39	4.36	110.99	14.68	3.84	4.30
	9:32	29.85	4.45	111.45	14.65	3.85	4.32
	9:33	29.85	4.42	109.92	14.62	3.84	4.29
	9:34	29.80	4.50	112.55	14.64	3.86	4.33
	9:35	29.73	4.49	113.85	14.53	3.85	4.30
	9:36	30.10	4.51	111.17	14.46	3.85	4.30
	9:37	29.82	4.49	110.70	14.56	3.83	4.29
	9:38	30.29	4.47	111.87	14.68	3.84	4.30
	9:39	29.52	4.57	109.84	14.59	3.84	4.30
	9:40	30.29	4.50	109.37	14.64	3.85	4.31
	9:41	31.76	4.41	110.59	14.74	3.84	4.30
	9:42	30.66	4.43	110.39	14.70	3.82	4.27
	9:43	31.17	4.41	106.04	14.65	3.82	4.29
	9:44	33.86	4.48	109.57	14.83	3.83	4.29
	9:45	32.30	4.48	116.88	14.81	3.86	4.32
	9:46	31.50	4.60	115.38	14.44	3.84	4.30
	9:47	30.46	4.48	109.96	14.36	3.83	4.28
	9:48	30.77	4.48	109.28	14.64	3.83	4.28
	9:49	30.55	4.52	110.51	14.70	3.82	4.29
	9:50	30.21	4.45	109.26	14.67	3.82	4.28
	9:51	31.03	4.47	110.96	14.72	3.83	4.28
	9:52	29.92	4.54	113.78	14.64	3.83	4.29
	9:53	29.90	4.58	112.37	14.51	3.83	4.28
	9:54	29.73	4.46	108.95	14.53	3.82	4.28
	9:55	31.00	4.41	109.88	14.72	3.82	4.29
	9:56	29.49	4.51	112.89	14.67	3.83	4.28
	9:57	29.32	4.49	111.32	14.59	3.84	4.30
	9:58	29.52	4.48	110.46	14.60	3.84	4.28
	9:59	30.00	4.53	111.58	14.67	3.84	4.31

Run 2
Qstd

SITE IDENTIFIER: GAVY

Date	Time	CO Var. 21	NOX Var. 24	Var. 27	O2 Var. 38	Var. 42	Var. 52
5/11/93	10:00	29.92	4.46	112.42	14.61	3.85	4.30
	10:01	30.57	4.49	112.65	14.59	3.84	4.31
	10:02	30.59	4.48	113.93	14.57	3.84	4.31
	10:03	30.48	4.50	111.74	14.49	3.84	4.30
	10:04	30.20	4.38	108.29	14.55	3.83	4.30
	10:05	33.70	4.32	108.01	14.77	3.83	4.29
	10:06	33.02	4.39	112.71	14.81	3.84	4.30
	10:07	30.27	4.55	111.30	14.63	3.82	4.28
	10:08	30.02	4.52	112.71	14.60	3.85	4.30
	10:09	29.82	4.54	114.57	14.57	3.83	4.29
	10:10	29.78	4.49	111.17	14.46	3.82	4.28
	10:11	29.88	4.38	108.97	14.62	3.83	4.29
	10:12	31.33	4.38	110.90	14.74	3.84	4.30
	10:13	29.95	4.44	111.33	14.67	3.83	4.28
	10:14	29.94	4.43	108.04	14.63	3.82	4.27
	10:15	33.48	4.43	107.19	14.79	3.84	4.30
	10:16	33.89	4.45	109.21	14.85	3.83	4.30
	10:17	32.38	4.50	108.38	14.76	3.83	4.29
	10:18	33.94	4.44	107.80	14.81	3.83	4.29
	10:19	33.95	4.46	112.13	14.88	3.84	4.29
	10:20	30.79	4.44	112.57	14.66	3.85	4.31
	10:21	30.34	4.48	109.03	14.56	3.83	4.29
	10:22	32.06	4.41	110.39	14.71	3.84	4.30
	10:23	30.98	4.38	114.35	14.70	3.84	4.31
	10:24	30.71	4.48	113.26	14.51	3.84	4.30
	10:25	30.48	4.47	111.17	14.47	3.83	4.29
	10:26	30.40	4.49	111.34	14.60	3.83	4.29
	10:27	30.22	4.46	108.14	14.65	3.83	4.29
	10:28	32.44	4.45	105.16	14.75	3.82	4.28
	10:29	34.21	4.35	110.91	14.95	3.83	4.29
	10:30	32.70	4.43	117.43	14.82	3.85	4.30
	10:31	31.45	4.55	111.95	14.37	3.82	4.29
	10:32	30.51	4.50	107.80	14.49	3.82	4.28
	10:33	32.71	4.44	110.41	14.77	3.83	4.29
	10:34	31.38	4.46	111.56	14.75	3.82	4.27
	10:35	30.59	4.49	109.58	14.66	3.81	4.26
	10:36	31.30	4.44	112.50	14.71	3.82	4.28
	10:37	30.38	4.49	112.58	14.68	3.82	4.27
	10:38	30.02	4.49	107.93	14.59	3.81	4.27
	10:39	33.09	4.40	108.12	14.76	3.80	4.26
	10:40	33.76	4.34	109.21	14.84	3.81	4.28
	10:41	33.03	4.41	109.26	14.80	3.82	4.27
	10:42	32.75	4.42	108.06	14.75	3.80	4.25
	10:43	34.51	4.34	110.04	14.89	3.82	4.28
	10:44	32.72	4.44	110.91	14.79	3.82	4.27
	10:45	30.67	4.49	109.60	14.65	3.82	4.28
	10:46	32.67	4.36	108.19	14.72	3.81	4.26
	10:47	35.23	4.38	107.48	14.87	3.81	4.27
	10:48	35.12	4.39	108.64	14.86	3.82	4.28
	10:49	32.97	4.42	109.44	14.78	3.82	4.27
	10:50	33.12	4.36	111.53	14.73	3.80	4.27
	10:51	31.66	4.41	110.59	14.73	3.81	4.26
	10:52	31.08	4.43	107.88	14.66	3.81	4.27
	10:53	34.03	4.39	108.14	14.80	3.81	4.26
	10:54	34.54	4.42	109.24	14.86	3.81	4.28
	10:55	33.54	4.39	107.30	14.80	3.80	4.25
	10:56	34.58	4.38	108.87	14.83	3.81	4.27

RUN 2

Run 2 Qstd

SITE IDENTIFIER: GAVY

Date	Time	CO Var. 21	NOx Var. 24	Var. 27	O2 Var. 28	Var. 42	Var. 52
	10:57	35.20	4.37	111.75	14.87	3.81	4.27
	10:58	32.09	4.41	113.73	14.73	3.82 3.81	4.27
	10:59	31.27	4.44	109.86	14.51	3.80	4.26
5/11/93	11:00	31.93	4.38	110.05	14.68	3.80	4.26
	11:01	31.23	4.41	113.44	14.72	3.81	4.27
	11:02	30.45	4.48	113.54	14.61	3.82	4.27
	11:03	30.20	4.48	112.65	14.53	3.83	4.29
	11:04	29.57	4.42	114.02	14.54	3.82	4.29
	11:05	29.39	4.45	112.18	14.58	3.81	4.26
	11:06	29.79	4.41	108.77	14.60	3.81	4.26
	11:07	32.93	4.36	109.92	14.76	3.83	4.29
	11:08	31.16	4.41	114.31	14.77	3.83	4.28
	11:09	29.91	4.44	111.89	14.58	3.82	4.28
	11:10	29.84	4.38	110.12	14.57	3.81	4.27
	11:11	30.59	4.32	112.79	14.71	3.81	4.27
	11:12	29.88	4.33	113.21	14.63	3.82	4.27
	11:13	29.56	4.40	110.38	14.55	3.80	4.27
	11:14	30.34	4.30	111.59	14.68	3.82	4.28
	11:15	29.94	4.39	113.71	14.69	3.82	4.28
	11:16	30.05	4.34	112.13	14.55	3.81	4.26
	11:17	29.99	4.35	110.79	14.62	3.81	4.28
	11:18	29.92	4.34	112.96	14.69	3.82	4.27
	11:19	29.50	4.36	115.58	14.56	3.82	4.27
	11:20	29.91	4.39	113.93	14.46	3.82	4.27
	11:21	29.36	4.37	116.79	14.50	3.83	4.29
	11:22	29.65	4.41	115.13	14.44	3.82	4.27
	11:23	29.11	4.37	110.93	14.40	3.81	4.27
	11:24	29.10	4.32	112.03	14.62	3.80	4.26
	11:25	29.43	4.37	110.18	14.67	3.81	4.27
	11:26	29.87	4.35	110.18	14.67	3.81	4.26
	11:27	31.56	4.37	109.37	14.74	3.80	4.26
	11:28	32.45	4.29	112.28	14.79	3.81	4.27
	11:29	30.11	4.30	109.39	14.68	3.81	4.27

Port change

SITE IDENTIFIER: GAVY

Date	Time	Var. 21	Var. 24	Var. 27	Var. 28	Var. 40	Var. 42	Var. 52
	15:37	33.22	4.17	111.82	14.50	33.71	3.72	4.17
	15:38	34.49	4.21	115.27	14.64	33.74	3.75	4.19
	15:39	32.21	4.24	115.30	14.54	34.23	3.73	4.18
	15:40	30.86	4.30	114.31	14.42	34.71	3.74	4.18
	15:41	33.22	4.20	111.50	14.48	34.47	3.70	4.15
	15:42	34.36	4.13	113.80	14.66	33.72	3.73	4.18
	15:43	31.98	4.25	117.95	14.55	34.15	3.73	4.18
	15:44	30.43	4.29	116.31	14.30	34.56	3.72	4.17
	15:45	31.22	4.26	115.74	14.36	34.92	3.74	4.19
	15:46	31.53	4.21	116.49	14.42	34.33	3.75	4.20
	15:47	30.71	4.22	113.54	14.41	34.20	3.72	4.17
	15:48	33.11	4.21	113.41	14.45	34.04	3.75	4.20
	15:49	33.26	4.22	116.31	14.56	34.03	3.76	4.20
	15:50	30.80	4.26	115.72	14.42	34.49	3.76	4.20
	15:51	31.67	4.21	114.25	14.39	34.74	3.75	4.20

Data dump for the following variables:

Variable 21 - COGEN.	STACK CO	PPM
Variable 24 - COGEN.	STACK NOx	PPM
Variable 27 - COGEN.	FUEL GAS FLOW	MSCFH
Variable 28 - COGEN.	STACK O2	PCT
Variable 40 - COGEN.	SCR INLET NOx	PPM
Variable 42 - COGEN.	ANNUB FLOW MEAS (DRY)	MMSCFH
Variable 52 - COGEN.	ANNUB FLOW MEAS (WET)	MMSCFH

Date	Time	CO Var. 21	NOx Var. 24	Var. 27	O2 Var. 28	Var. 40	Var. 42	Var. 52
5/11/93	11:00	31.93	4.38	110.05	14.68	33.64	3.80	4.26
	11:01	31.23	4.41	113.44	14.72	33.79	3.81	4.27
	11:02	30.45	4.48	113.54	14.61	33.88	3.82	4.27
	11:03	30.20	4.48	112.65	14.53	34.08	3.83	4.29
	11:04	29.57	4.42	114.02	14.54	33.97	3.82	4.29
	11:05	29.39	4.45	112.18	14.58	33.81	3.81	4.26
	11:06	29.79	4.41	108.77	14.60	33.81	3.81	4.26
	11:07	32.93	4.36	109.92	14.76	33.59	3.83	4.29
	11:08	31.16	4.41	114.31	14.77	34.08	3.83	4.28
	11:09	29.91	4.44	111.89	14.53	34.09	3.82	4.28
	11:10	29.84	4.38	110.12	14.57	33.84	3.81	4.27
	11:11	30.59	4.32	112.79	14.71	33.83	3.81	4.27
	11:12	29.88	4.33	113.21	14.63	33.96	3.82	4.27
	11:13	29.56	4.40	110.33	14.55	33.88	3.80	4.27
	11:14	30.34	4.30	111.59	14.68	33.81	3.82	4.28
	11:15	29.94	4.39	113.71	14.69	33.94	3.82	4.28
	11:16	30.05	4.34	112.13	14.55	33.82	3.81	4.26
	11:17	29.99	4.35	110.79	14.62	33.82	3.81	4.28
	11:18	29.92	4.34	112.96	14.69	34.18	3.82	4.27
	11:19	29.50	4.36	115.58	14.56	34.14	3.82	4.27
	11:20	29.91	4.39	113.93	14.46	34.13	3.82	4.27
	11:21	29.36	4.37	116.79	14.50	34.06	3.83	4.29
	11:22	29.65	4.41	115.13	14.44	34.14	3.82	4.27
	11:23	29.11	4.37	110.93	14.40	34.12	3.81	4.27
	11:24	29.10	4.32	112.03	14.62	33.67	3.80	4.26
	11:25	29.43	4.37	110.18	14.67	33.83	3.81	4.27
	11:26	29.87	4.35	110.18	14.67	33.84	3.81	4.26
	11:27	31.56	4.37	109.37	14.74	33.76	3.80	4.26
	11:28	32.45	4.29	112.28	14.79	33.62	3.81	4.27
	11:29	30.11	4.30	109.39	14.68	33.86	3.81	4.27
	11:30	32.73	4.28	108.35	14.74	33.37	3.81	4.27
Run 2	11:31	33.28	4.31	111.46	14.84	33.54	3.82	4.27
	11:32	31.26	4.38	109.60	14.72	33.60	3.81	4.26
	11:33	33.30	4.34	107.96	14.77	33.31	3.81	4.28
	11:34	34.08	4.32	112.87	14.88	33.29	3.83	4.28
	11:35	30.57	4.41	114.41	14.69	33.78	3.83	4.29
	11:36	30.24	4.43	110.10	14.54	33.85	3.81	4.27
	11:37	31.47	4.40	110.88	14.68	33.58	3.83	4.28
	11:38	31.51	4.43	114.32	14.76	33.81	3.82	4.29
	11:39	30.20	4.43	110.99	14.57	33.94	3.81	4.27
	11:40	30.73	4.34	109.37	14.63	33.61	3.80	4.26
	11:41	33.40	4.30	110.20	14.81	33.52	3.81	4.27
	11:42	32.68	4.31	107.93	14.77	33.33	3.82	4.28
	11:43	34.58	4.24	107.22	14.88	32.89	3.81	4.26
	11:44	34.20	4.35	113.99	14.94	33.05	3.82	4.28

Run 3 Ø std 3.81

SITE IDENTIFIER: GAVY

Date	Time	Var. 21 (CO)	Var. 24 (NOx)	Var. 27	Var. 28	Var. 40	Var. 42 (O2)	Var. 52	
	11:45	31.78	4.44	114.22	14.60	33.58	3.80	4.26	
	11:46	30.94	4.49	110.28	14.50	33.65	3.79	4.25	
	11:47	32.07	4.45	109.13	14.71	33.68	3.80	4.26	
	11:48	32.92	4.39	111.74	14.77	33.44	3.80	4.25	
	11:49	31.03	4.48	112.58	14.71	33.88	3.81	4.27	
	11:50	30.71	4.48	108.47	14.64	33.70	3.80	4.24	
	11:51	33.93	4.42	110.48	14.79	33.36	3.81	4.27	
	11:52	31.95	4.40	113.75	14.77	33.69	3.82	4.28	
	11:53	30.63	4.49	116.99	14.60	33.79	3.82	4.27	
	11:54	30.83	4.48	114.79	14.43	33.73	3.82	4.28	
	11:55	30.06	4.45	113.16	14.49	33.80	3.82	4.28	
	11:56	29.47	4.42	111.51	14.54	33.87	3.82	4.27	
	11:57	29.78	4.38	109.28	14.65	33.80	3.80	4.25	
	11:58	31.96	4.40	109.37	14.76	33.52	3.81	4.27	
	11:59	32.04	4.41	115.68	14.78	33.68	3.82	4.28	
5/11/93	12:00	30.74	4.49	114.30	14.55	33.82	3.82	4.28	
	12:01	30.24	4.48	114.09	14.47	33.83	3.81	4.27	
	12:02	29.73	4.49	112.45	14.54	33.86	3.82	4.28	
	12:03	29.62	4.41	112.32	14.56	33.73	3.82	4.28	
	12:04	29.98	4.37	109.67	14.64	33.65	3.82	4.27	RUN 3
	12:05	32.61	4.39	108.14	14.78	33.57	3.81	4.26	
	12:06	33.43	4.46	112.83	14.82	33.49	3.82	4.28	
	12:07	31.00	4.48	114.15	14.70	33.78	3.81	4.27	Run 4
	12:08	30.44	4.50	110.31	14.55	33.77	3.80	4.26	
	12:09	31.64	4.39	111.40	14.70	33.48	3.82	4.27	Psta
	12:10	30.85	4.49	114.82	14.71	33.60	3.82	4.29	3.82
	12:11	30.69	4.42	111.25	14.54	33.69	3.82	4.28	
	12:12	30.79	4.45	110.54	14.61	33.36	3.82	4.26	
	12:13	31.75	4.44	111.66	14.73	33.29	3.81	4.27	
	12:14	30.61	4.44	113.44	14.67	33.44	3.81	4.28	
	12:15	30.36	4.48	109.70	14.60	33.59	3.81	4.27	
	12:16	31.44	4.50	113.02	14.71	33.52	3.81	4.26	
	12:17	30.59	4.47	114.27	14.65	33.78	3.81	4.28	Post CHANGE
	12:18	30.08	4.52	110.14	14.56	33.89	3.82	4.27	
	12:19	31.09	4.41	113.10	14.66	33.59	3.82	4.29	
	12:20	30.57	4.45	118.19	14.67	33.74	3.83	4.28	
	12:21	30.30	4.58	113.70	14.34	34.03	3.81	4.27	
	12:22	29.64	4.51	110.35	14.42	33.94	3.81	4.27	Run 5
	12:23	31.71	4.39	107.67	14.71	33.46	3.82	4.28	
	12:24	33.58	4.38	105.82	14.91	33.17	3.82	4.28	RUN 3
	12:25	34.40	4.36	107.53	14.99	33.13	3.83	4.29	
	12:26	34.91	4.39	106.21	15.00	33.17	3.82	4.28	Psta 3.82
	12:27	35.09	4.43	106.94	15.00	33.23	3.83	4.28	
	12:28	35.32	4.48	106.85	15.00	33.25	3.81	4.26	
	12:29	35.58	4.48	107.31	15.00	33.14	3.80	4.27	
	12:30	35.83	4.39	106.07	15.00	32.91	3.79	4.25	
	12:31	35.95	4.46	107.19	15.01	32.93	3.81	4.27	
	12:32	36.07	4.48	106.36	15.00	32.79	3.81	4.26	
	12:33	36.29	4.48	106.57	15.00	32.81	3.79	4.25	
	12:34	36.12	4.52	107.22	15.00	32.91	3.79	4.25	
	12:35	36.21	4.53	110.33	15.00	33.04	3.80	4.25	
	12:36	35.27	4.54	106.36	14.82	32.99	3.80	4.26	
	12:37	36.06	4.52	107.06	14.95	32.93	3.79	4.24	
	12:38	36.26	4.49	106.73	15.00	32.99	3.80	4.26	
	12:39	36.03	4.52	106.75	15.01	33.04	3.81	4.27	
	12:40	36.11	4.54	106.39	15.01	32.88	3.80	4.25	

SITE IDENTIFIER: GAVY

Date	Time	Var. 21	Var. 24	Var. 27	Var. 28	Var. 40	Var. 42	Var. 52
	12:41	36.14	4.54	107.54	15.00	32.92	3.78	4.24
	12:42	36.21	4.49	108.71	15.00	32.80	3.79	4.24
	12:43	35.71	4.55	107.88	14.91	32.86	3.79	4.25
	12:44	36.16	4.52	107.59	14.91	32.78	3.79	4.25
	12:45	36.04	4.57	110.51	14.94	33.03	3.80	4.25
	12:46	34.44	4.50	107.64	14.81	33.13	3.78	4.23
	12:47	35.75	4.42	106.75	14.88	33.07	3.80	4.26
	12:48	35.90	4.41	106.72	15.00	32.85	3.81	4.27
	12:49	36.18	4.42	107.38	15.00	32.86	3.79	4.24
	12:50	36.49	4.45	106.10	15.00	32.80	3.78	4.23
	12:51	37.34	4.49	107.23	15.00	32.66	3.79	4.24
	12:52	37.32	4.50	108.50	15.00	32.76	3.80	4.25
	12:53	36.12	4.58	114.72	14.94	33.10	3.81	4.26
	12:54	33.64	4.54	107.67	14.59	33.22	3.79	4.24
	12:55	36.25	4.52	107.38	14.84	32.76	3.79	4.23
	12:56	36.83	4.46	106.60	15.00	32.86	3.78	4.23
	12:57	37.14	4.48	107.17	15.00	32.79	3.78	4.24
	12:58	37.08	4.46	107.04	14.97	32.82	3.79	4.24
	12:59	37.21	4.46	108.22	14.99	32.65	3.78	4.23
5/11/93	13:00	36.92	4.51	110.73	14.95	32.92	3.78	4.23

END RUN 3

Data dump for the following variables:

Variable 21 -	COGEN.	STACK CO	PPM
Variable 24 -	COGEN.	STACK NOx	PPM
Variable 27 -	COGEN.	FUEL GAS FLOW	MSCFH
Variable 28 -	COGEN.	STACK O2	PCT
Variable 40 -	COGEN.	SCR INLET NOx	PPM
Variable 42 -	COGEN.	ANNUB FLOW MEAS (DRY)	MMSCFH
Variable 52 -	COGEN.	ANNUB FLOW MEAS (WET)	MMSCFH

Date	Time	CO Var. 21	NOx Var. 24	Var. 27	O2 Var. 28	Var. 40	Var. 42	Var. 52
5/11/93	13:00	36.92	4.51	110.73	14.95	32.92	3.78	4.23
	13:01	35.87	4.58	106.23	14.81	32.84	3.77	4.23
	13:02	37.04	4.54	107.07	14.94	32.60	3.77	4.23
	13:03	37.25	4.51	106.80	15.00	32.66	3.78	4.22
	13:04	37.21	4.55	112.34	15.00	32.74	3.79	4.24
	13:05	34.73	4.59	116.26	14.81	33.26	3.79	4.24
	13:06	34.44	4.59	119.55	14.48	33.11	3.79	4.23
	13:07	33.22	4.59	122.48	14.29	33.51	3.78	4.23
	13:08	31.20	4.59	118.74	14.10	33.78	3.78	4.23
	13:09	30.48	4.46	117.41	14.21	33.86	3.79	4.24
	13:10	30.21	4.44	117.37	14.33	33.77	3.77	4.22
	13:11	29.82	4.53	116.93	14.32	33.79	3.77	4.22
	13:12	29.64	4.53	114.02	14.39	33.82	3.78	4.22
	13:13	29.37	4.37	113.68	14.51	33.61	3.77	4.22
	13:14	29.47	4.38	112.92	14.56	33.54	3.78	4.23
	13:15	29.48	4.47	113.62	14.56	33.56	3.77	4.22
	13:16	29.70	4.48	112.57	14.62	33.65	3.78	4.23
	13:17	29.84	4.48	112.96	14.59	33.60	3.78	4.24
	13:18	30.13	4.48	108.37	14.59	33.45	3.79	4.25
	13:19	33.59	4.42	106.81	14.86	33.00	3.80	4.25
	13:20	34.27	4.43	106.56	14.99	32.84	3.79	4.24
	13:21	34.78	4.43	106.88	15.00	32.71	3.80	4.26
	13:22	35.23	4.41	106.65	15.00	32.61	3.78	4.24
	13:23	35.58	4.51	106.81	15.00	32.71	3.80	4.26
	13:24	36.11	4.47	106.68	15.00	32.58	3.80	4.26
	13:25	36.21	4.46	106.75	15.00	32.65	3.79	4.25
	13:26	36.26	4.39	106.80	15.00	32.58	3.79	4.23
	13:27	36.24	4.40	107.22	15.00	32.68	3.79	4.24
	13:28	36.08	4.50	106.41	15.00	32.73	3.78	4.23
	13:29	36.19	4.51	106.67	15.00	32.60	3.78	4.23
	13:30	36.31	4.53	107.54	14.99	32.61	3.79	4.24
	13:31	36.58	4.42	106.29	15.00	32.50	3.76	4.21
	13:32	36.48	4.46	106.75	15.00	32.53	3.78	4.23
	13:33	36.32	4.46	106.85	15.00	32.48	3.77	4.22
	13:34	36.10	4.45	106.57	15.00	32.54	3.79	4.24
	13:35	36.24	4.51	106.73	15.00	32.54	3.79	4.25
	13:36	36.36	4.51	107.04	14.99	32.77	3.80	4.25
	13:37	36.12	4.47	106.76	15.00	32.55	3.80	4.25
	13:38	36.08	4.44	106.57	15.00	32.66	3.78	4.23
	13:39	36.17	4.47	107.04	15.00	32.67	3.78	4.23
	13:40	36.25	4.53	106.63	15.00	32.60	3.77	4.22
	13:41	36.01	4.51	107.09	15.00	32.65	3.78	4.23
	13:42	35.96	4.53	106.18	15.00	32.72	3.77	4.23
	13:43	35.90	4.54	107.43	15.01	32.65	3.77	4.22
	13:44	35.97	4.61	106.21	14.99	32.62	3.77	4.23

RUN 4

SITE IDENTIFIER: GAVY

Date	Time	Var. 21	Var. 24	Var. 27	Var. 28	Var. 40	Var. 42	Var. 52
	13:45	35.80	4.54	106.93	15.00	32.70	3.79	4.24
	13:46	35.76	4.51	107.06	15.00	32.76	3.78	4.23
	13:47	36.00	4.43	106.69	15.00	32.69	3.76	4.20
	13:48	36.07	4.49	106.59	15.00	32.81	3.76	4.21
	13:49	36.21	4.49	107.15	14.99	32.62	3.77	4.21
	13:50	35.92	4.49	106.57	14.99	32.64	3.76	4.21
	13:51	35.83	4.50	106.65	14.99	32.53	3.76	4.22
	13:52	35.59	4.53	107.57	14.99	32.56	3.76	4.21
	13:53	35.88	4.52	106.51	14.99	32.53	3.76	4.22
	13:54	35.98	4.47	106.94	14.99	32.59	3.76	4.21
	13:55	36.24	4.54	107.41	14.99	32.44	3.76	4.22
	13:56	36.35	4.49	106.93	14.99	32.53	3.76	4.21
	13:57	36.33	4.49	107.46	14.99	32.45	3.74	4.20
	13:58	36.33	4.52	107.88	14.99	32.28	3.76	4.22
	13:59	36.65	4.52	107.10	14.99	32.25	3.77	4.22
5/11/93	14:00	36.41	4.46	107.17	14.98	32.28	3.75	4.21
	14:01	36.52	4.45	106.80	14.98	31.99	3.76	4.21
	14:02	36.62	4.43	107.01	14.99	31.92	3.76	4.20
	14:03	36.46	4.48	107.37	14.99	31.98	3.75	4.21
	14:04	36.53	4.49	107.45	14.99	32.10	3.76	4.21
	14:05	36.52	4.49	107.80	14.99	32.18	3.74	4.19
	14:06	36.70	4.46	108.06	14.98	31.99	3.75	4.20
	14:07	36.69	4.43	107.32	14.98	32.18	3.75	4.19
	14:08	36.80	4.50	108.22	14.98	32.02	3.76	4.21
	14:09	36.61	4.45	107.57	14.98	32.00	3.76	4.21
	14:10	36.46	4.43	107.96	14.98	32.03	3.78	4.23
	14:11	36.74	4.42	107.01	14.99	31.98	3.78	4.22
	14:12	36.75	4.45	108.58	14.98	32.01	3.78	4.23
	14:13	37.06	4.45	115.94	14.99	31.88	3.79	4.25
	14:14	36.17	4.51	132.79	14.76	32.40	3.81	4.27
	14:15	31.65	4.72	126.44	13.74	33.32	3.77	4.23
	14:16	29.93	4.67	121.49	13.79	33.30	3.80	4.26
	14:17	30.34	4.55	115.69	14.08	33.17	3.78	4.23
	14:18	30.17	4.41	109.12	14.37	32.78	3.75	4.20
	14:19	33.04	4.29	106.47	14.76	32.23	3.78	4.23
	14:20	34.29	4.36	108.81	14.97	32.11	3.77	4.23
	14:21	35.16	4.39	107.09	14.98	32.05	3.75	4.20
	14:22	35.78	4.37	108.45	14.98	32.06	3.76	4.21
	14:23	35.96	4.43	107.38	14.98	31.93	3.77	4.22
	14:24	36.37	4.44	108.69	14.98	31.86	3.76	4.21
	14:25	36.96	4.40	106.68	14.98	31.62	3.76	4.22
	14:26	36.93	4.36	108.25	14.98	31.92	3.77	4.22
	14:27	37.13	4.39	107.28	14.98	31.99	3.77	4.21
	14:28	37.41	4.42	107.30	14.98	31.61	3.75	4.20
	14:29	37.26	4.37	107.96	14.98	31.72	3.74	4.19
	14:30	37.22	4.42	108.09	14.98	31.68	3.77	4.23
	14:31	37.38	4.42	107.22	14.98	31.59	3.76	4.21
	14:32	37.26	4.35	109.08	14.98	31.54	3.76	4.21
	14:33	37.64	4.36	108.34	14.98	31.89	3.76	4.22
	14:34	36.68	4.38	111.66	14.90	32.65	3.76	4.22
	14:35	36.27	4.18	110.72	14.81	32.91	3.76	4.21
	14:36	36.40	4.11	111.21	14.79	33.00	3.77	4.21
	14:37	36.21	4.07	111.71	14.77	32.94	3.75	4.20
	14:38	36.14	4.02	111.53	14.75	32.94	3.77	4.21
	14:39	36.03	3.99	111.74	14.74	33.01	3.76	4.22
	14:40	35.77	4.03	112.45	14.72	33.13	3.77	4.22

RuN 4

SITE IDENTIFIER: GAVY

Date	Time	CO Var. 21	NOx Var. 24	Var. 27	O_2 Var. 28	Var. 40	Var. 42	Var. 52	
	14:41	35.99	4.00	112.73	14.71	33.16	3.76	4.22	
	14:42	35.98	4.01	112.00	14.69	33.51	3.75	4.20	
	14:43	35.74	4.00	112.71	14.68	33.46	3.76	4.21	
	14:44	35.87	4.07	112.19	14.67	33.56	3.76	4.21	
	14:45	35.53	4.06	112.45	14.67	33.79	3.76	4.22	
	14:46	35.73	4.07	112.70	14.66	33.91	3.76	4.21	
	14:47	35.66	3.99	112.69	14.66	33.72	3.75	4.20	
	14:48	35.44	4.04	112.26	14.65	33.80	3.77	4.23	
	14:49	35.37	4.02	112.11	14.65	33.73	3.77	4.22	
	14:50	35.52	4.06	112.47	14.65	33.74	3.76	4.21	
	14:51	35.20	4.07	112.58	14.65	33.93	3.77	4.23	
	14:52	35.18	4.03	112.37	14.64	33.79	3.77	4.22	
	14:53	35.39	4.04	112.56	14.65	33.69	3.77	4.22	
	14:54	35.45	4.12	112.58	14.65	33.77	3.77	4.23	
	14:55	35.59	4.08	111.95	14.65	33.74	3.76	4.20	
	14:56	35.85	4.09	112.94	14.65	33.60	3.75	4.20	
	14:57	35.52	4.13	113.21	14.63	33.68	3.76	4.22	
	14:58	35.71	4.14	128.95	14.63	33.85	3.80	4.25	RUN 5
	14:59	33.55	4.20	128.74	13.93	34.41	3.79	4.24	
5/11/93	15:00	31.16	4.22	123.31	13.72	34.59	3.78	4.23	
	15:01	30.33	4.17	117.33	13.91	34.05	3.76	4.21	
	15:02	30.06	4.13	116.54	14.28	33.45	3.76	4.21	
	15:03	30.22	4.21	116.54	14.39	33.67	3.77	4.22	
	15:04	30.49	4.20	116.52	14.38	33.64	3.76	4.21	
	15:05	30.18	4.17	119.76	14.39	34.15	3.76	4.22	
	15:06	29.40	4.13	120.57	14.23	34.44	3.76	4.22	
	15:07	30.23	4.13	117.49	14.19	34.13	3.77	4.22	Port change
	15:08	29.51	4.17	122.55	14.23	34.19	3.76	4.20	
	15:09	29.00	4.22	134.98	14.29	34.31	3.78	4.23	
	15:10	29.74	4.29	133.24	14.23	34.18	3.78	4.23	
	15:11	28.98	4.21	132.27	14.25	34.26	3.76	4.22	
	15:12	29.08	4.20	130.66	14.34	34.20	3.77	4.22	
	15:13	28.99	4.25	130.40	14.36	34.36	3.77	4.22	
	15:14	30.24	4.20	132.63	14.43	34.54	3.77	4.23	
	15:15	28.72	4.19	136.29	14.35	34.89	3.79	4.23	RUN 5
	15:16	28.87	4.24	132.85	14.14	35.31	3.77	4.22	
	15:17	28.17	4.16	113.88	14.14	35.18	3.77	4.22	
	15:18	30.34	4.11	114.70	14.39	34.13	3.76	4.21	
	15:19	29.85	4.17	114.83	14.49	34.30	3.77	4.22	
	15:20	30.18	4.21	114.17	14.44	34.18	3.77	4.22	
	15:21	31.72	4.23	112.18	14.49	33.94	3.77	4.22	
	15:22	33.18	4.25	117.02	14.57	34.50	3.79	4.24	
	15:23	29.86	4.33	116.21	14.43	35.19	3.78	4.23	
	15:24	30.05	4.20	116.44	14.39	34.44	3.78	4.24	
	15:25	29.88	4.16	118.54	14.41	34.56	3.77	4.22	
	15:26	30.20	4.28	119.10	14.24	34.58	3.76	4.21	
	15:27	29.70	4.26	116.32	14.19	34.73	3.76	4.22	
	15:28	28.79	4.27	117.01	14.32	34.64	3.75	4.21	
	15:29	28.52	4.36	117.22	14.34	34.76	3.75	4.21	
	15:30	28.83	4.20	113.39	14.31	34.72	3.75	4.19	
	15:31	31.00	4.11	114.74	14.43	34.34	3.74	4.19	
	15:32	32.54	4.06	116.08	14.48	34.09	3.72	4.17	
	15:33	30.15	4.14	115.64	14.41	34.24	3.72	4.16	
	15:34	30.53	4.22	114.54	14.38	34.15	3.73	4.19	
	15:35	32.35	4.18	114.59	14.46	33.88	3.73	4.18	
	15:36	32.59	4.19	113.81	14.49	33.91	3.74	4.19	

Data dump for the following variables:

Variable 21 - COGEN.	STACK CO	PPM
Variable 24 - COGEN.	STACK NOx	PPM
Variable 27 - COGEN.	FUEL GAS FLOW	MSCFH
Variable 28 - COGEN.	STACK O2	PCT
Variable 40 - COGEN.	SCR INLET NOx	PPM
Variable 42 - COGEN. ANNUB FLOW MEAS (DRY)		MMSCFH
Variable 52 - COGEN. ANNUB FLOW MEAS (WET)		MMSCFH

Date	Time	Var. 21	Var. 24	Var. 27	Var. 28	Var. 40	Var. 42	Var. 52
5/11/93	15:00	31.16	4.22	123.31	13.72	34.59	3.78	4.23
	15:01	30.33	4.17	117.33	13.91	34.05	3.76	4.21
	15:02	30.06	4.13	116.54	14.28	33.45	3.76	4.21
	15:03	30.22	4.21	116.54	14.39	33.67	3.77	4.22
	15:04	30.49	4.20	116.52	14.38	33.64	3.76	4.21
	15:05	30.18	4.17	119.76	14.39	34.15	3.76	4.22
	15:06	29.40	4.13	120.57	14.23	34.44	3.76	4.22
	15:07	30.23	4.13	117.49	14.19	34.13	3.77	4.22
	15:08	29.51	4.17	122.55	14.28	34.19	3.76	4.20
	15:09	29.00	4.22	134.98	14.29	34.31	3.78	4.23
	15:10	29.74	4.29	133.24	14.23	34.18	3.78	4.23
	15:11	28.98	4.21	132.27	14.25	34.26	3.76	4.22
	15:12	29.08	4.20	130.66	14.34	34.20	3.77	4.22
	15:13	28.99	4.25	130.40	14.36	34.36	3.77	4.22
	15:14	30.24	4.28	132.63	14.43	34.54	3.77	4.23
	15:15	28.72	4.19	136.29	14.35	34.89	3.79	4.23
	15:16	28.87	4.24	132.85	14.14	35.31	3.77	4.22
	15:17	28.17	4.11	113.86	14.14	35.18	3.77	4.22
	15:18	30.34	4.11	114.70	14.39	34.13	3.76	4.21
	15:19	29.85	4.17	114.83	14.49	34.30	3.77	4.22
	15:20	30.18	4.21	114.17	14.44	34.18	3.77	4.22
	15:21	31.72	4.23	112.18	14.49	33.94	3.77	4.22
	15:22	33.18	4.25	117.02	14.57	34.50	3.79	4.24
	15:23	29.86	4.33	116.21	14.43	35.19	3.78	4.23
	15:24	30.05	4.20	116.44	14.39	34.44	3.78	4.24
	15:25	29.88	4.16	118.54	14.41	34.56	3.77	4.22
	15:26	30.20	4.28	119.10	14.24	34.58	3.76	4.21
	15:27	29.70	4.26	116.32	14.19	34.73	3.76	4.22
	15:28	28.79	4.27	117.01	14.32	34.64	3.75	4.21
	15:29	28.52	4.26	117.22	14.34	34.76	3.75	4.21
	15:30	28.83	4.20	113.39	14.31	34.72	3.75	4.19
	15:31	31.00	4.11	114.74	14.43	34.34	3.74	4.19
	15:32	32.54	4.06	116.08	14.48	34.09	3.72	4.17
	15:33	30.15	4.14	115.64	14.41	34.24	3.72	4.16
	15:34	30.53	4.22	114.54	14.38	34.15	3.73	4.19
	15:35	32.35	4.18	114.59	14.48	33.88	3.73	4.18
	15:36	32.59	4.19	113.81	14.49	33.91	3.74	4.19
	15:37	33.22	4.17	111.82	14.50	33.71	3.72	4.17
	15:38	34.49	4.21	115.27	14.64	33.74	3.75	4.19
	15:39	32.21	4.24	115.30	14.54	34.23	3.73	4.18
	15:40	30.86	4.30	114.31	14.42	34.71	3.74	4.18
	15:41	33.22	4.20	111.50	14.48	34.47	3.70	4.15
	15:42	34.36	4.12	113.80	14.68	33.72	3.73	4.18
	15:43	31.98	4.25	117.95	14.55	34.15	3.73	4.18
	15:44	30.43	4.29	116.31	14.30	34.56	3.72	4.17

SITE IDENTIFIER: GAVY

Date	Time	CO Var. 21	NOx Var. 24	Var. 27	O2 Var. 28	Var. 40	Var. 42	Var. 52
	15:45	31.22	4.26	115.74	14.36	34.92	3.74	4.19
	15:46	31.53	4.21	116.49	14.42	34.33	3.75	4.20
	15:47	30.71	4.22	113.54	14.41	34.20	3.72	4.17
	15:48	33.11	4.21	113.41	14.49	34.04	3.75	4.20
	15:49	33.26	4.22	116.31	14.56	34.03	3.76	4.20
	15:50	30.80	4.26	115.72	14.42	34.49	3.76	4.20
	15:51	31.67	4.21	114.25	14.39	34.74	3.75	4.20
	15:52	33.39	4.17	115.46	14.55	34.45	3.77	4.22
	15:53	31.56	4.18	117.33	14.47	34.67	3.77	4.22
	15:54	30.61	4.18	113.07	14.34	34.39	3.75	4.20
	15:55	33.46	4.10	114.72	14.49	34.10	3.76	4.22
	15:56	32.39	4.19	118.22	14.52	34.46	3.78	4.23
	15:57	30.06	4.20	113.15	14.33	34.73	3.76	4.21
	15:58	31.96	4.19	111.80	14.44	34.10	3.75	4.21
	15:59	33.55	4.18	111.66	14.62	34.33	3.75	4.20
5/11/93	16:00	33.63	4.24	113.62	14.68	34.42	3.78	4.23
	16:01	33.07	4.23	111.84	14.52	35.15	3.77	4.22
	16:02	33.49	4.21	111.93	14.60	35.21	3.78	4.23
	16:03	33.92	4.20	110.23	14.65	34.98	3.78	4.23
	16:04	35.75	4.17	110.25	14.70	34.48	3.78	4.23
	16:05	34.46	4.19	111.06	14.71	34.62	3.78	4.23
	16:06	34.70	4.24	110.77	14.71	34.79	3.76	4.22
	16:07	34.70	4.22	110.51	14.70	34.38	3.77	4.22
	16:08	35.42	4.21	111.35	14.70	34.67	3.77	4.23
	16:09	35.58	4.17	111.37	14.70	34.67	3.78	4.22
	16:10	35.23	4.17	111.11	14.67	34.92	3.76	4.23
	16:11	35.43	4.14	110.02	14.64	34.74	3.75	4.20
	16:12	35.95	4.22	111.11	14.69	34.56	3.78	4.24
	16:13	35.60	4.27	110.82	14.70	34.51	3.77	4.22
	16:14	36.39	4.25	110.49	14.70	34.43	3.78	4.23
	16:15	36.37	4.21	115.69	14.69	34.70	3.77	4.24
	16:16	34.58	4.29	125.94	14.52	35.57	3.80	4.26
	16:17	32.77	4.26	121.51	13.89	35.63	3.78	4.23
	16:18	31.55	4.27	119.02	13.99	35.15	3.78	4.25
	16:19	30.59	4.25	116.02	14.18	34.95	3.79	4.25
	16:20	29.82	4.28	116.08	14.33	34.97	3.78	4.23
	16:21	29.73	4.31	115.26	14.37	35.29	3.78	4.23
	16:22	30.11	4.34	113.71	14.38	35.08	3.78	4.24
	16:23	32.77	4.26	115.92	14.51	35.05	3.78	4.23
	16:24	31.40	4.32	120.41	14.42	35.39	3.77	4.22
	16:25	31.02	4.33	119.11	14.12	35.74	3.78	4.23
	16:26	29.28	4.35	117.41	14.16	35.89	3.77	4.22
	16:27	29.58	4.28	118.33	14.30	35.69	3.76	4.22
	16:28	29.86	4.30	118.90	14.26	35.33	3.75	4.19
	16:29	29.96	4.38	117.43	14.17	35.37	3.72	4.17
	16:30	30.93	4.37	117.56	14.28	35.35	3.74	4.19
	16:31	31.55	4.40	115.12	14.25	35.36	3.73	4.18
	16:32	32.63	4.39	113.00	14.39	35.21	3.73	4.18
	16:33	33.85	4.35	117.05	14.50	35.08	3.75	4.20
	16:34	30.94	4.41	119.24	14.37	35.86	3.76	4.22
	16:35	30.84	4.35	114.46	14.21	35.56	3.74	4.19
	16:36	31.16	4.31	116.70	14.35	35.43	3.74	4.19
	16:37	30.83	4.33	120.18	14.35	35.40	3.78	4.25
	16:38	31.23	4.38	118.25	14.17	35.49	3.79	4.25
	16:39	30.74	4.33	117.33	14.21	35.24	3.79	4.25
	16:40	30.00	4.39	118.14	14.27	35.54	3.78	4.24

