KERN COUNTY AIR POLLUTION CONTROL DISTRICT

PERMIT TO OPERATE

2700 "M" STREET, SUITE 275
BAKERSFIELD, CA. 93301
TELEPHONE: (805) 861-3682

Number: 4013601(E)

PERMIT TO OPERATE IS HEREBY GRANTED TO: Shell Western E & P, Inc.

FOR EQUIPMENT LOCATED AT: Sec. 10, T29S, R28E (Kern River)

EQUIPMENT OR PROCESS DESCRIPTION: Turbine Engine Cogeneration System

OPERATIONAL CONDITIONS LISTED BELOW.

THIS PERMIT BECOMES VOID UPON ANY CHANGE OF OWNERSHIP OR LOCATION, OR ANY ALTERATION.

NOTE: The permittee may be required to provide adequate sampling and testing facilities. Equipment modification requires a new permit.

REVOCABLE: This permit does not authorize the emission of air contaminants in excess of those allowed by the Rules and Regulations of the K.C.A.P.C.D.

WILLIAM J. RODDY
AIR POLLUTION CONTROL OFFICER

By: _____

For Period: 2-28-91 TO 2-28-92

CONDITIONAL APPROVAL:
Compliance with all conditions of approval imposed by any applicable Authority to Construct is required for life of this equipment unless modified by application. Equipment authorized by this Permit to Operate shall comply in full with applicable Rule 210.1 requirements.

EQUIPMENT DESCRIPTION: 20 MW Gas Fired Gas Turbine Engine Cogeneration System, including the following:

a. Fuel gas preparation system consisting of:
   1. Inlet gas/liquid separator,
   2. Electric fuel/gas compressor,
   3. Fuel gas surge drum,
b. General Electric, Model LM 2500 PE, gas trubine generator set rated at 22.89 MW electrical output with combustor water injector system for NOx control,
c. Unfired heat recovery steam generator,
d. Selective catalytic reduction system (SCR) NOx control system,
e. Ammonia storage control and distribution system for support of the SCR system,
f. Carbon monoxide catalytic converter,
g. Continuously recording emission monitors for NOx, CO and 02.

OPERATIONAL CONDITIONS:

1. Gas turbine engine shall be fired exclusively with PUC-regulated quality natural gas or unregulated natural gas documented to be of comparable quality. (Rule 210.1)
2. Lube oil cooler/accumulator vent shall be equipped with device(s) sufficient to prevent any detectable emissions. (Rules 209 & 210.1)
3. Gas turbine water injection rate shall be maintained at water to fuel ratio documented to result in compliance with emission limits. (Rule 209)
4. Ammonia injection rate shall be controlled to maintain ammonia "break through" to less than 20 ppmv. (Rule 419)

5. If water injection, SCR or catalytic converstion system is inoperative, gas turbine engine shall be shutdown. (Rule 209)
6. Inlet gas temperature for both catalyst beds shall be maintained within the range recommended by catalyst manufacterer. (Rule 209)
7. Gas turbine engine shall not burn more than 5.76 MM scf/day of natural gas. (Rule 209)
8. All gas turbine engine exhaust shall flow through both catalyst beds. (Rule 210.1)
9. Gas turbine engine exhaust may be diverted to bypass stack during cold turbine startup. (Rule 209)
10. Gas turbine engine exhaust may be diverted to bypass stack under Rule 111, Equipment Breakdown Conditions, provided all applicable record keeping and reporting requirements of Rule 111 are fulfilled. (Rule 111)

SPECIAL CONDITIONS:

a. SWEPI shall comply in full with Rule 422 (New Source Performance Standards) requirements including notification, record keeping, and monitoring requirements.
b. Continuous emission monitoring system for NO_x (as NO_2), CO and O_2 serving exhaust gas stream shall conform to Rule 108 specifications. (Rule 108)
c. Continuous emission monitoring system shall be calibrated and operated according to EPA guidelines as specified in CFR, Part 60, Appendix B. (Rule 108)
d. Audits of monitors shall be conducted annually by independent laboratory in accordance with EPA guidelines, witnessed by District, and reports shall be submitted to District withint 30 days of such audit. (Rule 108)
e. SWEPI continuous emission monitoring printouts shall be made readily available for District inspection upon request. (Rule 108)
f. SWEPI shall keep accurate records of all maintenance activites, periodic inspections, and repairs of the SCR unit, CO catalyst, water and NH3 injection systems, and their associated controllers and instrumentation units.
g. SWEPI shall maintain records of ammonia consumption.
h. SWEPI shall notify the District in writing 30 days prior to any planned shutodwn of the turbine system, The APCD shall be afforded the opportunity to inspect and sample the SCR and CO catalyst systems.
i. SWEPI shall keep accurate records of daily fuel consumption of gas turbine engine and shall make them readily available for District inspection upon request. (Rule 209)
j. Steam produced at this facility for use in oil-production operations shall affect ony wells connected to well vent vapor recovery systems. (Rule 210.1)
k. SWEPI shall provide design details, including but not limited to engineering drawings of SCR and catalystic convertor units for District approval prior to installation. (Rule 209)
l. Non-compliance with NOx emission sampling limit shall require: shutdown of gas turbine, down-throttling (reduced fuel consumption), or installation of additional SCR catalyst volume-increased emission limit(s) will require modified Authority to Construct before continued operation at such levels pursuant to Section 42350 of California Health & Safety Code, a variance from this condition cannot be obtained. (Rule 109)

Warning:

Failure of catalysts to perform as required because of catalyst poisoning or fouling shall not be recognized as basis for Rule 111 enforcement exemption. (Rule 209)

EMISSION SAMPLING LIMITS:

Particulates:	3.36	lbm/hr	(Rule 210.1)	
Sulfur Compounds:	1.13	lbm/hr	(of SO_2)	(Rule 210.1)
	0.30	lbm/hr	(of SO_4)	(Rule 210.1)
Oxides of Nitrogen:	13.15	lbm/hr	(as NO_2)	(Rule 210.1)
Hydrocarbons:	10.08	lbm/hr	(Rule 210.1)	
Carbon Monoxide:	6.40	lbm/hr	(Rule 210.1)	