Run 7

SITE IDENTIFIER: GAVY

Date	Time	Var. 21 (CO)	Var. 24 (NOx)	Var. 27	Var. 28 (O2)	Var. 40	Var. 42	Var. 52	
	16:41	29.88	4.40	116.91	14.24	35.69	3.79	4.24	
	16:42	29.50	4.38	116.96	14.27	35.66	3.81	4.27	
	16:43	29.27	4.34	120.00	14.29	35.94	3.80	4.25	
	16:44	28.95	4.29	119.00	14.14	36.43	3.80	4.25	RUN 7
	16:45	28.88	4.22	113.04	14.13	36.01	3.80	4.25	
	16:46	30.96	4.20	114.77	14.43	35.36	3.80	4.26	
	16:47	30.40	4.25	114.65	14.43	35.58	3.80	4.26	
	16:48	29.55	4.31	114.15	14.42	35.64	3.80	4.27	
	16:49	29.91	4.31	116.44	14.41	35.82	3.80	4.26	
	16:50	29.54	4.37	118.84	14.37	35.91	3.81	4.26	
	16:51	30.12	4.34	118.46	14.20	36.08	3.81	4.26	POWER CHANGE
	16:52	28.75	4.31	115.47	14.15	36.37	3.80	4.26	
	16:53	28.67	4.29	113.85	14.31	36.40	3.80	4.26	
	16:54	29.51	4.29	115.16	14.44	35.96	3.80	4.25	
	16:55	29.79	4.30	112.74	14.39	35.79	3.81	4.26	
	16:56	32.31	4.24	113.68	14.49	35.42	3.81	4.26	
	16:57	30.30	4.30	116.37	14.46	35.83	3.80	4.26	
	16:58	29.63	4.39	114.09	14.31	35.95	3.81	4.25	
	16:59	30.36	4.37	113.71	14.38	35.81	3.79	4.25	
5/11/93	17:00	30.98	4.32	117.73	14.47	36.12	3.81	4.27	
	17:01	29.70	4.40	116.31	14.29	36.60	3.81	4.26	RUN 7
	17:02	30.05	4.29	111.12	14.31	36.09	3.79	4.24	
	17:03	33.42	4.23	114.46	14.57	35.53	3.81	4.27	
	17:04	31.03	4.35	118.17	14.49	35.85	3.81	4.26	
	17:05	30.17	4.46	118.01	14.22	36.30	3.79	4.24	
	17:06	29.74	4.46	116.02	14.19	36.17	3.81	4.26	
	17:07	29.24	4.41	117.31	14.30	36.07	3.79	4.24	
	17:08	29.04	4.44	116.36	14.29	36.37	3.81	4.26	
	17:09	28.75	4.39	112.99	14.27	36.34	3.79	4.24	
	17:10	30.34	4.35	115.34	14.45	36.40	3.77	4.23	
	17:11	29.45	4.43	116.52	14.43	36.32	3.75	4.19	
	17:12	29.12	4.44	116.63	14.30	36.45	3.73	4.17	
	17:13	29.00	4.46	117.25	14.31	36.18	3.72	4.17	
	17:14	29.43	4.51	118.87	14.27	36.22	3.72	4.18	
	17:15	29.52	4.49	117.09	14.20	36.36	3.73	4.18	
	17:16	28.40	4.53	114.06	14.23	36.42	3.71	4.15	
	17:17	28.29	4.52	115.13	14.37	36.52	3.71	4.15	
	17:18	28.60	4.53	116.96	14.40	36.47	3.71	4.16	
	17:19	28.63	4.57	120.04	14.33	36.74	3.73	4.17	
	17:20	28.45	4.58	116.49	14.08	36.89	3.73	4.17	
	17:21	27.96	4.51	117.73	14.27	36.80	3.71	4.16	
	17:22	28.29	4.46	114.72	14.24	36.66	3.72	4.18	
	17:23	28.52	4.46	113.67	14.38	36.49	3.75	4.21	
	17:24	29.98	4.45	114.80	14.48	36.37	3.78	4.23	
	17:25	29.37	4.49	117.64	14.42	36.74	3.78	4.22	
	17:26	28.62	4.50	116.52	14.28	37.07	3.76	4.20	
	17:27	27.83	4.49	117.68	14.29	37.09	3.76	4.21	
	17:28	29.17	4.52	117.38	14.26	36.65	3.76	4.22	
	17:29	29.12	4.58	114.33	14.24	36.74	3.76	4.20	
	17:30	28.94	4.51	112.70	14.37	36.74	3.75	4.20	
	17:31	29.33	4.55	115.24	14.46	36.86	3.77	4.21	
	17:32	28.37	4.54	116.39	14.42	37.02	3.77	4.23	
	17:33	28.25	4.52	113.99	14.34	37.24	3.74	4.18	
	17:34	28.19	4.51	116.81	14.39	37.34	3.72	4.17	
	17:35	28.62	4.53	118.03	14.31	36.88	3.73	4.18	
	17:36	28.99	4.51	115.64	14.23	36.75	3.78	4.22	

SITE IDENTIFIER: GAVY

Date	Time	Var. 21	Var. 24	Var. 27	Var. 28	Var. 40	Var. 42	Var. 52	
	17:37	28.47	4.61	118.24	14.30	36.94	3.80	4.26	RUN 8
	17:38	28.50	4.59	118.95	14.21	37.17	3.80	4.27	
	17:39	27.47	4.58	120.00	14.15	37.39	3.80	4.26	
	17:40	27.37	4.57	118.19	14.13	37.50	3.79	4.24	
	17:41	26.79	4.51	117.96	14.19	37.39	3.80	4.26	
	17:42	26.45	4.53	117.30	14.20	37.71	3.80	4.26	
	17:43	26.20	4.52	115.08	14.20	37.69	3.79	4.24	
	17:44	26.85	4.41	118.56	14.31	37.67	3.79	4.25	
	17:45	27.35	4.42	120.96	14.25	37.49	3.80	4.26	
	17:46	26.86	4.55	117.01	14.06	37.36	3.81	4.26	
	17:47	26.73	4.54	117.17	14.15	37.43	3.80	4.25	Port CHANGE
	17:48	26.82	4.55	118.45	14.26	37.68	3.79	4.24	
	17:49	26.85	4.57	116.91	14.19	37.62	3.78	4.24	
	17:50	26.54	4.56	115.56	14.25	37.40	3.79	4.24	
	17:51	27.26	4.53	119.44	14.35	37.45	3.78	4.23	
	17:52	26.81	4.61	119.92	14.16	37.65	3.79	4.24	
	17:53	25.93	4.65	117.67	14.07	38.20	3.78	4.24	
	17:54	26.38	4.51	117.51	14.16	38.06	3.78	4.22	
	17:55	26.21	4.48	117.10	14.17	38.04	3.76	4.22	
	17:56	26.79	4.45	115.53	14.20	37.64	3.78	4.24	RUN 8
	17:57	26.82	4.49	118.20	14.29	37.70	3.77	4.22	
	17:58	26.42	4.54	120.79	14.24	37.73	3.77	4.22	
	17:59	26.51	4.59	119.08	14.06	37.54	3.77	4.22	
5/11/93	18:00	26.31	4.56	116.79	14.09	37.52	3.77	4.21	
	18:01	26.21	4.50	118.50	14.20	37.82	3.77	4.23	
	18:02	26.10	4.47	120.02	14.16	38.09	3.75	4.20	
	18:03	25.73	4.50	118.21	14.10	38.17	3.75	4.20	
	18:04	26.46	4.46	116.73	14.13	37.54	3.75	4.21	
	18:05	27.10	4.50	118.94	14.27	37.54	3.77	4.22	
	18:06	26.66	4.52	117.54	14.17	37.79	3.78	4.23	
	18:07	26.92	4.55	116.21	14.17	37.54	3.77	4.22	
	18:08	27.05	4.54	117.35	14.26	37.63	3.73	4.17	
	18:09	26.92	4.53	117.64	14.22	37.62	3.70	4.14	
	18:10	27.08	4.53	114.88	14.18	37.98	3.69	4.13	
	18:11	27.02	4.46	118.48	14.33	37.86	3.72	4.17	
	18:12	27.18	4.49	118.95	14.24	37.93	3.69	4.14	
	18:13	27.56	4.50	115.11	14.13	37.47	3.71	4.14	
	18:14	27.57	4.54	116.26	14.30	37.25	3.70	4.15	
	18:15	28.29	4.58	118.84	14.34	37.20	3.72	4.17	
	18:16	27.60	4.66	119.47	14.21	37.60	3.71	4.14	
	18:17	27.56	4.61	117.67	14.10	37.58	3.71	4.16	
	18:18	27.23	4.57	118.16	14.18	37.89	3.70	4.15	
	18:19	26.77	4.56	118.72	14.18	38.03	3.71	4.15	
	18:20	26.29	4.48	117.33	14.12	38.17	3.68	4.13	
	18:21	26.88	4.49	115.84	14.19	37.83	3.69	4.14	
	18:22	27.80	4.42	117.73	14.33	37.70	3.72	4.17	
	18:23	27.17	4.58	118.79	14.23	37.81	3.70	4.15	
	18:24	27.16	4.64	116.37	14.14	37.69	3.70	4.13	
	18:25	26.83	4.54	117.62	14.27	38.20	3.71	4.15	
	18:26	26.39	4.54	118.88	14.22	38.68	3.70	4.15	
	18:27	26.74	4.45	117.14	14.12	38.23	3.70	4.13	
	18:28	26.79	4.47	116.47	14.23	37.89	3.70	4.15	
	18:29	27.17	4.35	116.71	14.26	37.75	3.71	4.15	
	18:30	27.04	4.18	114.46	14.24	37.68	3.78	4.23	
	18:31	27.98	4.12	112.53	14.33	37.63	3.76	4.21	

Data dump for the following variables:

Variable 21 -	COGEN.	STACK CO	PPM
Variable 24 -	COGEN.	STACK NOx	PPM
Variable 27 -	COGEN.	FUEL GAS FLOW	MSCFH
Variable 28 -	COGEN.	STACK O2	PCT
Variable 40 -	COGEN.	SCR INLET NOx	PPM
Variable 42 -	COGEN.	ANNUB FLOW MEAS (DRY)	MMSCFH
Variable 52 -	COGEN.	ANNUB FLOW MEAS (WET)	MMSCFH

Date	Time	Var. 21	Var. 24	Var. 27	Var. 28	Var. 40	Var. 42	Var. 52
5/11/93	18:00	26.31	4.56	116.79	14.09	37.82	3.77	4.21
	18:01	26.21	4.50	118.50	14.20	37.82	3.77	4.23
	18:02	26.10	4.47	120.02	14.16	38.09	3.75	4.20
	18:03	25.73	4.50	118.21	14.10	38.17	3.75	4.20
	18:04	26.46	4.46	116.73	14.13	37.54	3.75	4.21
	18:05	27.10	4.50	118.94	14.27	37.54	3.77	4.22
	18:06	26.66	4.52	117.54	14.17	37.79	3.78	4.23
	18:07	26.92	4.55	116.21	14.17	37.54	3.77	4.22
	18:08	27.05	4.54	117.35	14.26	37.63	3.73	4.17
	18:09	26.92	4.53	117.64	14.22	37.62	3.70	4.14
	18:10	27.08	4.53	114.88	14.18	37.98	3.69	4.13
	18:11	27.02	4.46	118.48	14.33	37.86	3.72	4.17
	18:12	27.18	4.49	118.95	14.24	37.93	3.69	4.14
	18:13	27.56	4.50	115.11	14.13	37.47	3.71	4.14
	18:14	27.57	4.54	116.28	14.30	37.25	3.70	4.15
	18:15	28.29	4.58	118.84	14.34	37.20	3.72	4.17
	18:16	27.60	4.66	119.47	14.21	37.60	3.71	4.14
	18:17	27.53	4.61	117.67	14.10	37.58	3.71	4.16
	18:18	27.23	4.57	118.16	14.18	37.89	3.70	4.15
	18:19	26.77	4.56	118.72	14.18	38.03	3.71	4.15
	18:20	26.29	4.48	117.33	14.12	38.17	3.68	4.13
	18:21	26.88	4.49	115.84	14.19	37.83	3.69	4.14
	18:22	27.80	4.42	117.73	14.33	37.70	3.72	4.17
	18:23	27.17	4.58	118.79	14.23	37.81	3.70	4.15
	18:24	27.16	4.64	116.37	14.14	37.69	3.70	4.13
	18:25	26.83	4.54	117.62	14.27	38.20	3.71	4.15
	18:26	26.39	4.54	118.88	14.22	38.68	3.70	4.15
	18:27	26.74	4.45	117.14	14.12	38.23	3.70	4.13
	18:28	26.79	4.47	116.47	14.23	37.89	3.70	4.15
	18:29	27.17	4.35	116.71	14.26	37.75	3.71	4.15
	18:30	27.04	4.18	114.46	14.24	37.68	3.78	4.23
	18:31	27.98	4.12	112.53	14.33	37.63	3.76	4.21
	18:32	29.53	4.10	116.62	14.51	37.47	3.79	4.25
	18:33	28.27	4.14	115.68	14.33	37.72	3.78	4.24
	18:34	27.49	4.15	115.76	14.29	37.95	3.78	4.23
	18:35	27.39	4.14	120.47	14.31	38.48	3.78	4.23
	18:36	26.94	4.20	120.86	14.10	38.77	3.78	4.24
	18:37	26.70	4.19	117.96	14.04	38.32	3.77	4.23
	18:38	27.05	4.17	117.10	14.14	38.25	3.77	4.23
	18:39	27.09	4.17	118.25	14.23	38.03	3.78	4.23
	18:40	26.47	4.21	116.20	14.18	38.21	3.76	4.22
	18:41	26.73	4.17	115.72	14.30	38.00	3.80	4.25
	18:42	26.63	4.21	117.57	14.32	38.31	3.80	4.25
	18:43	26.60	4.23	118.29	14.22	38.62	3.80	4.25
	18:44	25.95	4.25	116.86	14.14	38.87	3.79	4.25

SITE IDENTIFIER: GAVY

Date	Time	Var. 21 (CO)	Var. 24 (NOX)	Var. 27	Var. 28 (O2)	Var. 40	Var. 42	Var. 52
	18:45	26.63	4.16	117.49	14.23	38.84	3.78	4.24
	18:46	26.81	4.19	117.22	14.25	38.53	3.80	4.26
	18:47	27.60	4.12	117.15	14.25	38.33	3.80	4.25
	18:48	27.32	4.19	117.04	14.25	38.19	3.81	4.26
	18:49	27.17	4.20	120.26	14.22	38.28	3.81	4.26
	18:50	26.22	4.26	116.57	14.08	38.45	3.80	4.25
	18:51	26.50	4.20	115.22	14.17	38.29	3.80	4.26
	18:52	26.49	4.20	117.00	14.34	38.32	3.82	4.28
	18:53	26.84	4.24	117.52	14.25	38.60	3.81	4.25
	18:54	26.92	4.22	116.52	14.19	38.46	3.81	4.27
	18:55	26.67	4.17	114.54	14.23	38.50	3.80	4.25
	18:56	27.52	4.13	116.97	14.36	38.11	3.79	4.25
	18:57	27.83	4.16	109.96	14.33	38.22	3.79	4.23
	18:58	30.09	4.14	109.62	14.49	37.69	3.81	4.27
	18:59	31.58	4.08	114.46	14.65	37.59	3.82	4.27
5/11/93	19:00	29.15	4.14	112.71	14.48	37.85	3.81	4.27
	19:01	29.93	4.17	108.53	14.59	37.90	3.81	4.27
	19:02	31.70	4.11	109.36	14.65	38.06	3.79	4.25
	19:03	31.72	4.12	116.55	14.67	38.19	3.82	4.27
	19:04	29.13	4.17	116.54	14.38	38.26	3.82	4.27
	19:05	29.60	4.14	115.95	14.25	38.10	3.81	4.27
	19:06	28.63	4.17	119.70	14.29	38.34	3.82	4.28
	19:07	28.35	4.22	119.50	14.17	38.32	3.81	4.27
	19:08	27.92	4.18	116.38	14.07	38.43	3.81	4.27
	19:09	27.17	4.26	117.77	14.23	38.33	3.79	4.25
	19:10	26.54	4.21	118.38	14.19	38.62	3.80	4.24
	19:11	26.84	4.24	114.80	14.13	38.46	3.78	4.24
	19:12	27.21	4.21	113.85	14.23	38.42	3.80	4.26
	19:13	27.36	4.15	115.82	14.36	38.53	3.82	4.29
	19:14	27.37	4.24	115.50	14.33	38.64	3.81	4.26
	19:15	28.02	4.19	114.85	14.29	38.42	3.80	4.26
	19:16	27.59	4.23	119.16	14.33	38.80	3.81	4.26
	19:17	26.89	4.26	118.14	14.14	38.96	3.81	4.28
	19:18	26.49	4.25	113.67	14.12	38.79	3.80	4.25
	19:19	26.80	4.25	112.65	14.33	38.40	3.80	4.26
	19:20	27.71	4.25	115.82	14.44	38.51	3.81	4.27
	19:21	27.47	4.20	116.76	14.35	38.39	3.81	4.27
	19:22	28.02	4.23	114.14	14.23	38.50	3.80	4.26
	19:23	27.27	4.21	117.10	14.33	38.49	3.82	4.27
	19:24	27.55	4.26	118.40	14.24	38.89	3.82	4.27
	19:25	26.89	4.24	115.09	14.12	38.92	3.80	4.26
	19:26	26.82	4.20	116.21	14.25	38.79	3.81	4.27
	19:27	26.50	4.23	116.02	14.27	38.94	3.82	4.28
	19:28	26.94	4.22	113.07	14.27	38.66	3.81	4.27
	19:29	27.94	4.23	113.73	14.41	38.65	3.80	4.27
	19:30	27.80	4.24	117.47	14.42	38.48	3.80	4.26
	19:31	27.98	4.23	116.38	14.18	38.67	3.80	4.27
	19:32	27.66	4.23	112.61	14.19	38.38	3.80	4.25
	19:33	27.75	4.21	116.10	14.43	38.50	3.82	4.28
	19:34	27.50	4.25	118.50	14.34	38.55	3.84	4.30
	19:35	27.41	4.24	118.74	14.13	38.84	3.82	4.28
	19:36	26.51	4.23	119.16	14.10	38.99	3.82	4.29
	19:37	26.03	4.22	121.15	14.10	39.04	3.82	4.27
	19:38	25.78	4.25	117.96	13.98	39.41	3.81	4.26
	19:39	26.14	4.21	114.67	14.08	38.81	3.82	4.27
	19:40	26.34	4.22	117.93	14.28	38.79	3.83	4.30

RUN 1©

PORT CHANGE

RUN 1D

SITE IDENTIFIER: GAVY

Date	Time	Var. 21	Var. 24	Var. 27	Var. 28	Var. 40	Var. 42	Var. 52
	19:41	25.90	4.29	119.10	14.18	38.93	3.83	4.29
	19:42	25.78	4.30	117.90	14.06	39.00	3.82	4.27
	19:43	26.06	4.26	119.28	14.14	38.84	3.81	4.27
	19:44	25.91	4.28	121.36	14.11	39.29	3.81	4.28
	19:45	25.06	4.26	118.74	13.99	39.42	3.81	4.27
	19:46	25.15	4.25	120.21	14.04	39.45	3.82	4.27

APPENDIX B

SCR OUTLET, CGA NO_X AUDIT

CYLINDER GAS AUDIT
GAVIOTA OIL AND GAS PROCESSING PLANT
SCR OUTLET, NOx MONITOR
MAY 7, 1993

Audit Point	Reading #	CGA Value	CEM Response
1	1	6.365	6.10
	2	6.365	6.00
	3	6.365	6.00
	Average	6.365	6.03
RELATIVE ACCURACY = 5.26			
2	1	18.230	18.20
	2	18.230	18.10
	3	18.230	18.10
	Average	18.230	18.13
RELATIVE ACCURACY = 0.55			

Parameter : NOx
Analyzer Span : 0–25 ppm
Manufacturer : Thermo Environmental
Serial Number : 105–20502–190

Relative Accuracy = $| d/AC \times 100 | \leq 15\%$ ($\leq 0.7\%$ for O_2 or CO_2)

where : d = Response – Calibration Gas Value
AC = Calibration Gas Value

GAVIOTA OIL & GAS PLANT

Data Assessment Report (DAR)
For Cylinder Gas Audit (CGA)

Period ending date JUNE 30 Year 1993

Company name CHEVRON U.S.A INC.

Plant name COGEN Source unit no. AT-1261

CEMS manufacturer THERMO-ELECTRON Model no. 105

CEMS serial no. 105-20502-190 CEMS type (e.g., in situ) Slip Stream

CEMS sampling location (e.g., control device outlet) SCR OUTLET

CEMS span values as per the applicable regulation. SO_2 ppm _____

O_2 _____ percent. NOx 0-25 ppm. CO _____ ppm . H_2S _____ ppm

Accuracy assessment results (Complete A, B, or C below for each CEMS or for each pollutant and diluent analyzer, as applicable.) If the quarterly audit results show the CEMS to be out-of-control, report the results of both the quarterly audit and the audit following the corrective action showing the CEMS to be operating properly.

Cylinder gas audit (CGA) for NOx-PPM (e.g., SO_2 in ppm).

1. Date of Audit 5/17/93.

		Audit point 1	Audit point 2	
2.	Cylinder ID number	AAL8606	AAL3534	
3.	Date of certification	10/9/92	12/17/92	
4.	Type of certification	CRM	CRM	(e.g., EPA Protocol I or CRM).
5.	Certified audit value	6.365	18.23	(e.g., ppm).
6.	CEMS response value	6.03	18.13	(e.g., ppm).
7.	Accuracy	5.26	.55	percent.

Scott Specialty Gases

CERTIFICATE OF ANALYSIS

CHEVRON USA

PO No. WVGU646X1806

CAS Reg. Component No.	Component	Certified Analysis	
10102-43-9	NITRIC OXIDE	18.15	PPM/M
7727-37-9	NITROGEN - OXYGEN FREE		BAL
	NOX	18.23	PPM

NIST Trace SRM2629A

Analysis Date 12-17-92

Project No 02-23182

Analytical Accuracy +/-1%

Analyst JOSEPH DE LA TORRE

Cylinder No. AAL3534

Item No.02022913 4AL

Grade CERTIFIED MASTER GAS

X

Scott Specialty Gases, Inc.

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

CERTIFICATE OF ANALYSIS

CHEVRON USA
ATTN: MIKE WADE
17100 MARIPOSA REINA

GOLETA CA 93117

PROJECT #: 02-21968
PO#: WVGU646X 1416
ITEM #: 02022913 4AL
DATE: 10/09/92

CYLINDER #: AAL8606
FILL PRESSURE: 2000 PSIG

ANALYTICAL ACCURACY: +/-1%

COMPONENT	REQUESTED GAS CONC MOLES		ANALYSIS (MOLES)	
NITRIC OXIDE	6.25	PPM	6.184	PPM
NITROGEN - OXYGEN FREE		BAL		BAL

CHEVRON 10/13 BIN#9
NOX = 6.365 PPM

CG-3

NIST TRACEABILITY: SRM 2629A

ANALYST: GK
GEORGE KING

APPROVED BY: [signature]
DR ARMAND LANGE PH D

GAVIOTA OIL AND GAS PLANT

CYLINDER GAS AUDIT DATA

DATE OF AUDIT MAY 17-1993

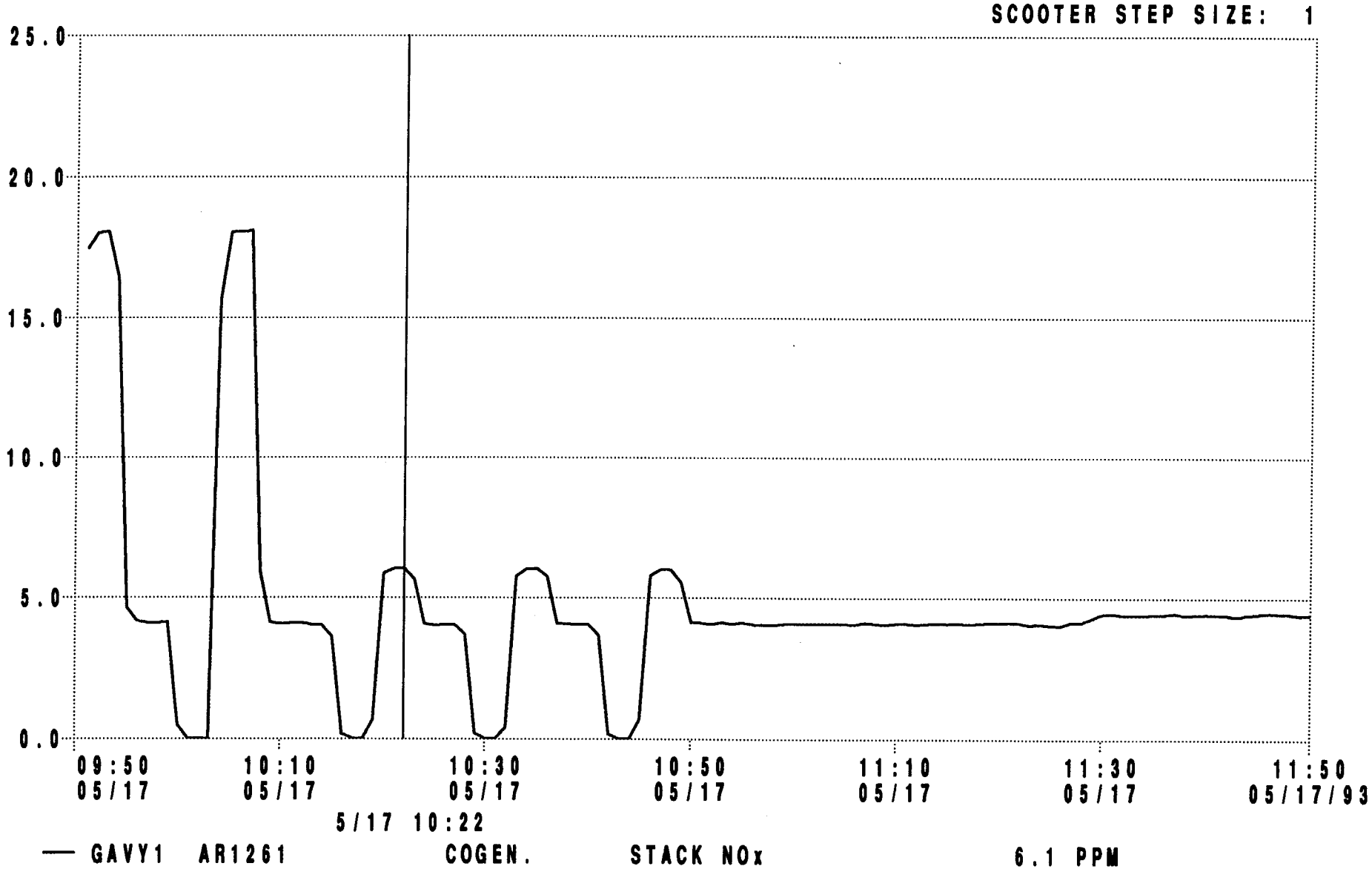
PLANT COGEN - SCR

ANALYZER TAG NO. AT-1261

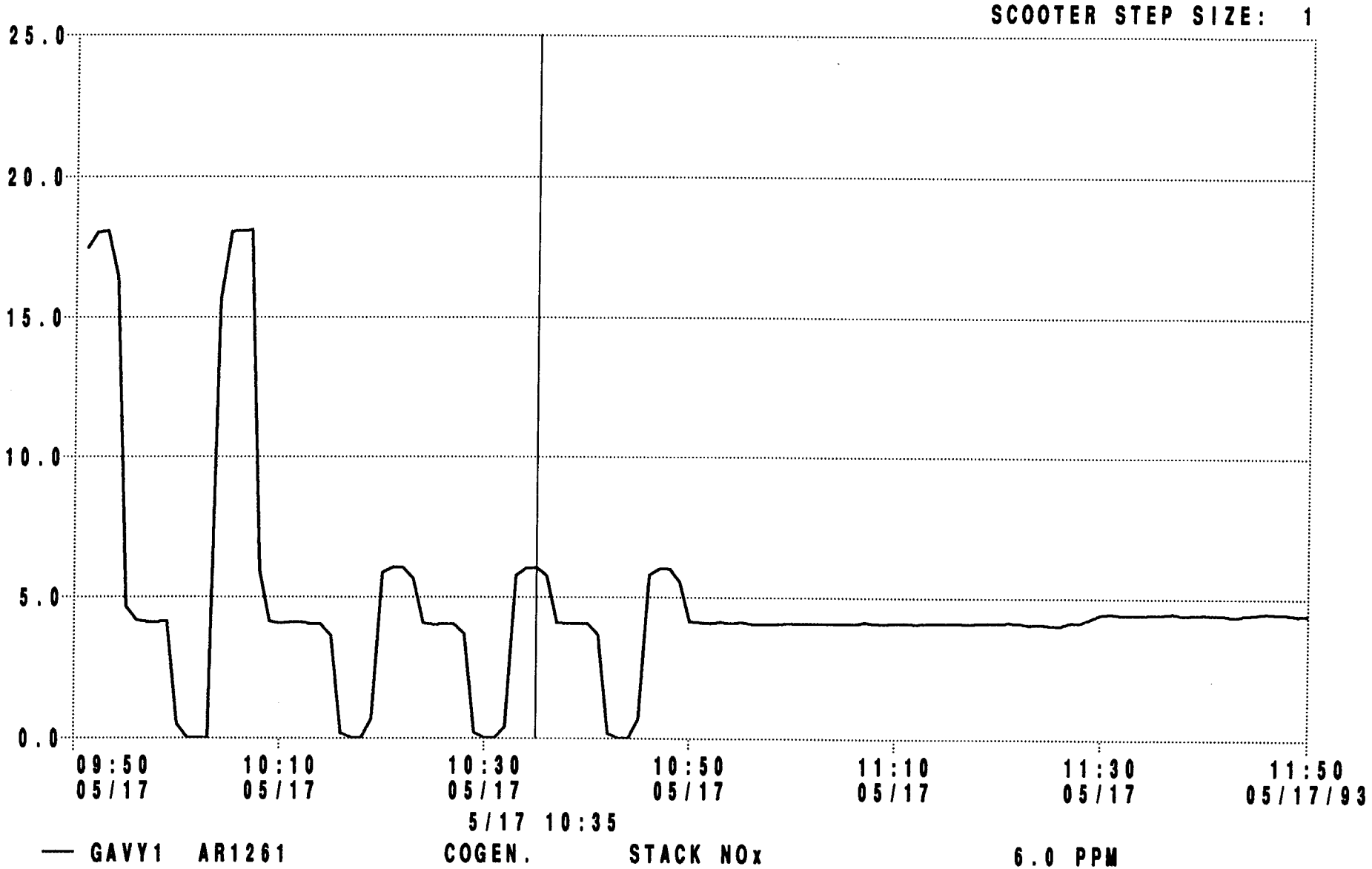
POLLUTANT/DILUENT TYPE NOx

AUDIT POINT	READING NO.	CGA PPM VALUE	CEM PPM VALUE	%DIFF.
#1	1	6.365	6.1	
	2	"	6.0	
	3	"	6.0	
	AVG.	6.365	6.03	5.26
#2	1	18.23	18.20	
	2	"	18.10	
	3	"	18.10	
	AVG.	18.23	18.13	.55

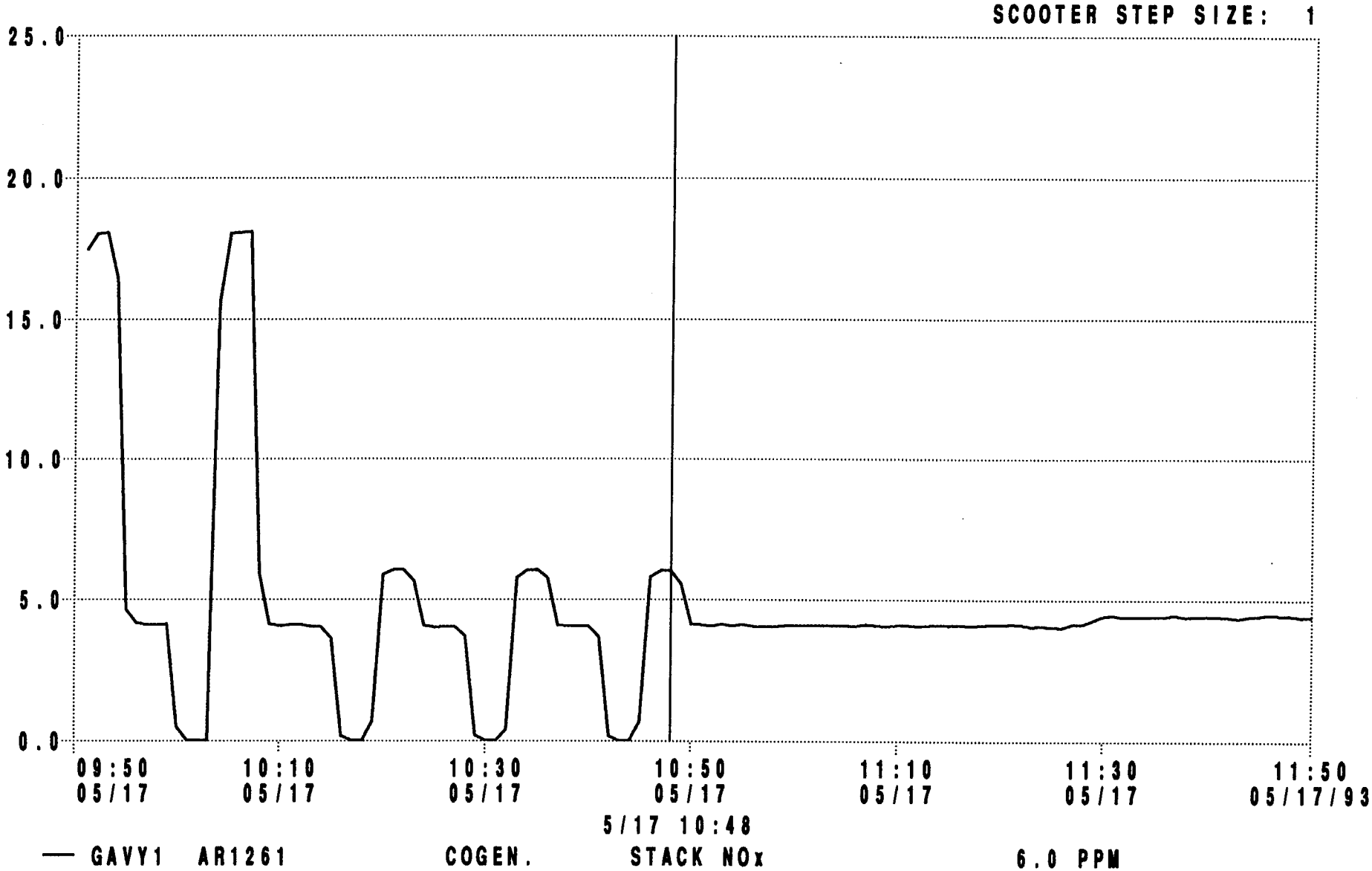
2 HOURS OF 1 MINUTE AVERAGE DATA



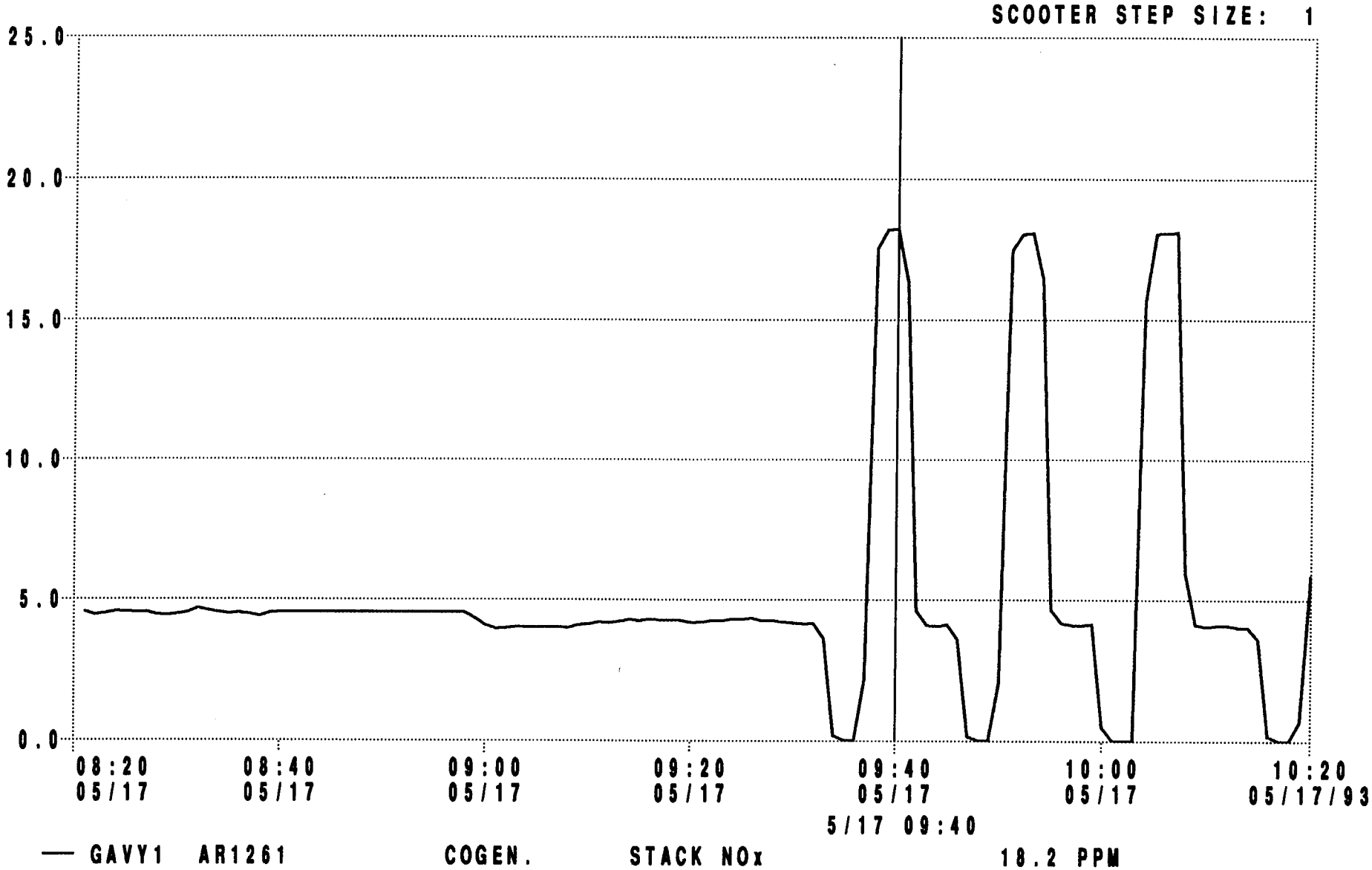
2 HOURS OF 1 MINUTE AVERAGE DATA



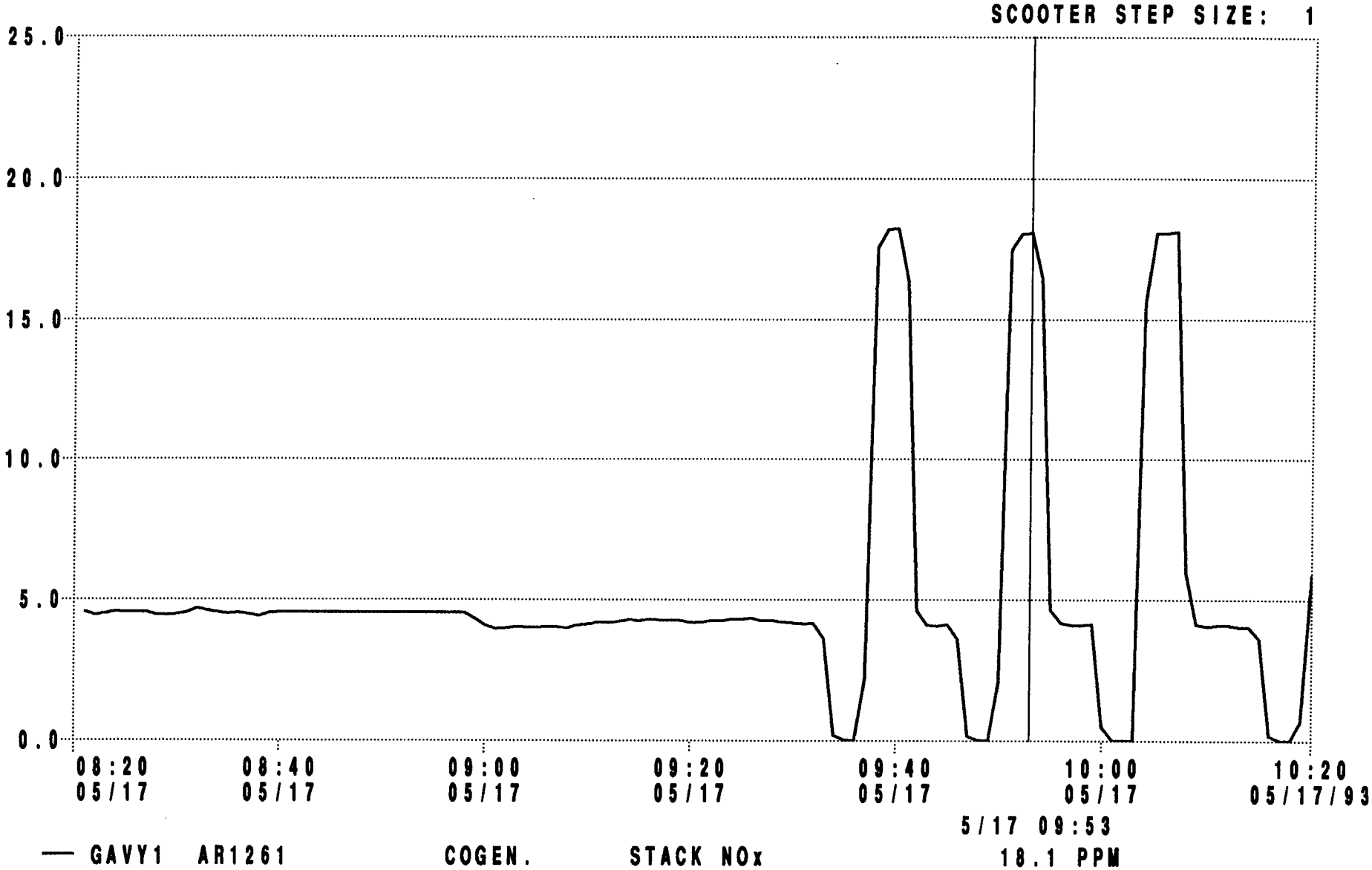
2 HOURS OF 1 MINUTE AVERAGE DATA



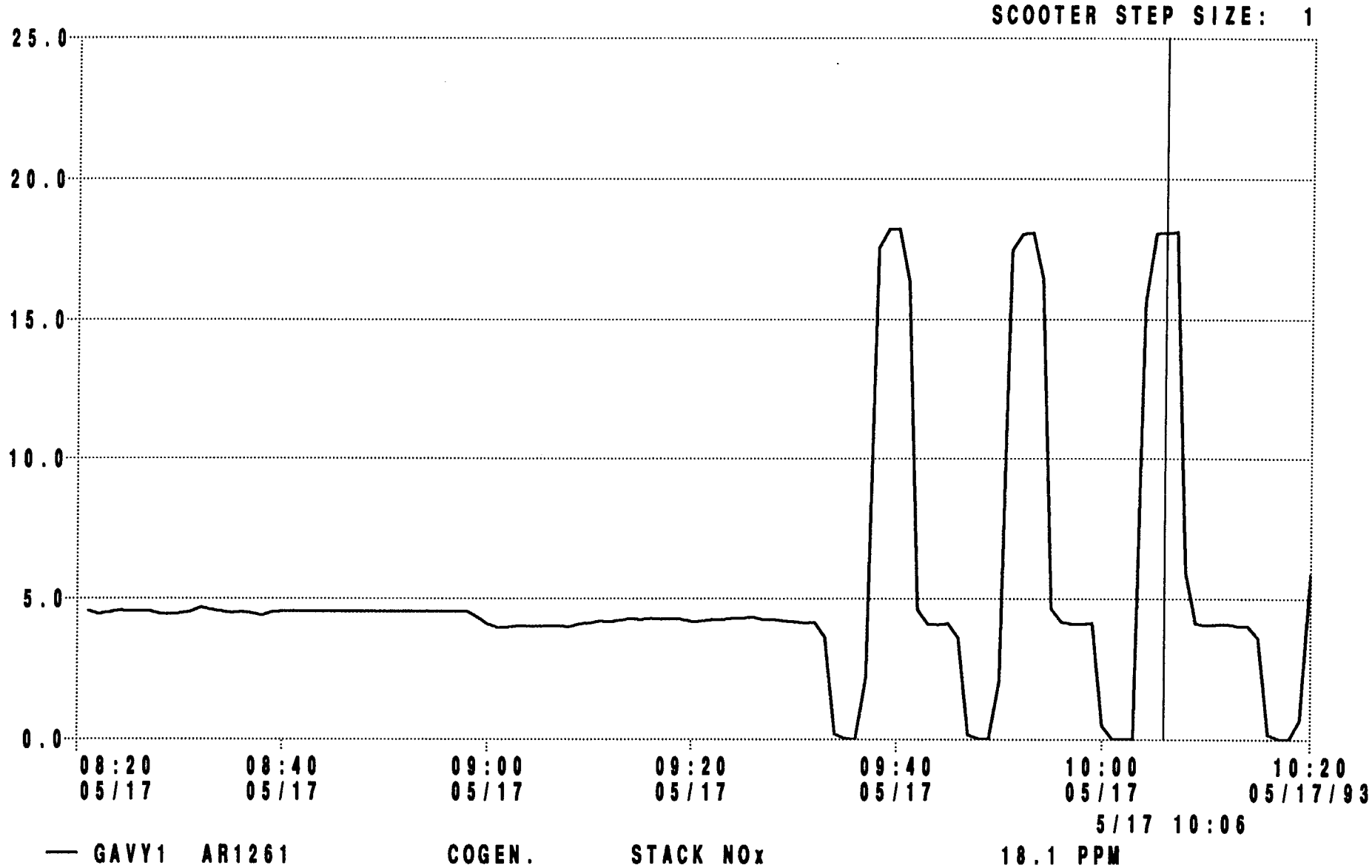
2 HOURS OF 1 MINUTE AVERAGE DATA



2 HOURS OF 1 MINUTE AVERAGE DATA



2 HOURS OF 1 MINUTE AVERAGE DATA



APPENDIX B

SCR OUTLET, CGA NO_X AUDIT

CYLINDER GAS AUDIT
GAVIOTA OIL AND GAS PROCESSING PLANT
SCR OUTLET, NOx MONITOR
MAY 7, 1993

Audit Point	Reading #	CGA Value	CEM Response
1	1	6.365	6.10
	2	6.365	6.00
	3	6.365	6.00
	Average	6.365	6.03
RELATIVE ACCURACY = 5.26			
2	1	18.230	18.20
	2	18.230	18.10
	3	18.230	18.10
	Average	18.230	18.13
RELATIVE ACCURACY = 0.55			

Parameter : NOx
Analyzer Span : 0–25 ppm
Manufacturer : Thermo Environmental
Serial Number : 105–20502–190

Relative Accuracy = $| d/AC \times 100 | \leq 15\%$ ($\leq 0.7\%$ for O_2 or CO_2)

where : d = Response – Calibration Gas Value
AC = Calibration Gas Value

GAVIOTA OIL & GAS PLANT

Data Assessment Report (DAR)
For Cylinder Gas Audit (CGA)

Period ending date JUNE 30 Year 1993

Company name CHEVRON U.S.A INC.

Plant name COGEN Source unit no. AT-1261

CEMS manufacturer THERMO-ELECTRON Model no. 105

CEMS serial no. 105-20502190 CEMS type (e.g., in situ) Slip Stream

CEMS sampling location (e.g., control device outlet) SCR OUTLET

CEMS span values as per the applicable regulation. SO_2 ppm _____

O_2 _____ percent. NOx 0-25 ppm. CO _____ ppm, H_2S _____ ppm

Accuracy assessment results (Complete A, B, or C below for each CEMS or for each pollutant and diluent analyzer, as applicable.) If the quarterly audit results show the CEMS to be out-of-control, report the results of both the quarterly audit and the audit following the corrective action showing the CEMS to be operating properly.

Cylinder gas audit (CGA) for NOx-PPM (e.g., SO_2 in ppm).

1. Date of Audit 5/17/93.

		Audit point 1	Audit point 2	
2.	Cylinder ID number	AAL8606	AAL3534	
3.	Date of certification	10/9/92	12/17/92	
4.	Type of certification	CRM	CRM	(e.g., EPA Protocol 1 or CRM).
5.	Certified audit value	6.365	18.23	(e.g., ppm).
6.	CEMS response value	6.03	18.13	(e.g., ppm).
7.	Accuracy	5.26	.55	percent.

Scott Specialty Gases

CERTIFICATE OF ANALYSIS

CHEVRON USA

PO No. WVGU646X1806

CAS Reg. Component No.	Component	Certified Analysis	
10102-43-9	NITRIC OXIDE	18.15	PPM/M
7727-37-9	NITROGEN - OXYGEN FREE		BAL
	NOX	18.23	PPM

NIST Trace SRM2629A

Analytical Accuracy +/-1%

Analysis Date 12-17-92

Analyst JOSEPH DE LA TORRE

Project No 02-23182

Cylinder No. AAL3534

Item No.02022913 4AL

Grade CERTIFIED MASTER GAS

X

Scott Specialty Gases, Inc.

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

CERTIFICATE OF ANALYSIS

CHEVRON USA
ATTN: MIKE WADE
17100 MARIPOSA REINA
GOLETA CA 93117

PROJECT #: 02-21968
PO#: WVGU646X 1416
ITEM #: 02022913 4AL
DATE: 10/09/92

CYLINDER #: AAL8606
FILL PRESSURE: 2000 PSIG

ANALYTICAL ACCURACY: +/-1%

COMPONENT	REQUESTED GAS CONC MOLES		ANALYSIS (MOLES)	
NITRIC OXIDE	6.25	PPM	6.184	PPM
NITROGEN - OXYGEN FREE		BAL		BAL

CHEVRON 10/13 BIN#9
NOX = 6.365 PPM

CG-3

NIST TRACEABILITY: SRM 2629A

ANALYST: GK
GEORGE KING

APPROVED BY: [signature]
DR ARMAND LANGE PH D

GAVIOTA OIL AND GAS PLANT

CYLINDER GAS AUDIT DATA

DATE OF AUDIT MAY 17-1993

PLANT COGEN - SCR

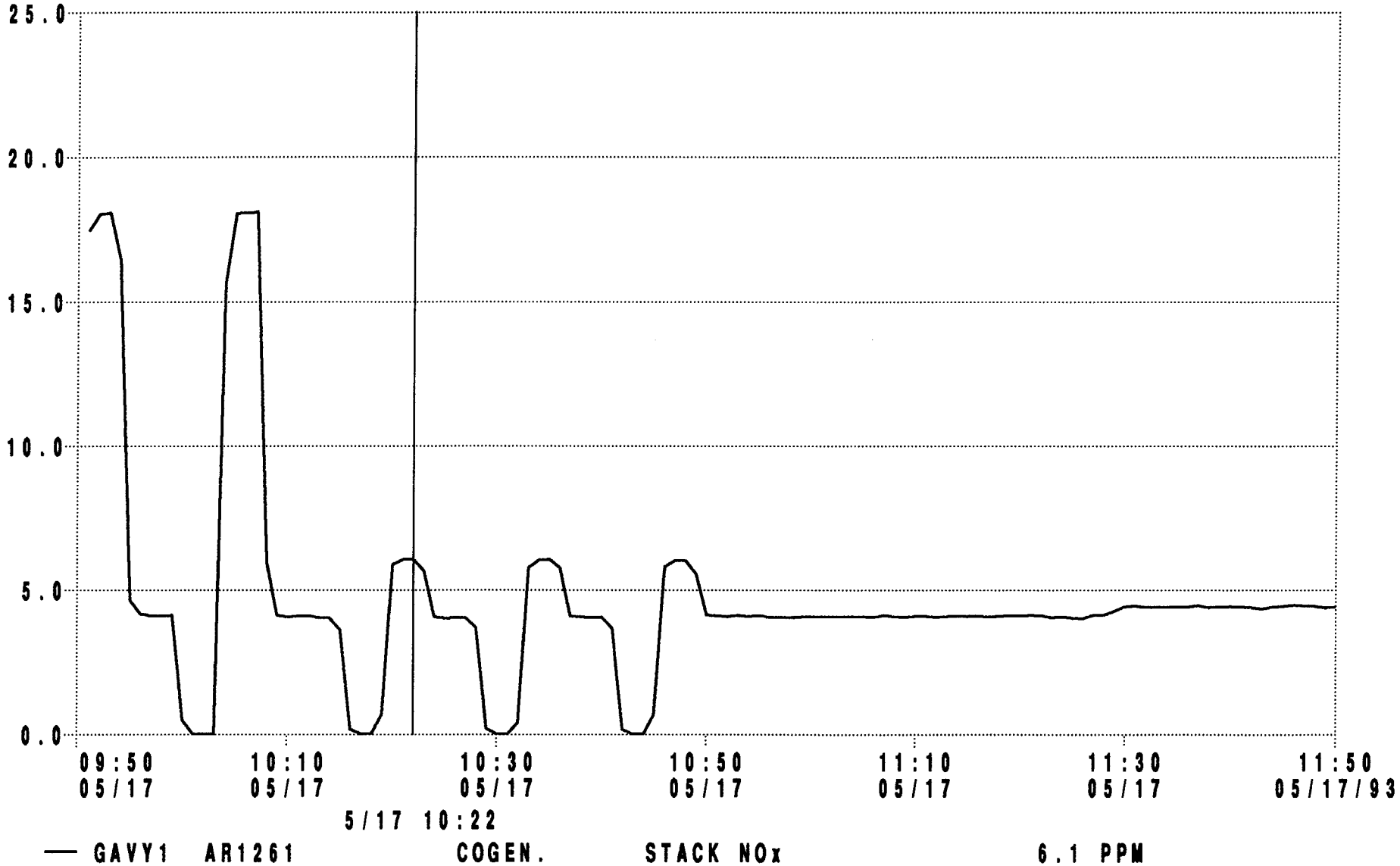
ANALYZER TAG NO. AT-1261

POLLUTANT/DILUENT TYPE NOx

AUDIT POINT	READING NO.	CGA PPM VALUE	CEM PPM VALUE	%DIFF.
#1	1	6.365	6.1	
	2	"	6.0	
	3	"	6.0	
	AVG.	6.365	6.03	5.26
#2	1	18.23	18.20	
	2	"	18.10	
	3	"	18.10	
	AVG.	18.23	18.13	.55

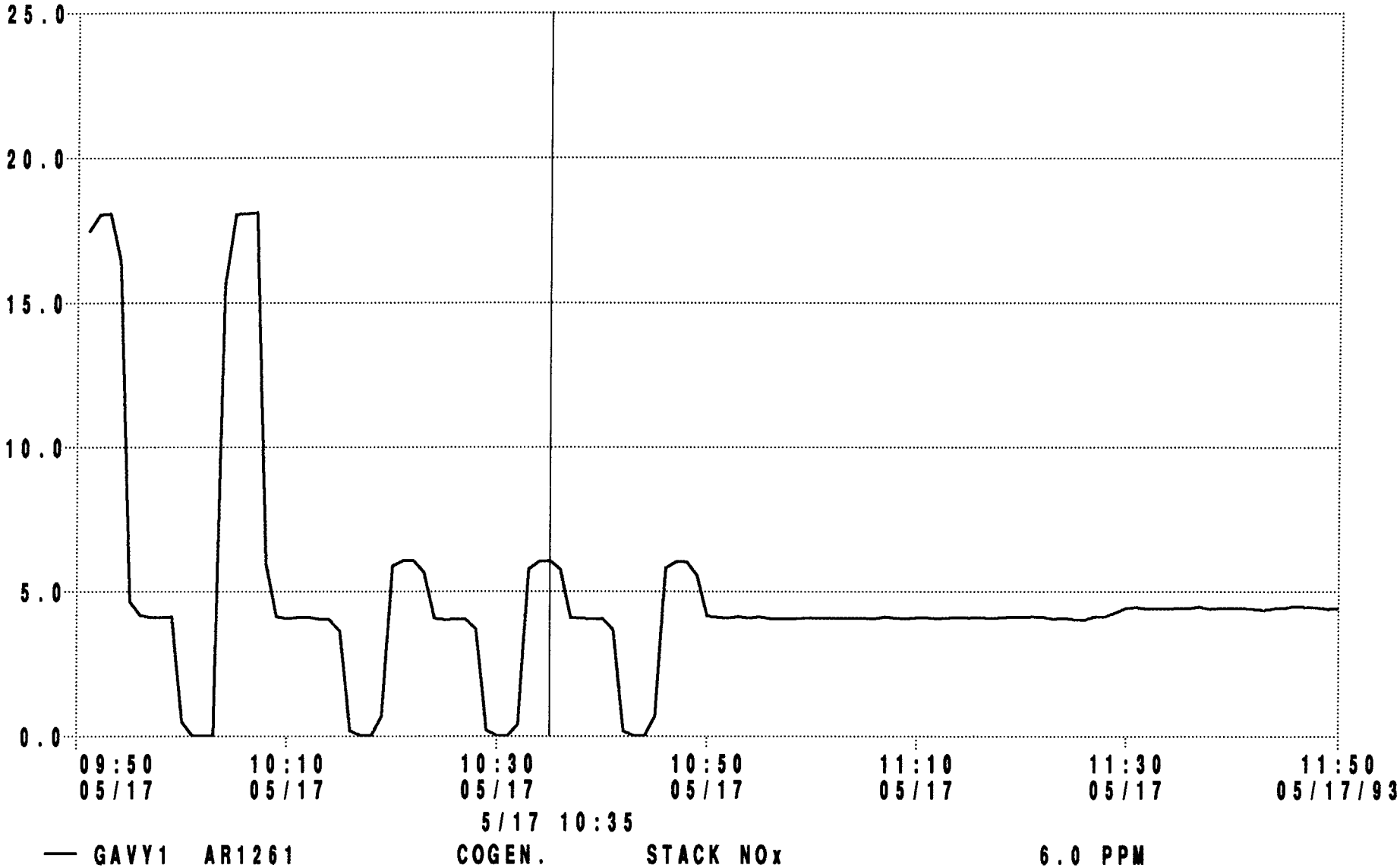
2 HOURS OF 1 MINUTE AVERAGE DATA

SCOOTER STEP SIZE: 1



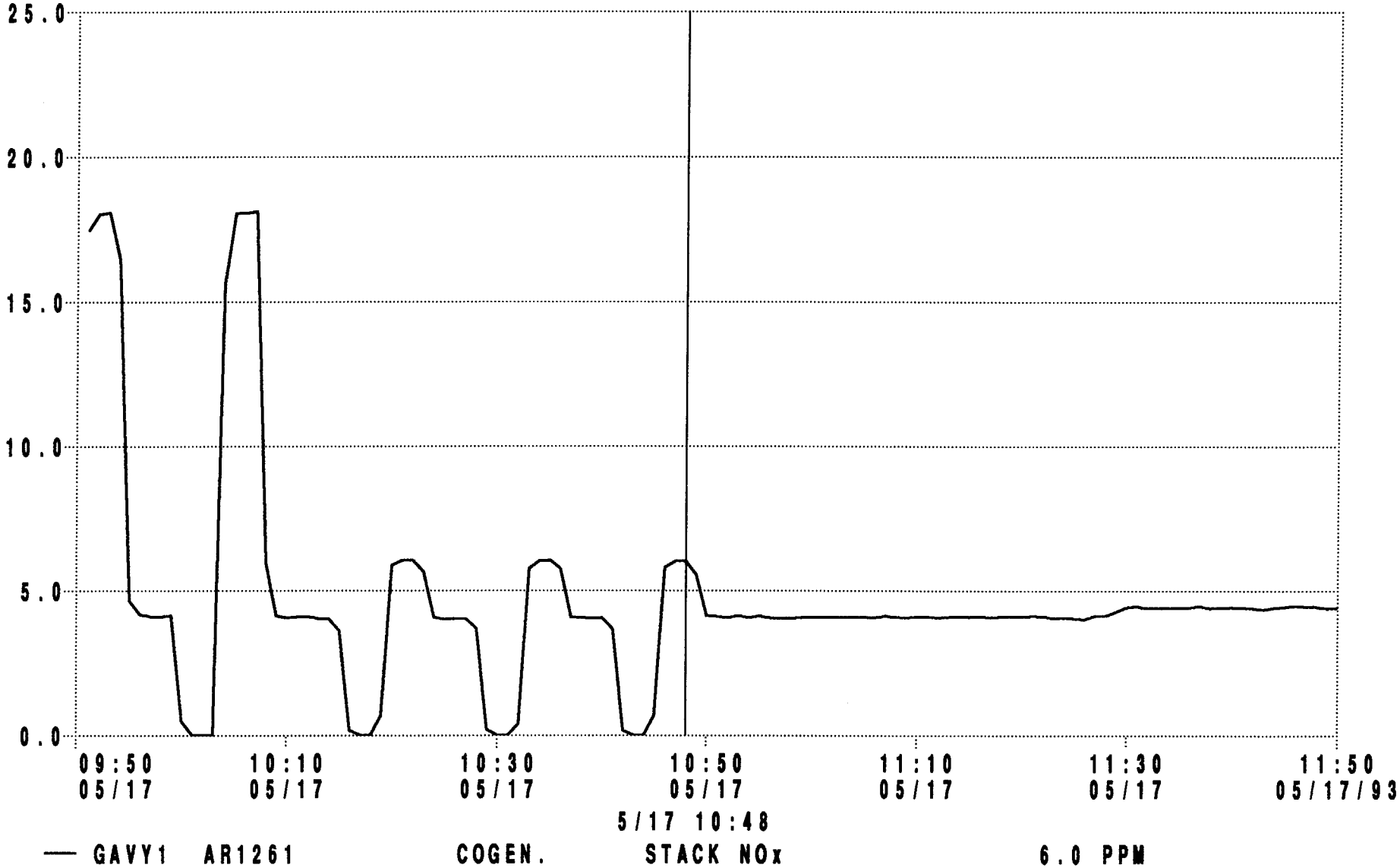
2 HOURS OF 1 MINUTE AVERAGE DATA

SCOOTER STEP SIZE: 1

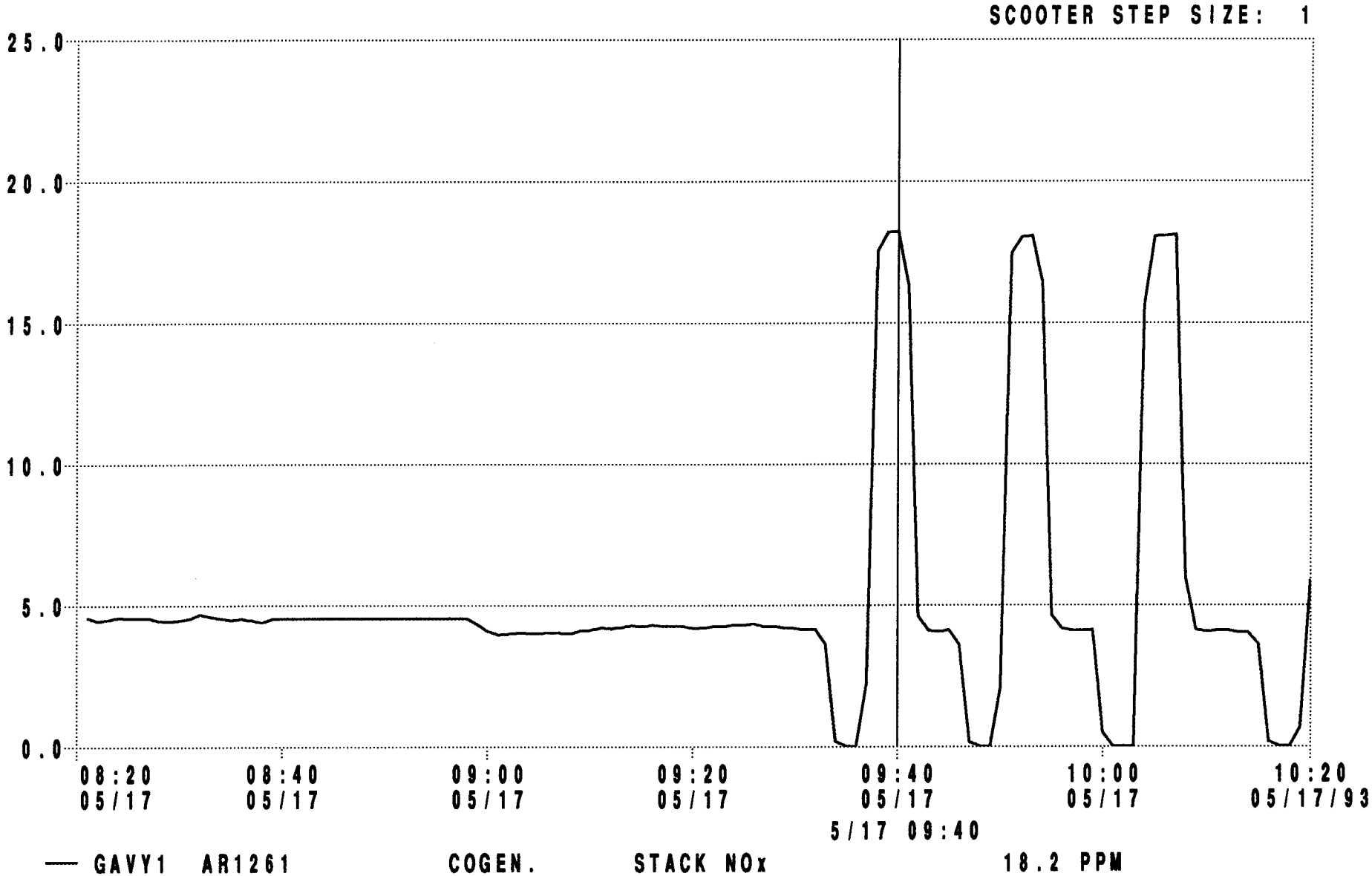


2 HOURS OF 1 MINUTE AVERAGE DATA

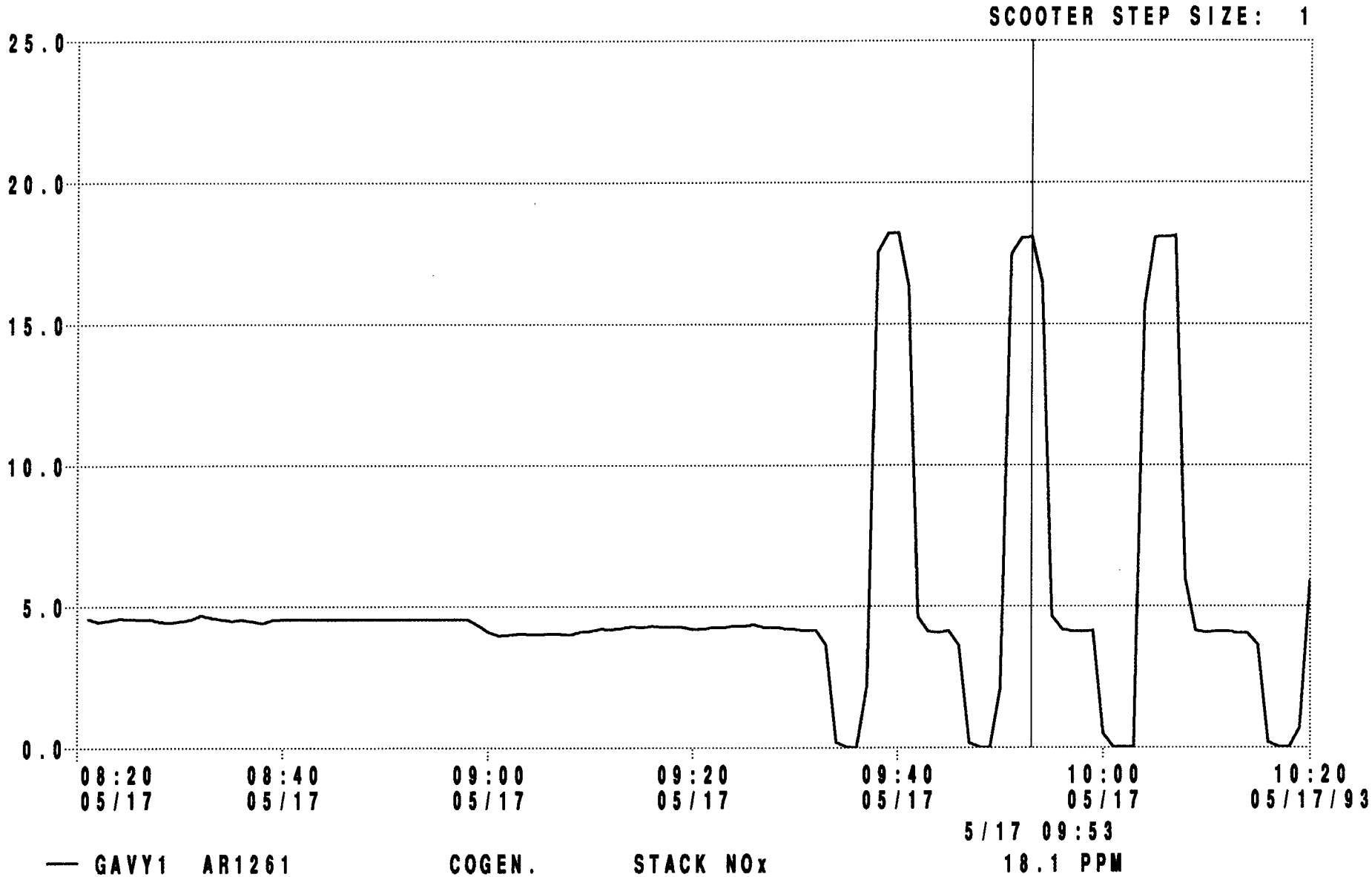
SCOOTER STEP SIZE: 1



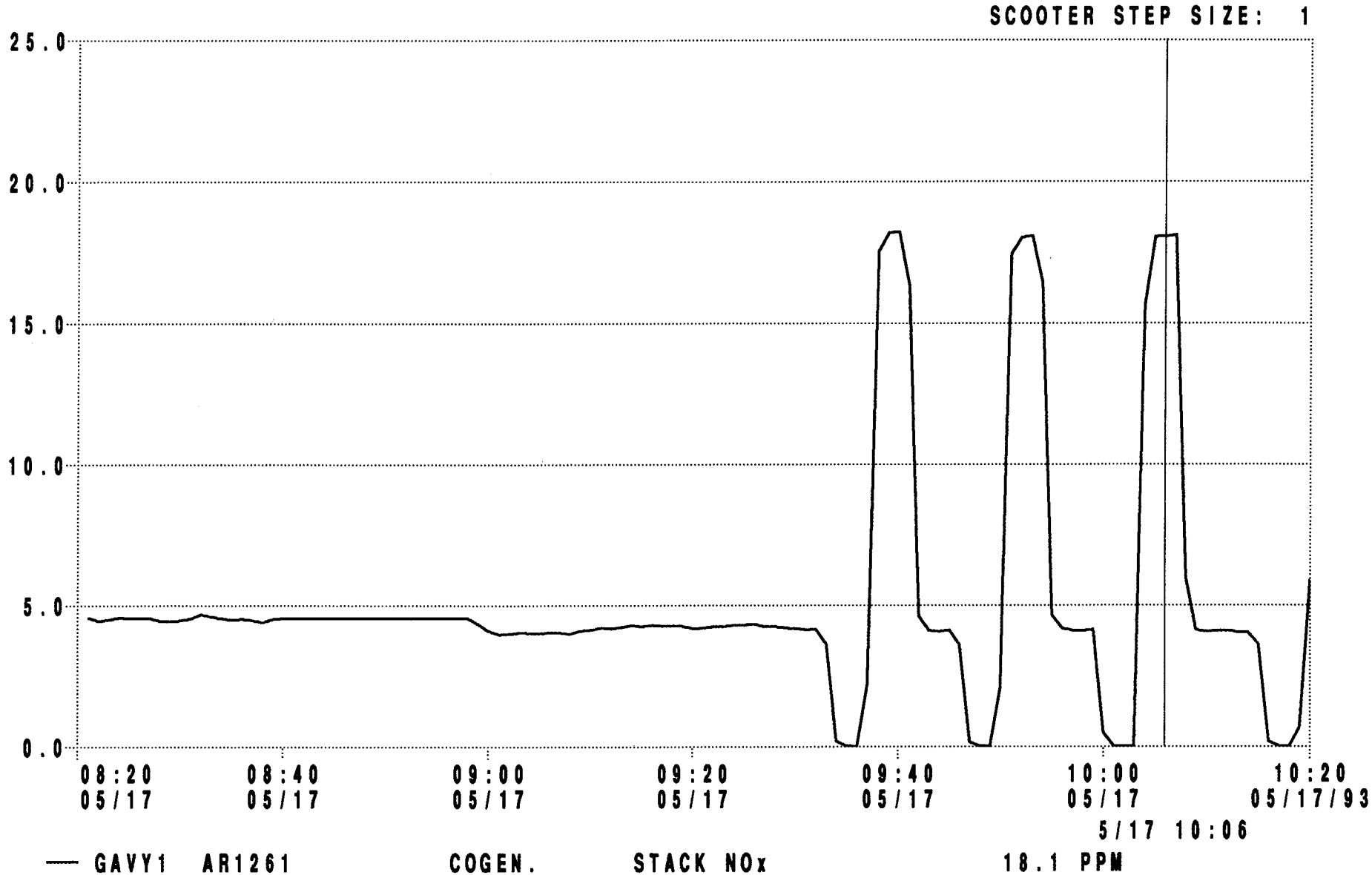
2 HOURS OF 1 MINUTE AVERAGE DATA



2 HOURS OF 1 MINUTE AVERAGE DATA



2 HOURS OF 1 MINUTE AVERAGE DATA



APPENDIX C

SCR OUTLET, AMMONIA / FLOW

AMMONIA CALCULATIONS

Company Name :	GAVIOTA OIL AND GAS PLANT	O2 Correction :	15 %
Source :	SCR OUTLET	Standard Temp. :	60 °F
Date :	MAY 11, 1993	Standard Press. :	29.92 "Hg

	Run 1	Run 2	Run 3
Tm, °F	66.33	75.00	74.00
Y, meter correction factor	0.9880	0.9880	0.9880
Vm, ft3	19.912	20.393	20.172
Pb, in.Hg.	29.71	29.71	29.70
dH, in.H2O	1.30	1.30	1.30
O2, percent	14.64	14.52	14.37
Qs(std), dscfm	63442.00	63579.00	62975.00
Vm(std), dscf	19.362	19.508	19.327
mg AMMONIA	3.48	3.48	3.46
ppm AMMONIA	8.81	8.74	8.76
ppm AMMONIA @ 15.0 %O2	8.31	8.08	7.92
lb/hr AMMONIA	1.51	1.50	1.49

EQUATIONS :

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

ppm AMMONIA = 1.60982 x (Temp.Std. + 460) x (mg AMMONIA) / (MW x Vm,std)
Where : 1.60982 = Ideal Gas Law Factor
Where MW of AMMONIA = 17.08 Lb/Lb–Mole

ppm AMMONIA @ corrected O2% = ppm AMMONIA x [20.9 – O2 correction / (20.9 – %O2 measured)

lb/hr = (0.00000137 Lb–Mole °R / ft3) x 60 min/hr x Qs(std) x MW x ppm / [T(std) + 460]

RELATIVE ACCURACY CALCULATIONS – Flow (MMdscfh)

GAVIOTA OIL AND GAS PLANT
SCR OUTLET

11–May–93

Run No.	RM Test Values		Plant CEM Values		Difference d
	Runs not Used for RA	Runs Used for RA	Runs not Used for RA	Runs Used for RA	
1		3.81		3.84	0.03
2		3.81		3.81	0.00
3		3.78		3.81	0.03
4		3.78		3.82	0.04
5		3.73		3.82	0.09
6					
7					
8					
9					
10					
11					
12					

$\overline{RM}$: 3.78

$\overline{d}$: 0.04

Standard Deviation (Std.Dev.) : 0.03

t–VALUES TABLE			
n	t0.975	n	t0.975
2	12.706	10	2.262
3	4.303	11	2.228
4	3.182	12	2.201
5	2.776	13	2.179
6	2.571	14	2.160
7	2.447	15	2.145
8	2.365	16	2.131
9	2.306		

CONFIDENCE COEFFICIENT

CC = t0.975 x [Std.Dev. / (Sq.Rt. n)]= 0.04

Where : CC = 2.5 percent error Confidence Coefficient.

n , number of valid test runs = 5

t0.975, t–Value from table = 2.776

RELATIVE ACCURACY

RA (%) = ($|\overline{d}|$ + |CC|) / $\overline{RM}$ x 100 = **2.08**

RM Flow Conversion from dscfm to MMSCFH (plant units)

dscfm	calculation	MMdscfh
63,442	/ 1000000 x 60 =	3.81
63,579	/ 1000000 x 60 =	3.81
63,076	/ 1000000 x 60 =	3.78
62,975	/ 1000000 x 60 =	3.78
62,227	/ 1000000 x 60 =	3.73

SOURCE TEST CALCULATIONS

GAVIOTA OIL AND GAS PLANT
SCR OUTLET

11–May –93
Run No. 1

FIELD DATA

Standard Temperature, T(std)	60	°F	Standard Pressure, Pstd	29.92	"Hg
Meter Temperature, Tm	526.3 66.3	°F	Static Pressure, Pstatic	0.11	"H2O
Stack Temperature, Ts	739.0 279.0	°F	Barometric Pressure, Pb	29.71	"Hg
SQ.RT. dP	0.3130		Condensate, Vlc	40.0	grams
Meter Orifice, dH	1.30	"H2O	Stack I.D.	120.00	inch
Meter Volume, Vm	19.912	ft3	Duct Length	0.00	inch
Meter Correction, y	0.9880		Duct Width	0.00	inch
Stack Gas Oxygen	14.64	% O2	Stack Area, As	78.540	ft2
Stack Gas Carbon Dioxide	3.64	% CO2	Test Time, Ø	30.0	min.
Stack Gas Carbon Monoxide	0.00	% CO	Pitot Coefficient, Cp	0.84	
Stack Gas Nitrogen	81.72	% N2			

CALCULATIONS

Vm(std) = [T(std) + 460 / Pstd] x Vm x y x (Pb + (dH / 13.6)) / (Tm + 460) ..	19.362	dscf
Vw(std) = 0.04715 ft3/g / 528 x [T(std) + 460] x Vlc	1.857	scf
Bws = Vw(std) / [Vm(std) + Vw(std)].....	0.088	
Bws @ Saturated Conditions = Vapor Press. of H2O @ Dew Point Temp. / (Pstack, in.Hg.)	Lower Bws Value Used 1.000	
% Excess Air =(%O2 – 0.5%CO) / [0.264%N2 – (%O2–0.5%CO)] x 100		%
Md = (0.44 x %CO2)+(0.32 x %O2)+[0.28 x (%N2 + %CO)]	29.17	lb/lb–mole
Ms = (Md x (1–Bws)) + (18.0 x Bws)	28.19	lb/lb–mole
P(stack) = Pb + [Pstatic / 13.6]	29.72	"Hg
vs = 85.49 x Cp x (Sq.Rt. dP) x [Sq.Rt.((Ts + 460) / (Ms x P(stack)))]	21.11	ft/sec
Qs = vs x As x 60	99,481	acfm
Qs(std) = Qs x (1 – Bws) x [(T(std) + 460) / (Ts + 460)] x (P(stack) / Pstd) ...	63,442	dscfm

0.04% diff
63,414 dscfm
negligible
negligible
negligible

SOURCE TEST CALCULATIONS

GAVIOTA OIL AND GAS PLANT
SCR OUTLET

11-May -93
Run No. 2

FIELD DATA

Standard Temperature, T(std)	60	°F	Standard Pressure, Pstd	29.92	"Hg
Meter Temperature, Tm	75.0	°F	Static Pressure, Pstatic	0.11	"H2O
Stack Temperature, Ts	280.0	°F	Barometric Pressure, Pb	29.71	"Hg
SQ.RT. dP	0.3121		Condensate, Vlc	37.2	grams
Meter Orifice, dH	1.30	"H2O	Stack I.D.	120.00	inch
Meter Volume, Vm	20.393	ft3	Duct Length	0.00	inch
Meter Correction, y	0.9880		Duct Width	0.00	inch
Stack Gas Oxygen	14.52	% O2	Stack Area, As	78.540	ft2
Stack Gas Carbon Dioxide	3.60	% CO2	Test Time, Ø	30.0	min.
Stack Gas Carbon Monoxide	0.00	% CO	Pitot Coefficient, Cp	0.84	
Stack Gas Nitrogen	81.88	% N2			

CALCULATIONS

Vm(std) = [T(std) + 460 / Pstd] x Vm x y x (Pb + (dH / 13.6)) / (Tm + 460) ..	19.508	dscf
Vw(std) = 0.04715 ft3/g / 528 x [T(std) + 460] x Vlc	1.727	scf
Bws = Vw(std) / [Vm(std) + Vw(std)].....	0.081	
Bws @ Saturated Conditions = Vapor Press. of H2O @ Dew Point Temp. / (Pstack, in.Hg.)	Lower Bws Value Used 1.000	
% Excess Air =(%O2 – 0.5%CO) / [0.264%N2 – (%O2–0.5%CO)] x 100		%
Md = (0.44 x %CO2)+(0.32 x %O2)+[0.28 x (%N2 + %CO)]	29.16	lb/lb–mole
Ms = (Md x (1–Bws)) + (18.0 x Bws)	28.25	lb/lb–mole
P(stack) = Pb + [Pstatic / 13.6]	29.72	"Hg
vs = 85.49 x Cp x (Sq.Rt. dP) x [Sq.Rt.((Ts + 460) / (Ms x P(stack)))]	21.04	ft/sec
Qs = vs x As x 60	99,158	acfm
Qs(std) = Qs x (1 – Bws) x [(T(std) + 460) / (Ts + 460)] x (P(stack) / Pstd) ...	63,579	dscfm

SOURCE TEST CALCULATIONS

GAVIOTA OIL AND GAS PLANT
SCR OUTLET

11-May -93
Run No. 3

FIELD DATA

Standard Temperature, T(std)	60	°F	Standard Pressure, Pstd	29.92	"Hg
Meter Temperature, Tm	75.0	°F	Static Pressure, Pstatic	0.11	"H2O
Stack Temperature, Ts	279.4	°F	Barometric Pressure, Pb	29.71	"Hg
SQ.RT. dP	0.3095		Condensate, Vlc	37.2	grams
Meter Orifice, dH	1.30	"H2O	Stack I.D.	120.00	inch
Meter Volume, Vm	20.393	ft3	Duct Length	0.00	inch
Meter Correction, y	0.9880		Duct Width	0.00	inch
Stack Gas Oxygen	14.52	% O2	Stack Area, As	78.540	ft2
Stack Gas Carbon Dioxide	3.60	% CO2	Test Time, Ø	30.0	min.
Stack Gas Carbon Monoxide	0.00	% CO	Pitot Coefficient, Cp	0.84	
Stack Gas Nitrogen	81.88	% N2			

CALCULATIONS

Vm(std) = [T(std) + 460 / Pstd] x Vm x y x (Pb + (dH / 13.6)) / (Tm + 460) ..	19.508	dscf
Vw(std) = 0.04715 ft3/g / 528 x [T(std) + 460] x Vlc	1.727	scf
Bws = Vw(std) / [Vm(std) + Vw(std)].....	0.081	
Bws @ Saturated Conditions = Vapor Press. of H2O @ Dew Point Temp. / (Pstack, in.Hg.)	Lower Bws Value Used 1.000	
% Excess Air =(%O2 – 0.5%CO) / [0.264%N2 – (%O2–0.5%CO)] x 100		%
Md = (0.44 x %CO2)+(0.32 x %O2)+[0.28 x (%N2 + %CO)]	29.16	lb/lb–mole
Ms = (Md x (1–Bws)) + (18.0 x Bws)	28.25	lb/lb–mole
P(stack) = Pb + [Pstatic / 13.6]	29.72	"Hg
vs = 85.49 x Cp x (Sq.Rt. dP) x [Sq.Rt.((Ts + 460) / (Ms x P(stack)))]	20.86	ft/sec
Qs = vs x As x 60	98,291	acfm
Qs(std) = Qs x (1 – Bws) x [(T(std) + 460) / (Ts + 460)] x (P(stack) / Pstd) ...	63,076	dscfm

SOURCE TEST CALCULATIONS

GAVIOTA OIL AND GAS PLANT
SCR OUTLET

11-May-93
Run No. 4

FIELD DATA

Standard Temperature, T(std)	60	°F	Standard Pressure, Pstd	29.92	"Hg
Meter Temperature, Tm	74.0	°F	Static Pressure, Pstatic	0.11	"H2O
Stack Temperature, Ts	281.0	°F	Barometric Pressure, Pb	29.70	"Hg
SQ.RT. dP	0.3115		Condensate, Vlc	40.7	grams
Meter Orifice, dH	1.30	"H2O	Stack I.D.	120.00	inch
Meter Volume, Vm	20.172	ft3	Duct Length	0.00	inch
Meter Correction, y	0.9880		Duct Width	0.00	inch
Stack Gas Oxygen	14.37	% O2	Stack Area, As	78.540	ft2
Stack Gas Carbon Dioxide	3.58	% CO2	Test Time, Ø	30.0	min.
Stack Gas Carbon Monoxide	0.00	% CO	Pitot Coefficient, Cp	0.84	
Stack Gas Nitrogen	82.05	% N2			

CALCULATIONS

Vm(std) = [T(std) + 460 / Pstd] x Vm x y x (Pb + (dH / 13.6)) / (Tm + 460) ..	19.327	dscf
Vw(std) = 0.04715 ft3/g / 528 x [T(std) + 460] x Vlc	1.890	scf
Bws = Vw(std) / [Vm(std) + Vw(std)].....	0.089	
Bws @ Saturated Conditions = Vapor Press. of H2O @ Dew Point Temp. / (Pstack, in.Hg.)	Lower Bws Value Used 1.000	
% Excess Air =(%O2 – 0.5%CO) / [0.264%N2 – (%O2–0.5%CO)] x 100		%
Md = (0.44 x %CO2)+(0.32 x %O2)+[0.28 x (%N2 + %CO)]	29.15	lb/lb–mole
Ms = (Md x (1–Bws)) + (18.0 x Bws)	28.15	lb/lb–mole
P(stack) = Pb + [Pstatic / 13.6]	29.71	"Hg
vs = 85.49 x Cp x (Sq.Rt. dP) x [Sq.Rt.((Ts + 460) / (Ms x P(stack)))]	21.05	ft/sec
Qs = vs x As x 60	99,217	acfm
Qs(std) = Qs x (1 – Bws) x [(T(std) + 460) / (Ts + 460)] x (P(stack) / Pstd) ...	62,975	dscfm

SOURCE TEST CALCULATIONS

GAVIOTA OIL AND GAS PLANT
SCR OUTLET

11–May –93
Run No. 5

FIELD DATA

Standard Temperature, T(std)	60	°F	Standard Pressure, Pstd	29.92	"Hg
Meter Temperature, Tm	74.0	°F	Static Pressure, Pstatic	0.11	"H2O
Stack Temperature, Ts	281.0	°F	Barometric Pressure, Pb	29.70	"Hg
SQ.RT. dP	0.3078		Condensate, Vlc	40.7	grams
Meter Orifice, dH	1.30	"H2O	Stack I.D.	120.00	inch
Meter Volume, Vm	20.172	ft3	Duct Length	0.00	inch
Meter Correction, y	0.9880		Duct Width	0.00	inch
Stack Gas Oxygen	14.37	% O2	Stack Area, As	78.540	ft2
Stack Gas Carbon Dioxide	3.58	% CO2	Test Time, Ø	30.0	min.
Stack Gas Carbon Monoxide	0.00	% CO	Pitot Coefficient, Cp	0.84	
Stack Gas Nitrogen	82.05	% N2			

CALCULATIONS

Vm(std) = [T(std) + 460 / Pstd] x Vm x y x (Pb + (dH / 13.6)) / (Tm + 460) ..	19.327	dscf
Vw(std) = 0.04715 ft3/g / 528 x [T(std) + 460] x Vlc	1.890	scf
Bws = Vw(std) / [Vm(std) + Vw(std)].....	0.089	
Bws @ Saturated Conditions = Vapor Press. of H2O @ Dew Point Temp. / (Pstack, in.Hg.)	Lower Bws Value Used 1.000	
% Excess Air =(%O2 – 0.5%CO) / [0.264%N2 – (%O2–0.5%CO)] x 100		%
Md = (0.44 x %CO2)+(0.32 x %O2)+[0.28 x (%N2 + %CO)]	29.15	lb/lb–mole
Ms = (Md x (1–Bws)) + (18.0 x Bws)	28.15	lb/lb–mole
P(stack) = Pb + [Pstatic / 13.6]	29.71	"Hg
vs = 85.49 x Cp x (Sq.Rt. dP) x [Sq.Rt.((Ts + 460) / (Ms x P(stack)))]	20.80	ft/sec
Qs = vs x As x 60	98,039	acfm
Qs(std) = Qs x (1 – Bws) x [(T(std) + 460) / (Ts + 460)] x (P(stack) / Pstd) ...	62,227	dscfm

Project # BK062

Analysis For: NH_3

Company: CHEVRON GAVIOTA

Sample Dates: 5/11/93

Source: SCR OUTLET STACK

Method and Handling: Samples collected by BAAQMD ST-1B. Analyzed by Ion Selective Electrode (ISE). Calibrated ISE meter w/ 1ppm, 10ppm, and 100ppm standards. 1ppm = +64.0 mv, 10ppm = +7.4 mv, 100ppm = -52.0 mv. Ise meter calculated slope = -59.6. Ise meter corrects slope automatically for blank water NH_3 value.

Identification		Raw Data						Comments/Descriptions
Sample ID Number	Run Number	Total Sample Volume,ml	Aliquot Sample Volume,ml	mv (millivolts)	ppm	mg NH_3/sample		
BK9305101	1a	351	100	7.6	9.92	3.482		
BK9305102	2a	353	100	7.7	9.85	3.477		
BK9305103	3	329	100	6.1	10.50	3.455		
BK9305100	Blank	282	100	143.2	0.0091			
BK9305101	1b	351	100	7.8	9.81	98.9% Dup		
BK9305102	2sp	353	100	-27.9	39.1	110.4 % Rec		Added 50 ml of 100 ppm std. = 33.3 ppm/sample. (39.1/33.3 + 9.85) = 110.4% rec.
	QA	100	100	-53.3	104	104.0% Conf.		
							Analyst	TL
							Date	5/25/93

FIELD DATA SHEET

ENGINEERING–SCIENCE, INC.