Compliance with emission sampling limit consistent with Policy Procedure E-1801 shall be demonstrated by District-witnessed sample collection by independent testing laboratory within 60 days after startup of this equipment and annually within 60 days prior to permit anniversary date, and the official test results and field data submitted within 30 days thereafter. Samples shall be collected during maximum fuel consumption and use of evaporative coolers. (Rule 108.1)

KERN COUNTY AIR POLLUTION CONTROL DISTRICT

PERMIT TO OPERATE

2700 "M" STREET, SUITE 275
BAKERSFIELD, CA 93301
TELEPHONE: (805) 861-3682

Number: 4013612(C)

PERMIT TO OPERATE IS HEREBY GRANTED TO: Shell Western E & P, Inc.

FOR EQUIPMENT LOCATED AT: Sec. 10, T29S, R28E (Kern River)

EQUIPMENT OR PROCESS DESCRIPTION: Turbine Engine Cogeneration System

OPERATIONAL CONDITIONS LISTED BELOW.

THIS PERMIT BECOMES VOID UPON ANY CHANGE OF OWNERSHIP OR LOCATION, OR ANY ALTERATION.

NOTE: The permittee may be required to provide adequate sampling and testing facilities. Equipment modification requires a new permit.

REVOCABLE: This permit does not authorize the emission of air contaminants in excess of those allowed by the Rules and Regulations of the K.C.A.P.C.D.

WILLIAM J. RODDY
AIR POLLUTION CONTROL OFFICER

By: _____

For Period: 2-28-91 TO 2-28-92

CONDITIONAL APPROVAL:
Compliance with all conditions of approval imposed by any applicable Authority to Construct is required for life of this equipment unless modified by application. Equipment authorized by this Permit to Operate shall comply in full with applicable Rule 210.1 requirements.

EQUIPMENT DESCRIPTION:

a. Allison, Model 501 KB5, gas turbine generator set rated at 4.0 MW electrical output with combustor water injector system for NO_x control,
b. Unfired heat recovery steam generator,
c. Continuously recording emission monitors for NO_x, CO and O_2.

OPERATIONAL CONDITIONS:

1. Gas turbine engine shall be fired exclusively with PUC-regulated quality natural gas or unregulated natural gas documented to be of comparable quality. (Rule 210.1)
2. Lube oil cooler/accumulator vent shall be equipped with device(s) sufficient to prevent any detectable emissions. (Rules 209 & 210.1)
3. Gas turbine engine water injection rate shall be no less than 0.53 by weight, water to fuel ratio, or rate documented to result in compliance with emission limits. (Rule 209)
4. Exhaust gas combustion contaminant emissions shall not exceed 0.1 gr/scf. (Rule 407.2)
5. Exhaust gas sulfur compound concentration shall not exceed 150 ppmv @ 15 excess oxygen and or dry basis. (Rule 422)
6. Exhaust gas oxides of nitrogen shall not exceed 206 ppmv at 15% excess oxygen and on dry basis. (Rule 422)
7. Gas turbine engine shall not burn more than 1.33 MM scf/day of fuel gas. (Rule 210.1)
8. Fuel gas sulfur content shall not exceed .1 gr/100 scf of fuel gas without prior District approval. (Rule 210.1)

9. SWEPI shall keep accurate daily record of sulfur content and volnme flow rate of fuel gas and such records shall be readily available for District inspection upon request. (Rule 422)
10. Gas turbine engine shall exhaust only to heat recovery steam generator. (Rule 210.1)
11. Gas turbine engine exhaust may be diverted to bypass stack under Rule 111, Equipment Breakdown Conditions, provided all applicable record keeping and reporting requirements of Rule 111 are fulfilled. (Rule 111)
12. Gas turbine engine bypass exhaust stack shall be gas-tight. (Rule 209)
13. If water injection system is inoperative, gas turbine shall be shut down. (Rule 210.1)
14. Gas turbine engine shall be equipped with continuously recording fuel gas flowrate indicator. (Rules 209 & 422)

SPECIAL CONDITIONS:

a. SWEPI shall comply in full with Rule 422 (New Source Performance Standards) requirements including notification, record keeping, and monitoring requirements.
b. Continuous emission monitoring system for NO_x (as NO_2), CO and O_2 serving exhaust gas stream shall conform to Rule 108 specifications. (Rule 108)
c. Continuous emission monitoring system shall be calibrated and operated according to EPA guidelines as specified in CFR, Part 60, Appendix B. (Rule 108)
d. Audits of monitors shall be conducted annually by independent laboratory in accordance with EPA guidelines, witnessed by District, and reports shall be submitted to District withint 30 days of such audit. (Rule 108)
e. SWEPI continuous emission monitoring printouts shall be made readily available for District inspection upon request. (Rule 108)
f. SWEPI shall keep accurate records of daily fuel consumption of gas turbine engine and shall make them readily available for District inspection upon request. (Rule 209)
g. All steam produced by this source operation shall be used to steam only existing wells served by existing vapor control system(s). Any emissions from new wells drilled into zone steamed by this equipment shall be fully controlled or offset. (Rule 210.1)

EMISSION SAMPLING LIMITS:

Particulates:	0.67	lbm/hr	(Rule 210.1)	
Sulfur Compounds:	0.22	lbm/hr	(of SO_2)	(Rule 210.1)
	0.06	lbm/hr	(of SO_4)	(Rule 210.1)
Oxides of Nitrogen:	8.34	lbm/hr	(as NO_2)	(Rule 210.1)
Hydrocarbons:	2.00	lbm/hr	(Rule 210.1)	
Carbon Monoxide:	5.08	lbm/hr	(Rule 210.1)	

COMPLIANCE TESTING REQUIREMENTS:

Compliance with emission sampling limit consistent with Policy Procedure E-1801 shall be demonstrated by District-witnessed sample collection by independent testing laboratory within 60 days after startup of this equipment and annually within 60 days prior to permit anniversary date, and the official test results and field data submitted within 30 days thereafter. Samples shall be collected during maximum fuel consumption and use of evaporative coolers. (Rule 108.1)

STATE OF CALIFORNIA AIR TOXICS HOT SPOTS REQUIREMENTS:

Facility shall comply with California Health and Safety Code Sections 44300 through 44384. (Rule 208.1)

KERN COUNTY AIR POLLUTION CONTROL DISTRICT

PERMIT TO OPERATE

2700 "M" STREET, SUITE 275
BAKERSFIELD, CA. 93301
TELEPHONE: (805) 861-3682

Number: 4013613(C)

PERMIT TO OPERATE IS HEREBY GRANTED TO: Shell Western E & P, Inc.

FOR EQUIPMENT LOCATED AT: Sec. 10, T29S, R28E (Kern River)

EQUIPMENT OR PROCESS DESCRIPTION: Turbine Engine Cogeneration System

OPERATIONAL CONDITIONS LISTED BELOW.

THIS PERMIT BECOMES VOID UPON ANY CHANGE OF OWNERSHIP OR LOCATION, OR ANY ALTERATION.

NOTE: The permittee may be required to provide adequate sampling and testing facilities. Equipment modification requires a new permit.

REVOCABLE: This permit does not authorize the emission of air contaminants in excess of those allowed by the Rules and Regulations of the K.C.A.P.C.D.

WILLIAM J. RODDY
AIR POLLUTION CONTROL OFFICER

By: _____

For Period: 2-28-91 TO 2-28-92

CONDITIONAL APPROVAL:
Compliance with all conditions of approval imposed by any applicable Authority to Construct is required for life of this equipment unless modified by application. Equipment authorized by this Permit to Operate shall comply in full with applicable Rule 210.1 requirements.

EQUIPMENT DESCRIPTION:

a. Allison, Model 501 KB5, gas turbine generator set rated at 4.0 MW electrical output with combustor water injector system for NO_x control,
b. Unfired heat recovery steam generator,
c. Continuously recording emission monitors for NO_x, CO and O_2.

OPERATIONAL CONDITIONS:

1. Gas turbine engine shall be fired exclusively with PUC-regulated quality natural gas or unregulated natural gas documented to be of comparable quality. (Rule 210.1)
2. Lube oil cooler/accumulator vent shall be equipped with device(s) sufficient to prevent any detectable emissions. (Rules 209 & 210.1)
3. Gas turbine engine water injection rate shall be no less than 0.53 by weight, water to fuel ratio, or rate documented to result in compliance with emission limits. (Rule 209)
4. Exhaust gas combustion contaminant emissions shall not exceed 0.1 gr/scf. (Rule 407.2)
5. Exhaust gas sulfur compound concentration shall not exceed 150 ppmv @ 15 excess oxygen and or dry basis. (Rule 422)
6. Exhaust gas oxides of nitrogen shall not exceed 206 ppmv at 15% excess oxygen and on dry basis. (Rule 422)
7. Gas turbine engine shall not burn more than 1.33 MM scf/day of fuel gas. (Rule 210.1)
8. Fuel gas sulfur content shall not exceed .1 gr/100 scf of fuel gas without prior District approval. (Rule 210.1)

9. SWEPI shall keep accurate daily record of sulfur content and volnme flow rate of fuel gas and such records shall be readily available for District inspection upon request. (Rule 422)
10. Gas turbine engine shall exhaust only to heat recovery steam generator. (Rule 210.1)
11. Gas turbine engine exhaust may be diverted to bypass stack under Rule 111, Equipment Breakdown Conditions, provided all applicable record keeping and reporting requirements of Rule 111 are fulfilled. (Rule 111)
12. Gas turbine engine bypass exhaust stack shall be gas-tight. (Rule 209)
13. If water injection system is inoperative, gas turbine shall be shut down. (Rule 210.1)
14. Gas turbine engine shall be equipped with continuously recording fuel gas flowrate indicator. (Rules 209 & 422)

SPECIAL CONDITIONS:

a. SWEPI shall comply in full with Rule 422 (New Source Performance Standards) requirements including notification, record keeping, and monitoring requirements.
b. Continuous emission monitoring system for NO_x (as NO_2), CO and O_2 serving exhaust gas stream shall conform to Rule 108 specifications. (Rule 108)
c. Continuous emission monitoring system shall be calibrated and operated according to EPA guidelines as specified in CFR, Part 60, Appendix B. (Rule 108)
d. Audits of monitors shall be conducted annually by independent laboratory in accordance with EPA guidelines, witnessed by District, and reports shall be submitted to District withint 30 days of such audit. (Rule 108)
e. SWEPI continuous emission monitoring printouts shall be made readily available for District inspection upon request. (Rule 108)
f. SWEPI shall keep accurate records of daily fuel consumption of gas turbine engine and shall make them readily available for District inspection upon request. (Rule 209)
g. All steam produced by this source operation shall be used to steam only existing wells served by existing vapor control system(s). Any emissions from new wells drilled into zone steamed by this equipment shall be fully controlled or offset. (Rule 210.1)

EMISSION SAMPLING LIMITS:

Particulates:	0.67	lbm/hr	(Rule 210.1)	
Sulfur Compounds:	0.22	lbm/hr	(of SO_2)	(Rule 210.1)
	0.06	lbm/hr	(of SO_4)	(Rule 210.1)
Oxides of Nitrogen:	8.34	lbm/hr	(as NO_2)	(Rule 210.1)
Hydrocarbons:	2.00	lbm/hr	(Rule 210.1)	
Carbon Monoxide:	5.08	lbm/hr	(Rule 210.1)	

COMPLIANCE TESTING REQUIREMENTS:

Compliance with emission sampling limit consistent with Policy Procedure E-1801 shall be demonstrated by District-witnessed sample collection by independent testing laboratory within 60 days after startup of this equipment and annually within 60 days prior to permit anniversary date, and the official test results and field data submitted within 30 days thereafter. Samples shall be collected during maximum fuel consumption and use of evaporative coolers. (Rule 108.1)

STATE OF CALIFORNIA AIR TOXICS HOT SPOTS REQUIREMENTS:

Facility shall comply with California Health and Safety Code Sections 44300 through 44384. (Rule 208.1)

BK023

SOURCE TESTING OF THREE NATURAL GAS FIRED TURBINES AT THE SEKR COGENERATION FACILITY, BAKERSFIELD, CALIFORNIA

Prepared for:

Shell Western Exploration and Production, Inc.
P.O. Box 11164
Bakersfield, California 93389

For Submittal to:

San Joaquin Valley Unified Air Pollution Control District
2700 M Street, Suite 275
Bakersfield, California 93301

Rec 5/5/92

Test Date:

March 31 and April 1, 1992

Report Date:

April 27, 1992

Prepared by:

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

ES ENGINEERING-SCIENCE

BK023

SOURCE TESTING OF THREE NATURAL GAS FIRED TURBINES AT THE SEKR COGENERATION FACILITY, BAKERSFIELD, CALIFORNIA

Prepared for:

Shell Western Exploration and Production, Inc.
P.O. Box 11164
Bakersfield, California 93389

For Submittal to:

San Joaquin Valley Unified Air Pollution Control District
2700 M Street, Suite 275
Bakersfield, California 93301

Test Dates:

March 31 and April 1, 1992

Report Date:

April 27, 1992

Prepared by:

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

Endorsed by:

Project Manager
Engineering-Science, Inc.

RECEIVED
MAY 5 1992
KERN COUNTY AIR
POLLUTION CONTROL DISTRICT

SUMMARY OF SOURCE TEST RESULTS

Company : SWEPI – SEKR
Test Date : 31–Mar–92

Permit # 4013612C
UNIT 2, HRSG OUTLET STACK

	gr/scf	gr/scf @12% CO2	ppm(v)	ppm(v) @15% O2	lb/hr	lb/MMBtu
PARTICULATE						
Mean						
SULFATE						
Mean						
NOx as NO2, dry						
Run 1			27.41	26.91	4.61	0.0982
2			27.32	26.80	4.65	0.0979
Mean			27.37	26.85	4.63	0.0981
CO						
Run 1			4.84	4.75	0.50	0.0106
2			4.88	4.79	0.51	0.0106
Mean			4.86	4.77	0.50	0.0106
SO2						
Mean						
HC (non–methane)						
Mean						

Scrubber Liquor Analysis :
Chlorides–

Specific Gravity–

Comments : ANNUAL 210.1 – PUC GAS F TURBINE PWR 4.0 MW Co-gen w H_2O INJ

For Regulatory Agency Use Only :

5/21/92

SUMMARY OF SOURCE TEST RESULTS

Company : SWEPI – SEKR
Test Date : 31–Mar–92

Permit # 4013613C
UNIT 3, HRSG OUTLET STACK

	gr/scf	gr/scf @12% CO2	ppm(v)	ppm(v) @15% O2	lb/hr	lb/MMBtu
PARTICULATE						
Mean						
SULFATE						
Mean						
NOx as NO2, dry						
Run 1			29.08	29.93	5.04	0.1093
2			28.80	30.09	5.06	0.1099
Mean			28.94	30.01	5.05	0.1096
CO						
Run 1			5.62	5.79	0.59	0.0129
2			5.54	5.79	0.59	0.0129
Mean			5.58	5.79	0.59	0.0129
SO2						
Mean						
HC (non–methane)						
Mean						

Scrubber Liquor Analysis :
Chlorides–

Specific Gravity–

Comments : ANNUAL 210.1 – PUC GAS F 4.0MW TURBINE PWR COGEN w H2O INJ

For Regulatory Agency Use Only :

5/21/92

Company : SWEPI – SEKR
Test Date : 01–Apr–92

Permit # 4013601F
UNIT 1, HRSG OUTLET STACK

	gr/scf	gr/scf @12% CO2	ppm(v)	ppm(v) @15% O2	lb/hr	lb/MMBtu
PARTICULATE						
Mean						
SULFATE						
Mean						
NOx as NO2, dry						
Run 1			8.43	7.45	6.34	0.0272
2			8.40	7.75	6.58	0.0283
3			8.89	7.82	7.11	0.0286
4			8.23	7.28	6.64	0.0266
5			7.99	7.08	6.36	0.0258
6			7.67	6.87	6.21	0.0251
Mean						
CO						
Run 1			0.39	0.35	0.18	0.0008
2			0.34	0.31	0.16	0.0007
3			0.33	0.29	0.16	0.0007
4			0.25	0.22	0.12	0.0005
5			0.26	0.23	0.13	0.0005
6			0.30	0.27	0.15	0.0006
Mean						
SO2						
Mean						
HC (non–methane)						
Mean						

Scrubber Liquor Analysis :
Chlorides–

Specific Gravity–

Comments : O2 Relative Accuracy = 1.83 %, NOx Relative Accuracy = 11.53 %, CO Relative Accuracy = 0.77 %.