Company: CHEVRON GAVIOTA
Test Location: SCR OUTLET
Test Method / Parameter: ST-1b / NH_3

Run #: 1
Date: 5/11/93
Operator: CNM

K-FACTOR: N.A.

Stack Dimensions: 120"
Barometric Pressure: 29.71 "Hg
Static Pressure: 0.112 "H_2O
Pitot Coeff.: 0.84
Filter #: N.A.
Control Box #: BROWN IV
Orifice dH@ / y: 1.64 / 0.988
Probe Type / Length: SS / 4'
Nozzle # / Size: N.A. / N.A.

IMPINGER CONTENTS, grams				
Impinger	Contents	Final	Initial	Net
1	0.1N HCl	658.9	628.6	30.3
2	0.1N HCl	648.3	645.0	3.3
3	Dry	485.1	484.2	0.9
4				
5				
Silica Gel		741.8	736.3	5.5
			TOTAL:	40.0

GAS COMPOSITION			
Time	O2	CO2	CO

LEAK RATE	cfm / lpm	"Hg Vacuum
Initial	0.002	15
Final	0.000	5

Sample Point	Time	Gas Meter (ft³ or liters)	dP "H2O	dH "H2O	Temperature, °F Meter	Stack	Probe	Oven	Impinger	Vacuum "Hg	Rotameter (liters/min)	Comments
	0930											
	0	739.004	N.A.	1.3	63		N.A.	N.A.	50	2	N.A.	START TIME: 0930 hrs
	5	742.4	"	1.3	64		"	"	49	2	"	
	10	745.7	"	1.3	66		"	"	51	2	"	
	15	748.9	"	1.3	67		"	"	55	2	"	
	20	752.2	"	1.3	69		"	"	56	2	"	
	25	755.6	"	1.3	69		"	"	58	2	"	
	30	758.916			END		RUN		#1			END: 1000 hrs.
total/AVG	30.0	19.912	—	1.30	66.33							

FIELD DATA SHEET

ENGINEERING–SCIENCE, INC.

Company: CHEVRON GAVIOTA
Test Location: SCR OUTLET
Test Method / Parameter: BAAQMD ST-1B / NH3

Run #: 2
Date: 5/11/93
Operator: CNM

K-FACTOR: N.A.

Stack Dimensions: 120"
Barometric Pressure: ~~30.19~~ "Hg 29.71
Static Pressure: 0.112 "H_2O Bum
Pitot Coeff.: 0.84
Filter #: N.A.
Control Box #: BR. IV
Orifice dH@ / y: 1.64 / 0.988
Probe Type / Length: SS / 4'
Nozzle # / Size: N.A. / N.A.

IMPINGER CONTENTS, grams				
Impinger	Contents	Final	Initial	Net
1	0.1NHCl	637.2	608.2	31.0
2	0.1NHCl	633.3	631.3	2.0
3	Dry	490.3	489.5	0.8
4				
5				
Silica Gel		843.3	839.9	3.4
			TOTAL:	37.2

GAS COMPOSITION			
Time	O2	CO2	CO

LEAK RATE	cfm / lpm	"Hg Vacuum
Initial	0.002	15
Final	0.000	5

Sample Point	Time	Gas Meter (ft³ or liters)	dP "H2O	dH "H2O	Temperature, °F Meter	Stack	Probe	Oven	Impinger	Vacuum "Hg	Rotameter (liters/min)	Comments
	1042 0	759.063	N.A.	1.3	73		N.A.	N.A.	55	3	N.A.	START: 1042 hrs
	5	762.4	"	1.3	73		"	"	57	3	"	
	10	765.8	"	1.3	74		"	"	58	3	"	
	15	769.2	"	1.3	75		"	"	59	3	"	
	20	772.6	"	1.3	76		"	"	61	3	"	
	25	776.1	"	1.3	77		"	"	61	3	"	
	30	779.456		END			RUN		#2			END: 1102 hrs.
Total/Avg	30.0	20.393 ft³		1.30	75							

FIELD DATA SHEET

ENGINEERING–SCIENCE, INC.

Company	CHEVRON GAVIOTA	Run #	3
Test Location	SCR OUTLET	Date	5/11/93
Test Method / Parameter	BAAQMD ST-1b / NH_3	Operator	CNM

K–FACTOR: N.A.

Stack Dimensions	120"
Barometric Pressure	29.70 "Hg
Static Pressure	0.112 "H_2O
Pitot Coeff.	0.84
Filter #	N/A
Control Box #	BROWN IV
Orifice dH@ / y	1.641 0.988
Probe Type / Length	SS / 4'
Nozzle # / Size	N/A

IMPINGER CONTENTS, grams

Impinger	Contents	Final	Initial	Net
1	0.1N HCL	632.8	602.9	29.9
2	0.1N HCL	613.7	610.2	3.5
3	EMPTY	486.2	484.8	1.4
4				
5				
Silica Gel		747.7	741.8	5.9
			TOTAL:	40.7

GAS COMPOSITION

Time	O2	CO2	CO

LEAK RATE	cfm / lpm	"Hg Vacuum
Initial	0.003	15
Final	0.000	5

Sample Point	Time	Gas Meter (ft³ or liters)	dP "H2O	dH "H2O	Temperature, °F Meter	Stack	Probe	Oven	Impinger	Vacuum "Hg	Rotameter (liters/min)	Comments
	1205											
	0	780.658	N.A.	1.3	71		N.A.	N.A.	56	2	N.A.	
	5	784.3	"	1.3	73		"	"	58	2	"	
	10	787.6	"	1.3	74		"	"	60	2	"	
	15	790.9	"	1.3	76		"	"	62	2	"	
	20	794.2	"	1.3	75		"	"	62	2	"	
	25	797.5	"	1.3	77		"	"	63	2	"	
	30	800.830			END RUN # 3							
	1235											
Total/Avg	30.0	20.172		1.30	74							

VELOCITY TRAVERSE DATA SHEET

COMPANY CHEVRON GAVIOTA

DATE 5/11/93

TEST LOCATION SCR OUTLET

STATIC PRESSURE 0.112 in. H2O

TEST CONDITION

PITOT COEFFICIENT 0.84 / 0.99

RUN #1						RUN #2					
Start Time: 0935 Pb: 29.71 "Hg			Start Time: 0950 Pb: 29.71 "Hg			Start Time: 1045 Pb: 29.71 "Hg			Start Time: 1100 Pb: 29.71 "Hg		
SAMPLE POINT # ~~EAST~~	VELOCITY dP (in. H2O) SOUTH	Ts (°F)	SAMPLE POINT # ~~SOUTH~~	VELOCITY dP (in. H2O) EAST	Ts (°F)	SAMPLE POINT #	VELOCITY dP (in. H2O) EAST	Ts (°F)	SAMPLE POINT #	VELOCITY dP (in. H2O) SOUTH	Ts (°F)
1	0.055	280	1	0.135	280	1	0.132	281	1	0.054	281
2	0.080	281	2	0.145	281	2	0.144	281	2	0.055	281
3	0.055	281	3	0.147	281	3	0.139	281	3	0.056	281
4	0.055	281	4	0.145	281	4	0.137	282	4	0.057	281
5	0.060	281	5	0.139	281	5	0.134	282	5	0.062	281
6	0.080	281	6	0.143	280	6	0.140	282	6	0.073	280
7	0.137	279	7	0.115	279	7	0.114	281	7	0.131	279
8	0.112	278	8	0.110	280	8	0.121	283	8	0.115	278
9	0.100	278	9	0.114	281	9	0.116	284	9	0.095	277
10	0.110	277	10	0.103	283	10	0.096	284	10	0.105	277
11	0.125	273	11	0.050	282	11	0.046	282	11	0.115	275
12	0.110	267	12	0.033	275	12	0.065	277	12	0.105	269
End Time:	0945		1000				1055		1110		
Avg. -dP	0.3130						0.3121				
Avg Ts	279						280				

VELOCITY TRAVERSE DATA SHEET

COMPANY CHEVRON GAVIOTA

DATE 5/11/93

TEST LOCATION SCR OUTLET

STATIC PRESSURE 0.112 in. H2O

TEST CONDITION

PITOT COEFFICIENT (0.84) / 0.99

RUN # 3						RUN # 4					
Start Time: 1130 TO 1135 Pb: 29.71 "Hg			Start Time: 1140 Pb: 29.71 "Hg			Start Time: 1205 Pb: 29.70 "Hg			Start Time: 1212 Pb: 29.70 "Hg		
SAMPLE POINT #	VELOCITY dP (in. H2O)	Ts (°F)	SAMPLE POINT #	VELOCITY dP (in. H2O)	Ts (°F)	SAMPLE POINT #	VELOCITY dP (in. H2O)	Ts (°F)	SAMPLE POINT #	VELOCITY dP (in. H2O)	Ts (°F)
S-1	0.053	280	E-1	0.130	279	E-1	0.128	280	S-1	0.050	281
2	0.054	281	2	0.142	280	2	0.135	281	2	0.055	281
3	0.055	280	3	0.141	280	3	0.136	281	3	0.051	281
4	0.054	281	4	0.138	281	4	0.137	282	4	0.056	282
5	0.058	282	5	0.136	282	5	0.131	282	5	0.058	282
6	0.077	282	6	0.138	282	6	0.134	281	6	0.079	282
7	0.130	281	7	0.117	281	7	0.111	281	7	0.131	281
8	0.105	279	8	0.119	280	8	0.114	284	8	0.103	283
9	0.095	278	9	0.119	279	9	0.113	282	9	0.091	282
10	0.100	278	10	0.094	278	10	0.097	283	10	0.103	280
11	0.099	276	11	0.045	276	11	0.089	280	11	0.105	279
12	0.101	274	12	0.061	275	12	0.075	279	12	0.103	275
End Time: 1135			1155			1210			1217		
Avg. -dP	0.3095					0.3115					
Avg Ts	279.38					281					

VELOCITY TRAVERSE DATA SHEET

COMPANY CHEVRON GAVIOTA

DATE 5/11/93

TEST LOCATION SCR OUTLET

STATIC PRESSURE 0.112 in. H2O

TEST CONDITION

PITOT COEFFICIENT 0.84 / 0.99

RUN # 5

Start Time: 1220 Pb: 29.70 "Hg			Start Time: 1230 Pb: 29.70 "Hg			Start Time: Pb: "Hg			Start Time: Pb: "Hg		
SAMPLE POINT #	VELOCITY dP (in. H2O)	Ts (°F)	SAMPLE POINT #	VELOCITY dP (in. H2O)	Ts (°F)	SAMPLE POINT #	VELOCITY dP (in. H2O)	Ts (°F)	SAMPLE POINT #	VELOCITY dP (in. H2O)	Ts (°F)
E-1	0.126	281	S-1	0.049	280						
2	0.124	281	2	0.051	281						
3	0.134	282	3	0.055	281						
4	0.130	282	4	0.053	282						
5	0.129	283	5	0.061	282						
6	0.131	283	6	0.070	282						
7	0.110	284	7	0.128	280						
8	0.115	284	8	0.101	280						
9	0.113	284	9	0.090	279						
10	0.105	285	10	0.099	278						
11	0.086	284	11	0.101	275						
12	0.071	278	12	0.096	277						
End Time:	1225		1235								
Avg. −dP	0.3078										
Avg Ts	281										

Data dump for the following variables:

Variable 21 - COGEN.	STACK CO	PPM
Variable 24 - COGEN.	STACK NOx	PPM
Variable 27 - COGEN.	FUEL GAS FLOW	MSCFH
Variable 28 - COGEN.	STACK O2	PCT
Variable 42 - COGEN. ANNUB FLOW MEAS (DRY)		MMSCFH
Variable 52 - COGEN. ANNUB FLOW MEAS (WET)		MMSCFH

SCR Outlet
5/11/93
Plant Data

Date	Time	CO Var. 21	NOX Var. 24	Var. 27	O2 Var. 28	Var. 42	Var. 52	
5/11/93	9:15	30.61	3.77	111.74	14.68	3.86	4.31	
	9:16	30.06	3.76	110.95	14.62	3.86	4.32	
	9:17	30.29	3.84	111.67	14.61	3.85	4.31	
	9:18	30.03	3.87	114.71	14.59	3.87	4.33	
	9:19	30.32	3.91	110.49	14.47	3.86	4.32	
	9:20	30.42	4.01	108.48	14.58	3.84	4.29	
	9:21	31.73	4.06	111.13	14.75	3.85	4.31	
	9:22	30.16	4.18	109.23	14.66	3.85	4.31	
	9:23	30.94	4.28	109.10	14.70	3.87	4.32	
	9:24	30.89	4.33	113.80	14.72	3.87	4.33	
	9:25	30.29	4.38	113.34	14.54	3.85	4.31	
	9:26	29.91	4.48	111.03	14.47	3.84	4.30	
	9:27	29.69	4.44	109.07	14.55	3.85	4.31	RUN 1
	9:28	30.56	4.43	111.40	14.70	3.84	4.29	
	9:29	29.48	4.44	110.59	14.61	3.84	4.30	
	9:30	29.52	4.38	108.69	14.63	3.84	4.29	
	9:31	30.39	4.36	110.99	14.68	3.84	4.30	
	9:32	29.85	4.45	111.45	14.65	3.85	4.32	
	9:33	29.85	4.42	109.92	14.62	3.84	4.29	
	9:34	29.80	4.50	112.55	14.64	3.86	4.33	
	9:35	29.73	4.49	113.85	14.58	3.85	4.30	
	9:36	30.10	4.51	111.17	14.46	3.85	4.30	
	9:37	29.82	4.49	110.70	14.56	3.83	4.29	Run #1
	9:38	30.29	4.47	111.87	14.68	3.84	4.30	
	9:39	29.52	4.57	109.84	14.59	3.84	4.30	
	9:40	30.29	4.50	109.37	14.64	3.85	4.31	NO_x = 4.46 ppm
	9:41	31.76	4.41	110.59	14.74	3.84	4.30	CO = 30.75 ppm
	9:42	30.66	4.43	110.39	14.70	3.82	4.27	
	9:43	31.17	4.41	106.04	14.65	3.82	4.29	O_2 = 14.65 %
	9:44	33.86	4.46	109.57	14.83	3.83	4.29	
	9:45	32.30	4.48	116.88	14.81	3.86	4.32	
	9:46	31.50	4.60	115.38	14.44	3.84	4.30	
	9:47	30.46	4.48	109.96	14.36	3.83	4.28	
	9:48	30.77	4.48	109.28	14.64	3.83	4.28	
	9:49	30.55	4.52	110.51	14.70	3.82	4.29	
	9:50	30.21	4.45	109.26	14.67	3.82	4.28	
	9:51	31.03	4.47	110.96	14.73	3.83	4.28	
	9:52	29.92	4.54	113.78	14.64	3.83	4.29	
	9:53	29.90	4.58	112.37	14.51	3.83	4.28	PORT CHANGE
	9:54	29.73	4.46	108.95	14.53	3.82	4.28	
	9:55	31.00	4.41	109.88	14.72	3.82	4.29	
	9:56	29.49	4.51	112.89	14.67	3.83	4.28	
	9:57	29.32	4.49	111.32	14.59	3.84	4.30	
	9:58	29.52	4.48	110.46	14.60	3.84	4.28	

SITE IDENTIFIER: GAVY

Date	Time	Var. 21	Var. 24	Var. 27	Var. 28	Var. 42	Var. 52
5/11/93	10:00	29.92	4.46	112.42	14.61	3.85	4.30
	10:01	30.57	4.49	112.65	14.59	3.84	4.31
	10:02	30.59	4.48	113.93	14.57	3.84	4.31
	10:03	30.48	4.50	111.74	14.49	3.84	4.30
	10:04	30.20	4.38	108.29	14.55	3.83	4.30
	10:05	33.70	4.32	108.01	14.77	3.83	4.29
	10:06	33.02	4.39	112.71	14.81	3.84	4.30
	10:07	30.27	4.55	111.30	14.63	3.82	4.28
	10:08	30.02	4.52	112.71	14.60	3.85	4.30
	10:09	29.82	4.54	114.57	14.57	3.83	4.29
	10:10	29.78	4.49	111.17	14.46	3.82	4.28
	10:11	29.88	4.38	108.97	14.62	3.83	4.29
	10:12	31.33	4.38	110.90	14.74	3.84	4.30
	10:13	29.95	4.44	111.33	14.67	3.83	4.28
	10:14	29.94	4.43	108.04	14.63	3.82	4.27
	10:15	33.48	4.43	107.19	14.79	3.84	4.30
	10:16	33.89	4.45	109.21	14.85	3.83	4.30
	10:17	32.38	4.50	108.38	14.76	3.83	4.29
	10:18	33.94	4.44	107.80	14.81	3.83	4.29
	10:19	33.95	4.46	112.13	14.88	3.84	4.29
	10:20	30.79	4.44	112.57	14.66	3.85	4.31
	10:21	30.34	4.48	109.03	14.56	3.83	4.29
	10:22	32.06	4.41	110.39	14.71	3.84	4.30
	10:23	30.98	4.38	114.35	14.70	3.84	4.31
	10:24	30.71	4.46	113.26	14.51	3.84	4.30

Data dump for the following variables:

Variable 21 -	COGEN.	STACK CO	PPM
Variable 24 -	COGEN.	STACK NOx	PPM
Variable 27 -	COGEN.	FUEL GAS FLOW	MSCFH
Variable 28 -	COGEN.	STACK O2	PCT
Variable 42 -	COGEN.	ANNUB FLOW MEAS (DRY)	MMSCFH
Variable 52 -	COGEN.	ANNUB FLOW MEAS (WET)	MMSCFH

Date	Time	Var. 21	Var. 24	Var. 27	Var. 28	Var. 42	Var. 52
5/11/93	9:15	30.61	3.77	111.74	14.68	3.86	4.31
	9:16	30.06	3.76	110.95	14.62	3.86	4.32
	9:17	30.29	3.84	111.67	14.61	3.85	4.31
	9:18	30.03	3.87	114.71	14.59	3.87	4.33
	9:19	30.32	3.91	110.49	14.47	3.86	4.32
	9:20	30.42	4.01	108.48	14.58	3.84	4.29
	9:21	31.73	4.06	111.13	14.75	3.85	4.31
	9:22	30.16	4.18	109.23	14.66	3.85	4.31
	9:23	30.94	4.28	109.10	14.70	3.87	4.32
	9:24	30.89	4.33	113.80	14.72	3.87	4.33
	9:25	30.29	4.38	113.34	14.54	3.85	4.31
	9:26	29.91	4.48	111.03	14.47	3.84	4.30
	9:27	29.69	4.44	109.07	14.55	3.85	4.31
	9:28	30.56	4.43	111.40	14.70	3.84	4.29
	9:29	29.48	4.44	110.59	14.61	3.84	4.30
	9:30	29.52	4.38	108.69	14.63	3.84	4.29
	9:31	30.39	4.36	110.99	14.68	3.84	4.30
	9:32	29.85	4.45	111.45	14.65	3.85	4.32
	9:33	29.85	4.42	109.92	14.62	3.84	4.29
	9:34	29.80	4.50	112.55	14.64	3.86	4.33
	9:35	29.73	4.49	113.85	14.58	3.85	4.30
	9:36	30.10	4.51	111.17	14.46	3.85	4.30
	9:37	29.82	4.49	110.70	14.56	3.83	4.29
	9:38	30.29	4.47	111.87	14.68	3.84	4.30
	9:39	29.52	4.57	109.84	14.59	3.84	4.30
	9:40	30.29	4.50	109.37	14.64	3.85	4.31
	9:41	31.76	4.41	110.59	14.74	3.84	4.30
	9:42	30.66	4.43	110.39	14.70	3.82	4.27
	9:43	31.17	4.41	106.04	14.65	3.82	4.29
	9:44	33.86	4.48	109.57	14.83	3.83	4.29
	9:45	32.30	4.48	116.88	14.81	3.86	4.32
	9:46	31.50	4.60	115.38	14.44	3.84	4.30
	9:47	30.46	4.48	109.96	14.36	3.83	4.28
	9:48	30.77	4.48	109.28	14.64	3.83	4.28
	9:49	30.55	4.52	110.51	14.70	3.82	4.29
	9:50	30.21	4.45	109.26	14.67	3.82	4.28
	9:51	31.03	4.47	110.96	14.72	3.83	4.28
	9:52	29.92	4.54	113.78	14.64	3.83	4.29
	9:53	29.90	4.58	112.37	14.51	3.83	4.28
	9:54	29.73	4.46	108.95	14.53	3.82	4.28
	9:55	31.00	4.41	109.88	14.72	3.82	4.29
	9:56	29.49	4.51	112.89	14.67	3.83	4.28
	9:57	29.32	4.49	111.32	14.59	3.84	4.30
	9:58	29.52	4.48	110.46	14.60	3.84	4.28
	9:59	30.00	4.53	111.58	14.67	3.84	4.31

Run 2
Qstd

SITE IDENTIFIER: GAVY

Date	Time	CO Var. 21	NOX Var. 24	Var. 27	O2 Var. 38	Var. 42	Var. 52
5/11/93	10:00	29.92	4.46	112.42	14.61	3.85	4.30
	10:01	30.57	4.49	112.65	14.59	3.84	4.31
	10:02	30.59	4.48	113.93	14.57	3.84	4.31
	10:03	30.48	4.50	111.74	14.49	3.84	4.30
	10:04	30.20	4.38	108.29	14.55	3.83	4.30
	10:05	33.70	4.32	108.01	14.77	3.83	4.29
	10:06	33.02	4.39	112.71	14.81	3.84	4.30
	10:07	30.27	4.55	111.30	14.63	3.82	4.28
	10:08	30.02	4.52	112.71	14.60	3.85	4.30
	10:09	29.82	4.54	114.57	14.57	3.83	4.29
	10:10	29.78	4.49	111.17	14.46	3.82	4.28
	10:11	29.88	4.38	108.97	14.62	3.83	4.29
	10:12	31.33	4.38	110.90	14.74	3.84	4.30
	10:13	29.95	4.44	111.33	14.67	3.83	4.28
	10:14	29.94	4.43	108.04	14.63	3.82	4.27
	10:15	33.48	4.43	107.19	14.79	3.84	4.30
	10:16	33.89	4.45	109.21	14.85	3.83	4.30
	10:17	32.38	4.50	108.38	14.76	3.83	4.29
	10:18	33.94	4.44	107.80	14.81	3.83	4.29
	10:19	33.95	4.46	112.13	14.88	3.84	4.29
	10:20	30.79	4.44	112.57	14.66	3.85	4.31
	10:21	30.34	4.48	109.03	14.56	3.83	4.29
	10:22	32.06	4.41	110.39	14.71	3.84	4.30
	10:23	30.98	4.38	114.35	14.70	3.84	4.31
	10:24	30.71	4.48	113.26	14.51	3.84	4.30
	10:25	30.48	4.47	111.17	14.47	3.83	4.29
	10:26	30.40	4.49	111.34	14.60	3.83	4.29
	10:27	30.22	4.46	108.14	14.65	3.83	4.29
	10:28	32.44	4.45	105.16	14.75	3.82	4.28
	10:29	34.21	4.35	110.91	14.95	3.83	4.29
	10:30	32.70	4.43	117.43	14.82	3.85	4.30
	10:31	31.45	4.55	111.95	14.37	3.82	4.29
	10:32	30.51	4.50	107.80	14.49	3.82	4.28
	10:33	32.71	4.44	110.41	14.77	3.83	4.29
	10:34	31.38	4.46	111.56	14.75	3.82	4.27
	10:35	30.59	4.49	109.58	14.66	3.81	4.26
	10:36	31.30	4.44	112.50	14.71	3.82	4.28
	10:37	30.38	4.49	112.58	14.68	3.82	4.27
	10:38	30.02	4.49	107.93	14.59	3.81	4.27
	10:39	33.09	4.40	108.12	14.76	3.80	4.26
	10:40	33.76	4.34	109.21	14.84	3.81	4.28
	10:41	33.03	4.41	109.26	14.80	3.82	4.27
	10:42	32.75	4.42	108.06	14.75	3.80	4.25
	10:43	34.51	4.34	110.04	14.89	3.82	4.28
	10:44	32.72	4.44	110.91	14.79	3.82	4.27
	10:45	30.67	4.49	109.60	14.65	3.82	4.28
	10:46	32.67	4.36	108.19	14.72	3.81	4.26
	10:47	35.23	4.38	107.48	14.87	3.81	4.27
	10:48	35.12	4.39	108.64	14.86	3.82	4.28
	10:49	32.97	4.42	109.44	14.78	3.82	4.27
	10:50	33.12	4.36	111.53	14.73	3.80	4.27
	10:51	31.66	4.41	110.59	14.73	3.81	4.26
	10:52	31.08	4.43	107.88	14.66	3.81	4.27
	10:53	34.03	4.39	108.14	14.80	3.81	4.26
	10:54	34.54	4.42	109.24	14.86	3.81	4.28
	10:55	33.54	4.39	107.30	14.80	3.80	4.25
	10:56	34.58	4.38	108.87	14.83	3.81	4.27

RUN 2

Run 2 Qstd

SITE IDENTIFIER: GAVY

Date	Time	CO Var. 21	NOx Var. 24	Var. 27	O2 Var. 28	Var. 42	Var. 52
	10:57	35.20	4.37	111.75	14.87	3.81	4.27
	10:58	32.09	4.41	113.73	14.73	3.82 3.81	4.27
	10:59	31.27	4.44	109.86	14.51	3.80	4.26
5/11/93	11:00	31.93	4.38	110.05	14.68	3.80	4.26
	11:01	31.23	4.41	113.44	14.72	3.81	4.27
	11:02	30.45	4.48	113.54	14.61	3.82	4.27
	11:03	30.20	4.48	112.65	14.53	3.83	4.29
	11:04	29.57	4.42	114.02	14.54	3.82	4.29
	11:05	29.39	4.45	112.18	14.58	3.81	4.26
	11:06	29.79	4.41	108.77	14.60	3.81	4.26
	11:07	32.93	4.36	109.92	14.76	3.83	4.29
	11:08	31.16	4.41	114.31	14.77	3.83	4.28
	11:09	29.91	4.44	111.89	14.58	3.82	4.28
	11:10	29.84	4.38	110.12	14.57	3.81	4.27
	11:11	30.59	4.32	112.79	14.71	3.81	4.27
	11:12	29.88	4.33	113.21	14.63	3.82	4.27
	11:13	29.56	4.40	110.38	14.55	3.80	4.27
	11:14	30.34	4.30	111.59	14.68	3.82	4.28
	11:15	29.94	4.39	113.71	14.69	3.82	4.28
	11:16	30.05	4.34	112.13	14.55	3.81	4.26
	11:17	29.99	4.35	110.79	14.62	3.81	4.28
	11:18	29.92	4.34	112.96	14.69	3.82	4.27
	11:19	29.50	4.36	115.58	14.56	3.82	4.27
	11:20	29.91	4.39	113.93	14.46	3.82	4.27
	11:21	29.36	4.37	116.79	14.50	3.83	4.29
	11:22	29.65	4.41	115.13	14.44	3.82	4.27
	11:23	29.11	4.37	110.93	14.40	3.81	4.27
	11:24	29.10	4.32	112.03	14.62	3.80	4.26
	11:25	29.43	4.37	110.18	14.67	3.81	4.27
	11:26	29.87	4.35	110.18	14.67	3.81	4.26
	11:27	31.56	4.37	109.37	14.74	3.80	4.26
	11:28	32.45	4.29	112.28	14.79	3.81	4.27
	11:29	30.11	4.30	109.39	14.68	3.81	4.27

Port change

Data dump for the following variables:

Variable 21 -	COGEN.	STACK CO	PPM
Variable 24 -	COGEN.	STACK NOx	PPM
Variable 27 -	COGEN.	FUEL GAS FLOW	MSCFH
Variable 28 -	COGEN.	STACK O2	PCT
Variable 40 -	COGEN.	SCR INLET NOx	PPM
Variable 42 -	COGEN.	ANNUB FLOW MEAS (DRY)	MMSCFH
Variable 52 -	COGEN.	ANNUB FLOW MEAS (WET)	MMSCFH

Date	Time	CO Var. 21	NOX Var. 24	Var. 27	O2 Var. 28	Var. 40	Var. 42	Var. 52
5/11/93	11:00	31.93	4.38	110.05	14.68	33.64	3.80	4.26
	11:01	31.23	4.41	113.44	14.72	33.79	3.81	4.27
	11:02	30.45	4.48	113.54	14.61	33.88	3.82	4.27
	11:03	30.20	4.48	112.65	14.55	34.08	3.83	4.29
	11:04	29.57	4.42	114.02	14.54	33.97	3.82	4.29
	11:05	29.39	4.45	112.18	14.58	33.81	3.81	4.26
	11:06	29.79	4.41	108.77	14.60	33.81	3.81	4.26
	11:07	32.93	4.36	109.92	14.76	33.59	3.83	4.29
	11:08	31.16	4.41	114.31	14.77	34.08	3.83	4.28
	11:09	29.91	4.44	111.89	14.53	34.09	3.82	4.28
	11:10	29.84	4.38	110.12	14.57	33.84	3.81	4.27
	11:11	30.59	4.32	112.79	14.71	33.83	3.81	4.27
	11:12	29.88	4.33	113.21	14.63	33.96	3.82	4.27
	11:13	29.56	4.40	110.38	14.55	33.88	3.80	4.27
	11:14	30.34	4.30	111.59	14.68	33.81	3.82	4.28
	11:15	29.94	4.39	113.71	14.69	33.94	3.82	4.28
	11:16	30.05	4.34	112.13	14.55	33.82	3.81	4.26
	11:17	29.99	4.35	110.79	14.62	33.82	3.81	4.28
	11:18	29.92	4.34	112.96	14.69	34.18	3.82	4.27
	11:19	29.50	4.36	115.58	14.56	34.14	3.82	4.27
	11:20	29.91	4.39	113.93	14.46	34.13	3.82	4.27
	11:21	29.36	4.37	116.79	14.50	34.06	3.83	4.29
	11:22	29.65	4.41	115.13	14.44	34.14	3.82	4.27
	11:23	29.11	4.37	110.93	14.40	34.12	3.81	4.27
	11:24	29.10	4.32	112.03	14.62	33.67	3.80	4.26
	11:25	29.43	4.37	110.18	14.67	33.83	3.81	4.27
	11:26	29.87	4.35	110.18	14.67	33.84	3.81	4.26
	11:27	31.56	4.37	109.37	14.74	33.76	3.80	4.26
	11:28	32.45	4.29	112.28	14.79	33.62	3.81	4.27
	11:29	30.11	4.30	109.39	14.68	33.86	3.81	4.27
	11:30	32.73	4.28	108.35	14.74	33.37	3.81	4.27
	11:31	33.28	4.31	111.46	14.84	33.54	3.82	4.27
Run 2	11:32	31.26	4.38	109.60	14.72	33.60	3.81	4.26
	11:33	33.30	4.34	107.96	14.77	33.31	3.81	4.28
	11:34	34.08	4.32	112.87	14.85	33.29	3.83	4.28
	11:35	30.57	4.41	114.41	14.69	33.78	3.83	4.29
	11:36	30.24	4.43	110.10	14.54	33.85	3.81	4.27
	11:37	31.47	4.40	110.88	14.68	33.58	3.83	4.28
	11:38	31.51	4.43	114.32	14.76	33.81	3.82	4.29
	11:39	30.20	4.43	110.99	14.57	33.94	3.81	4.27
	11:40	30.73	4.34	109.37	14.66	33.61	3.80	4.26
	11:41	33.40	4.30	110.20	14.81	33.52	3.81	4.27
	11:42	32.68	4.31	107.93	14.77	33.33	3.82	4.28
	11:43	34.58	4.24	107.22	14.88	32.89	3.81	4.26
	11:44	34.20	4.35	113.99	14.94	33.05	3.82	4.28

Run 3 Pstd 3.81

SITE IDENTIFIER: GAVY

Date	Time	CO Var. 21	NOX Var. 24	Var. 27	Var. 28	O2 Var. 40	Var. 42	Var. 52	
	11:45	31.78	4.44	114.22	14.60	33.58	3.80	4.26	
	11:46	30.94	4.49	110.28	14.50	33.65	3.79	4.25	
	11:47	32.07	4.45	109.13	14.71	33.68	3.80	4.26	
	11:48	32.92	4.39	111.74	14.77	33.44	3.80	4.25	
	11:49	31.03	4.48	112.58	14.71	33.88	3.81	4.27	
	11:50	30.71	4.48	108.47	14.64	33.70	3.80	4.24	
	11:51	33.93	4.42	110.48	14.79	33.36	3.81	4.27	
	11:52	31.95	4.40	113.75	14.77	33.69	3.82	4.28	
	11:53	30.63	4.49	116.99	14.60	33.79	3.82	4.27	
	11:54	30.83	4.48	114.79	14.43	33.73	3.82	4.28	
	11:55	30.06	4.45	113.16	14.49	33.80	3.82	4.28	
	11:56	29.47	4.42	111.51	14.54	33.87	3.82	4.27	
	11:57	29.78	4.38	109.28	14.65	33.80	3.80	4.25	
	11:58	31.96	4.40	109.37	14.76	33.52	3.81	4.27	
	11:59	32.04	4.41	115.68	14.78	33.68	3.82	4.28	
5/11/93	12:00	30.74	4.49	114.30	14.55	33.82	3.82	4.28	
	12:01	30.24	4.48	114.09	14.47	33.83	3.81	4.27	
	12:02	29.73	4.49	112.45	14.54	33.86	3.82	4.28	
	12:03	29.62	4.41	112.32	14.56	33.73	3.82	4.28	
	12:04	29.98	4.37	109.67	14.64	33.65	3.82	4.27	RUN 3
	12:05	32.61	4.39	108.14	14.78	33.57	3.81	4.26	
	12:06	33.43	4.46	112.83	14.82	33.49	3.82	4.28	
	12:07	31.00	4.48	114.15	14.70	33.78	3.81	4.27	Run 4
	12:08	30.44	4.50	110.31	14.55	33.77	3.80	4.26	
	12:09	31.64	4.39	111.40	14.70	33.48	3.82	4.27	Qstd
	12:10	30.85	4.49	114.82	14.71	33.60	3.82	4.29	3.82
	12:11	30.69	4.42	111.25	14.54	33.69	3.82	4.28	
	12:12	30.79	4.45	110.54	14.61	33.36	3.82	4.26	
	12:13	31.75	4.44	111.66	14.73	33.29	3.81	4.27	
	12:14	30.61	4.44	113.44	14.67	33.44	3.81	4.28	
	12:15	30.26	4.48	109.70	14.60	33.59	3.81	4.27	
	12:16	31.44	4.50	113.02	14.71	33.52	3.81	4.26	
	12:17	30.59	4.47	114.27	14.65	33.78	3.81	4.28	POST CHANGE
	12:18	30.08	4.52	110.14	14.55	33.89	3.82	4.27	
	12:19	31.09	4.41	113.10	14.66	33.59	3.82	4.29	
	12:20	30.57	4.45	118.19	14.67	33.74	3.83	4.28	
	12:21	30.30	4.58	113.70	14.34	34.03	3.81	4.27	
	12:22	29.64	4.51	110.35	14.42	33.94	3.81	4.27	Run 5
	12:23	31.71	4.39	107.67	14.71	33.46	3.82	4.28	
	12:24	33.58	4.38	105.82	14.91	33.17	3.82	4.28	RUN 3
	12:25	34.40	4.36	107.53	14.99	33.13	3.83	4.29	
	12:26	34.91	4.39	106.21	15.00	33.17	3.82	4.28	
	12:27	35.09	4.43	106.94	15.00	33.23	3.83	4.28	Qstd 3.82
	12:28	35.32	4.48	106.85	15.00	33.25	3.81	4.26	
	12:29	35.58	4.48	107.31	15.00	33.14	3.80	4.27	
	12:30	35.83	4.39	106.07	15.00	32.91	3.79	4.25	
	12:31	35.95	4.46	107.19	15.01	32.93	3.81	4.27	
	12:32	36.07	4.48	106.36	15.00	32.79	3.81	4.26	
	12:33	36.29	4.48	106.57	15.00	32.81	3.79	4.25	
	12:34	36.12	4.52	107.22	15.00	32.91	3.79	4.25	
	12:35	36.21	4.53	110.33	15.00	33.04	3.80	4.25	
	12:36	35.27	4.54	106.36	14.82	32.99	3.30	4.26	
	12:37	36.06	4.52	107.06	14.95	32.93	3.79	4.24	
	12:38	36.26	4.49	106.73	15.00	32.99	3.80	4.26	
	12:39	36.03	4.52	106.75	15.01	33.04	3.81	4.27	
	12:40	36.11	4.54	106.39	15.01	32.88	3.80	4.25	

APPENDIX D

SCR OUTLET, TOTAL HYDROCARBONS

EMISSION CALCULATIONS
HYDROCARBON COMPOUNDS

GAVIOTA OIL AND GAS PLANT
SCR OUTLET
MAY 11, 1993

Hydrocarbon Compound		Molecular Weight	Molecular Formula	Laboratory Analysis, ppm as HC compound *			ppm HC as methane *		
				Run 1	Run 2	Run 3	Run 1	Run2	Run 3
C_1	Methane	16.04	CH_4	12.1	11.5	13.3	12.10	11.50	13.30
C_2	Ethane	30.07	C_2H_6						
C_3	Propane	44.09	C_3H_8						
C_4	Butane	58.12	C_4H_{10}						
C_5	Pentane	72.15	C_5H_{12}						
C_6	Hexane	86.17	C_6H_{14}						
C_6+	as Hexane	86.17	C_6H_{14}						

	Run 1	Run 2	Run 3	Average	
Stack Parameters					
Stack Gas Oxygen, %	14.64	14.52	14.37	14.51	
Stack Gas Flowrate, dscfm	63,442	63,579	62,975	63,332	
F–Factor, dscf/MMBtu	8,570.00	8,570.00	8,570.00	8,570.00	
Total Hydrocarbons, THC as methane					
ppm	12.10	11.50	13.30	12.30	C_1-C_6+ HC
ppm @ Oxygen Correction	11.40	10.63	12.02	11.35	
lb/hr	1.95	1.85	2.14	1.98	
lb/MMBtu	0.0146	0.0137	0.0158	0.0147	
Reactive Organic Compounds, ROC as methane					
ppm	0.00	0.00	0.00	0.00	C_2-C_6+ HC
ppm @ Oxygen Correction	0.00	0.00	0.00	0.00	
lb/hr	0.00	0.00	0.00	0.00	
lb/MMBtu	0.0000	0.0000	0.0000	0.0000	

Oxygen Correction : 15.0 %
Standard Temperature = 60 °F

Equations

HC corrected to methane, ppm = (MW of HC Compound / MW of Methane) x ppm value

ppm @ Oxygen Correction = ppm measured x [(20.9 – Oxygen Correction) / (20.9 – %Oxygen Measured)]

lb/hr = (0.00000137 lb–mole dR / ft3) x 60 min/hr x Qs(std) x (MW of Methane) x ppm / [T(std) + 460)]

lb/MMBtu = F–Factor x (MW of Methane) x [(1.3711E–06 lb–mole dR/ft3) / [T(std) + 460)] x [20.9 / 20.9 – O2%)] x ppm

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ANALYTICAL LABORATORIES

PRECISION ANALYSIS / QUALITY SERVICE

Established 1949

California State Approved
Testing Laboratory

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P.O. Box 80475
Bakersfield, CA
93380-0475
805 392-8811

NPDES Permit Analysis
Injection Water Quality
Reservoir Fluid Analysis
Natural Gas Analysis
Enhanced Recovery
Drilling & Production Support

May 17, 1993

Attention: Mr. Troy Delfino
ENGINEERING SCIENCE, INC.
2520 Pegasus Drive
Bakersfield, CA 93308

Ref: Lab No. 93-1997

Enclosed please find your report of analysis performed on the samples submitted to our lab on May 12, 1993.

We thank you for this opportunity to be of service. If you should have any questions concerning this report, or require further analysis, please do not hesitate to call.

Respectfully submitted,

Ronald P. Hoff
RPH/sj
enclosure

Our letters and reports are for the exclusive use of the clients to whom they are addressed. The use of our names must receive our prior written approval. Our letters and reports apply only to the samples tested and are not necessarily indicative to the qualities of identical or similar products.

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ANALYTICAL LABORATORIES

Established 1949

Attention: Mr. Troy Delfino
ENGINEERING SCIENCE, INC.
2520 Pegasus Drive
Bakersfield, CA 93308

Report Date: May 17, 1993
Sampled: May 11, 1993
Submitted: May 12, 1993
Lab No. 93-1997-1

LABORATORY TEST REPORT

Project Name: Gaviota SCR
Project No.: BK062
Sample ID: Run # 1
Control No. BK9305104

Analyzed For: Trace Hydrocarbons
Method: EPA 18

Component	Found	Units	MDL
Methane	12.1	ppm	1.0
Ethane	ND	ppm	1.0
Propane	ND	ppm	1.0
Butane	ND	ppm	1.0
Pentane	ND	ppm	1.0
Hexanes +	ND	ppm	1.0

ND: None Detected
MDL: Method Detection Limit

Date Analyzed: 14-May-93
Analyst: S. Harris

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805 392-8811

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ANALYTICAL LABORATORIES

Established 1949

Attention: Mr. Troy Delfino
ENGINEERING SCIENCE, INC.
2520 Pegasus Drive
Bakersfield, CA 93308

Report Date: May 17, 1993
Sampled: May 11, 1993
Submitted: May 12, 1993
Lab No. 93-1997-2

LABORATORY TEST REPORT

Project Name: Gaviota SCR
Project No.: BK062
Sample ID: Run # 2
Control No. BK9305105

Analyzed For: Trace Hydrocarbons
Method: EPA 18

Component	Found	Units	MDL
Methane	11.5	ppm	1.0
Ethane	ND	ppm	1.0
Propane	ND	ppm	1.0
Butane	ND	ppm	1.0
Pentane	ND	ppm	1.0
Hexanes +	ND	ppm	1.0

ND: None Detected
MDL: Method Detection Limit

Date Analyzed: 14-May-93
Analyst: S. Harris

3161 Pegasus Drive P.O. Box 80475 Bakersfield, CA 93380-0475
805 392-8811

oilwell research, inc.
ANALYTICAL LABORATORIES

Established 1949

Attention: Mr. Troy Delfino
ENGINEERING SCIENCE, INC.
2520 Pegasus Drive
Bakersfield, CA 93308

Report Date: May 17, 1993
Sampled: May 11, 1993
Submitted: May 12, 1993
Lab No. 93-1997-3

LABORATORY TEST REPORT

Project Name: Gaviota SCR
Project No.: BK062
Sample ID: Run # 3
Control No. BK9305106

Analyzed For: Trace Hydrocarbons
Method: EPA 18

Component	Found	Units	MDL
Methane	13.3	ppm	1.0
Ethane	ND	ppm	1.0
Propane	ND	ppm	1.0
Butane	ND	ppm	1.0
Pentane	ND	ppm	1.0
Hexanes +	ND	ppm	1.0

ND: None Detected
MDL: Method Detection Limit

Date Analyzed: 14-May-93
Analyst: S. Harris

3161 Pegasus Drive P.O. Box 80475 Bakersfield, CA 93380-0475
805 392-8811

INTEGRATED BAG GAS SAMPLING
FIELD DATA SHEET

Company: CHEVRON GAVIOTA

Test Location: SCR OUTLET

Test Method / Parameter: EPA 18/TAC

Date: 5/11/93

ENGINEERING–SCIENCE, INC.

Run No.	Laboratory No.	Start Time	Rotameter (liter/min)	End Time	Rotameter (liter/min)	Total Time (min)	Leak Rate (liter/min)	Comments
			~~0.33~~					
1	BK9305104	0930	0.33	1000	0.33	30	0.00	
2	BK9305105	1042	0.33	1112	0.33	30	0.00	
3	BK9305106	1205	0.33	1235	0.33	30	0.00	

Note: Using a 10 liter sample bag, set the flowrate as follows: 15 min sample = 0.67 l/min; 30 min sample = 0.33 l/min; 60min sample = 0.17 l/min.

APPENDIX E

SCR INLET, CONTINUOUS EMISSION MONITORING

RELATIVE ACCURACY CALCULATIONS – NOx (ppm)

GAVIOTA OIL AND GAS PLANT
SCR INLET

13–May–93

Run No.	RM Test Values		Plant CEM Values		Difference d
	Runs not Used for RA	Runs Used for RA	Runs not Used for RA	Runs Used for RA	
1		36.20		36.20	0.00
2		36.59		34.50	–2.09
3		37.02		33.50	–3.52
4		37.94		34.86	–3.08
5		37.99		35.67	–2.32
6		38.09		35.96	–2.13
7		38.06		35.94	–2.12
8		37.68		35.80	–1.88
9		37.60		35.15	–2.45
10					
11					
12					

$\overline{RM}$: 37.46

$\overline{d}$: –2.18
Standard Deviation (Std.Dev.) : 0.97

t–VALUES TABLE			
n	t0.975	n	t0.975
2	12.706	10	2.262
3	4.303	11	2.228
4	3.182	12	2.201
5	2.776	13	2.179
6	2.571	14	2.160
7	2.447	15	2.145
8	2.365	16	2.131
9	2.306		

CONFIDENCE COEFFICIENT

CC = t0.975 x [Std.Dev. / (Sq.Rt. n)] = 0.75

Where : CC = 2.5 percent error Confidence Coefficient.
n , number of valid test runs = 9
t0.975, t–Value from table = 2.306

RELATIVE ACCURACY

RA (%) = ($|\overline{d}|$ + |CC|) / $\overline{RM}$ x 100 = **7.80**

GAS ANALYZER DATA

GAVIOTA OIL AND GAS PLANT
SCR INLET

Date : 05/13/93
Run No. : 1

	O2, %		CO2, %		NOx, ppm		CO, ppm		SO2, ppm	
	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading
Point #										
1	15.25	15.25			34.17	34.17				
2	14.67	14.67			34.99	35.00				
3	14.76	14.76			34.77	34.79				
4	14.89	14.89			33.56	33.58				
5	14.82	14.82			34.98	35.01				
6	14.35	14.35			36.31	36.35				
7	14.45	14.45			36.19	36.24				
8	14.39	14.39			35.27	35.33				
9	14.46	14.46			35.87	35.93				
10	13.81	13.81			38.16	38.24				
11	14.08	14.08			37.50	37.58				
12	13.81	13.81			37.96	38.05				
13	14.69	14.69			36.13	36.22				
14	14.34	14.34			37.33	37.44				
15	14.21	14.21			37.44	37.55				
16	13.37	13.37			39.47	39.60				
17	14.60	14.60			36.16	36.28				
18	14.59	14.59			36.18	36.31				
19	14.31	14.31			36.85	36.99				
20	13.92	13.92			37.25	37.40				
21	14.74	14.74			36.01	36.16				
22	15.08	15.08			35.35	35.51				
23	15.19	15.19			34.66	34.82				
24	15.15	15.15			34.15	34.32				
25										
26										
27										
28										
29										
30										
MEAN :		14.50				36.20				

Zero Check	0.00	0.00
Span Check	15.02	83.80
Initial Span Value	15.02	84.22
Drift, Percent	0.0	−0.5
Zero Drift, Zcf	0.00000	0.00000
Span Drift, Scf	0.00000	−0.00021

Drift, Percent = [(Span Check − Zero Check) − Calib. Gas] / Calib. Gas x 100

Zero Drift Correction Factor, Zcf = Zero Check / # of Readings

Span Drift Correction Factor, Scf = (% Drift / 100) / # of Readings

Cz, Zero Corr. Concentration = measured value − [Zcf x (Point # − 0.5)]

Drift Corrected Reading = Cz / [1 + (Scf x (Point # − 0.5))]

GAS ANALYZER DATA

GAVIOTA OIL AND GAS PLANT
SCR INLET

Date : 05/13/93
Run No. : 2

	O2, %		CO2, %		NOx, ppm		CO, ppm		SO2, ppm	
	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading
Point #										
1	13.63	13.63			38.06	38.11				
2	14.02	14.03			36.62	36.76				
3	13.50	13.51			37.60	37.84				
4	14.22	14.24			35.83	36.15				
5	13.86	13.88			36.64	37.07				
6	13.05	13.07			36.91	37.44				
7	14.55	14.58			33.10	33.66				
8	13.92	13.95			34.99	35.67				
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28										
29										
30										
MEAN :		13.86				36.59				

Zero Check	0.00	0.00
Span Check	14.98	82.50
Initial Span Value	15.02	84.22
Drift, Percent	−0.3	−2.0
Zero Drift, Zcf	0.00000	0.00000
Span Drift, Scf	−0.00033	−0.00255

Drift, Percent = [(Span Check − Zero Check) − Calib. Gas] / Calib. Gas x 100

Zero Drift Correction Factor, Zcf = Zero Check / # of Readings

Span Drift Correction Factor, Scf = (% Drift / 100) / # of Readings

Cz, Zero Corr. Concentration = measured value − [Zcf x (Point # − 0.5)]

Drift Corrected Reading = Cz / [1 + (Scf x (Point # − 0.5))]

GAS ANALYZER DATA

GAVIOTA OIL AND GAS PLANT
SCR INLET

Date : 05/13/93
Run No. : 3

	O2, %		CO2, %		NOx, ppm		CO, ppm		SO2, ppm	
	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading
Point #										
1	13.72	13.72			37.73	37.68				
2	14.33	14.33			35.96	35.82				
3	13.49	13.49			38.40	38.15				
4	14.14	14.14			37.33	36.99				
5	13.85	13.85			38.55	38.10				
6	13.17	13.17			39.44	38.88				
7	14.52	14.52			36.05	35.44				
8	14.38	14.38			35.81	35.11				
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29										
30										
MEAN :		13.95				37.02				

Zero Check	0.00	0.00
Span Check	15.02	86.00
Initial Span Value	15.02	84.22
Drift, Percent	0.0	2.1
Zero Drift, Zcf	0.00000	0.00000
Span Drift, Scf	0.00000	0.00264

Drift, Percent = [(Span Check – Zero Check) – Calib. Gas] / Calib. Gas x 100

Zero Drift Correction Factor, Zcf = Zero Check / # of Readings

Span Drift Correction Factor, Scf = (% Drift / 100) / # of Readings

Cz, Zero Corr. Concentration = measured value – [Zcf x (Point # – 0.5)]

Drift Corrected Reading = Cz / [1 + (Scf x (Point # – 0.5))]

GAS ANALYZER DATA

GAVIOTA OIL AND GAS PLANT
SCR INLET

Date : 05/13/93
Run No. : 4

	O2, %		CO2, %		NOx, ppm		CO, ppm		SO2, ppm	
	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading
Point #										
1	13.94	13.94			37.89	37.89				
2	14.22	14.22			36.73	36.73				
3	14.37	14.37			36.08	36.08				
4	14.00	14.00			38.49	38.49				
5	13.93	13.93			38.67	38.67				
6	13.14	13.14			40.68	40.68				
7	14.38	14.38			37.12	37.12				
8	13.95	13.95			37.87	37.87				
9										
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29										
30										
MEAN :		13.99				37.94				

Zero Check	0.00	0.00
Span Check	15.02	84.22
Initial Span Value	15.02	84.22
Drift, Percent	0.0	0.0
Zero Drift, Zcf	0.00000	0.00000
Span Drift, Scf	0.00000	0.00000

Drift, Percent = [(Span Check – Zero Check) – Calib. Gas] / Calib. Gas x 100

Zero Drift Correction Factor, Zcf = Zero Check / # of Readings

Span Drift Correction Factor, Scf = (% Drift / 100) / # of Readings

Cz, Zero Corr. Concentration = measured value – [Zcf x (Point # – 0.5)]

Drift Corrected Reading = Cz / [1 + (Scf x (Point # – 0.5))]

GAS ANALYZER DATA

GAVIOTA OIL AND GAS PLANT
SCR INLET

Date : 05/13/93
Run No. : 5

	O2, %		CO2, %		NOx, ppm		CO, ppm		SO2, ppm	
	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading
Point #										
1	13.90	13.90			37.84	37.86				
2	14.10	14.10			37.28	37.34				
3	14.08	14.08			37.41	37.51				
4	13.99	13.99			37.79	37.93				
5	13.74	13.74			38.97	39.16				
6	13.34	13.34			39.28	39.51				
7	14.43	14.43			36.87	37.13				
8	13.99	13.99			37.19	37.49				
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30										
MEAN :		13.95				37.99				

Zero Check	0.00	0.00
Span Check	15.02	83.50
Initial Span Value	15.02	84.22
Drift, Percent	0.0	−0.9
Zero Drift, Zcf	0.00000	0.00000
Span Drift, Scf	0.00000	−0.00107

Drift, Percent = [(Span Check − Zero Check) − Calib. Gas] / Calib. Gas x 100

Zero Drift Correction Factor, Zcf = Zero Check / # of Readings

Span Drift Correction Factor, Scf = (% Drift / 100) / # of Readings

Cz, Zero Corr. Concentration = measured value − [Zcf x (Point # − 0.5)]

Drift Corrected Reading = Cz / [1 + (Scf x (Point # − 0.5))]

GAS ANALYZER DATA

GAVIOTA OIL AND GAS PLANT
SCR INLET

Date : 05/13/93
Run No. : 6

	O2, %		CO2, %		NOx, ppm		CO, ppm		SO2, ppm	
	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading
Point #										
1	13.70	13.70			38.98	38.98				
2	14.24	14.24			37.33	37.33				
3	13.96	13.96			37.71	37.71				
4	13.66	13.66			38.48	38.48				
5	13.65	13.65			38.95	38.95				
6	13.31	13.31			39.36	39.36				
7	14.31	14.31			36.75	36.75				
8	14.02	14.02			37.15	37.15				
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30										
MEAN :		13.86				38.09				

Zero Check	0.00	0.00
Span Check	15.02	84.22
Initial Span Value	15.02	84.22
Drift, Percent	0.0	0.0
Zero Drift, Zcf	0.00000	0.00000
Span Drift, Scf	0.00000	0.00000

Drift, Percent = [(Span Check – Zero Check) – Calib. Gas] / Calib. Gas x 100

Zero Drift Correction Factor, Zcf = Zero Check / # of Readings

Span Drift Correction Factor, Scf = (% Drift / 100) / # of Readings

Cz, Zero Corr. Concentration = measured value – [Zcf x (Point # – 0.5)]

Drift Corrected Reading = Cz / [1 + (Scf x (Point # – 0.5))]

GAS ANALYZER DATA

GAVIOTA OIL AND GAS PLANT
SCR INLET

Date : 05/13/93
Run No. : 7

	O2, %		CO2, %		NOx, ppm		CO, ppm		SO2, ppm	
	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading
Point #										
1	13.57	13.57			38.75	38.78				
2	14.03	14.03			37.63	37.72				
3	14.14	14.14			37.00	37.14				
4	13.92	13.92			38.04	38.24				
5	13.81	13.81			38.14	38.40				
6	13.80	13.80			40.06	40.40				
7	14.15	14.15			36.42	36.78				
8	14.13	14.13			36.61	37.03				
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30										
MEAN :		13.94				38.06				

Zero Check	0.00	0.00
Span Check	15.02	83.20
Initial Span Value	15.02	84.22
Drift, Percent	0.0	−1.2
Zero Drift, Zcf	0.00000	0.00000
Span Drift, Scf	0.00000	−0.00151

Drift, Percent = [(Span Check − Zero Check) − Calib. Gas] / Calib. Gas x 100

Zero Drift Correction Factor, Zcf = Zero Check / # of Readings

Span Drift Correction Factor, Scf = (% Drift / 100) / # of Readings

Cz, Zero Corr. Concentration = measured value − [Zcf x (Point # − 0.5)]

Drift Corrected Reading = Cz / [1 + (Scf x (Point # − 0.5))]

GAS ANALYZER DATA

GAVIOTA OIL AND GAS PLANT
SCR INLET

Date : 05/13/93
Run No. : 8

	O2, %		CO2, %		NOx, ppm		CO, ppm		SO2, ppm	
	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading
Point #										
1	13.70	13.70			38.41	38.41				
2	13.81	13.81			37.34	37.34				
3	14.22	14.22			36.78	36.78				
4	14.16	14.16			37.65	37.65				
5	13.66	13.66			38.76	38.76				
6	13.19	13.19			38.80	38.80				
7	14.46	14.46			36.12	36.12				
8	13.82	13.82			37.59	37.59				
9										
10										
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30										
MEAN :		13.88				37.68				

Zero Check	0.00	0.00
Span Check	15.02	84.22
Initial Span Value	15.02	84.22
Drift, Percent	0.0	0.0
Zero Drift, Zcf	0.00000	0.00000
Span Drift, Scf	0.00000	0.00000

Drift, Percent = [(Span Check – Zero Check) – Calib. Gas] / Calib. Gas x 100

Zero Drift Correction Factor, Zcf = Zero Check / # of Readings

Span Drift Correction Factor, Scf = (% Drift / 100) / # of Readings

Cz, Zero Corr. Concentration = measured value – [Zcf x (Point # – 0.5)]

Drift Corrected Reading = Cz / [1 + (Scf x (Point # – 0.5))]

GAS ANALYZER DATA

GAVIOTA OIL AND GAS PLANT
SCR INLET

Date : 05/13/93
Run No. : 9

	O2, %		CO2, %		NOx, ppm		CO, ppm		SO2, ppm	
	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading
Point #										
1	13.62	13.62			38.28	38.29				
2	14.13	14.13			37.20	37.22				
3	14.11	14.11			36.73	36.76				
4	14.10	14.10			37.13	37.17				
5	13.83	13.83			39.01	39.07				
6	13.22	13.22			38.89	38.96				
7	14.29	14.29			36.48	36.56				
8	13.84	13.84			36.69	36.78				
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30										
MEAN :		13.89				37.60				

Zero Check	0.00	0.00
Span Check	15.02	84.00
Initial Span Value	15.02	84.22
Drift, Percent	0.0	−0.3
Zero Drift, Zcf	0.00000	0.00000
Span Drift, Scf	0.00000	−0.00033

Drift, Percent = [(Span Check − Zero Check) − Calib. Gas] / Calib. Gas x 100

Zero Drift Correction Factor, Zcf = Zero Check / # of Readings

Span Drift Correction Factor, Scf = (% Drift / 100) / # of Readings

Cz, Zero Corr. Concentration = measured value − [Zcf x (Point # − 0.5)]

Drift Corrected Reading = Cz / [1 + (Scf x (Point # − 0.5))]

ENGINEERING–SCIENCE, INC.
CEM FIELD DATA SHEET

PLANT: CHEVRON GAVIOTA
TEST LOCATION: SCR INLET
CEM VAN NO.: 3
DATE: 5-13-93
OPERATOR: SP

O2, %
Calibration Gases :
High 20.9 Cyl. # AIR
Mid 15.02 Cyl. # AAL12850
Low 8.017 Cyl. # ALM008255

CO2, %
Calibration Gases :
High ___ Cyl. # ___
Mid ___ Cyl. # ___
Low ___ Cyl. # ___

NOx, ppm
Calibration Gases :
High 84.22 Cyl. # ALM008231
Mid 51.10 Cyl. # ALM005581
Low 23.2 Cyl. # AAL 2534

CO, ppm
Calibration Gases :
High ___ Cyl. # ___
Mid ___ Cyl. # ___
Low ___ Cyl. # ___

SO2, ppm
Calibration Gases :
High ___ Cyl. # ___
Mid ___ Cyl. # ___
Low ___ Cyl. # ___

Calibration Gases :
High ___ Cyl. # ___
Mid ___ Cyl. # ___
Low ___ Cyl. # ___

TIME	SAMPLE POINT	O2 (%)	CO2 (%)	NOx (ppm)	CO (ppm)	SO2 (ppm)		COMMENTS / RUN #
		15.02		84.22				Span gas values used for test.
								EPA METHOD 20 MODIFIED
								Calibration
		0.0		0.0				ZERO
		20.9		84.22				SPAN
								LINEARITY ✓
		20.9		84.22				HIGH
		15.02		51.8				MID
		8.05		23.0				LOW
		0.0		0.0				ZERO
		0.0		0.0				INTERFERENCE ✓
				20.0				CONVERTOR CHECK = 95.2%

ENGINEERING–SCIENCE, INC.
CEM FIELD DATA SHEET

PLANT: CHEVRON GAVIOTA
TEST LOCATION: SCR INLET
CEM VAN NO. 3
DATE: 5-13-93
OPERATOR: SP

TIME	SAMPLE POINT	O2 (%)	CO2 (%)	NOx (ppm)	CO (ppm)	SO2 (ppm)		COMMENTS / RUN #
		15.02		84.22				Span gas values used for test.
								Response CK
								UP DOWN
								1: 60sec 1: 50 sec
								2: 52 sec 2: 54 sec
								3: 56 sec 3: 56 sec
								AVG: 56sec AVG: 53.3sec
0956-0958	PORT A - 1	15.25		34.17				START RUN 1
0958-1000	2	14.67		34.99				
1000-1002	3	14.76		34.77				
1002-1004	4	14.89		33.56				
1006-1008	PORT B - 1	14.82		34.98				
1008-1010	2	14.35		36.31				
1010-1012	3	14.45		36.19				
1012-1014	4	14.39		35.27				
1016-1018	PORT C - 1	14.46		35.87				
1018-1020	2	13.81		38.16				
1020-1022	3	14.08		37.50				
1022-1024	4	13.81		37.86				
1026-1028	PORT D - 1	14.69		36.13				
1028-1030	2	14.34		37.33				
1030-1032	3	14.21		37.44				
1032-1034	4	13.37		39.47				
1036-1038	PORT E - 1	14.60		36.16				
1038-1040	2	14.59		36.18				
1040-1042	3	14.31		36.86				

ENGINEERING–SCIENCE, INC.
CEM FIELD DATA SHEET

PLANT: CHEVRON GAVIOTA
TEST LOCATION: SCR INLET
CEM VAN NO.: 3
DATE: 5-13-93
OPERATOR: JP

TIME	SAMPLE POINT	O2 (%)	CO2 (%)	NOx (ppm)	CO (ppm)	SO2 (ppm)		COMMENTS / RUN #
		15.02		84.22				Span gas values used for test.
1042-1044	PORT E-4	13.92		37.25				
1046-1048	PORT F-1	14.74		36.01				
1048-1050	2	15.08		35.35				
1050-1052	3	15.19		34.66				
1052-1054	4	15.15		34.15				END OF RUN 1
Calibrate		0.0		0.0				ZERO ✓
		15.02		83.8				SPAN ✓
				84.22				Cal ADJ
1144-1148	PORT C-2	13.63		38.06				START RUN 2
1148-1152	3	14.02		36.62				
1152-1156	4	13.50		37.60				
1200-1204	PORT D-2	14.22		35.83				
1204-1208	3	13.86		36.64				
1208-1212	4	13.85		36.91				
1216-1220	PORT E-3	14.55		33.10				
1220-1224	4	13.92		34.99				END OF RUN 2
Calibrate		0.0		0.0				ZERO ✓
		14.98		82.5				SPAN ✓
		15.02		84.22				Cal ADJ

ENGINEERING–SCIENCE, INC.
CEM FIELD DATA SHEET

PLANT: CHEVRON GAVIOTA
TEST LOCATION: SCR INLET
CEM VAN NO. 3
DATE: 5-13-93
OPERATOR: JP

TIME	SAMPLE POINT	O2 (%)	CO2 (%)	NOx (ppm)	CO (ppm)	SO2 (ppm)		COMMENTS / RUN #
		15.02		84.22				Span gas values used for test.
1240-1244	PORT C-2	13.72		37.73				START RUN 3
1244-1248	3	14.33		35.96				
1248-1252	4	13.49		38.40				
1256-1300	PORT D-2	14.14		37.33				
1300-1304	3	13.85		38.55				
1304-1308	4	13.17		39.44				
1312-1316	PORT E-3	14.52		36.05				
1316-1320	4	14.38		35.81				END RUN 3
Calibrate		0.0		0.0				ZERO ✓
		15.02		86.0				SPAN ✓
				84.22				CAL ADJ
1328-1332	PORT C-2	13.94		37.89				START RUN 4
1332-1336	3	14.22		36.73				
1336-1340	4	14.37		36.08				
1344-1348	PORT D-2	14.00		38.49				
1348-1352	3	13.93		38.67				
1352-1356	4	13.14		40.68				
1400-1404	PORT E-3	14.38		37.12				
1404-1408	4	13.95		37.87				END RUN 4
Calibrate		0.0		0.0				ZERO ✓
		15.02		84.22				SPAN ✓

ENGINEERING–SCIENCE, INC.
CEM FIELD DATA SHEET

PLANT: CHEVRON GAVIOTA
TEST LOCATION: SCR INLET
CEM VAN NO.: 3
DATE: 5-13-93
OPERATOR: JP

TIME	SAMPLE POINT	O2 (%)	CO2 (%)	NOx (ppm)	CO (ppm)	SO2 (ppm)		COMMENTS / RUN #
		15.02		84.22				Span gas values used for test.
1416-1420	PORT C-2	13.90		37.84				START RUN 5
1420-1424	3	14.10		37.28				
1424-1428	4	14.08		37.41				
1432-1436	PORT D-2	13.99		37.79				
1436-1440	3	13.74		38.97				
1440-1444	4	13.34		39.28				
1448-1452	PORT E-3	14.43		36.87				
1452-1456	4	13.99		37.19				END RUN 5
Calibrate		0.0		0.0				ZERO ✓
		15.02		83.5				SPAN ✓
				84.22				CAL ADJ
1504-1508	PORT C-2	13.70		38.98				START RUN 6
1508-1512	3	14.24		37.33				
1512-1516	4	13.96		37.71				
1520-1524	PORT D-2	13.66		38.48				
1524-1528	3	13.65		38.95				
1528-1532	4	13.31		39.36				
1536-1540	PORT E-3	14.31		36.75				
1540-1544	4	14.02		37.15				
calibrate		0.0		0.0				ZERO ✓
		15.02		84.22				SPAN ✓

ENGINEERING–SCIENCE, INC.
CEM FIELD DATA SHEET

PLANT: CHEVRON GAVIOTA
TEST LOCATION: SCR INLET
CEM VAN NO.: 3
DATE: 5-13-93
OPERATOR: JP

TIME	SAMPLE POINT	O2 (%)	CO2 (%)	NOx (ppm)	CO (ppm)	SO2 (ppm)		COMMENTS / RUN #
		15.02		84.22				Span gas values used for test.
1548-1552	PORT C-2	13.57		38.75				START RUN 7
1552-1556	3	14.03		37.63				
1556-1600	4	14.14		37.00				
1604-1608	PORT D-2	13.92		38.04				
1608-1612	3	13.81		38.14				
1612-1616	4	13.80		40.06				
1620-1624	PORT E-3	14.15		36.42				
1624-1628	4	14.13		36.61				
Calibrate		0.0		0.0				ZERO ✓
		15.02		83.2				SPAN ✓
				84.22				CAL ADJ
1636-1640	PORT C-2	13.70		38.41				START RUN 8
1640-1644	3	13.81		37.34				
1644-1648	4	14.22		36.78				
1652-1656	PORT-D-2	14.16		37.65				
1656-1700	3	13.66		38.76				
1700-1704	4	13.19		38.80				
1708-1712	PORT E-3	14.46		36.12				
1712-1716	4	13.82		37.59				END RUN 8
Calibrate		0.0		0.0				ZERO ✓
		15.02		84.22				SPAN ✓

ENGINEERING–SCIENCE, INC.
CEM FIELD DATA SHEET

PLANT: CHEVRON GAVIOTA
TEST LOCATION: SCR INLET
CEM VAN NO. 3
DATE: 5-13-93
OPERATOR: JP

TIME	SAMPLE POINT	O2 (%)	CO2 (%)	NOx (ppm)	CO (ppm)	SO2 (ppm)		COMMENTS / RUN #
		15.02		84.22				Span gas values used for test.
1720-1724	Port C-2	13.62		38.28				START RUN 9
1724-1728	3	14.13		37.20				
1728-1732	4	14.11		36.73				
1736-1740	Port D-2	14.10		37.13				
1740-1744	3	13.83		38.01				
1744-1748	4	13.22		38.89				
1752-1756	Port E-3	14.29		36.48				
1756-1800	4	13.84		36.69				END of RUN 9
Calibrate		0.0		0.0				ZERO ✓
		15.02		84.0				SPAN ✓
		15.02		81.9				System Bias.
								Leak ✓ @ 15" Hg = 0.0

OXYGEN TRAVERSE DATA SHEET

COMPANY CHEVRON GAVIOTA DATE 5-13-93

TEST LOCATION SCR INLET TEST CONDITION

START Time : 0956 —			END Time : 1056			Time :		Time :	
SAMPLE POINT #	OXYGEN (%)		SAMPLE POINT #	OXYGEN (%)		SAMPLE POINT #	OXYGEN (%)	SAMPLE POINT #	OXYGEN (%)
Port A-1	15.25		Port E-1	14.60					
2	14.67		2	14.59					
3	14.76		3	14.31	*				
4	14.69		4	13.92	*				
Port B-1	14.82		Port F-1	14.74					
2	14.35		2	15.08					
3	14.45		3	15.19					
4	14.39		4	15.15					
Port C-1	14.46								
2	13.81	*							
3	14.08	*							
4	13.81	*							
Port D-1	14.69								
2	14.34	*							
3	14.21	*							
4	13.37	*							

SAMPLE POINT RELOCATION :

* 8 PTS USED FOR Lowest O_2

CHEVRON GAVIOTA
SCR INLET
08:30:03 05/13/93
DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
DDDDDDDDDDDDD
Channel No.: 1 2
Color: _ _
DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
DDDDDDDDDDDDD
1: 02 0 ... 25 % 2: NOX 0 ... 100 PPM

SCR Inlet
5/13/93
ES Data
Acquisition System

09:56:00 05/13/93
#01 15.25 % #02 32.77 PPM
START RUN 1
PORT A
09:58:00 05/13/93
#01 15.25 % #02 34.17 PPM
10:00:00 05/13/93
#01 14.67 % #02 34.99 PPM
10:02:00 05/13/93
#01 14.76 % #02 34.77 PPM
10:04:00 05/13/93
#01 14.89 % #02 33.56 PPM — Port change
10:06:00 05/13/93
#01 15.49 % #02 31.34 PPM
PORT B
10:08:00 05/13/93
#01 14.82 % #02 34.98 PPM
10:10:00 05/13/93
#01 14.35 % #02 36.31 PPM
10:12:00 05/13/93
#01 14.45 % #02 36.19 PPM
10:14:00 05/13/93
#01 14.39 % #02 35.27 PPM
PORT CHANGE
10:16:00 05/13/93
#01 15.10 % #02 33.53 PPM
PORT C
10:18:00 05/13/93
#01 14.46 % #02 35.87 PPM
10:20:00 05/13/93
#01 13.81 % #02 38.16 PPM
10:22:00 05/13/93
#01 14.08 % #02 37.50 PPM
10:24:00 05/13/93
#01 13.81 % #02 37.96 PPM
PORT CHAGE
10:26:00 05/13/93
#01 15.05 % #02 32.94 PPM
PORT D
10:28:00 05/13/93
#01 14.69 % #02 36.13 PPM
10:30:00 05/13/93
#01 14.34 % #02 37.33 PPM
10:32:00 05/13/93
#01 14.21 % #02 37.44 PPM
10:34:00 05/13/93
#01 13.37 % #02 39.47 PPM
PORT CHANGE
10:36:00 05/13/93
#01 14.83 % #02 34.80 PPM
PORT E
10:38:00 05/13/93
#01 14.60 % #02 36.16 PPM
10:40:00 05/13/93

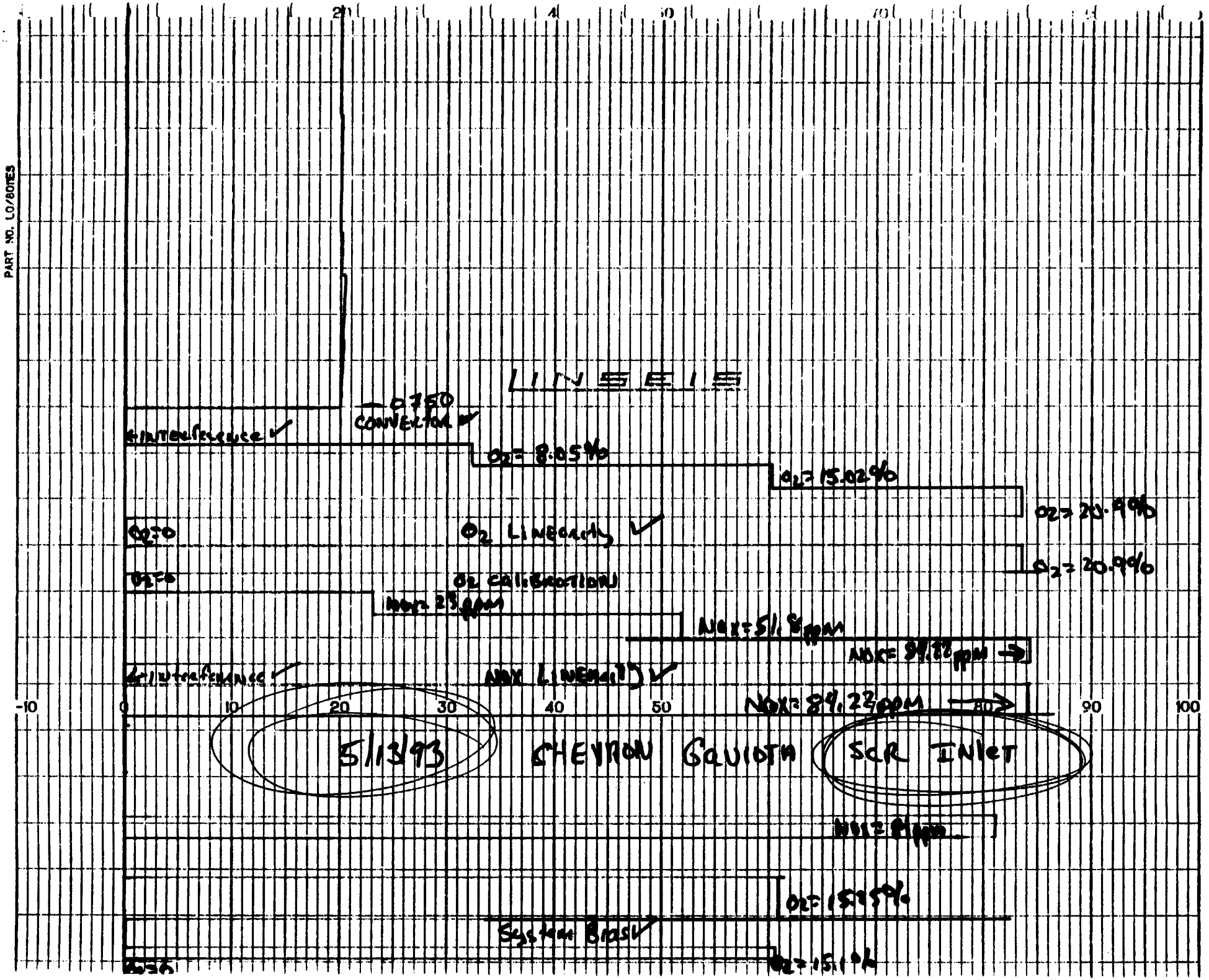
#01 14.31 % #02 36.85 PPM
10:44:00 05/13/93
#01 13.92 % #02 37.25 PPM
PORT CHANGE
10:46:00 05/13/93
#01 15.04 % #02 34.12 PPM
PORT F
10:48:00 05/13/93
#01 14.74 % #02 36.01 PPM
10:50:00 05/13/93
#01 15.08 % #02 35.35 PPM
10:52:00 05/13/93
#01 15.19 % #02 34.66 PPM
10:54:00 05/13/93
#01 15.15 % #02 34.15 PPM
END RUN 1
10:56:00 05/13/93
#01 0.17 % #02 0.00 PPM
10:58:00 05/13/93
#01 4.93 % #02 -0.01 PPM
11:00:00 05/13/93
#01 8.32 % #02 37.87 PPM
11:02:00 05/13/93
#01 -0.05 % #02 84.19 PPM
11:04:00 05/13/93
#01 15.49 % #02 0.45 PPM
11:06:00 05/13/93
#01 20.83 % #02 0.14 PPM
11:08:00 05/13/93
#01 20.84 % #02 0.12 PPM
11:10:00 05/13/93
#01 20.85 % #02 0.12 PPM
11:12:00 05/13/93
#01 20.85 % #02 0.09 PPM
11:14:00 05/13/93
#01 20.85 % #02 0.08 PPM
11:16:00 05/13/93
#01 20.78 % #02 0.06 PPM
11:24:00 05/13/93
#01 20.78 % #02 0.07 PPM
11:28:00 05/13/93
#01 20.78 % #02 0.06 PPM
11:32:00 05/13/93
#01 20.78 % #02 0.07 PPM
11:36:00 05/13/93
#01 20.77 % #02 0.07 PPM
11:40:00 05/13/93
#01 20.77 % #02 0.05 PPM
11:44:00 05/13/93
#01 13.89 % #02 37.64 PPM
START RUN 2
PORT C
11:48:00 05/13/93
#01 13.63 % #02 38.06 PPM
11:52:00 05/13/93
#01 14.02 % #02 36.62 PPM
11:56:00 05/13/93
#01 13.50 % #02 37.60 PPM
PORT CHANGE
12:00:00 05/13/93
#01 14.17 % #02 36.26 PPM
PORT D
12:04:00 05/13/93
#01 14.22 % #02 35.83 PPM

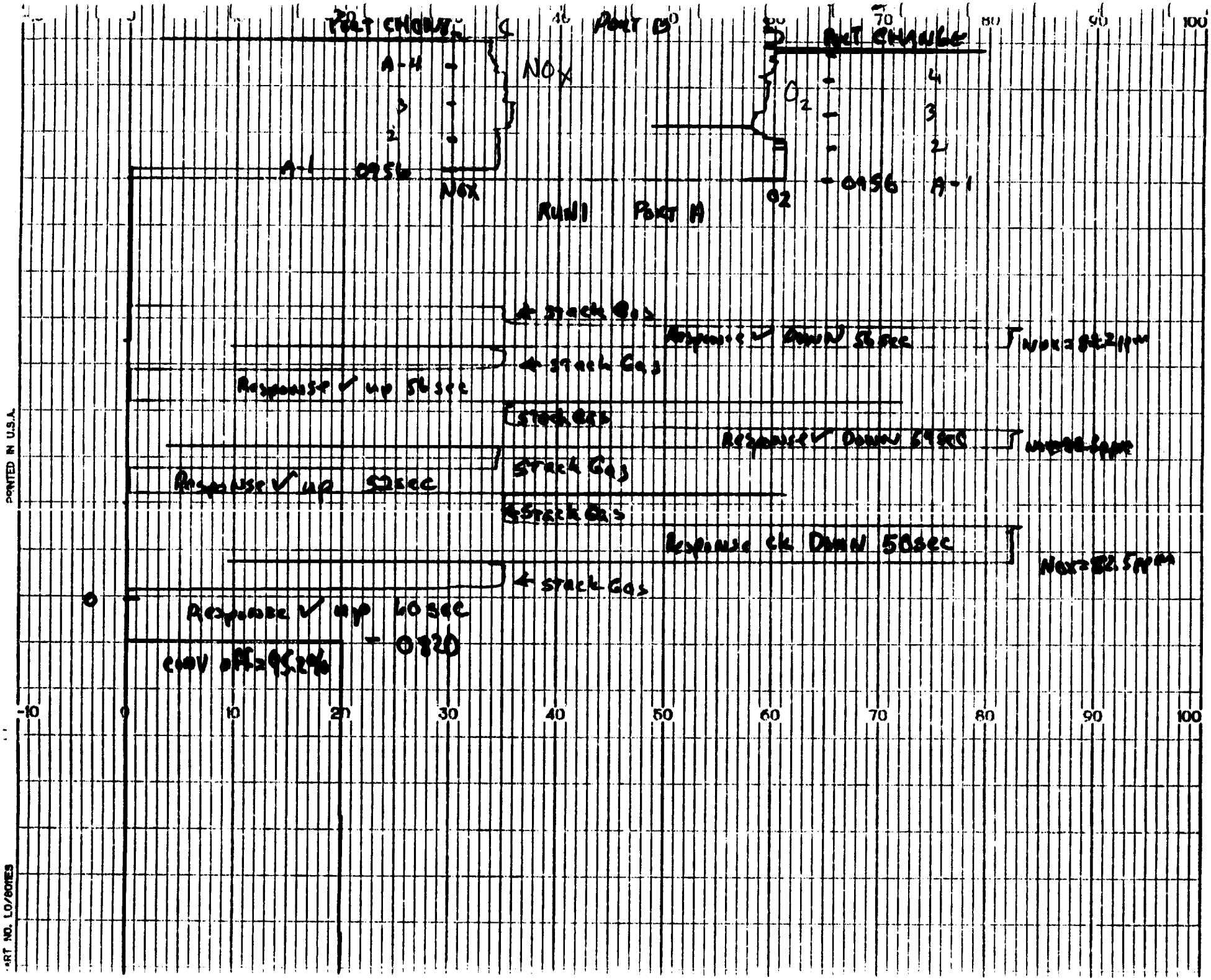
#01 [illegible] % #02 [illegible] PPM
12:12:00 05/13/93
#01 13.05 % #02 36.91 PPM
PORT CHANGE
12:16:00 05/13/93
#01 14.40 % #02 33.82 PPM
PORT E
12:20:00 05/13/93
#01 14.55 % #02 33.10 PPM
12:24:00 05/13/93
#01 13.92 % #02 34.99 PPM
END RUN 2
12:28:00 05/13/93
#01 14.69 % #02 -0.06 PPM
12:32:00 05/13/93
#01 0.02 % #02 81.11 PPM
12:36:00 05/13/93
#01 6.39 % #02 29.22 PPM
12:40:00 05/13/93
#01 13.92 % #02 37.07 PPM
START RUN 3
12:44:00 05/13/93
#01 13.72 % #02 37.73 PPM
12:48:00 05/13/93
#01 14.33 % #02 35.96 PPM
12:52:00 05/13/93
#01 13.49 % #02 38.40 PPM
PORT CHANGE
12:56:00 05/13/93
#01 14.22 % #02 36.76 PPM
PORT D
13:00:00 05/13/93
#01 14.14 % #02 37.33 PPM
13:04:00 05/13/93
#01 13.85 % #02 38.55 PPM
13:08:00 05/13/93
#01 13.17 % #02 39.44 PPM
PORT CHANGE
13:12:00 05/13/93
#01 14.40 % #02 36.29 PPM
PORT E
13:16:00 05/13/93
#01 14.52 % #02 36.05 PPM
13:20:00 05/13/93
#01 14.38 % #02 35.81 PPM
END RUN 3
13:24:00 05/13/93
#01 0.19 % #02 86.26 PPM
13:28:00 05/13/93
#01 13.84 % #02 37.86 PPM
START RUN 4 PORT C
13:32:00 05/13/93
#01 13.94 % #02 37.89 PPM
13:36:00 05/13/93
#01 14.22 % #02 36.73 PPM
13:40:00 05/13/93
#01 14.37 % #02 36.08 PPM
PORT CHANGE
13:44:00 05/13/93
#01 13.56 % #02 38.77 PPM
PORT D
13:48:00 05/13/93
#01 14.00 % #02 38.49 PPM
13:52:00 05/13/93
#01 13.93 % #02 38.67 PPM

PORT CHANGE
14:00:00 05/13/93
#01 14.02 % #02 37.48 PPM
PORT E
14:04:00 05/13/93
#01 14.38 % #02 37.12 PPM
14:08:00 05/13/93
#01 13.95 % #02 37.87 PPM
END RUN4
14:12:00 05/13/93
#01 15.00 % #02 -0.05 PPM
14:16:00 05/13/93
#01 13.93 % #02 38.10 PPM
START RUN 5 PORT C
14:20:00 05/13/93
#01 13.90 % #02 37.84 PPM
14:24:00 05/13/93
#01 14.10 % #02 37.28 PPM
14:28:00 05/13/93
#01 14.08 % #02 37.41 PPM
PORT CHANGE
14:32:00 05/13/93
#01 13.96 % #02 37.78 PPM
PORT D
14:36:00 05/13/93
#01 13.99 % #02 37.79 PPM
14:40:00 05/13/93
#01 13.74 % #02 38.97 PPM
14:44:00 05/13/93
#01 13.34 % #02 39.28 PPM
PORT CHANGE
14:48:00 05/13/93
#01 14.30 % #02 36.66 PPM
PORT E
14:52:00 05/13/93
#01 14.43 % #02 36.87 PPM
14:56:00 05/13/93
#01 13.99 % #02 37.19 PPM
END RUN 5
15:00:00 05/13/93
#01 14.94 % #02 -0.05 PPM
15:04:00 05/13/93
#01 -0.06 % #02 0.00 PPM
START RUN 6 PORT C
15:08:00 05/13/93
#01 13.70 % #02 38.98 PPM
15:12:00 05/13/93
#01 14.24 % #02 37.33 PPM
15:16:00 05/13/93
#01 13.96 % #02 37.71 PPM
PORT CHANGE
15:20:00 05/13/93
#01 14.20 % #02 36.93 PPM
PORT D
15:24:00 05/13/93
#01 13.66 % #02 38.48 PPM
15:28:00 05/13/93
#01 13.65 % #02 38.95 PPM
15:32:00 05/13/93
#01 13.31 % #02 39.36 PPM
15:36:00 05/13/93
#01 14.53 % #02 36.42 PPM
PORT E
15:40:00 05/13/93

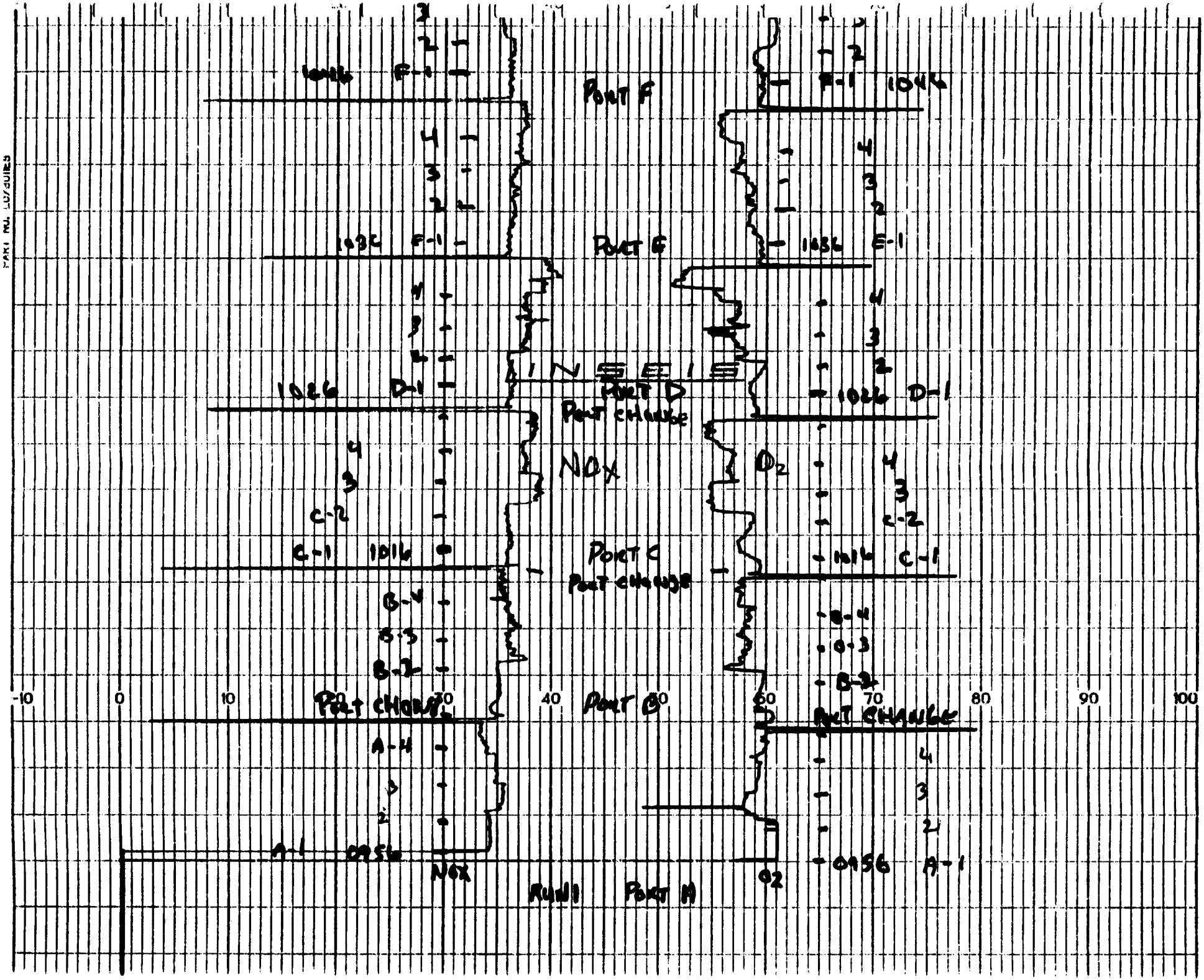
15:44:00 05/13/93
#01 14.02 % #02 37.15 PPM
END RUN 6
15:48:00 05/13/93
#01 0.20 % #02 83.97 PPM
START RUN 7 PORT C
15:52:00 05/13/93
#01 13.57 % #02 38.75 PPM
15:56:00 05/13/93
#01 14.03 % #02 37.63 PPM
16:00:00 05/13/93
#01 14.14 % #02 37.00 PPM
PORT CHANGE
16:04:00 05/13/93
#01 13.92 % #02 37.57 PPM
PORT D
16:08:00 05/13/93
#01 13.92 % #02 38.04 PPM
16:12:00 05/13/93
#01 13.81 % #02 38.14 PPM
16:16:00 05/13/93
#01 12.80 % #02 40.06 PPM
PORT CHANGE
16:20:00 05/13/93
#01 14.29 % #02 36.19 PPM
PORT E
16:24:00 05/13/93
#01 14.15 % #02 36.42 PPM
16:28:00 05/13/93
#01 14.13 % #02 36.61 PPM
END RUN 7
16:32:00 05/13/93
#01 14.93 % #02 0.05 PPM
16:36:00 05/13/93
#01 13.66 % #02 38.09 PPM
START RUN 8 PORT C
16:40:00 05/13/93
#01 13.70 % #02 38.41 PPM
16:44:00 05/13/93
#01 13.81 % #02 37.34 PPM
16:48:00 05/13/93
#01 14.22 % #02 36.78 PPM
PORT CHANGE
16:52:00 05/13/93
#01 13.71 % #02 38.43 PPM
PORT D
16:56:00 05/13/93
#01 14.16 % #02 37.65 PPM
17:00:00 05/13/93
#01 13.66 % #02 38.76 PPM
17:04:00 05/13/93
#01 13.19 % #02 38.80 PPM
PORT CHANGE
17:08:00 05/13/93
#01 13.93 % #02 37.60 PPM
PORT E
17:12:00 05/13/93
#01 14.46 % #02 36.12 PPM
17:16:00 05/13/93
#01 13.82 % #02 37.59 PPM
END RUN 8
17:20:00 05/13/93
#01 13.59 % #02 37.95 PPM
START RUN 9 PORT C