For Regulatory Agency Use Only :

Company : SWEPI – SEKR
Test Date : 01–Apr–92

Permit # 4013601F
UNIT 1, HRSG OUTLET STACK

	gr/scf	gr/scf @12% CO2	ppm(v)	ppm(v) @15% O2	lb/hr	lb/MMBtu
PARTICULATE						
Run 7						
8						
9						
10						
Mean						
SULFATE						
Run 7						
8						
9						
10						
Mean						
NOx as NO2, dry						
Run 7			7.79	7.00	6.34	0.0255
8			7.68	6.89	6.23	0.0252
9			7.90	7.01	6.34	0.0256
10			7.84	6.97	6.31	0.0255
Mean			8.08	7.21	6.45	0.0263
CO						
Run 7			0.30	0.27	0.15	0.0006
8			0.30	0.27	0.15	0.0006
9			0.29	0.26	0.14	0.0006
10			0.28	0.25	0.14	0.0006
Mean			0.30	0.27	0.15	0.0006
SO2						
Mean						
HC (non–methane)						
Mean						

Scrubber Liquor Analysis :
Chlorides–

Specific Gravity–

Comments : ANNUAL 210.1 – PUC GAS F TURBINE PWR 22.89 MW COGEN W H_2O INJ NH_3/SCR + CO CATALYST

For Regulatory Agency Use Only :

5/21/92

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SECTION 1

INTRODUCTION

SOURCE TESTING OF THREE NATURAL GAS FIRED TURBINES AT THE SEKR COGENERATION FACILITY, BAKERSFIELD, CALIFORNIA

INTRODUCTION

Engineering-Science, Inc. (ES), Bakersfield, California conducted air emissions testing of three natural gas fired turbines located at the SEKR Cogeneration Facility located in the Kern River Oil Field, Bakersfield, California. Testing was conducted to demonstrate the facility's compliance with the Authority to Construct Permit No.'s 4013601F, 4013612C, and 4013613C for Turbines 1-3, respectively. Turbine 1 is rated at 20 MW and Turbines 2 and 3 are rated at 4 MW each. These permits were issued by the San Joaquin Valley Unified Air Pollution Control District (District).

Testing procedures were conducted in accordance with the guidelines published in 40 CFR, Part 60, Appendix A and Appendix B, dated July 1990 and CARB Method 100. Testing consisted of Continuous Emission Monitoring (CEM) for Nitrogen Oxides (NO_X), Carbon Monoxide (CO), and Oxygen (O_2). The turbines were operated at base load conditions and fueled by natural gas. On March 31, 1992 duplicate 1-hour tests were performed on Turbines 2 and 3.

Ten CEM runs were conducted April 1, 1992 on Turbine 1 for determining compliance and Relative Accuracy for the facility CEM NO_X, CO, and O_2 monitors. The facility's analyzer system is configured to cycle on a regular interval to monitor the emissions from all three unit's stacks using a single set of analyzers. The CEM system was operated in its normal mode during this test period.

A fuel sample was collected and analyzed for Carbon (C), Hydrogen (H), Oxygen (O), Nitrogen (N), Sulfur (S), and heating value (Btu). The fuel analysis and fuel consumption (supplied by SWEPI SEKR plant personnel) was used to determine exhaust gas flowrates and pollutant mass emission rates in accordance with F-Factor calculaton methods specified in 40 CFR, Part 60, Appendix A.

Mr. Ken Kirkpatrick of Shell Western Exploration and Production, Inc. coordinated activities for the plant and was responsible for supplying ES with the plant operating data. The testing program was observed by Mr. Greg LeFore of the District. The ES testing team was comprised of Messrs. Jim Polhamus and Cesario Mangaoang.

SECTION 2

DATA SUMMARIES

SECTION 2

DATA SUMMARIES

The test results for NO_X and CO are presented in the Summary of Source Test Results at the front of this report. Additional data summaries are presented in the following tables of this section to supplement and clarify results. Section 3, Test Method Calculations presents emission calculations for Relative Accuracy of CEM instruments (NO_X, CO, and O_2), gaseous components (NO_X and CO) emissions, and the fuel calculations used for determining these emissions. Carbon Monoxide relative accuracy was calculated using the applicable emission standard value of 43.47 ppm in the RA equation. This calculation method was used due to the very low CO emissions (<1 ppm).

EMISSION DATA SUMMARY
GAS COMPONENTS

SWEPI – SEKR
UNIT 2, HRSG OUTLET STACK

31–Mar–92

NITROGEN DIOXIDE

Run #	% O2	Corrected ppm (dry)	Corrected ppm (dry) @ 15% O2	lb/hr	lb/MMBtu
1	14.89	27.41	26.91	4.61	0.0982
2	14.89	27.32	26.80	4.65	0.0979
Average	14.89	27.37	26.85	4.63	0.0981

CARBON MONOXIDE

Run #	Corrected ppm (dry)	Corrected ppm (dry) @ 15% O2	lb/hr	lb/MMBtu
1	4.84	4.75	0.50	0.0106
2	4.88	4.79	0.51	0.0106
Average	4.86	4.77	0.50	0.0106

SULFUR DIOXIDE

Run #	Corrected ppm (dry)	Corrected ppm (dry) @ 15% O2	lb/hr	lb/MMBtu
Average				

HYDROCARBON (NON–METHANE)

Run #	Corrected ppm (dry)	Corrected ppm (dry) @ 15% O2	lb/hr	lb/MMBtu
1				
2				
Average				

EMISSION DATA SUMMARY
GAS COMPONENTS

31-Mar-92

SWEPI - SEKR
UNIT 3, HRSG OUTLET STACK

NITROGEN DIOXIDE

Run #	% O2	Corrected ppm (dry)	Corrected ppm (dry) @ 15% O2	lb/hr	lb/MMBtu
1	15.17	29.08	29.93	5.04	0.1093
2	15.25	28.80	30.09	5.06	0.1099
Average	15.21	28.94	30.01	5.05	0.1096

CARBON MONOXIDE

Run #	Corrected ppm (dry)	Corrected ppm (dry) @ 15% O2	lb/hr	lb/MMBtu
1	5.62	5.79	0.59	0.0129
2	5.54	5.79	0.59	0.0129
Average	5.58	5.79	0.59	0.0129

SULFUR DIOXIDE

Run #	Corrected ppm (dry)	Corrected ppm (dry) @ 15% O2	lb/hr	lb/MMBtu
Average				

HYDROCARBON (NON-METHANE)