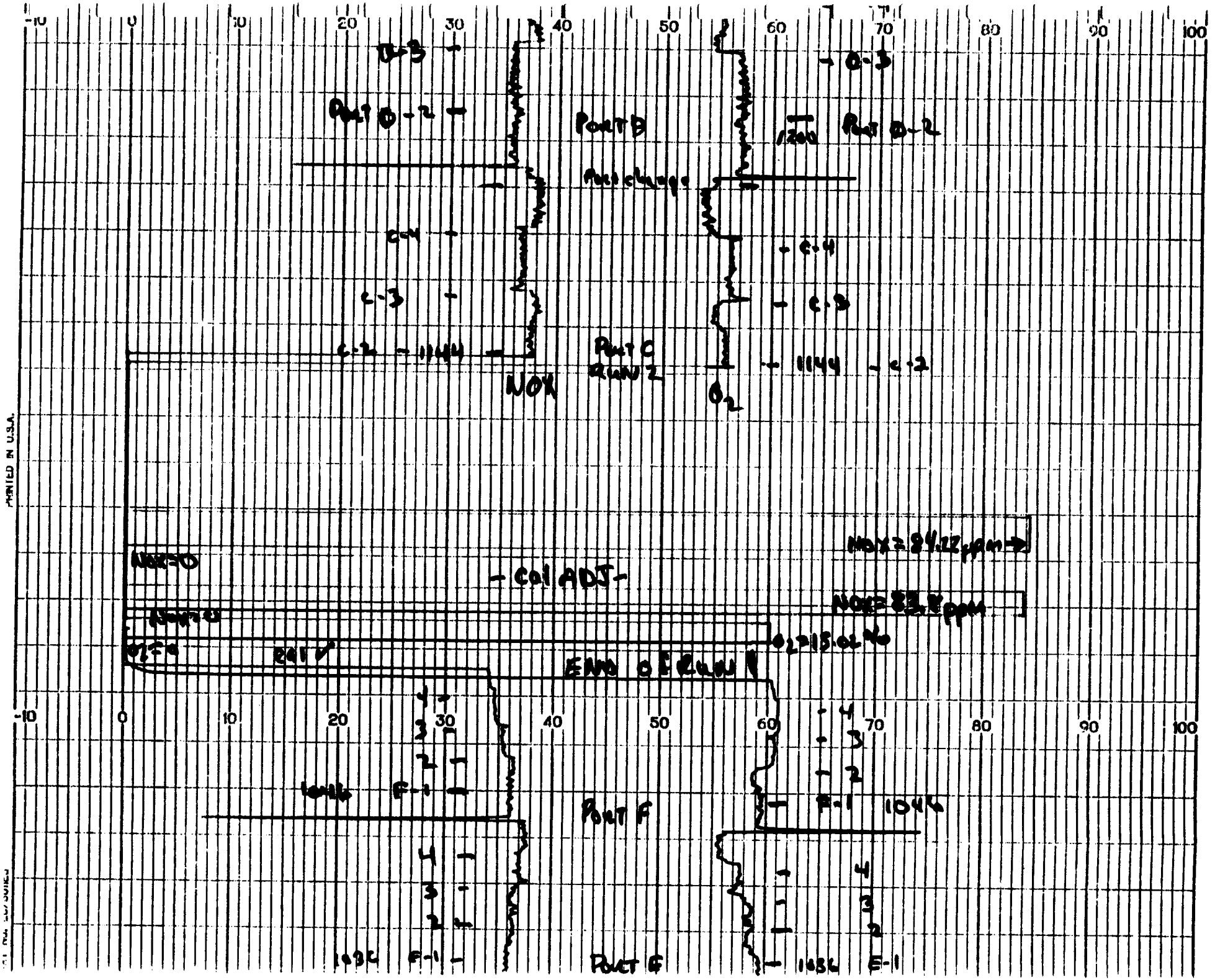
```
#01   14.13 %      #02   37.20 PPM
17:32:00  05/13/93
#01   14.11 %      #02   36.73 PPM
PORT CHANGE
17:36:00  05/13/93
#01   14.10 %      #02   37.25 PPM
PORT D
17:40:00  05/13/93
#01   14.10 %      #02   37.13 PPM
17:44:00  05/13/93
#01   13.83 %      #02   39.01 PPM
17:48:00  05/13/93
#01   13.22 %      #02   38.89 PPM
PORT CHANGE
17:52:00  05/13/93
#01   13.96 %      #02   37.43 PPM
PORT E
17:56:00  05/13/93
#01   14.29 %      #02   36.48 PPM
18:00:00  05/13/93
#01   13.84 %      #02   36.69 PPM
END RUN 9
18:04:00  05/13/93
#01   14.83 %      #02    0.08 PPM
18:08:00  05/13/93
#01    0.38 %      #02   81.67 PPM
```


PART NO. LO/80TES
LINSELIS
0750
CONVERTOR
Interference
O2 = 8.05%
O2 = 15.02%
O2 = 20.9%
O2 = 20.9%
O2 LINEARITY
O2 CALIBRATION
NOX = 25 ppm
NOX = 51.8 ppm
NOX = 84.22 ppm
NOX LINEARITY
Interference
NOX = 84.22 ppm
-10
0
10
20
30
40
50
90
100
5/13/93
CHEVRON GAVIOTA
SCR INLET
O2 = 15.25%
System Bias
O2 = 15.10%

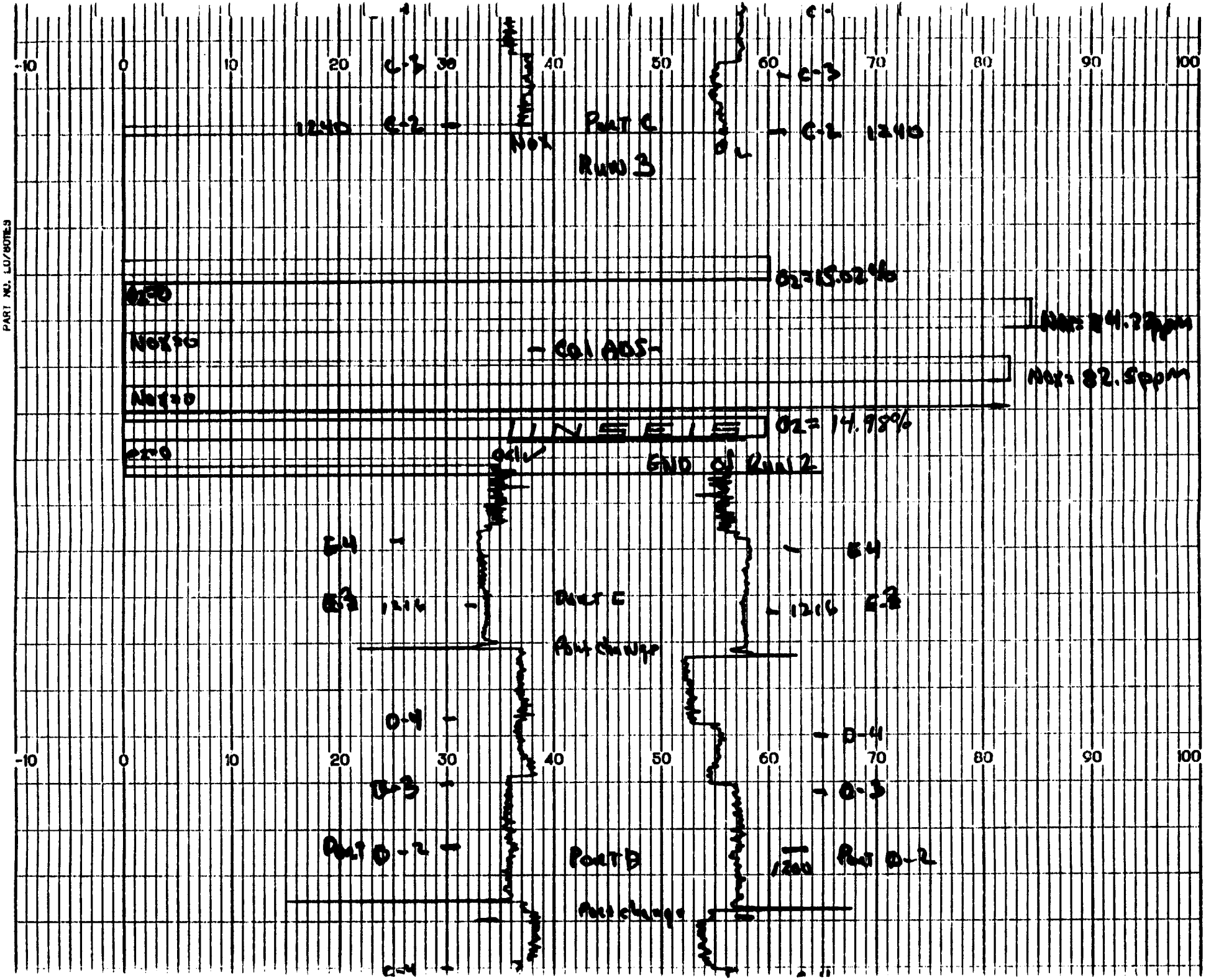


PRINTED IN U.S.A.
ART NO. LO/80MES

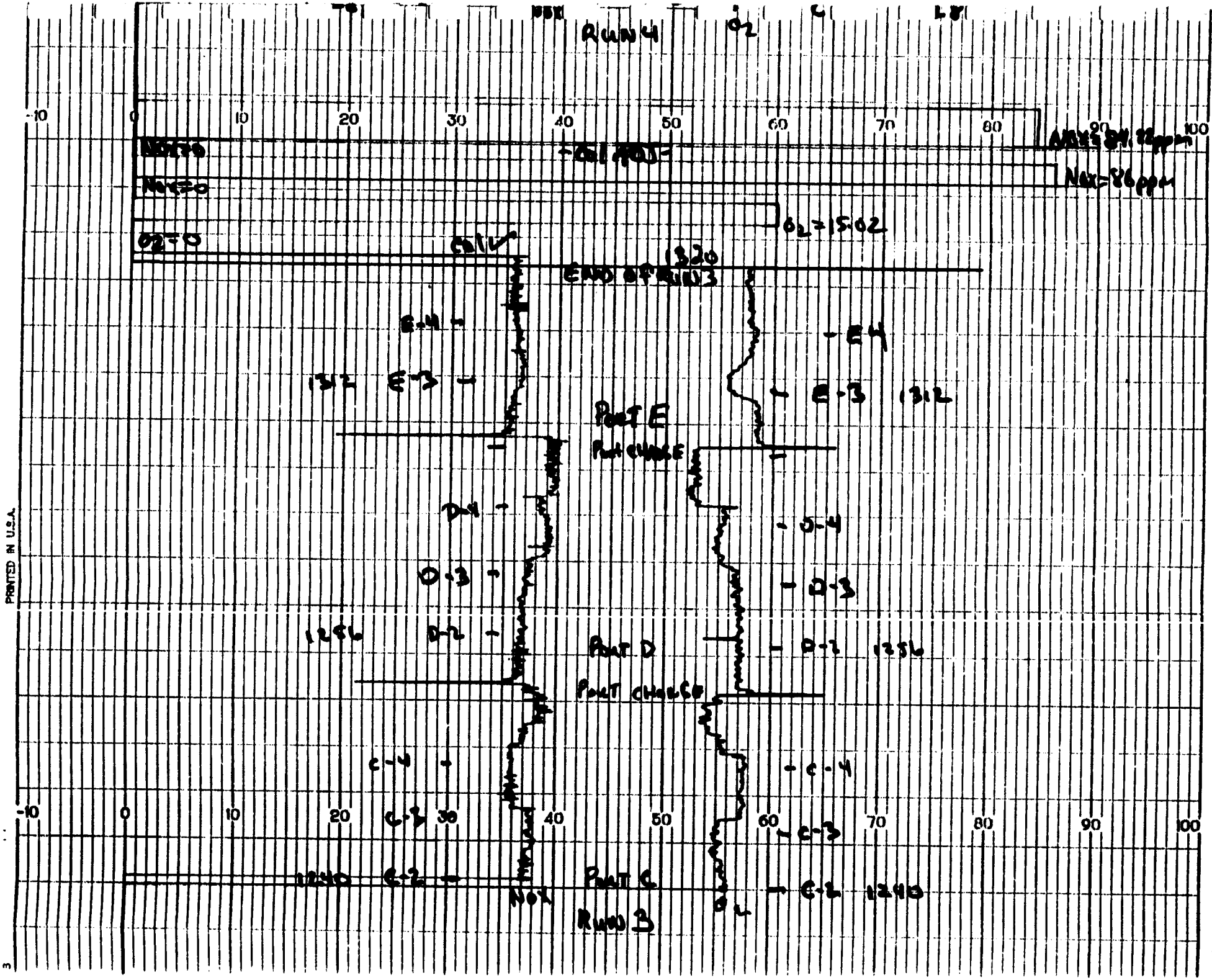

PORT F
PORT E
PORT D
PORT C
PORT B
PORT A
PORT CHANGE
NOX
O2
RUN 1
1046 F-1
1036 E-1
1026 D-1
1016 C-1
0956 A-1
-10
0
10
20
30
40
50
60
70
80
90
100



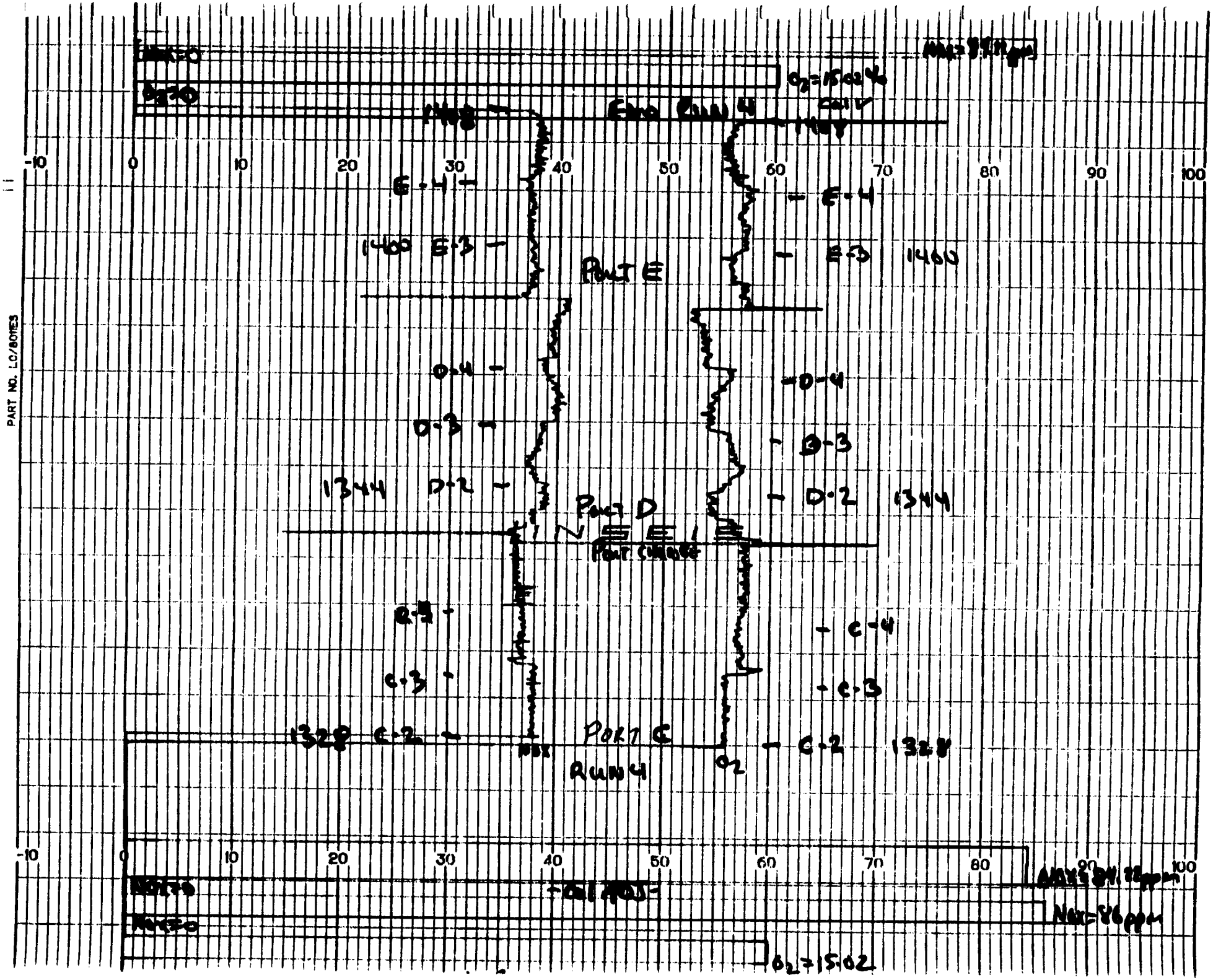
PRINTED IN U.S.A.



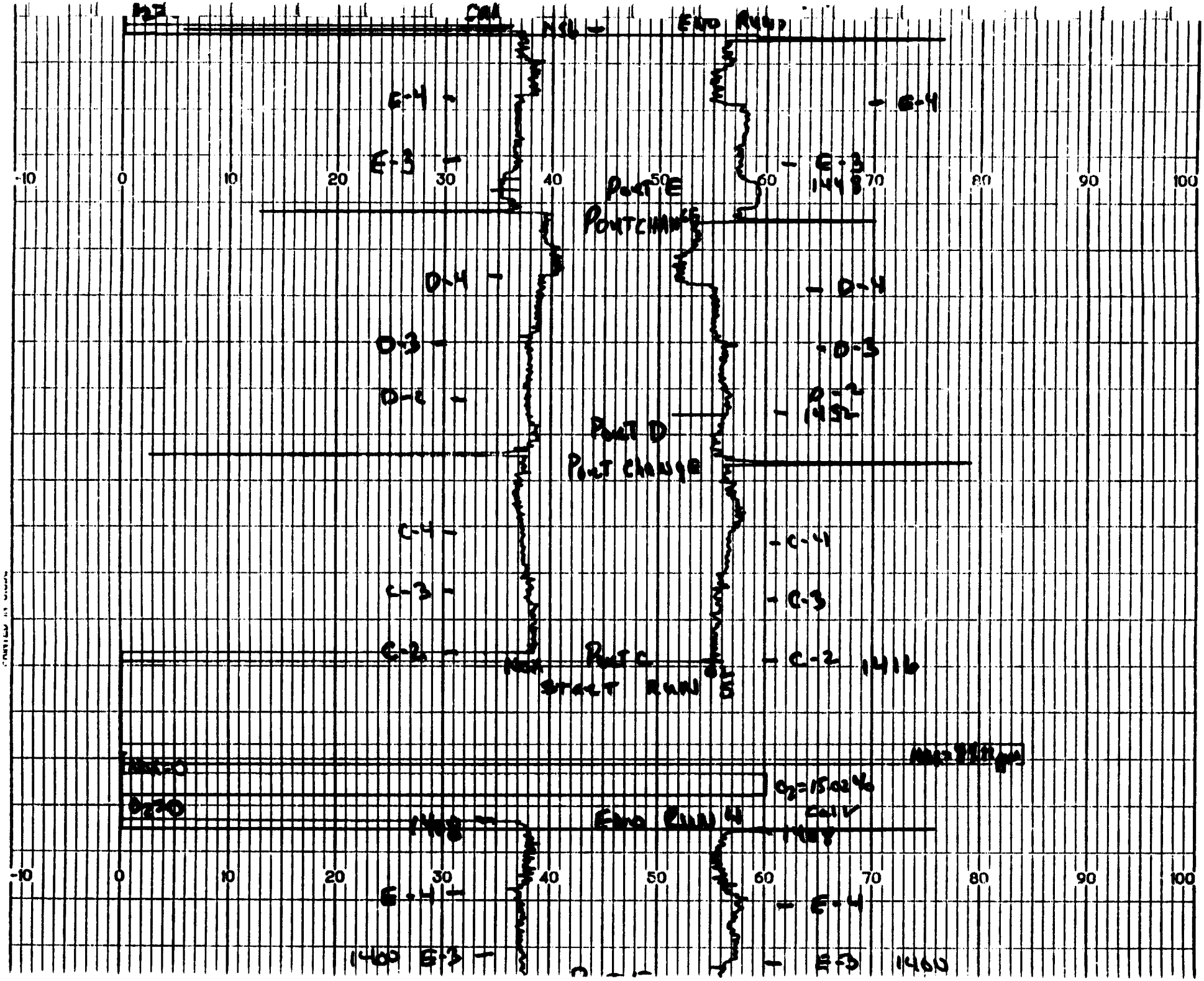
PART NO. LO/80TE.9

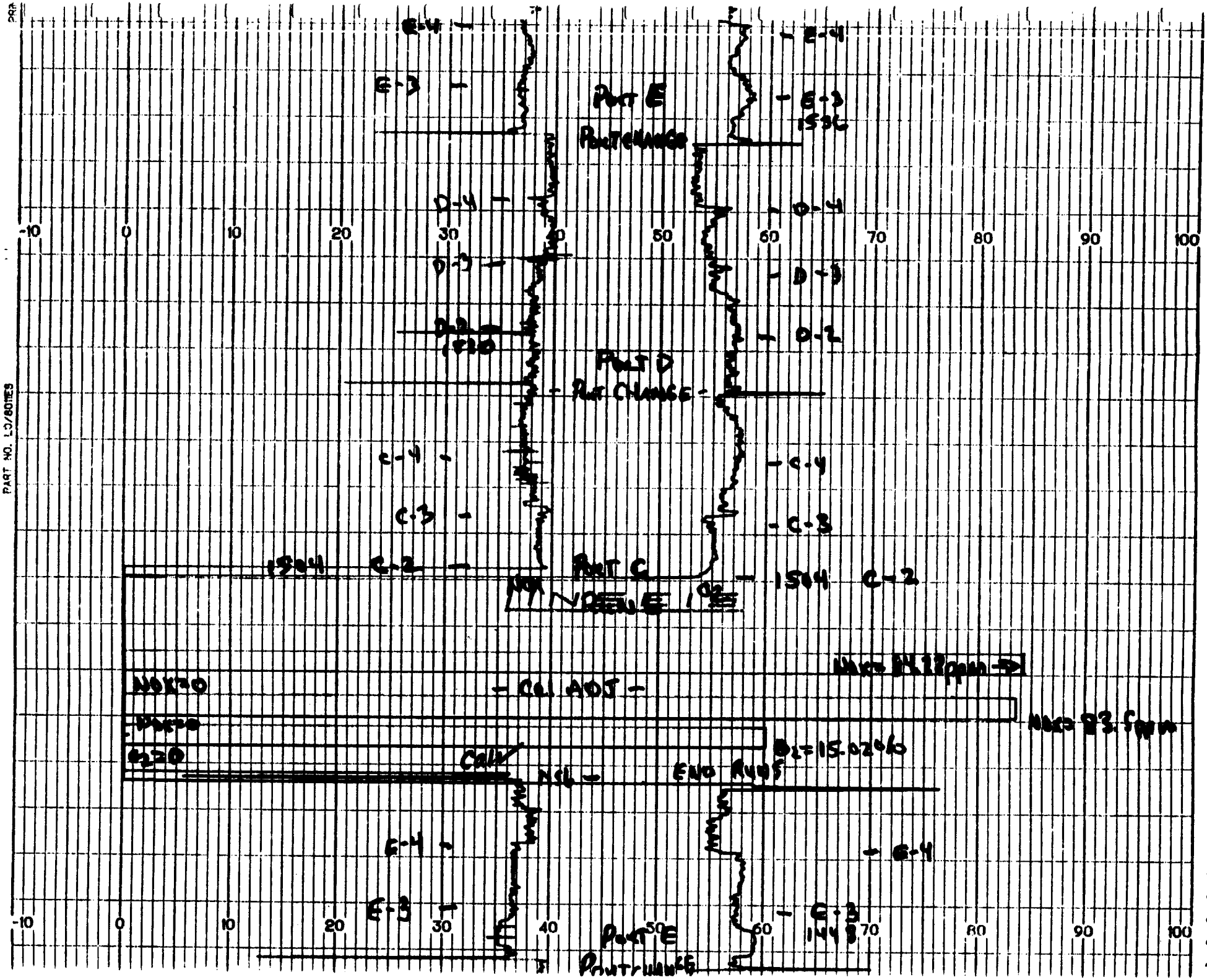


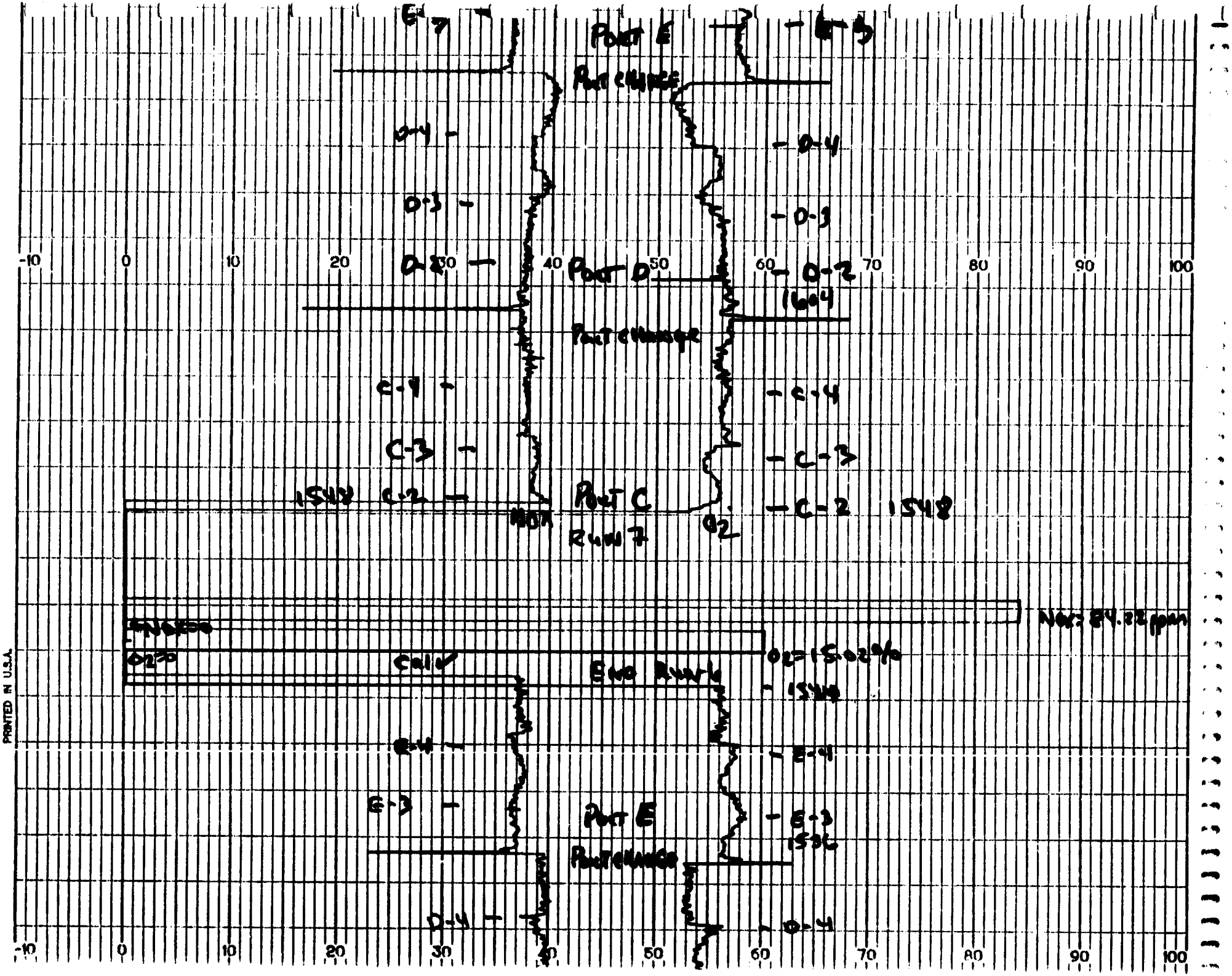
PRINTED IN U.S.A.



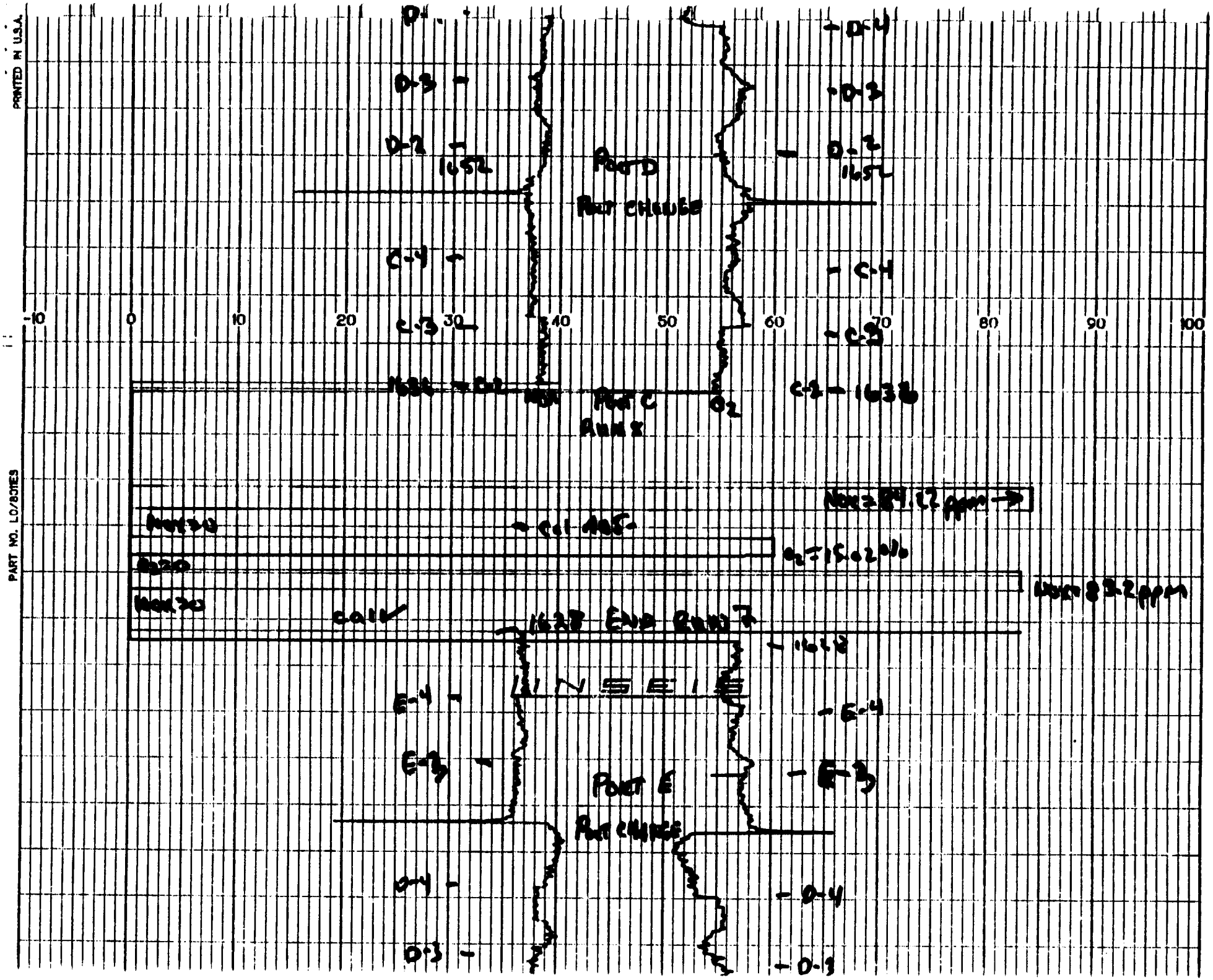
PART NO. LC/80MES

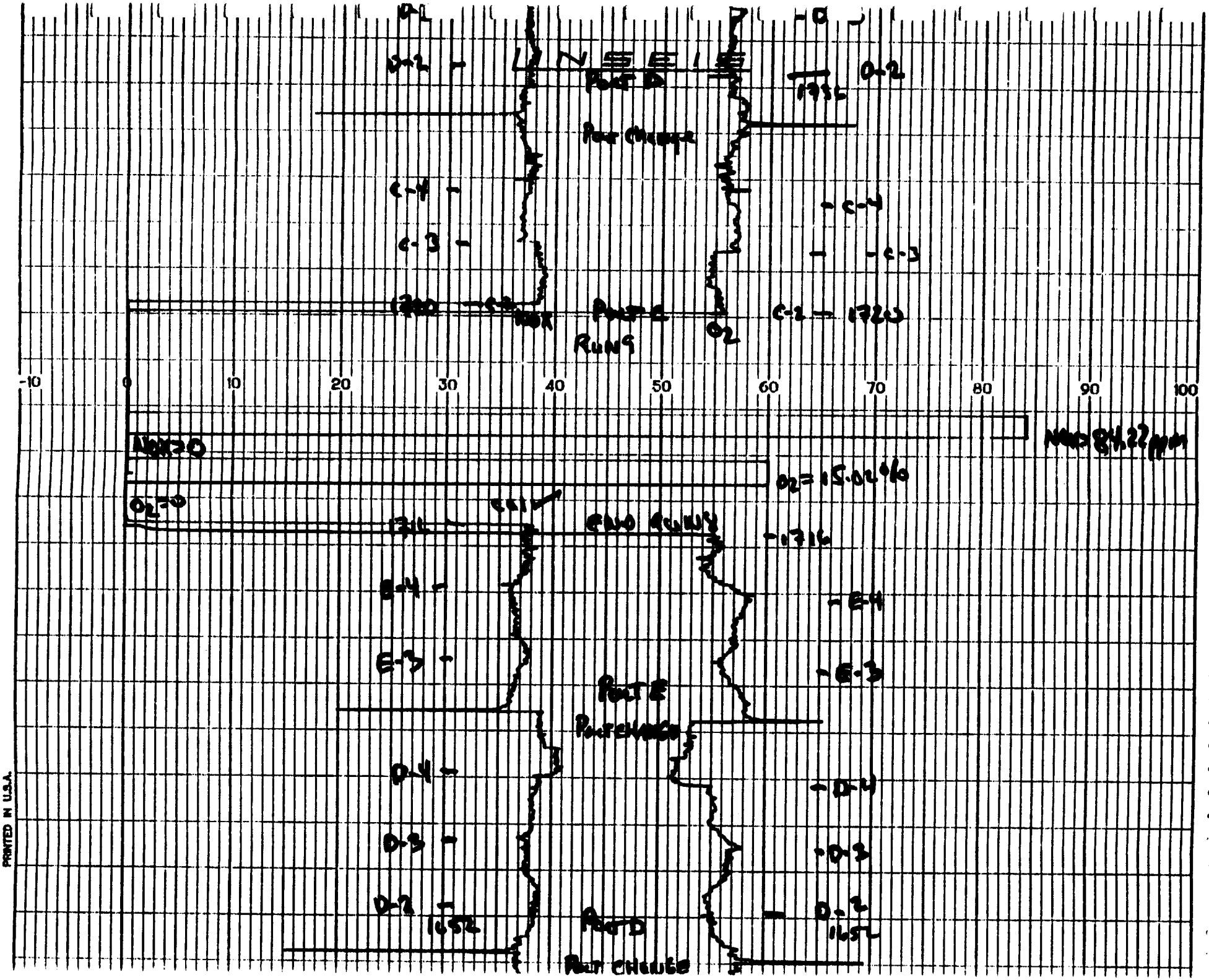

-10
0
10
20
30
40
50
60
70
80
90
100
E-4
E-3
D-4
D-3
D-2
C-4
C-3
C-2
1416
1460
1468
POINT E
POINT CHANGE
POINT D
POINT CHANGE
POINT C
START RUN
END RUN
END RUN


PART NO. L3/80TES
PLOT E
PLOT CHANGE
PLOT D
PLOT CHANGE
PLOT C
PLOT CHANGE
CAL ADJ
END RUNS
PLOT E
PLOT CHANGE
-10
0
10
20
30
40
50
60
70
80
90
100

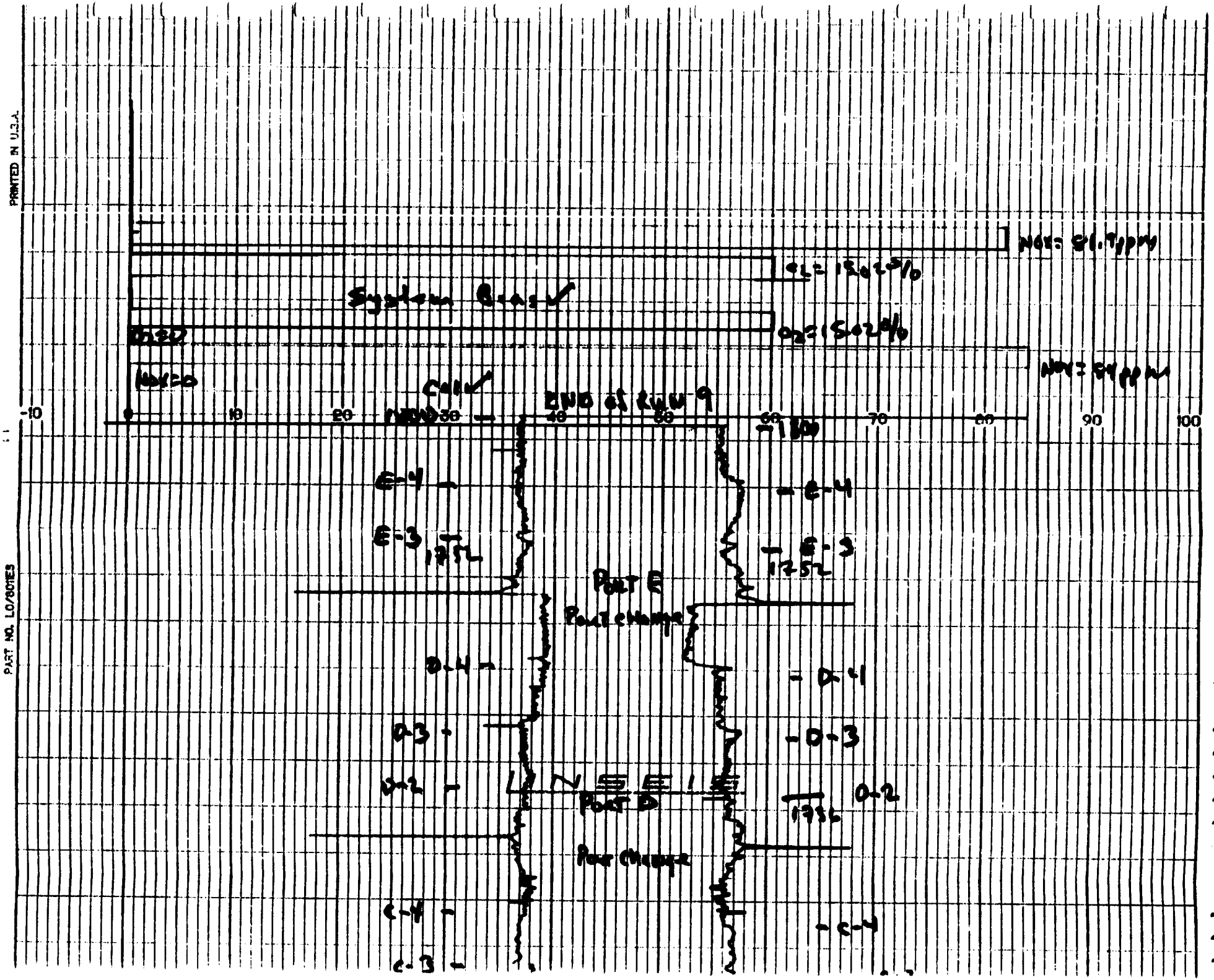


PRINTED IN U.S.A.


PRINTED IN U.S.A.
PART NO. LD/80IES
-10
0
10
20
30
40
50
60
70
80
90
100
D-4
D-3
D-2
1652
POINT D
PORT CHIMNEY
C-4
C-3
1638
POINT C
RUN 2
NOx = 89.12 ppm
CO = 1.1 445
O2 = 15.02%
NOx = 83.2 ppm
CO = 1.1
1628 END RUN 2
1612
E-4
E-3
POINT E
PORT CHIMNEY
0-4
0-3



PRINTED IN U.S.A.


PRINTED IN U.S.A.
PART NO. LO/80TES
NOx: 81.9ppm
CL2: 18.02%
System Bias ✓
O2: 15.02%
NOx = 84 ppm
Cal ✓
END of Run 9
-10
0
10
20
30
40
50
60
70
80
90
100
E-4
E-3
125L
PORT E
Port change
D-4
D-3
D-2
PORT D
125L
Port change
C-4
C-3

Data dump for the following variables:
Variable 40 - COGEN. SCR INLET NOx PPM

SCR Inlet
5/13/93
Plant Data

Date	Time	Var. 40
5/13/93	9:00	37.93
	9:01	38.00
	9:02	37.99
	9:03	37.96
	9:04	37.27
	9:05	37.18
	9:06	37.10
	9:07	37.13
	9:08	37.08
	9:09	37.00
	9:10	36.76
	9:11	36.96
	9:12	37.07
	9:13	36.96
	9:14	36.92
	9:15	36.74
	9:16	36.55
	9:17	36.57
	9:18	36.29
	9:19	36.30
	9:20	36.12
	9:21	36.36
	9:22	36.71
	9:23	36.96
	9:24	36.90
	9:25	36.42
	9:26	36.03
	9:27	36.07
	9:28	36.07
	9:29	35.98
	9:30	36.12
	9:31	36.31
	9:32	36.41
	9:33	36.48
	9:34	36.36
	9:35	36.56
	9:36	36.35
	9:37	35.91
	9:38	35.79
	9:39	35.86
	9:40	35.89
	9:41	36.07
	9:42	36.14
	9:43	36.30
	9:44	36.12
	9:45	35.50
	9:46	35.70
	9:47	35.78
	9:48	35.57
	9:49	35.66
	9:50	35.56

Date	Time	Var. 40
	9:51	36.16
	9:52	36.14
	9:53	35.89
	9:54	35.72
	9:55	35.75
	9:56	35.67
	9:57	35.75
	9:58	35.83
	9:59	36.05
5/13/93	10:00	36.58
	10:01	36.39
	10:02	36.37
	10:03	36.52
	10:04	35.97
	10:05	35.80
	10:06	35.76
	10:07	36.20
	10:08	36.38
	10:09	36.37
	10:10	36.53
	10:11	36.48
	10:12	36.13
	10:13	35.75
	10:14	35.66
	10:15	35.77
	10:16	35.66
	10:17	36.22
	10:18	36.48
	10:19	36.18
	10:20	36.07
	10:21	36.29
	10:22	36.09
	10:23	35.63
	10:24	35.87
	10:25	36.14
	10:26	36.00
	10:27	36.36
	10:28	36.21
	10:29	35.63
	10:30	36.06
	10:31	36.43
	10:32	36.50
	10:33	36.54
	10:34	37.00
	10:35	36.59
	10:36	36.10
	10:37	35.85
	10:38	36.36
	10:39	36.19
	10:40	36.18
	10:41	36.32
	10:42	36.39
	10:43	36.12
	10:44	36.43
	10:45	36.46
	10:46	36.[illegible]

Date	Time	Var. 40	
	11:43	34.46	
	11:44	34.68	
	11:45	34.73	
	11:46	34.83	
	11:47	34.87	
	11:48	35.48	
	11:49	35.21	
	11:50	34.50	Run 2
	11:51	34.61	C
	11:52	34.52	
	11:53	34.89	
	11:54	35.18	
	11:55	35.42	
	11:56	35.58	
	11:57	34.94	
	11:58	34.67	
	11:59	34.46	Port change
5/13/93	12:00	34.58	
	12:01	34.55	
	12:02	34.53	
	12:03	34.61	
	12:04	34.51	
	12:05	35.12	
	12:06	34.97	
	12:07	34.40	Run 2
	12:08	34.25	D
	12:09	34.06	
	12:10	34.04	
	12:11	34.01	
	12:12	34.06	
	12:13	34.08	
	12:14	34.09	
	12:15	34.29	Port change
	12:16	34.50	
	12:17	34.21	
	12:18	33.81	
	12:19	33.76	
	12:20	33.56	Run 2
	12:21	33.50	E
	12:22	33.57	
	12:23	33.78	
	12:24	34.06	
	12:25	33.77	
	12:26	33.29	
	12:27	33.27	
	12:28	33.12	
	12:29	33.23	
	12:30	33.39	
	12:31	33.43	
	12:32	33.42	
	12:33	33.80	
	12:34	34.01	
	12:35	33.61	
	12:36	33.04	
	12:37	33.37	
	12:38	33.38	

Date	Time	Var. 40	
	12:39	32.90	
	12:40	32.57	
	12:41	32.79	
	12:42	32.81	
	12:43	33.14	
	12:44	33.50	
	12:45	33.31	
	12:46	32.90	
	12:47	32.90	RUN 3
	12:48	32.97	C
	12:49	32.92	
	12:50	32.93	
	12:51	33.46	
	12:52	34.07	
	12:53	33.63	
	12:54	33.26	
	12:55	33.38	
	12:56	33.29	
	12:57	33.25	
	12:58	33.35	
	12:59	33.27	
5/13/93	13:00	33.59	
	13:01	33.96	
	13:02	34.03	RUN 3
	13:03	34.20	D
	13:04	34.20	
	13:05	33.65	
	13:06	33.58	
	13:07	33.36	
	13:08	33.53	
	13:09	33.37	
	13:10	33.49	
	13:11	33.67	
	13:12	33.82	
	13:13	33.96	
	13:14	34.42	
	13:15	33.98	
	13:16	33.91	RUN 3
	13:17	33.36	E
	13:18	33.42	
	13:19	33.61	
	13:20	33.62	
	13:21	33.57	
	13:22	33.36	
	13:23	33.60	
	13:24	34.06	
	13:25	34.10	
	13:26	34.23	
	13:27	34.00	
	13:28	34.12	
	13:29	34.02	
	13:30	33.97	
	13:31	33.90	
	13:32	33.97	
	13:33	33.93	
	13:34	34.09	

Date	Time	Var. 40
	13:35	34.43
	13:36	34.70
	13:37	34.55
	13:38	34.00
	13:39	34.00
	13:40	33.92
	13:41	33.81
	13:42	34.14
	13:43	35.02
	13:44	35.86
	13:45	35.71

RUN 4
C

Data dump for the following variables:
Variable 40 - COGEN. SCR INLET NOx PPM

Date	Time	Var. 40
5/13/93	9:00	37.93
	9:01	38.00
	9:02	37.99
	9:03	37.96
	9:04	37.27
	9:05	37.18
	9:06	37.10
	9:07	37.18
	9:08	37.08
	9:09	37.00
	9:10	36.76
	9:11	36.96
	9:12	37.07
	9:13	36.96
	9:14	36.92
	9:15	36.74
	9:16	36.55
	9:17	36.57
	9:18	36.29
	9:19	36.30
	9:20	36.12
	9:21	36.36
	9:22	36.71
	9:23	36.96
	9:24	36.90
	9:25	36.42
	9:26	36.03
	9:27	36.07
	9:28	36.07
	9:29	35.98
	9:30	36.12
	9:31	36.31
	9:32	36.41
	9:33	36.48
	9:34	36.36
	9:35	36.56
	9:36	36.35
	9:37	35.91
	9:38	35.79
	9:39	35.86
	9:40	35.89
	9:41	36.07
	9:42	36.14
	9:43	36.30
	9:44	36.12
	9:45	35.59
	9:46	35.70
	9:47	35.78
	9:48	35.57
	9:49	35.66
	9:50	35.96

Date	Time	Var. 40	
	9:51	36.16	
	9:52	36.14	
	9:53	35.69	
	9:54	35.72	
	9:55	35.75	
	9:56	35.67	
	9:57	35.73	
	9:58	35.83	
	9:59	36.03	
5/13/93	10:00	36.58	A
	10:01	36.39	
	10:02	36.37	
	10:03	36.52	
	10:04	35.97	
	10:05	35.80	
	10:06	35.76	Port change
	10:07	36.20	
	10:08	36.38	
	10:09	36.37	
	10:10	36.53	
	10:11	36.48	B
	10:12	36.13	
	10:13	35.75	
	10:14	35.66	
	10:15	35.77	
	10:16	35.88	Port change
	10:17	36.22	
	10:18	36.48	
	10:19	36.18	
	10:20	36.07	C
	10:21	36.29	
	10:22	36.03	
	10:23	35.63	
	10:24	35.87	
	10:25	36.14	Port change
	10:26	36.00	
	10:27	36.38	
	10:28	36.21	
	10:29	35.63	
	10:30	36.06	D
	10:31	36.43	
	10:32	36.50	
	10:33	36.54	
	10:34	37.00	
	10:35	36.59	Port change
	10:36	36.10	
	10:37	35.85	
	10:38	36.36	
	10:39	36.19	
	10:40	36.18	E
	10:41	36.32	
	10:42	36.39	
	10:43	36.12	
	10:44	36.43	
	10:45	36.46	
	10:46	36.08	

Run 1

Date	Time	Var. 40
	10:47	36.15
	10:48	36.56
	10:49	36.70

Data dump for the following variables:
Variable 40 - COGEN. SCR INLET NOx PPM

Date	Time	Var. 40
5/13/93	12:00	34.58
	12:01	34.55
	12:02	34.53
	12:03	34.61
	12:04	34.91
	12:05	35.12
	12:06	34.97
	12:07	34.40
	12:08	34.25
	12:09	34.06
	12:10	34.04
	12:11	34.01
	12:12	34.06
	12:13	34.08
	12:14	34.09
	12:15	34.29
	12:16	34.50
	12:17	34.21
	12:18	33.81
	12:19	33.76
	12:20	33.56
	12:21	33.50
	12:22	33.57
	12:23	33.78
	12:24	34.06
	12:25	33.97
	12:26	33.29
	12:27	33.27
	12:28	33.12
	12:29	33.23
	12:30	33.39
	12:31	33.43
	12:32	33.42
	12:33	33.80
	12:34	34.01
	12:35	33.61
	12:36	33.04
	12:37	32.87
	12:38	32.88
	12:39	32.90
	12:40	32.57
	12:41	32.79
	12:42	32.81
	12:43	33.14
	12:44	33.50
	12:45	33.31
	12:46	32.90
	12:47	32.90
	12:48	32.97
	12:49	32.92
	12:50	32.93

PRC
RUN #3

Date	Time	Var. 40	
	12:51	33.46	
	12:52	34.07	
	12:53	33.63	
	12:54	33.26	
	12:55	33.33	
	12:56	33.29	
	12:57	33.25	
	12:58	33.35	
	12:59	33.27	
5/13/93	13:00	33.59	
	13:01	33.96	
	13:02	34.03	POST D
	13:03	34.20	#3
	13:04	34.20	
	13:05	33.63	
	13:06	33.58	
	13:07	33.36	
	13:08	33.53	
	13:09	33.37	
	13:10	33.49	
	13:11	33.67	
	13:12	33.53	
	13:13	33.36	
	13:14	34.42	
	13:15	33.98	33.50
	13:16	33.11	POST E
	13:17	33.36	#2
	13:18	33.42	
	13:19	33.61	
	13:20	33.62	
	13:21	33.57	
	13:22	33.36	
	13:23	33.60	
	13:24	34.06	
	13:25	34.10	
	13:26	34.26	
	13:27	34.00	
	13:28	34.12	
	13:29	34.02	
	13:30	33.97	
	13:31	33.90	
	13:32	33.97	
	13:33	33.93	
	13:34	34.29	POST C
	13:35	34.43	#4
	13:36	34.70	
	13:37	34.55	
	13:38	34.00	
	13:39	34.00	
	13:40	33.92	
	13:41	33.81	
	13:42	34.14	
	13:43	35.02	
	13:44	35.66	
	13:45	35.71	
	13:46	34.[illegible]	

Date	Time	Var. 40	
	13:47	34.61	POLT D
	13:48	34.86	#4
	13:49	35.38	
	13:50	36.11	
	13:51	36.05	
	13:52	35.33	
	13:53	35.00	
	13:54	34.89	
	13:55	34.82	
	13:56	35.09	
	13:57	35.54	
	13:58	35.90	
	13:59	36.05	
5/13/93	14:00	35.66	
	14:01	35.44	
	14:02	35.13	
	14:03	35.08	
	14:04	34.99	POLT E
	14:05	35.21	#4 34 86
	14:06	35.39	
	14:07	35.93	
	14:08	36.12	
	14:09	35.93	
	14:10	35.47	
	14:11	35.19	
	14:12	35.12	
	14:13	35.13	
	14:14	35.37	
	14:15	35.43	
	14:16	35.43	
	14:17	35.63	
	14:18	36.29	
	14:19	36.04	
	14:20	35.53	
	14:21	35.42	
	14:22	35.55	POLT C
	14:23	35.55	#5
	14:24	35.52	
	14:25	35.45	
	14:26	35.31	
	14:27	35.20	
	14:28	35.63	
	14:29	35.98	
	14:30	36.25	
	14:31	36.20	
	14:32	35.53	
	14:33	35.24	
	14:34	35.24	
	14:35	35.35	
	14:36	35.42	
	14:37	35.29	
	14:38	35.59	
	14:39	35.83	
	14:40	35.89	
	14:41	36.31	
	14:42	36.37	

P-27 D
#5

Date	Time	Var. 40
	14:43	36.13
	14:44	35.44
	14:45	35.27
	14:46	35.35
	14:47	35.35
	14:48	35.48
	14:49	35.84
	14:50	35.72
	14:51	35.49
	14:52	35.68
	14:53	35.99
	14:54	36.31
	14:55	35.75
	14:56	35.57
	14:57	35.64
	14:58	35.32
	14:59	35.43
5/13/93	15:00	35.28
	15:01	35.79
	15:02	35.91
	15:03	36.13
	15:04	35.88
	15:05	35.54
	15:06	35.35
	15:07	35.62
	15:08	35.91
	15:09	36.02
	15:10	36.57
	15:11	36.33
	15:12	35.66
	15:13	35.60

P-27 E 35.67
#5

Data dump for the following variables:
Variable 40 - COGEN. SCR INLET NOx PPM

Date	Time	Var. 40	
5/13/93	14:55	35.75	
	14:56	35.57	
	14:57	35.64	
	14:58	35.32	
	14:59	35.43	
5/13/93	15:00	35.28	
	15:01	35.79	
	15:02	35.91	
	15:03	36.13	
	15:04	35.88	
	15:05	35.54	
	15:06	35.35	
	15:07	35.62	
	15:08	35.91	
	15:09	36.02	PORT C
	15:10	36.57	
	15:11	36.33	RUN 6
	15:12	35.66	
	15:13	35.60	
	15:14	35.51	
	15:15	35.45	
	15:16	35.88	
	15:17	36.19	
	15:18	36.45	
	15:19	36.18	
	15:20	35.73	
	15:21	35.58	
	15:22	35.79	
	15:23	35.71	
	15:24	35.96	
	15:25	36.11	PORT D
	15:26	36.40	
	15:27	36.64	RUN 6
	15:28	36.53	
	15:29	36.16	
	15:30	35.99	
	15:31	35.98	
	15:32	35.69	
	15:33	35.46	
	15:34	35.52	
	15:35	36.36	
	15:36	35.83	
	15:37	35.96	
	15:38	36.25	
	15:39	36.76	
	15:40	36.42	PORT E
	15:41	36.06	RUN 6
	15:42	35.85	
	15:43	35.69	
	15:44	35.79	

Date	Time	Var. 40	
	15:45	35.77	
	15:46	35.68	
	15:47	35.75	
	15:48	36.33	
	15:49	36.86	
	15:50	35.61	
	15:51	35.37	
	15:52	35.97	PORT C
	15:53	35.97	
	15:54	35.85	RUN 7
	15:55	36.00	
	15:56	36.20	
	15:57	35.89	
	15:58	36.13	
	15:59	36.27	
5/13/93	16:00	35.69	
	16:01	35.42	
	16:02	35.65	
	16:03	35.67	
	16:04	35.58	
	16:05	35.54	
	16:06	35.63	
	16:07	35.73	
	16:08	35.92	PORT D
	16:09	36.49	
	16:10	36.72	RUN 7
	16:11	35.71	
	16:12	35.46	
	16:13	35.44	
	16:14	35.69	
	16:15	36.08	
	16:16	36.49	
	16:17	36.12	
	16:18	35.28	
	16:19	35.46	
	16:20	35.61	
	16:21	35.58	
	16:22	36.19	
	16:23	36.53	
	16:24	35.91	PORT E
	16:25	35.95	RUN 7
	16:26	35.75	
	16:27	35.82	
	16:28	35.55	
	16:29	35.11	
	16:30	35.56	
	16:31	36.02	
	16:32	36.17	
	16:33	36.33	
	16:34	35.78	
	16:35	35.24	
	16:36	35.10	
	16:37	35.45	
	16:38	35.85	
	16:39	35.75	
	16:40	36.09	

Date	Time	Var. 40	
	16:41	36.18	
	16:42	35.86	PORT C
	16:43	35.76	RUN 8
	16:44	35.76	
	16:45	35.61	
	16:46	35.84	
	16:47	35.92	
	16:48	35.68	
	16:49	35.46	
	16:50	35.44	
	16:51	35.66	
	16:52	36.18	
	16:53	36.31	
	16:54	36.07	
	16:55	35.48	
	16:56	35.18	
	16:57	35.29	PORT D
	16:58	35.63	
	16:59	35.48	RUN 8
5/13/93	17:00	35.73	
	17:01	36.22	
	17:02	36.48	
	17:03	35.75	
	17:04	35.56	
	17:05	35.31	
	17:06	35.25	
	17:07	35.39	
	17:08	36.11	
	17:09	36.70	
	17:10	35.81	
	17:11	35.73	
	17:12	35.55	PORT E
	17:13	35.02	RUN 8
	17:14	35.48	
	17:15	36.13	
	17:16	36.31	
	17:17	36.26	
	17:18	35.49	
	17:19	35.18	
	17:20	35.18	
	17:21	35.40	
	17:22	35.98	

Data dump for the following variables:
Variable 40 - COGEN. SCR INLET NOx PPM

Date	Time	Var. 40
5/13/93	16:00	35.69
	16:01	35.42
	16:02	35.65
	16:03	35.67
	16:04	35.58
	16:05	35.54
	16:06	35.63
	16:07	35.78
	16:08	35.92
	16:09	36.49
	16:10	36.72
	16:11	35.71
	16:12	35.46
	16:13	35.44
	16:14	35.69
	16:15	36.08
	16:16	36.49
	16:17	36.12
	16:18	35.28
	16:19	35.46
	16:20	35.61
	16:21	35.58
	16:22	36.19
	16:23	36.53
	16:24	35.91
	16:25	35.95
	16:26	35.75
	16:27	35.82
	16:28	35.55
	16:29	35.11
	16:30	35.56
	16:31	36.02
	16:32	36.17
	16:33	36.33
	16:34	35.78
	16:35	35.24
	16:36	35.10
	16:37	35.45
	16:38	35.85
	16:39	35.75
	16:40	36.09
	16:41	36.18
	16:42	35.86
	16:43	35.76
	16:44	35.76
	16:45	35.61
	16:46	35.84
	16:47	35.92
	16:48	35.68
	16:49	35.46
	16:50	35.44

Date	Time	Var. 40
	16:51	35.66
	16:52	36.18
	16:53	36.31
	16:54	36.07
	16:55	35.48
	16:56	35.18
	16:57	35.39
	16:58	35.63
	16:59	35.48
5/13/93	17:00	35.73
	17:01	36.22
	17:02	36.48
	17:03	35.75
	17:04	35.56
	17:05	35.31
	17:06	35.25
	17:07	35.39
	17:08	36.11
	17:09	36.70
	17:10	35.81
	17:11	35.73
	17:12	35.55
	17:13	35.02
	17:14	35.48
	17:15	36.15
	17:16	36.31
	17:17	36.26
	17:18	35.49
	17:19	35.18
	17:20	35.18
	17:21	35.40
	17:22	35.98
	17:23	36.21
	17:24	35.90
	17:25	35.70
	17:26	35.20
	17:27	35.50
	17:28	35.70
	17:29	36.11
	17:30	36.37
	17:31	36.53
	17:32	35.79
	17:33	35.17
	17:34	35.13
	17:35	35.26
	17:36	35.86
	17:37	36.34
	17:38	36.45
	17:39	35.90
	17:40	35.87
	17:41	35.62
	17:42	35.50
	17:43	35.77
	17:44	36.14
	17:45	35.99
	17:46	35.89

Port C
Run 9

Port D
Run 9

Date	Time	Var. 40
	17:47	35.97
	17:48	35.63
	17:49	35.62
	17:50	35.63
	17:51	35.61
	17:52	35.92
	17:53	36.32
	17:54	36.70
	17:55	36.10
	17:56	35.53
	17:57	35.81
	17:58	36.05
	17:59	36.03
5/13/93	18:00	36.24
	18:01	36.04
	18:02	35.77
	18:03	36.04
	18:04	36.25
	18:05	35.82

Point E
Run 9

Date	Time	Var. 40
	10:47	36.15
	10:48	36.56
	10:49	36.79
	10:50	36.11
	10:51	36.01
	10:52	35.92
	10:53	35.85
	10:54	35.86
	10:55	36.18
	10:56	36.23
	10:57	36.46
	10:58	36.74
	10:59	36.21
5/13/93	11:00	35.92
	11:01	35.78
	11:02	35.56
	11:03	35.71
	11:04	35.49
	11:05	35.79
	11:06	35.97
	11:07	35.46
	11:08	34.81
	11:09	34.88
	11:10	34.69
	11:11	34.73
	11:12	35.13
	11:13	35.72
	11:14	36.18
	11:15	36.16
	11:16	35.72
	11:17	35.61
	11:18	35.57
	11:19	35.31
	11:20	35.59
	11:21	35.39
	11:22	35.43
	11:23	35.61
	11:24	35.95
	11:25	35.34
	11:26	35.19
	11:27	35.11
	11:28	35.14
	11:29	35.13
	11:30	35.30
	11:31	35.48
	11:32	35.55
	11:33	34.73
	11:34	34.09
	11:35	33.84
	11:36	33.94
	11:37	34.30
	11:38	34.58
	11:39	35.44
	11:40	35.31
	11:41	34.95
	11:42	34.20

Run 1

APPENDIX F

DIVERTER VALVE, CONTINUOUS EMISSION MONITORING

EMISSION CALCULATIONS
GAS COMPONENTS

GAVIOTA OIL AND GAS PLANT
DIVERTER VALVE

DATA :

	Run 1	Run 2	Run 3	Average
Date	12-May-93	12-May-93	12-May-93	
Oxygen (%)	13.88	13.88	13.73	13.83
Qs(std), dscfm	1.179	1.161	1.132	1.157
F-Factor, dscf/MMBtu	8,570.00	8,570.00	8,570.00	8,570.00
NOx, ppm	38.36	38.05	38.49	38.30
CO, ppm	47.01	48.21	45.87	47.03
SO2, ppm				
HC (non-methane), ppm				

CALCULATIONS :

NOx, lb/hr	0.00	0.00	0.00	0.00
NOx, ppm @ 15 %O2	32.24	31.98	31.69	31.97
NOx, lb/MMBtu	0.1187	0.1178	0.1167	0.1177
CO, lb/hr	0.00	0.00	0.00	0.00
CO, ppm @ 15 %O2	39.51	40.52	37.76	39.26
CO, lb/MMBtu	0.0886	0.0908	0.0847	0.0880
SO2, lb/hr				
SO2, ppm @ 15 %O2				
SO2, lb/MMBtu				
HC, lb/hr				
HC, ppm @ 15 %O2				
HC, lb/MMBtu				

EQUATIONS :

lb/hr = (0.00000137 Lb-Mole °R / ft3) x 60 min/hr x Qs(std) x MW x ppm / [T(std) + 460]

ppm @ 15 %O2 = ppm measured x [(20.9 - 15 %O2) / (20.9 - %O2 measured)]

lb/MMBtu = F-Factor x MW x [(1.3711E-6 Lb-Mole °R / ft3) / (T(std) + 460)] x [20.9 / (20.9 - O2%)] x ppm

CONSTANTS :

Standard Temp. T(std): 60 °F
Oxygen Correction : 15 % O2

NOx, MW = 46.005 lb/lb-mole
CO, MW = 28.010 lb/lb-mole
SO2, MW = 64.058 lb/lb-mole
HC, MW = 16.043 lb/lb-mole

GAS ANALYZER DATA

GAVIOTA OIL AND GAS PLANT
DIVERTER VALVE

Date : 05/12/93
Run No. : 1

	O2, %		CO2, %		NOx, ppm		CO, ppm		SO2, ppm	
Point #	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading
1	13.77	13.77	4.06	4.06	38.31	38.33	48.40	48.39		
2	13.84	13.84	4.06	4.06	38.14	38.19	46.82	46.79		
3	13.86	13.86	4.06	4.06	38.18	38.27	46.82	46.78		
4	13.88	13.88	4.06	4.06	38.18	38.31	46.84	46.78		
5	13.90	13.90	4.06	4.06	38.20	38.36	46.94	46.86		
6	13.91	13.91	4.06	4.06	38.25	38.45	46.96	46.86		
7	13.92	13.92	4.06	4.06	38.25	38.49	46.82	46.70		
8	13.92	13.92	4.06	4.06	38.17	38.44	47.10	46.97		
9	13.92	13.92	4.06	4.06	38.11	38.42	47.12	46.97		
10										
11										
12										
13										
14										
15										
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24										
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26										
27										
28										
29										
30										
MEAN :		13.88		4.06		38.36		47.01		

Zero Check	0.00	0.00	0.00	0.00
Span Check	15.02	15.95	83.50	85.00
Initial Span Value	15.02	15.95	84.22	84.71
Drift, Percent	0.0	0.0	−0.9	0.3
Zero Drift, Zcf	0.00000	0.00000	0.00000	0.00000
Span Drift, Scf	0.00000	0.00000	−0.00095	0.00038

Drift, Percent = [(Span Check − Zero Check) − Calib. Gas] / Calib. Gas x 100

Zero Drift Correction Factor, Zcf = Zero Check / # of Readings

Span Drift Correction Factor, Scf = (% Drift / 100) / # of Readings

Cz, Zero Corr. Concentration = measured value − [Zcf x (Point # − 0.5)]

Drift Corrected Reading = Cz / [1 + (Scf x (Point # − 0.5))]

GAS ANALYZER DATA

GAVIOTA OIL AND GAS PLANT
DIVERTER VALVE

Date : 05/12/93
Run No. : 2

	O2, %		CO2, %		NOx, ppm		CO, ppm		SO2, ppm	
Point #	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading
1	13.86	13.86	4.00	4.00	38.02	38.04	47.65	47.65		
2	13.89	13.89	4.00	4.00	38.02	38.09	47.98	47.98		
3	13.89	13.89	4.00	4.01	38.02	38.14	47.83	47.83		
4	13.89	13.89	4.00	4.01	37.94	38.10	47.99	47.99		
5	13.88	13.88	4.00	4.01	37.88	38.09	48.04	48.04		
6	13.88	13.88	4.00	4.02	37.78	38.03	48.40	48.40		
7	13.88	13.88	4.00	4.02	37.71	38.01	48.58	48.58		
8	13.88	13.88	4.00	4.02	37.68	38.03	48.62	48.62		
9	13.87	13.87	4.00	4.03	37.53	37.92	48.80	48.80		
10										
11										
12										
13										
14										
15										
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18										
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20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
MEAN :		13.88		4.01		38.05		48.21		

Zero Check	0.00	0.00	0.00	0.00
Span Check	15.02	15.84	83.30	84.71
Initial Span Value	15.02	15.95	84.22	84.71
Drift, Percent	0.0	−0.7	−1.1	0.0
Zero Drift, Zcf	0.00000	0.00000	0.00000	0.00000
Span Drift, Scf	0.00000	−0.00077	−0.00121	0.00000

Drift, Percent = [(Span Check − Zero Check) − Calib. Gas] / Calib. Gas x 100

Zero Drift Correction Factor, Zcf = Zero Check / # of Readings

Span Drift Correction Factor, Scf = (% Drift / 100) / # of Readings

Cz, Zero Corr. Concentration = measured value − [Zcf x (Point # − 0.5)]

Drift Corrected Reading = Cz / [1 + (Scf x (Point # − 0.5))]

GAS ANALYZER DATA

GAVIOTA OIL AND GAS PLANT
DIVERTER VALVE

Date : 05/12/93
Run No. : 3

	O2, %		CO2, %		NOx, ppm		CO, ppm		SO2, ppm	
	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading	Instrument Reading	Drift Corrected Reading
Point #										
1	13.62	13.62	4.25	4.25	38.32	38.34	44.44	44.44		
2	13.61	13.60	4.24	4.24	38.43	38.50	44.39	44.39		
3	13.73	13.71	4.22	4.22	38.32	38.44	45.24	45.24		
4	13.78	13.75	4.22	4.22	38.28	38.44	45.65	45.65		
5	13.77	13.73	4.22	4.22	38.34	38.55	45.81	45.81		
6	13.77	13.73	4.26	4.26	38.41	38.67	45.29	45.29		
7	13.79	13.74	4.23	4.23	38.30	38.60	46.92	46.92		
8	13.82	13.76	4.23	4.23	38.12	38.47	47.67	47.67		
9	14.04	13.97	4.14	4.14	37.99	38.39	47.44	47.44		
10										
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24										
25										
26										
27										
28										
29										
30										
MEAN :		13.73		4.22		38.49		45.87		

Zero Check	0.00	0.00	0.00	0.00
Span Check	15.10	15.95	83.30	84.71
Initial Span Value	15.02	15.95	84.22	84.71
Drift, Percent	0.5	0.0	−1.1	0.0
Zero Drift, Zcf	0.00000	0.00000	0.00000	0.00000
Span Drift, Scf	0.00059	0.00000	−0.00121	0.00000

Drift, Percent = [(Span Check − Zero Check) − Calib. Gas] / Calib. Gas x 100

Zero Drift Correction Factor, Zcf = Zero Check / # of Readings

Span Drift Correction Factor, Scf = (% Drift / 100) / # of Readings

Cz, Zero Corr. Concentration = measured value − [Zcf x (Point # − 0.5)]

Drift Corrected Reading = Cz / [1 + (Scf x (Point # − 0.5))]

ENGINEERING–SCIENCE, INC.
CEM FIELD DATA SHEET

PLANT: CHEVRON Gaviota
TEST LOCATION: UNIT "A" DIVERTER VALVE
CEM VAN NO.: 3
DATE: 5-12-93
OPERATOR: SP

O2, %			
Calibration Gases :			
High	15.02	Cyl. #	AAL12850
Mid		Cyl. #	
Low		Cyl. #	

CO2, %			
Calibration Gases :			
High	15.95	Cyl. #	ALM008255
Mid		Cyl. #	
Low		Cyl. #	

NOx, ppm			
Calibration Gases :			
High	84.22	Cyl. #	ALM008231
Mid		Cyl. #	
Low		Cyl. #	

CO, ppm			
Calibration Gases :			
High	41.48	Cyl. #	ALM005581
Mid		Cyl. #	
Low		Cyl. #	

SO2, ppm			
Calibration Gases :			
High		Cyl. #	
Mid		Cyl. #	
Low		Cyl. #	

Calibration Gases :			
High		Cyl. #	
Mid		Cyl. #	
Low		Cyl. #	

TIME	SAMPLE POINT	O2 (%)	CO2 (%)	NOx (ppm)	CO (ppm)	SO2 (ppm)		COMMENTS / RUN #
		15.02	15.95	84.22	41.48			Span gas values used for test.
								EPA METHOD 20 MODIFIED
								CALIBRATION
		0.0	0.0	0.0	0.0			ZERO
		15.02	15.95	84.22	41.48			SPAN
								Leak ✓ @ 15.0" HG = 0.0
								STACK GAS ✓
								CHANGE CO RANGE TO 0-100PPM
								SPAN VALUE = 84.71 ALM008231
								Recal CO
					0.0			ZERO
					84.71			SPAN

ENGINEERING–SCIENCE, INC.
CEM FIELD DATA SHEET

PLANT: Chevron Gaviota
TEST LOCATION: UNIT "A" Diverter Valve
CEM VAN NO.: 3
DATE: 5-12-93
OPERATOR: JP

TIME	SAMPLE POINT	O2 (%)	CO2 (%)	NOx (ppm)	CO (ppm)	SO2 (ppm)		COMMENTS / RUN #
		15.02	15.95	84.22	84.71			Span gas values used for test.
1120-1125		13.77	4.06	38.31	48.4			START RUN 1
1125-1130		13.84	4.06	38.14	46.82			
1130-1135		13.86	4.06	38.18	46.82			
1135-1140		13.88	4.06	38.18	46.84			
1140-1145		13.90	4.06	38.20	46.94			
1145-1150		13.91	4.06	38.25	46.96			
1150-1155		13.92	4.06	38.25	46.82			
1155-1200		13.92	4.06	38.17	47.1			
1200-1205		13.92	4.06	38.11	47.12			
calibrate		0.0	0.0	0.0	0.0			ZERO ✓
		15.02	15.95	83.5	85.0			SPAN
				84.22	84.71			Cal ADJ
1220-1225		13.86	4.00	38.02	47.65			START RUN 2
1225-1230		13.89	4.00	38.02	47.98			
1230-1235		13.89	4.00	38.02	47.83			
1235-1240		13.89	4.00	37.94	47.99			
1240-1245		13.88	4.00	37.88	48.04			
1245-1250		13.88	4.00	37.78	48.40			
1250-1255		13.88	4.00	37.71	48.58			
1255-1300		13.88	4.00	37.68	48.62			
1300-1305		13.87	4.00	37.63	48.80			
calibrate		0.0	0.0	0.0	0.0			ZERO
		15.02	15.84	83.3	84.71			SPAN
			15.95	84.22				Cal ADJ

ENGINEERING–SCIENCE, INC.
CEM FIELD DATA SHEET

PLANT: CHEVRON GAVIOTA
TEST LOCATION: UNIT "A" DIVERTER Valve
CEM VAN NO.: 3
DATE: 5-12-93
OPERATOR: JP

TIME	SAMPLE POINT	O2 (%)	CO2 (%)	NOx (ppm)	CO (ppm)	SO2 (ppm)		COMMENTS / RUN #
		15.02	15.95	84.22	84.71			Span gas values used for test.
1320-1325		13.62	4.25	38.32	44.44			START RUN 3
1325-1330		13.61	4.24	38.43	44.39			
1330-1335		13.73	4.22	38.32	45.24			
1335-1340		13.78	4.22	38.28	45.65			
1340-1345		13.77	4.22	38.34	45.81			
1345-1350		13.77	4.26	38.41	45.29			
1350-1355		13.79	4.23	38.30	46.92			
1355-1400		13.82	4.23	38.12	47.67			
1400-1405		14.04	4.14	37.99	47.44			
Calibrate		0.0	0.0	0.0	0.0			ZERO ✓
		15.10	15.95	83.3	84.71			SPAN ✓
								Leak ✓ @ 15" HG = 0.0
		15.25	15.60	81.0	80.0			System Bias ✓

CHEVRON GAVIOTA
DIVERTA VALVE
11:02:06 05/12/93
DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
DDDDDDDDDDDDD
Channel No.: 1 2 3 4
Color: _ _ _ _
DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
DDDDDDDDDDDDD

1: O2	0 ... 25 %	3: CO2	0 ... 20 %
2: NOX	0 ... 100 PPM	4: CO	0 ... 50 PPM

11:10:00 05/12/93
#01 20.65 % #02 1.45 PPM #03 0.05 % #04 0.33 PPM
11:15:00 05/12/93
#01 17.40 % #02 17.99 PPM #03 1.97 % #04 16.98 PPM
11:20:00 05/12/93
#01 1.31 % #02 52.02 PPM #03 0.41 % #04 26.00 PPM
DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
DDDDDDDDDDDDD
Channel No.: 1 2 3 4
Color: _ _ _ _
DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
DDDDDDDDDDDDD

1: O2	0 ... 25 %	3: CO2	0 ... 20 %
2: NOX	0 ... 100 PPM	4: CO	0 ... ~~50 PPM~~ 0 – 100 PPM

START RUN 1

Diverter Valve 5/12/93 ES Data Acquisition System

RUN 1

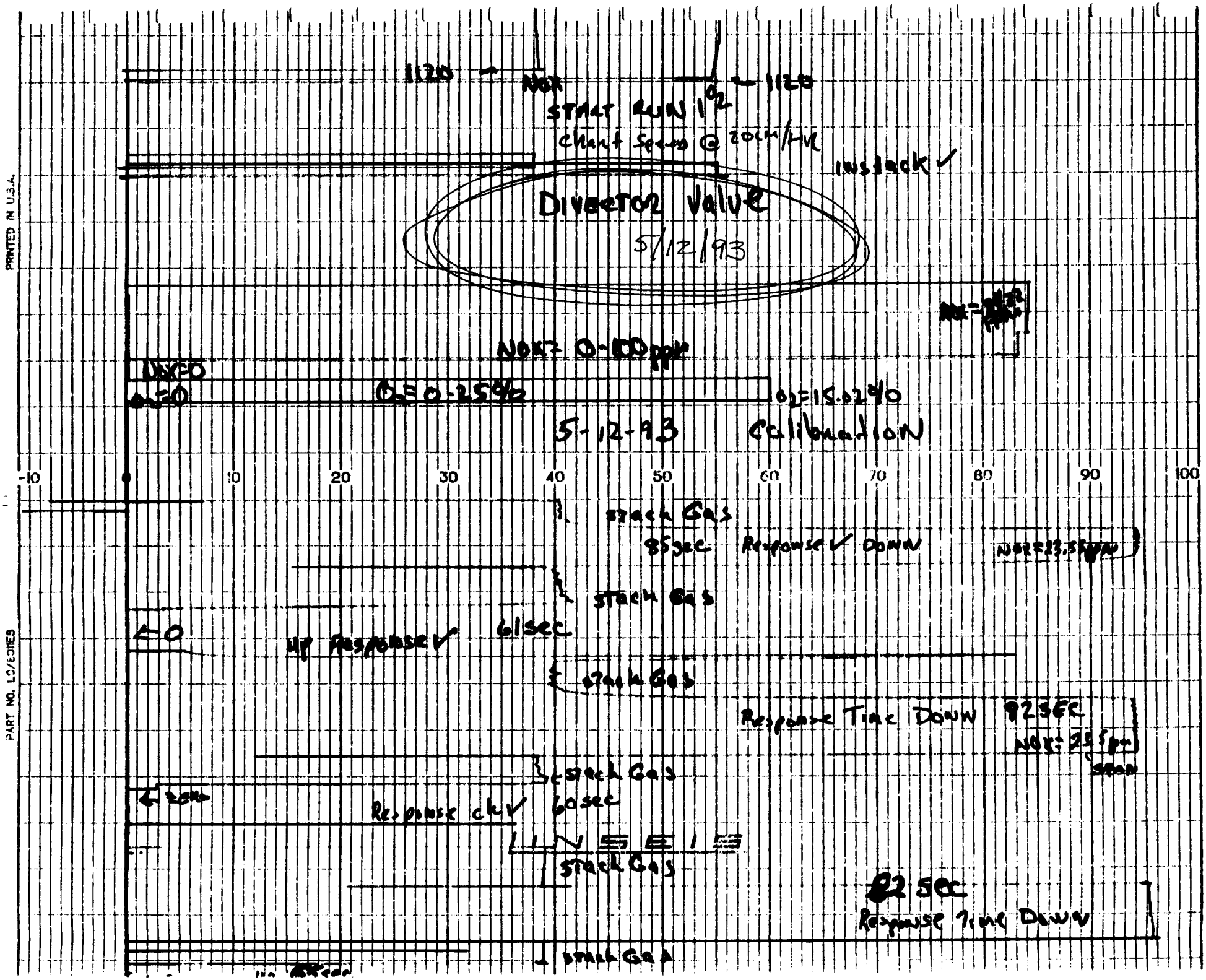
11:25:00 05/12/93
#01 13.77 % #02 38.31 PPM #03 4.06 % #04 24.20 PPM
11:30:00 05/12/93
#01 13.84 % #02 38.14 PPM #03 4.06 % #04 23.41 PPM
11:35:00 05/12/93
#01 13.86 % #02 38.18 PPM #03 4.06 % #04 23.41 PPM
11:40:00 05/12/93
#01 13.88 % #02 38.18 PPM #03 4.06 % #04 23.42 PPM
11:45:00 05/12/93
#01 13.90 % #02 38.20 PPM #03 4.06 % #04 23.47 PPM
11:50:00 05/12/93
#01 13.91 % #02 38.25 PPM #03 4.06 % #04 23.48 PPM
11:55:00 05/12/93
#01 13.92 % #02 38.25 PPM #03 4.06 % #04 23.41 PPM
12:00:00 05/12/93
#01 13.92 % #02 38.17 PPM #03 4.06 % #04 23.55 PPM
12:05:00 05/12/93
#01 13.92 % #02 38.11 PPM #03 4.06 % #04 47.12 PPM
END RUN 1
12:10:00 05/12/93
#01 0.72 % #02 36.61 PPM #03 0.19 % #04 31.62 PPM
12:15:00 05/12/93
#01 5.93 % #02 13.87 PPM #03 5.11 % #04 15.64 PPM
12:20:00 05/12/93
#01 0.83 % #02 65.33 PPM #03 0.27 % #04 68.25 PPM
START RUN 2

RUN 2

12:25:00 05/12/93
#01 13.86 % #02 38.02 PPM #03 4.00 % #04 47.65 PPM
12:30:00 05/12/93
#01 13.89 % #02 38.02 PPM #03 4.00 % #04 47.98 PPM
12:35:00 05/12/93
#01 13.89 % #02 38.02 PPM #03 4.00 % #04 47.83 PPM
12:40:00 05/12/93
#01 13.89 % #02 37.94 PPM #03 4.00 % #04 47.99 PPM
12:45:00 05/12/93
#01 13.88 % #02 37.88 PPM #03 4.00 % #04 48.04 PPM
12:50:00 05/12/93
#01 13.88 % #02 37.78 PPM #03 4.00 % #04 48.40 PPM

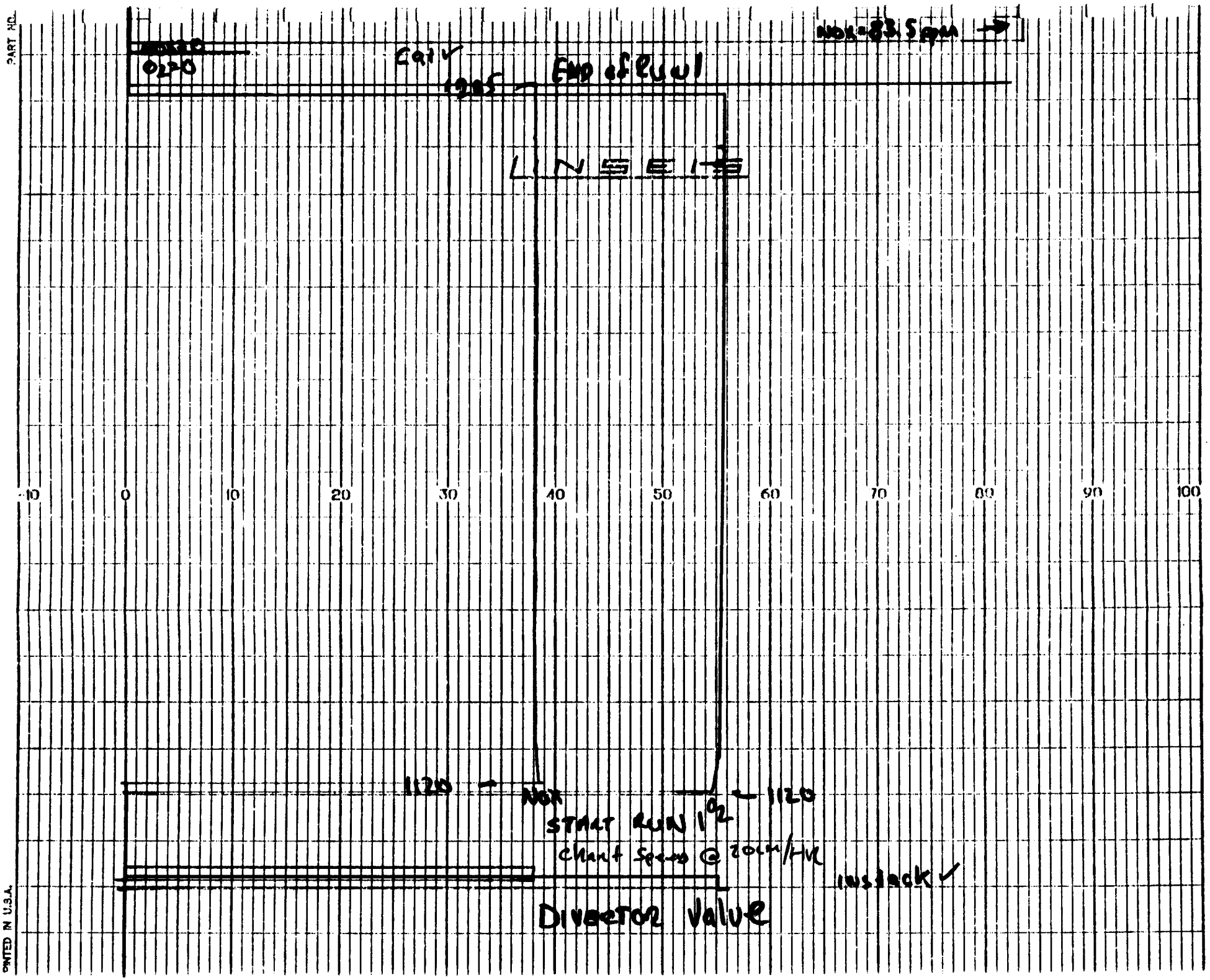
13:00:00 05/12/93
#01 13.88 % #02 37.68 PPM #03 4.00 % #04 48.62 PPM
13:05:00 05/12/93
#01 13.87 % #02 37.53 PPM #03 4.00 % #04 48.80 PPM
END RUN 2
13:10:00 05/12/93
#01 1.34 % #02 46.78 PPM #03 0.60 % #04 48.45 PPM
13:15:00 05/12/93
#01 7.25 % #02 12.87 PPM #03 7.61 % #04 8.19 PPM
13:20:00 05/12/93
#01 8.72 % #02 27.55 PPM #03 2.64 % #04 34.89 PPM
START RUN 3
13:25:00 05/12/93
#01 13.62 % #02 38.32 PPM #03 4.25 % #04 44.44 PPM
13:30:00 05/12/93
#01 13.61 % #02 38.43 PPM #03 4.24 % #04 44.39 PPM
13:35:00 05/12/93
#01 13.73 % #02 38.32 PPM #03 4.22 % #04 45.24 PPM
13:40:00 05/12/93
#01 13.78 % #02 38.28 PPM #03 4.22 % #04 45.65 PPM
13:45:00 05/12/93
#01 13.77 % #02 38.34 PPM #03 4.22 % #04 45.81 PPM
13:50:00 05/12/93
#01 13.77 % #02 38.41 PPM #03 4.26 % #04 45.29 PPM
13:55:00 05/12/93
#01 13.79 % #02 38.30 PPM #03 4.23 % #04 46.92 PPM
14:00:00 05/12/93
#01 13.82 % #02 38.12 PPM #03 4.23 % #04 47.67 PPM
14:05:00 05/12/93
#01 14.04 % #02 37.99 PPM #03 4.14 % #04 47.44 PPM
END RUN 3
14:10:00 05/12/93
#01 1.31 % #02 29.08 PPM #03 0.35 % #04 25.51 PPM
14:15:00 05/12/93
#01 14.75 % #02 4.87 PPM #03 6.67 % #04 12.96 PPM
14:20:00 05/12/93
#01 21.24 % #02 0.57 PPM #03 0.18 % #04 0.34 PPM
14:25:00 05/12/93
#01 18.35 % #02 0.47 PPM #03 3.83 % #04 0.63 PPM
14:30:00 05/12/93
#01 11.38 % #02 1.00 PPM #03 12.33 % #04 1.62 PPM
14:35:00 05/12/93
#01 8.70 % #02 0.66 PPM #03 15.25 % #04 2.46 PPM
14:40:00 05/12/93
#01 11.91 % #02 0.63 PPM #03 11.58 % #04 2.39 PPM
14:45:00 05/12/93
#01 1.32 % #02 77.31 PPM #03 0.13 % #04 74.84 PPM

Run 3



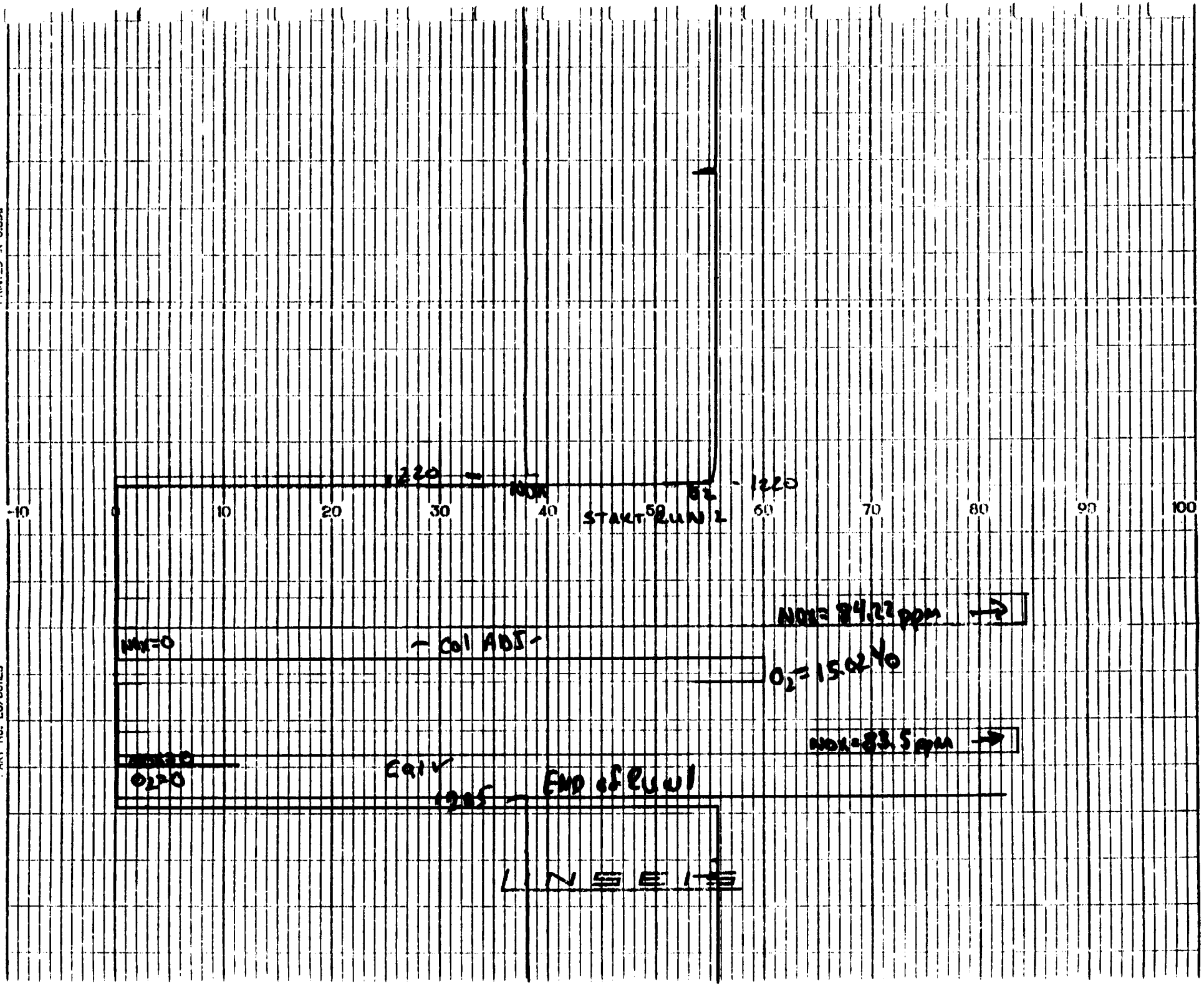
PRINTED IN U.S.A.