Run #	Corrected ppm (dry)	Corrected ppm (dry) @ 15% O2	lb/hr	lb/MMBtu
Average				

EMISSION DATA SUMMARY
GAS COMPONENTS

01-Apr-92

SWEPI - SEKR
UNIT 1, HRSG OUTLET STACK

NITROGEN DIOXIDE

Run #	% O2	Corrected ppm (dry)	Corrected ppm (dry) @ 15% O2	lb/hr	lb/MMBtu
1	14.23	8.43	7.45	6.34	0.0272
2	14.50	8.40	7.75	6.58	0.0283
3	14.19	8.89	7.82	7.11	0.0286
4	14.23	8.23	7.28	6.64	0.0266
5	14.24	7.99	7.08	6.36	0.0258
6	14.31	7.67	6.87	6.21	0.0251
Average					

CARBON MONOXIDE

Run #	Corrected ppm (dry)	Corrected ppm (dry) @ 15% O2	lb/hr	lb/MMBtu
1	0.39	0.35	0.18	0.0008
2	0.34	0.31	0.16	0.0007
3	0.33	0.29	0.16	0.0007
4	0.25	0.22	0.12	0.0005
5	0.26	0.23	0.13	0.0005
6	0.30	0.27	0.15	0.0006
Average				

SULFUR DIOXIDE

Run #	Corrected ppm (dry)	Corrected ppm (dry) @ 15% O2	lb/hr	lb/MMBtu
Average				

HYDROCARBON (NON-METHANE)

Run #	Corrected ppm (dry)	Corrected ppm (dry) @ 15% O2	lb/hr	lb/MMBtu
Average				

EMISSION DATA SUMMARY
GAS COMPONENTS

01-Apr-92

SWEPI - SEKR
UNIT 1, HRSG OUTLET STACK

NITROGEN DIOXIDE

Run #	% O2	Corrected ppm (dry)	Corrected ppm (dry) @ 15% O2	lb/hr	lb/MMBtu
7	14.33	7.79	7.00	6.34	0.0255
8	14.33	7.68	6.89	6.23	0.0252
9	14.25	7.90	7.01	6.34	0.0256
10	14.27	7.84	6.97	6.31	0.0255
Average	14.29	8.08	7.21	6.45	0.0263

CARBON MONOXIDE

Run #	Corrected ppm (dry)	Corrected ppm (dry) @ 15% O2	lb/hr	lb/MMBtu
7	0.30	0.27	0.15	0.0006
8	0.30	0.27	0.15	0.0006
9	0.29	0.26	0.14	0.0006
10	0.28	0.25	0.14	0.0006
Average	0.30	0.27	0.15	0.0006

SULFUR DIOXIDE

Run #	Corrected ppm (dry)	Corrected ppm (dry) @ 15% O2	lb/hr	lb/MMBtu
Average				

HYDROCARBON (NON-METHANE)

Run #	Corrected ppm (dry)	Corrected ppm (dry) @ 15% O2	lb/hr	lb/MMBtu
Average				

SECTION 3

TEST METHOD CALCULATIONS

EMISSION CALCULATIONS
GAS COMPONENTS

SWEPI – SEKR
UNIT 2, HRSG OUTLET STACK

DATA :

	Run 1	Run 2	Average
Date	31–Mar–92	31–Mar–92	
Oxygen (%)	14.89	14.89	14.89
Qs(std), dscfm	23,139	23,376	23,258
F–Factor, dscf/MMBtu	8,498.04	8,498.04	8,498.04
NOx, ppm	27.41	27.32	27.37
CO, ppm	4.84	4.88	4.86
SO2, ppm			
HC (non–methane), ppm			
Fuel, Lb/hr	2,043	2,064	2,054
Fuel, ft3/lb	21.99	21.99	21.99

CALCULATIONS :

NOx, lb/hr	4.61	4.65	4.63
NOx, ppm @ 15 %O2	26.91	26.80	26.85
NOx, lb/MMBtu	0.0982	0.0979	0.0981
NOx, lb/MMscf of fuel	102.72	102.37	102.54
CO, lb/hr	0.50	0.51	0.50
CO, ppm @ 15 %O2	4.75	4.79	4.77
CO, lb/MMBtu	0.0106	0.0106	0.0106
CO, lb/MMscf of fuel	11.05	11.13	11.09
SO2, lb/hr			
SO2, ppm @ 15 %O2			
SO2, lb/MMBtu			
SO2, lb/MMscf of fuel			
HC, lb/hr			
HC, ppm @ 15 %O2			
HC, lb/MMBtu			
HC, lb/MMscf of fuel			

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

Lb/MMscf of fuel = [(lb/hr) / (lb fuel/hr) / (ft3/lb fuel) x (1E+06/MM)]

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

EMISSION CALCULATIONS
GAS COMPONENTS

SWEPI – SEKR
UNIT 3, HRSG OUTLET STACK

DATA :

	Run 1	Run 2	Average
Date	31–Mar–92	31–Mar–92	
Oxygen (%)	15.17	15.25	15.21
Qs(std), dscfm	23,806	24,143	23,975
F–Factor, dscf/MMBtu	8,498.04	8,498.04	8,498.04
NOx, ppm	29.08	28.80	28.94
CO, ppm	5.62	5.54	5.58
SO2, ppm			
HC (non–methane), ppm			
Fuel, Lb/hr	2,004	2,004	2,004
Fuel, ft3/lb	21.99	21.99	21.99

CALCULATIONS :

NOx, lb/hr	5.04	5.06	5.05
NOx, ppm @ 15 %O2	29.93	30.09	30.01
NOx, lb/MMBtu	0.1093	0.1099	0.1096
NOx, lb/MMscf of fuel	114.29	114.79	114.54
CO, lb/hr	0.59	0.59	0.59
CO, ppm @ 15 %O2	5.79	5.79	5.79
CO, lb/MMBtu	0.0129	0.0129	0.0129
CO, lb/MMscf of fuel	13.45	13.44	13.45
SO2, lb/hr			
SO2, ppm @ 15 %O2			
SO2, lb/MMBtu			
SO2, lb/MMscf of fuel			
HC, lb/hr			
HC, ppm @ 15 %O2			
HC, lb/MMBtu			
HC, lb/MMscf of fuel			

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

Lb/MMscf of fuel = [(lb/hr) / (lb fuel/hr) / (ft3/lb fuel) x (1E+06/MM)]

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

EMISSION CALCULATIONS
GAS COMPONENTS

SWEPI – SEKR
UNIT 1, HRSG OUTLET STACK

DATA :

	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Average
Date	01–Apr–92	01–Apr–92	01–Apr–92	01–Apr–92	01–Apr–92	01–Apr–92	
Oxygen (%)	14.23	14.50	14.19	14.23	14.24	14.31	
Qs(std), dscfm	103,347	107,601	109,873	110,930	109,400	111,161	
F–Factor, dscf/MMBtu	8,498.04	8,498.04	8,498.04	8,498.04	8,498.04	8,498.04	
NOx, ppm	8.43	8.40	8.89	8.23	7.99	7.67	
CO, ppm	0.39	0.34	0.33	0.25	0.26	0.30	
SO2, ppm							
HC (non–methane), ppm							
Fuel, Lb/hr	10,127	10,117	10,831	10,870	10,704	10,762	
Fuel, ft3/lb	21.99	21.99	21.99	21.99	21.99	21.99	

CALCULATIONS :

NOx, lb/hr	6.34	6.58	7.11	6.64	6.36	6.21
NOx, ppm @ 15 %O2	7.45	7.75	7.82	7.28	7.08	6.87
NOx, lb/MMBtu	0.0272	0.0283	0.0286	0.0266	0.0258	0.0251
NOx, lb/MMscf of fuel	28.46	29.56	29.84	27.79	27.02	26.24
CO, lb/hr	0.18	0.16	0.16	0.12	0.13	0.15
CO, ppm @ 15 %O2	0.35	0.31	0.29	0.22	0.23	0.27
CO, lb/MMBtu	0.0008	0.0007	0.0007	0.0005	0.0005	0.0006
CO, lb/MMscf of fuel	0.80	0.73	0.67	0.51	0.54	0.62
SO2, lb/hr						
SO2, ppm @ 15 %O2						
SO2, lb/MMBtu						
SO2, lb/MMscf of fuel						
HC, lb/hr						
HC, ppm @ 15 %O2						
HC, lb/MMBtu						
HC, lb/MMscf of fuel						

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

Lb/MMscf of fuel = [(lb/hr) / (lb fuel/hr) / (ft3/lb fuel) x (1E+06/MM)]

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

EMISSION CALCULATIONS
GAS COMPONENTS

SWEPI – SEKR
UNIT 1, HRSG OUTLET STACK

DATA :

	Run 7	Run 8	Run 9	Run 10	Average
Date	01–Apr–92	01–Apr–92	01–Apr–92	01–Apr–92	
Oxygen (%)	14.33	14.33	14.25	14.27	14.30
Qs(std), dscfm	111,810	111,613	110,270	110,603	109,661
F–Factor, dscf/MMBtu	8,498.04	8,498.04	8,498.04	8,498.04	8,498.04
NOx, ppm	7.79	7.68	7.9	7.84	8.08
CO, ppm	0.30	0.30	0.29	0.28	0.30
SO2, ppm					
HC (non–methane), ppm					
Fuel, Lb/hr	10,792	10,773	10,773	10,773	10,652
Fuel, ft3/lb	21.99	21.99	21.99	21.99	21.99

CALCULATIONS :

NOx, lb/hr	6.34	6.24	6.34	6.31	6.45
NOx, ppm @ 15 %O2	7.00	6.90	7.01	6.98	7.21
NOx, lb/MMBtu	0.0255	0.0252	0.0256	0.0255	0.0263
NOx, lb/MMscf of fuel	26.70	26.32	26.75	26.63	27.53
CO, lb/hr	0.15	0.15	0.14	0.14	0.15
CO, ppm @ 15 %O2	0.27	0.27	0.26	0.25	0.27
CO, lb/MMBtu	0.0006	0.0006	0.0006	0.0006	0.0006
CO, lb/MMscf of fuel	0.63	0.63	0.60	0.58	0.63
SO2, lb/hr					
SO2, ppm @ 15 %O2					
SO2, lb/MMBtu					
SO2, lb/MMscf of fuel					
HC, lb/hr					
HC, ppm @ 15 %O2					
HC, lb/MMBtu					
HC, lb/MMscf of fuel					

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

Lb/MMscf of fuel = [(lb/hr) / (lb fuel/hr) / (ft3/lb fuel) x (1E+06/MM)]

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

FUEL BASED CALCULATIONS

SWEPI – SEKR
UNIT 2, HRSG OUTLET STACK

31–Mar–92

FUEL ANALYSIS DATA

Run #	Fuel Value (%), Moisture & Ash Free: Carbon	Hydrogen	Nitrogen	Oxygen	Sulfur	GCV BTU/lb	ft3/lb	lb/gal
1	73.46	23.76	1.36	1.42	0.00	22,995		
2	73.46	23.76	1.36	1.42	0.00	22,995		

CALCULATIONS

Run #	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	Heat Input MMBTU/hr	F–Factor dscf/MMBTU	Qs(std) dscfm
1	14.89	2043					46.97844	8,498.04	23,139
2	14.89	2064					47.46133	8,498.04	23,376

Heat Input, MMBTU/hr = (lb/hr fuel gas) x BTU/lb x MM/1E+06

= (ft3/hr fuel gas) x BTU/lb / (ft3/lb fuel gas) x MM/1E+06

= (lb/hr fuel oil) x BTU/lb x MM/1E+06

= (gal/hr fuel oil) x lb/gal x BTU/lb x MM/1E+06

= (lb/hr solid fuel) x BTU/lb x MM/1E+06

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

Qs(std), dscfm = MMBTU/hr x [F–Factor x (20.9 / (20.9 – %O2)) x (hr / 60 min)]