PART NO. LS/EDIES

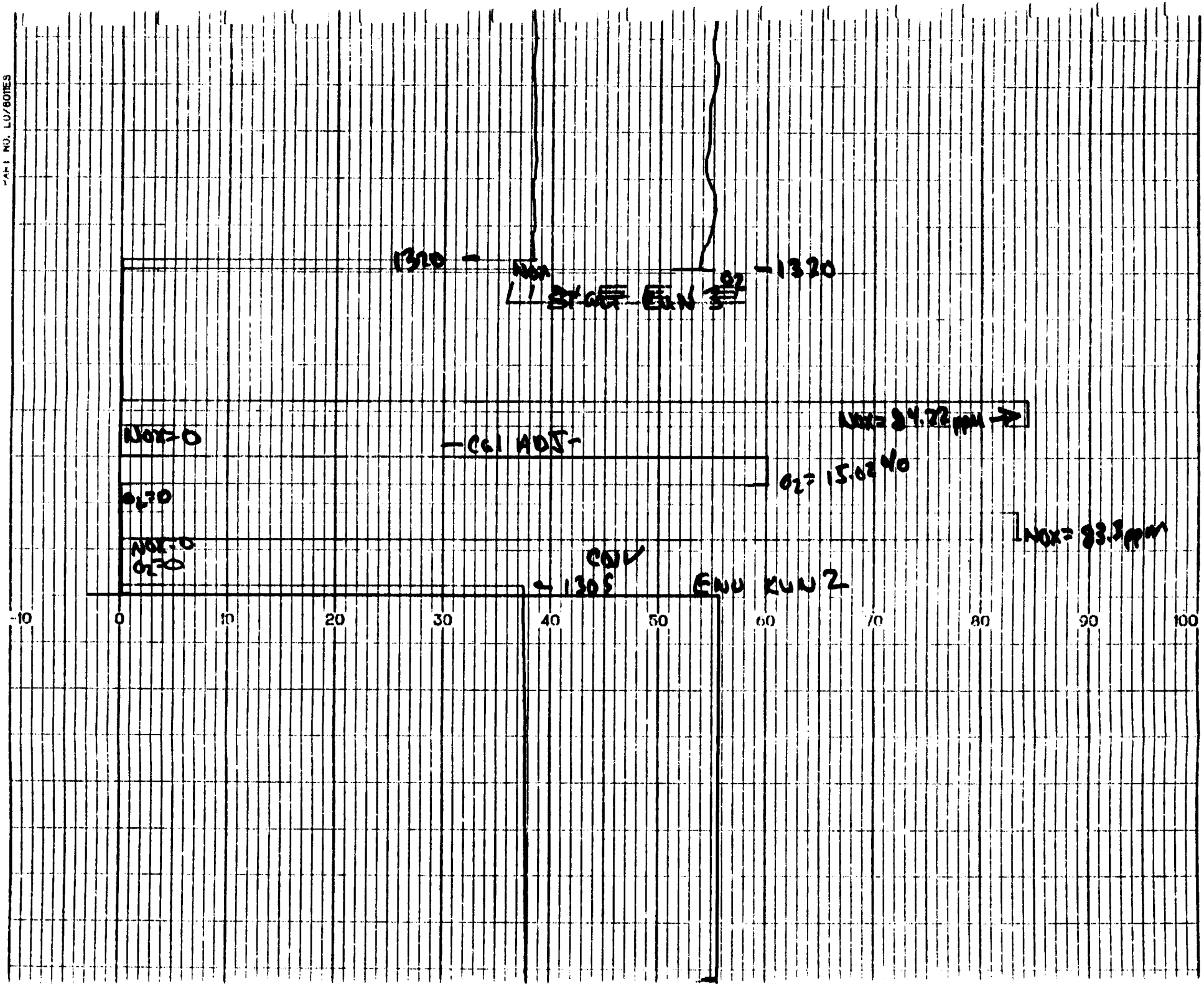


PART NO.

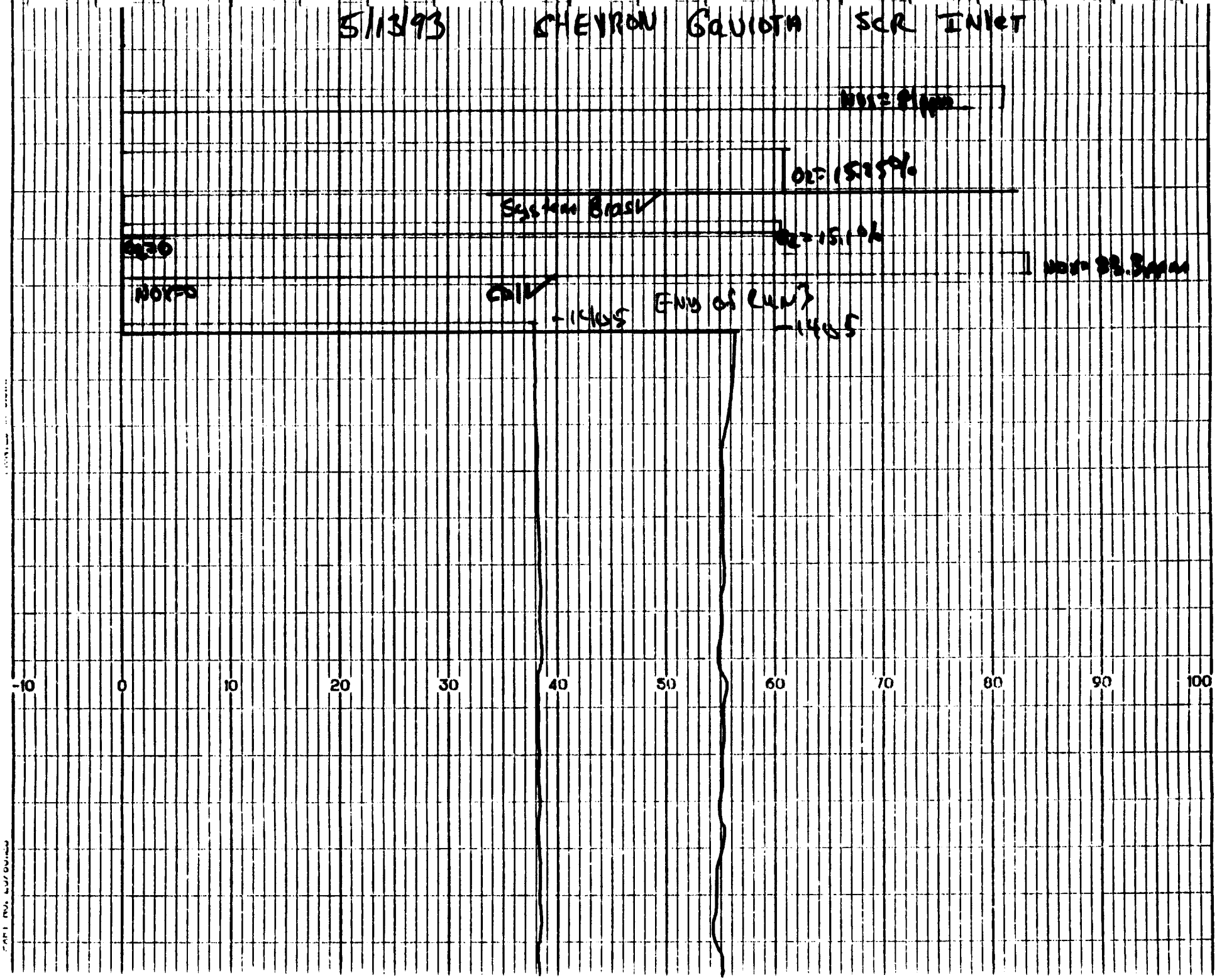
PRINTED IN U.S.A.

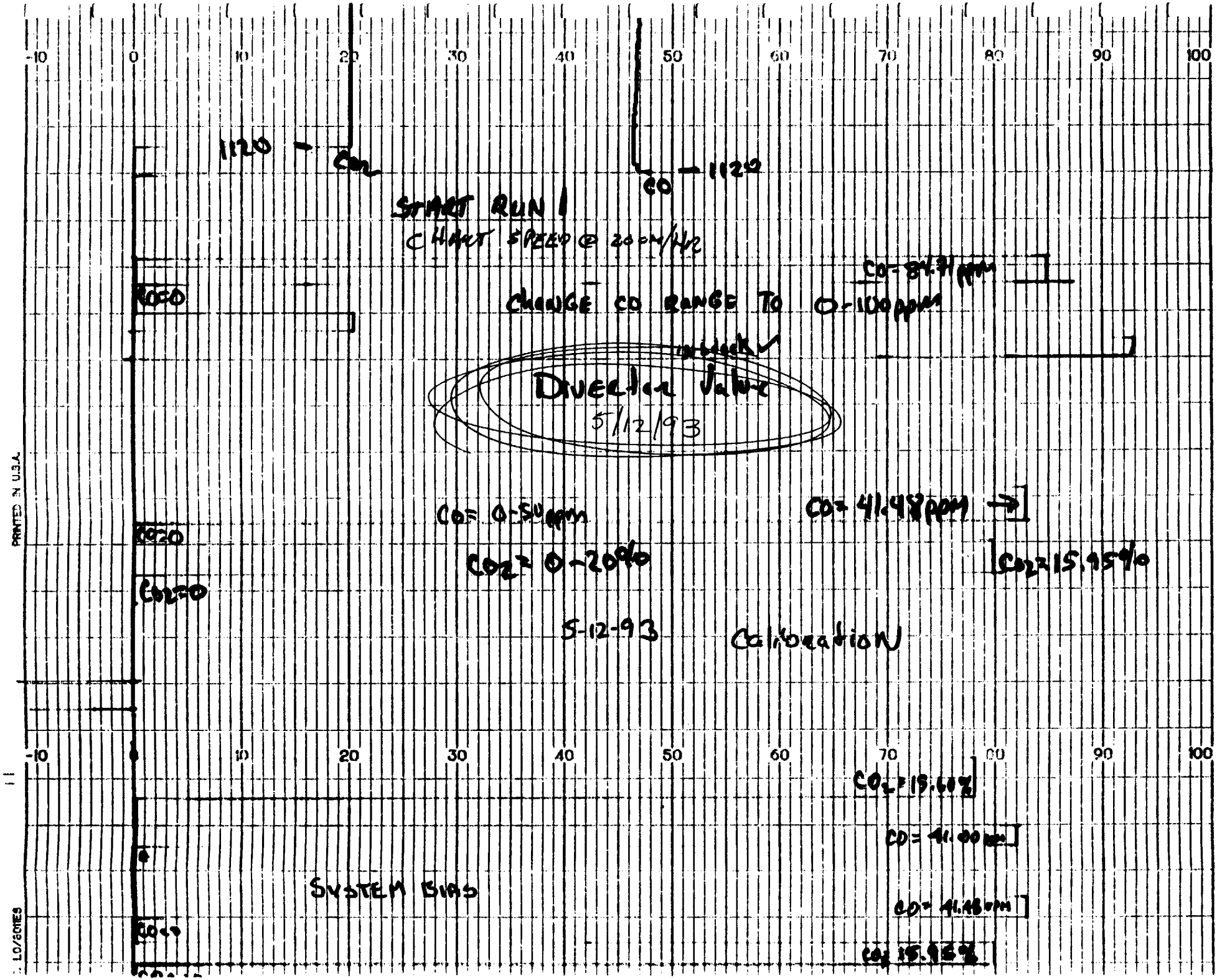


PRINTED IN U.S.A.
PART NO. LO/8CHES


PART NO. LO/80MES
1320
NOX
STAGE RUN 3
O2
1320
NOX=84.72 ppm
NOX=0
CGI ADJ
O2=15.02%
O2=0
NOX=83.3 ppm
NOX=0
O2=0
COV
1305
END RUN 2
-10
0
10
20
30
40
50
60
70
80
90
100

5/13/93 CHEVRON GAVIOTA SCR INLET





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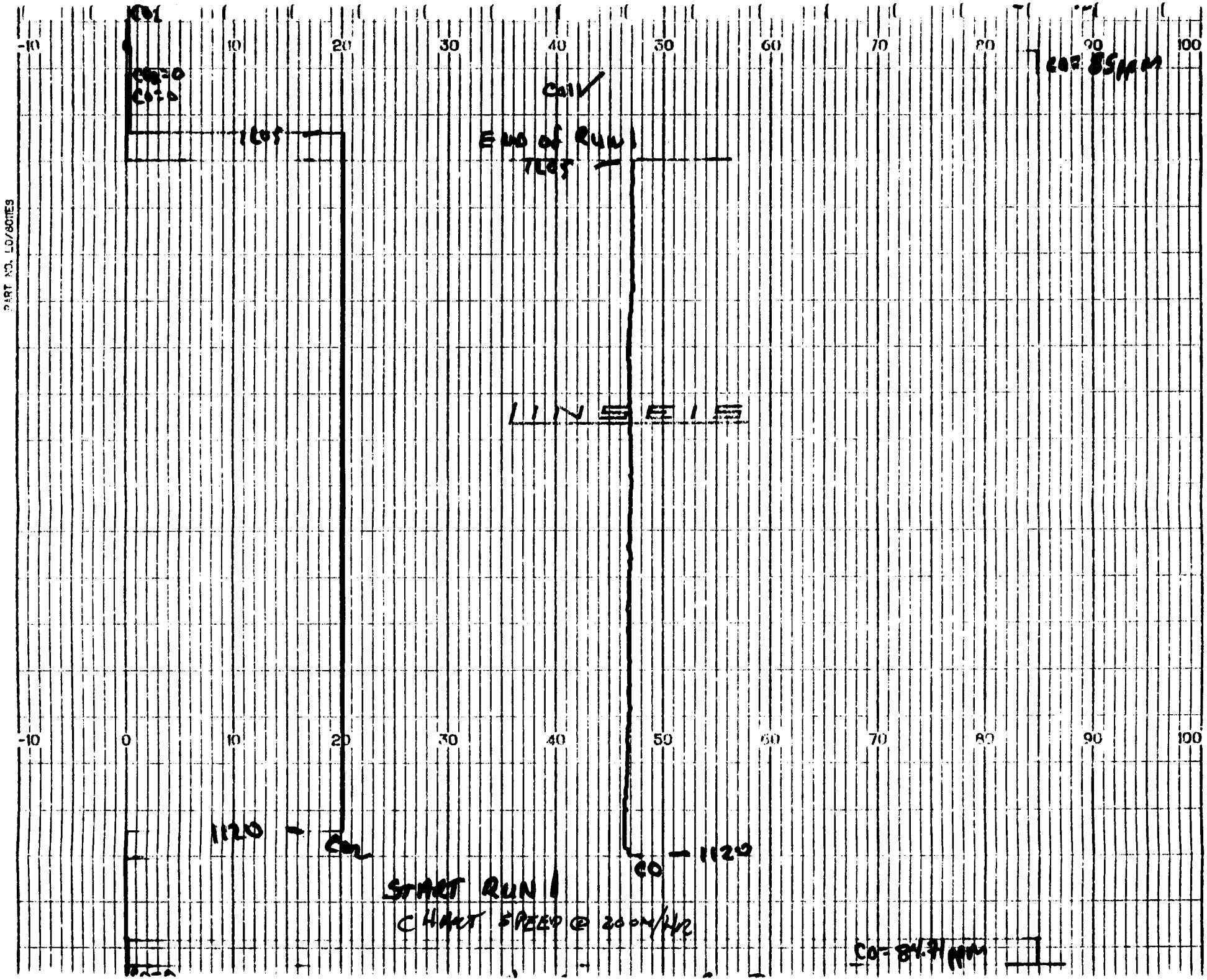
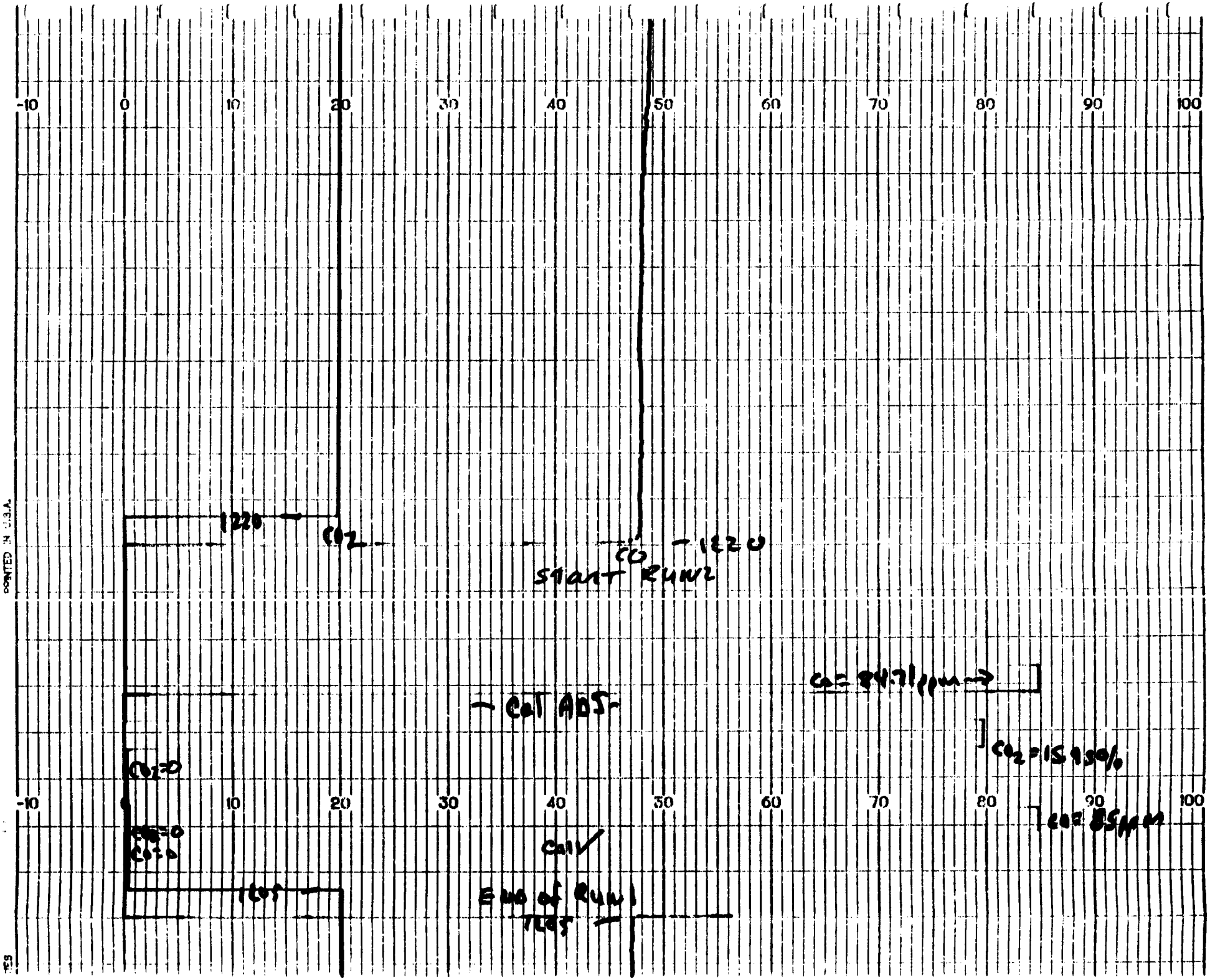
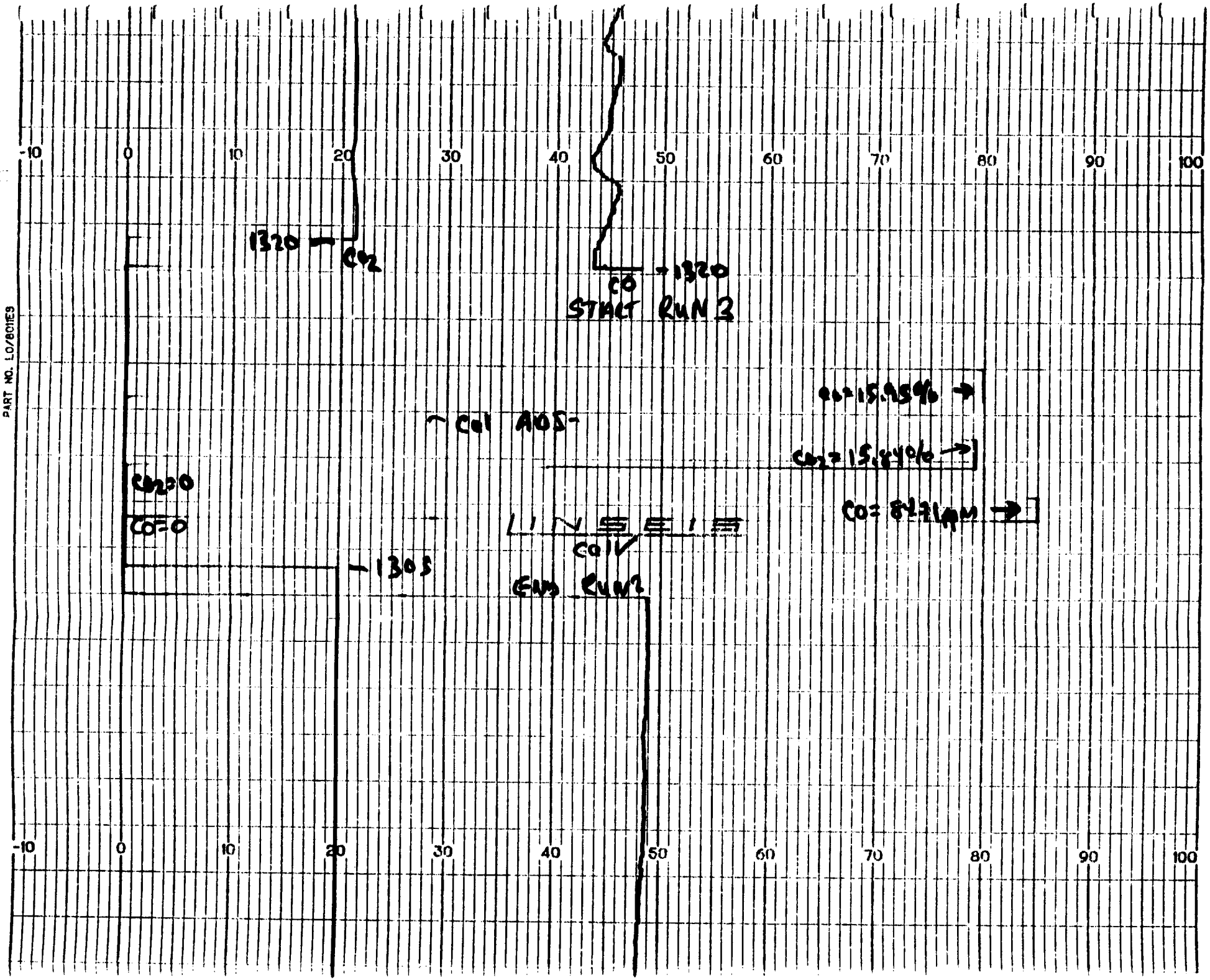
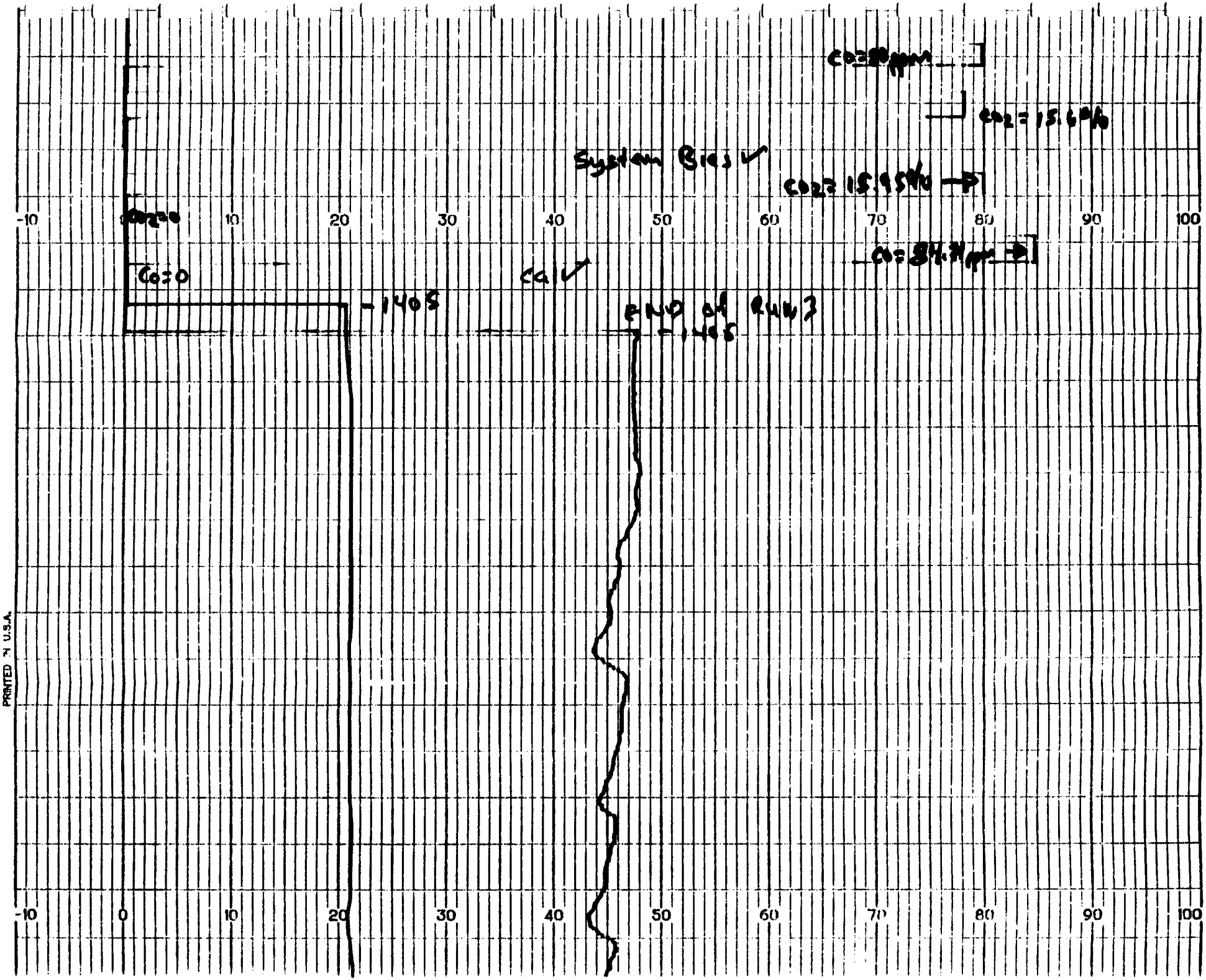
LO/GONES


-10
0
10
20
30
40
50
60
70
80
90
100
Cal
END of RUN 1
1105
1120 - Cal
CO - 1120
START RUN 1
CHART SPEED @ 200M/HR
CO - 84.71 MM


-10
0
10
20
30
40
50
60
70
80
90
100
1220
CO2
CO
1220
START RUN2
CO2 = 94.71 ppm
CaT ADS
CO2 = 15.9.50%
CO2 = 0
CO2 = 85 ppm
CaT✓
END of RUN1
TEST



PART NO. LO/80115



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SOURCE TEST CALCULATIONS

GAVIOTA OIL AND GAS PROCESSING PLANT
UNIT A, DIVERTER VALVE

12–May –93
Run No. 1

FIELD DATA					
Standard Temperature, T(std)	60	°F	Standard Pressure, Pstd	29.92	"Hg
Meter Temperature, Tm		°F	Static Pressure, Pstatic		"H2O
Stack Temperature, Ts		°F	Barometric Pressure, Pb		"Hg
SQ.RT. dP			Condensate, Vlc		grams
Meter Orifice, dH		"H2O	Stack I.D.	2.08	inch
Meter Volume, Vm		ft3	Duct Length	0.00	inch
Meter Correction, y			Duct Width	0.00	inch
Stack Gas Oxygen	0.00	% O2	Stack Area, As	0.024	ft2
Stack Gas Carbon Dioxide	0.00	% CO2	Test Time, Ø		min.
Stack Gas Carbon Monoxide	0.00	% CO	Pitot Coefficient, Cp	0.84	
Stack Gas Nitrogen		% N2			

CALCULATIONS

Vm(std) = [T(std) + 460 / Pstd] x Vm x y x (Pb + (dH / 13.6)) / (Tm + 460) ..		dscf
Vw(std) = 0.04715 ft3/g / 528 x [T(std) + 460] x Vlc		scf
Bws = Vw(std) / [Vm(std) + Vw(std)].....		
Bws @ Saturated Conditions = Vapor Press. of H2O @ Dew Point Temp. / (Pstack, in.Hg.)	Lower Bws Value Used	
% Excess Air =(%O2 – 0.5%CO) / [0.264%N2 – (%O2–0.5%CO)] x 100		%
Md = (0.44 x %CO2)+(0.32 x %O2)+[0.28 x (%N2 + %CO)]		lb/lb–mole
Ms = (Md x (1–Bws)) + (18.0 x Bws)		lb/lb–mole
P(stack) = Pb + [Pstatic / 13.6]		"Hg
vs = 85.49 x Cp x (Sq.Rt. dP) x [Sq.Rt.((Ts + 460) / (Ms x P(stack)))]	1.097	ft/sec
Qs = vs x As x 60	1.553	acfm
Qs(std) = Qs x (1 – Bws) x [(T(std) + 460) / (Ts + 460)] x (P(stack) / Pstd) ...	1.179	dscfm

SOURCE TEST CALCULATIONS

GAVIOTA OIL AND GAS PROCESSING PLANT
UNIT A, DIVERTER VALVE

12–May –93
Run No. 2

FIELD DATA					
Standard Temperature, T(std)	60	°F	Standard Pressure, Pstd	29.92	"Hg
Meter Temperature, Tm		°F	Static Pressure, Pstatic		"H2O
Stack Temperature, Ts		°F	Barometric Pressure, Pb		"Hg
SQ.RT. dP			Condensate, Vlc		grams
Meter Orifice, dH		"H2O	Stack I.D.	2.08	inch
Meter Volume, Vm		ft3	Duct Length	0.00	inch
Meter Correction, y			Duct Width	0.00	inch
Stack Gas Oxygen	0.00	% O2	Stack Area, As	0.024	ft2
Stack Gas Carbon Dioxide	0.00	% CO2	Test Time, Ø		min.
Stack Gas Carbon Monoxide	0.00	% CO	Pitot Coefficient, Cp	0.84	
Stack Gas Nitrogen		% N2			

CALCULATIONS

Vm(std) = [T(std) + 460 / Pstd] x Vm x y x (Pb + (dH / 13.6)) / (Tm + 460) ..		dscf
Vw(std) = 0.04715 ft3/g / 528 x [T(std) + 460] x Vlc		scf
Bws = Vw(std) / [Vm(std) + Vw(std)].....		
Bws @ Saturated Conditions = Vapor Press. of H2O @ Dew Point Temp. / (Pstack, in.Hg.)	Lower Bws Value Used	
% Excess Air =(%O2 – 0.5%CO) / [0.264%N2 – (%O2–0.5%CO)] x 100		%
Md = (0.44 x %CO2)+(0.32 x %O2)+[0.28 x (%N2 + %CO)]		lb/lb–mole
Ms = (Md x (1–Bws)) + (18.0 x Bws)		lb/lb–mole
P(stack) = Pb + [Pstatic / 13.6]		"Hg
vs = 85.49 x Cp x (Sq.Rt. dP) x [Sq.Rt.((Ts + 460) / (Ms x P(stack)))]	1.082	ft/sec
Qs = vs x As x 60	1.531	acfm
Qs(std) = Qs x (1 – Bws) x [(T(std) + 460) / (Ts + 460)] x (P(stack) / Pstd) ...	1.161	dscfm

SOURCE TEST CALCULATIONS

GAVIOTA OIL AND GAS PROCESSING PLANT
UNIT A, DIVERTER VALVE

12–May –93
Run No. 3

FIELD DATA					
Standard Temperature, T(std)	60	°F	Standard Pressure, Pstd	29.92	"Hg
Meter Temperature, Tm		°F	Static Pressure, Pstatic		"H2O
Stack Temperature, Ts		°F	Barometric Pressure, Pb		"Hg
SQ.RT. dP			Condensate, Vlc		grams
Meter Orifice, dH		"H2O	Stack I.D.	2.08	inch
Meter Volume, Vm		ft3	Duct Length	0.00	inch
Meter Correction, y			Duct Width	0.00	inch
Stack Gas Oxygen	0.00	% O2	Stack Area, As	0.024	ft2
Stack Gas Carbon Dioxide	0.00	% CO2	Test Time, Ø		min.
Stack Gas Carbon Monoxide	0.00	% CO	Pitot Coefficient, Cp	0.84	
Stack Gas Nitrogen		% N2			

CALCULATIONS

Vm(std) = [T(std) + 460 / Pstd] x Vm x y x (Pb + (dH / 13.6)) / (Tm + 460) ..		dscf
Vw(std) = 0.04715 ft3/g / 528 x [T(std) + 460] x Vlc		scf
Bws = Vw(std) / [Vm(std) + Vw(std)].....		
Bws @ Saturated Conditions = Vapor Press. of H2O @ Dew Point Temp. / (Pstack, in.Hg.)	Lower Bws Value Used	
% Excess Air =(%O2 – 0.5%CO) / [0.264%N2 – (%O2–0.5%CO)] x 100		%
Md = (0.44 x %CO2)+(0.32 x %O2)+[0.28 x (%N2 + %CO)]		lb/lb–mole
Ms = (Md x (1–Bws)) + (18.0 x Bws)		lb/lb–mole
P(stack) = Pb + [Pstatic / 13.6]		"Hg
vs = 85.49 x Cp x (Sq.Rt. dP) x [Sq.Rt.((Ts + 460) / (Ms x P(stack)))]	1.055	ft/sec
Qs = vs x As x 60	1.494	acfm
Qs(std) = Qs x (1 – Bws) x [(T(std) + 460) / (Ts + 460)] x (P(stack) / Pstd) ...	1.132	dscfm

VELOCITY TRAVERSE DATA SHEET *

COMPANY CHEVRON GAVIOTA DATE 5-12-93

TEST LOCATION UNIT "A" DIVERTER VALVE STATIC PRESSURE _____ in. H2O

TEST CONDITION _____ PITOT COEFFICIENT ~~0.84/0.99~~

RUN # 1			RUN #2			RUN #3					
Start Time: 11:20 Pb: 29.96 "Hg			Start Time: 1220 Pb: 29.96 "Hg			Start Time: 1320 Pb: 29.96 "Hg			Start Time: Pb: "Hg		
~~SAMPLE POINT~~ # TIME	VELOCITY ~~dP (in. H2O)~~ FPM	Ts (°F)	~~SAMPLE POINT~~ # TIME	VELOCITY ~~dP (in. H2O)~~ FPM	Ts (°F)	~~SAMPLE POINT~~ # TIME	VELOCITY ~~dP (in. H2O)~~ FPM	Ts (°F)	SAMPLE POINT #	VELOCITY dP (in. H2O)	Ts (°F)
11:20	64	225	12:20	66	227	13:20	62	227			
11:25	63	225	12:25	64	227	13:25	64	227			
11:30	65	226	12:30	66	227	13:30	66	226			
11:35	64	225	1235	60	227	13:35	59	227			
11:40	68	225	12:40	70	226	13:40	62	227			
11:45	68	225	12:45	68	227	13:45	66	227			
11:50	62	226	12:50	63	227	13:50	62	227			
11:55	69	226	12:55	64	227	13:55	67	227			
12:00	67	226	13:00	64	227	14:00	61	227			
12:05	68	226	13:05	61	227	14:05	64	227			
End Time:	12:05		1305			1405					
Avg. ~~dP~~ FPM	65.80			64.90			63.30				
Avg Ts		225.50			226.90			226.90			

* Direct readings from Chevron mass flow meter, FPM

INSERTION FLOWMETER
CALIBRATION DATA AND CERTIFICATION
DOCUMENT

STOMER CODE: 203-673
ART NO.: 455-08
ERIAL NO.: DLI-1486-F
PLICATION MEDIUM: AIR
LOCITY RANGE: 0 - 12000.0 SFPM MASS RANGE: 0 - 250.0 SCFM
UCT I.D.: 2.08 inch. DUCT AREA: 0.0235 SQ.FEET

.#	VELOCITY SFPM	MASS SCFM	SENSE VOLTAGE Volts	LINEAR OUT Volts	SCALED OUT Volts
	0.0	0.0	0.935	000	000
	600.0	14.1	1.606	.250	.282
	1200.0	28.2	1.780	.500	.564
	2400.0	56.4	1.981	1.001	1.130
	3600.0	84.6	2.109	1.506	1.699
	4800.0	112.8	2.210	2.005	2.262
	6000.0	141.0	2.293	2.500	2.821
	7200.0	169.2	2.366	3.009	3.395
	8400.0	197.5	2.436	3.500	3.949
	9600.0	225.7	2.500	4.015	4.531
	10635.5	250.0			5.000
.0	10800.0	253.9	2.558	4.508	
	12000.0	282.1	2.616	5.000	

T MODEL:	400C	LFE S/N:	1075	DUE DATE:	5-4-93	NOZ.AREA:	.136353SQ.FT
VM S/N:	2105	DUE DATE:	1-4-94	THERMO S/N:	13039	DUE DATE:	2-29-93
BQ.S/N:	N/A	DUE DATE:	N/A	BAR. S/N:	115080Y1	DUE DATE:	N / A

his form is to confirm that this instrument was calibrated with an NIST traceable mass flow meter and associated equipment having ated accuracy of +/- 2 % of reading. Refer to product data sheet for calibration specifications.
s calibration is traceable to National Institute of Standard & Technology Test numbers 2.6/167716 A&B 232.09/209275.B.
TANDARD CONDITIONS: 25 degrees C and 760 mmHg.
ES: * - This instrument was calibrated under velocity conditions. Mass data was mathematically derived using the noted duct information. Any change in duct dimensions will result in faulty mass data.
** - This calculated velocity value is necessary to achieve the desired full scale mass flow rate.

ALIBRATION TECHNICIAN: EJ DATE: 2-20-93
IALITY CONTROL INSPECTOR: Monty Dikes DATE: 3-2-93

-800-424-7356
(408)-646-5911
KURZ INSTRUMENTS INC.
2411 Garden Road, Monterey,
FAX(408)-646-8901

APPENDIX G

FUEL ANALYSIS

ENGINEERING SCIENCE, INC.
2520 Pegasus Drive
Bakersfield, CA 93308
Attention: Mr. Troy Delfino

oilwell research, inc.
ANALYTICAL LABORATORIES
Established 1949

Gas Analysis by GC - ASTM D 3588-81

Sample ID: BK9305107
Collected By: Troy Delfino 5/11/93

Date Submitted: 05-12-93
Date Analyzed: 05-14-93

Report Date: May 17, 1993
OWR Lab No. : 93-1997-4

Component	Mole %	Weight %	GPM	Gross BTU/ft³	Net BTU/ft³	Gross BTU/lb	Net BTU/lb
Hydrogen	0.000	0.00		0.00	0.00	0.00	0.00
Oxygen	0.009	0.02					
Nitrogen	0.470	0.70					
Carbon Dioxide	9.204	21.47					
Carbon Monoxide	0.000	0.00					
Hydrogen Sulfide	0.000	0.00		0.00	0.00	0.00	0.00
Methane	89.852	76.40		909.30	818.73	18270.99	16451.11
Ethane	0.010	0.02		0.18	0.16	3.60	3.30
Propane	0.009	0.02	0.003	0.24	0.22	4.74	4.36
iso-Butane	0.212	0.65	0.069	6.91	6.38	138.85	128.11
n-Butane	0.221	0.68	0.070	7.22	6.66	145.02	133.84
iso-Pentane	0.006	0.02	0.002	0.26	0.24	5.22	4.83
n-Pentane	0.006	0.02	0.002	0.25	0.23	5.06	4.68
Hexanes Plus	0.001	0.00	0.000	0.04	0.04	0.77	0.72
Totals	100.000	100.00	0.147	924.39	832.65	18574.25	16730.94

Specific Gravity (Calculated)		0.6515	Air = 1.000 @ 760 mm Hg, 60 °F dry		
Specific Gravity - Corrected		0.6528			
BTU/ft³ Gross - Corrected	Dry:	926.3	Wet:	910.2	*Values corrected for compressibility*
BTU/ft³ Net - Corrected	Dry:	834.4	Wet:	819.9	
BTU/lb Gross - Corrected	Dry:	18613.6	Wet:	18289.7	
BTU/lb Net - Corrected	Dry:	16766.4	Wet:	16474.6	
Specific Volume, ft³/lb	Dry:	20.09	Wet:	19.74	
"F" Factor @ 60 °F, dscf/MMBTU	Dry:	8570	Wet:	8421	
"F" Factor @ 68 °F, dscf/MMBTU	Dry:	8702	Wet:	8550	

Composition by Weight	
64.232	% Carbon
19.447	% Hydrogen
15.624	% Oxygen
0.697	% Nitrogen
0.000	% Sulfur
100.000	Sum