GCV = Gross Calorific Value of fuel

Standard Temperature = 60 °F

FUEL BASED CALCULATIONS

SWEPI – SEKR
UNIT 3, HRSG OUTLET STACK

31–Mar–92

FUEL ANALYSIS DATA

Run #	Fuel Value (%), Moisture & Ash Free: Carbon	Hydrogen	Nitrogen	Oxygen	Sulfur	GCV BTU/lb	ft3/lb	lb/gal
1	73.46	23.76	1.36	1.42	0.00	22,995		
2	73.46	23.76	1.36	1.42	0.00	22,995		

CALCULATIONS

Run #	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	Heat Input MMBTU/hr	F–Factor dscf/MMBTU	Qs(std) dscfm
1	15.17	2004					46.08164	8,498.04	23,806
2	15.25	2004					46.08164	8,498.04	24,143

Heat Input, MMBTU/hr = (lb/hr fuel gas) x BTU/lb x MM/1E+06

= (ft3/hr fuel gas) x BTU/lb / (ft3/lb fuel gas) x MM/1E+06

= (lb/hr fuel oil) x BTU/lb x MM/1E+06

= (gal/hr fuel oil) x lb/gal x BTU/lb x MM/1E+06

= (lb/hr solid fuel) x BTU/lb x MM/1E+06

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

Qs(std), dscfm = MMBTU/hr x [F–Factor x (20.9 / (20.9 – %O2)) x (hr / 60 min)]

GCV = Gross Calorific Value of fuel

Standard Temperature = 60 °F

FUEL BASED CALCULATIONS

SWEPI – SEKR
UNIT 1, HRSG OUTLET STACK

01–Apr–92

FUEL ANALYSIS DATA

Run #	Fuel Value (%), Moisture & Ash Free: Carbon	Hydrogen	Nitrogen	Oxygen	Sulfur	GCV BTU/lb	ft3/lb	lb/gal
1	73.46	23.76	1.36	1.42	0.00	22,995		
2	73.46	23.76	1.36	1.42	0.00	22,995		
3	73.46	23.76	1.36	1.42	0.00	22,995		
4	73.46	23.76	1.36	1.42	0.00	22,995		
5	73.46	23.76	1.36	1.42	0.00	22,995		
6	73.46	23.76	1.36	1.42	0.00	22,995		

CALCULATIONS

Run #	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	Heat Input MMBTU/hr	F–Factor dscf/MMBTU	Qs(std) dscfm
1	14.23	10,127					232.869	8,498.04	103,347
2	14.50	10,117					232.639	8,498.04	107,601
3	14.19	10,831					249.057	8,498.04	109,873
4	14.23	10,870					249.954	8,498.04	110,930
5	14.24	10,704					246.137	8,498.04	109,400
6	14.31	10,762					247.470	8,498.04	111,161

Heat Input, MMBTU/hr = (lb/hr fuel gas) x BTU/lb x MM/1E+06

= (ft3/hr fuel gas) x BTU/lb / (ft3/lb fuel gas) x MM/1E+06

= (lb/hr fuel oil) x BTU/lb x MM/1E+06

= (gal/hr fuel oil) x lb/gal x BTU/lb x MM/1E+06

= (lb/hr solid fuel) x BTU/lb x MM/1E+06

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

Qs(std), dscfm = MMBTU/hr x [F–Factor x (20.9 / (20.9 – %O2)) x (hr / 60 min)]

GCV = Gross Calorific Value of fuel

Standard Temperature = 60 °F

FUEL BASED CALCULATIONS

01-Apr-92

SWEPI - SEKR
UNIT 1, HRSG OUTLET STACK

FUEL ANALYSIS DATA

Run #	Fuel Value (%), Moisture & Ash Free: Carbon	Hydrogen	Nitrogen	Oxygen	Sulfur	GCV BTU/lb	ft3/lb	lb/gal
7	73.46	23.76	1.36	1.42	0.00	22,995		
8	73.46	23.76	1.36	1.42	0.00	22,995		
9	73.46	23.76	1.36	1.42	0.00	22,995		
10	73.46	23.76	1.36	1.42	0.00	22,995		

CALCULATIONS

Run #	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	Heat Input MMBTU/hr	F-Factor dscf/MMBTU	Qs(std) dscfm
7	14.33	10,792					248.160	8,498.04	111,810
8	14.33	10,773					247.723	8,498.04	111,613
9	14.25	10,773					247.723	8,498.04	110,270
10	14.27	10,773					247.723	8,498.04	110,603

Heat Input, MMBTU/hr = (lb/hr fuel gas) x BTU/lb x MM/1E+06

= (ft3/hr fuel gas) x BTU/lb / (ft3/lb fuel gas) x MM/1E+06

= (lb/hr fuel oil) x BTU/lb x MM/1E+06

= (gal/hr fuel oil) x lb/gal x BTU/lb x MM/1E+06

= (lb/hr solid fuel) x BTU/lb x MM/1E+06

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

Qs(std), dscfm = MMBTU/hr x [F-Factor x (20.9 / (20.9 - %O2)) x (hr / 60 min)]

GCV = Gross Calorific Value of fuel

Standard Temperature = 60 °F

RELATIVE ACCURACY CALCULATIONS – O2 (%)

01–Apr–92

SWEPI – SEKR
UNIT 1, HRSG OUTLET STACK

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		14.23		14.70	0.47
2		14.50		14.65	0.15
3		14.19		14.40	0.21
4		14.23		14.35	0.12
5		14.24		14.45	0.21
6		14.31		14.45	0.14
7		14.33		14.45	0.12
8		14.33		14.50	0.17
9		14.25		14.40	0.15
10		14.27		14.40	0.13
11					
12					

$\overline{RM}$: 14.29

$\overline{d}$: 0.19

Standard Deviation (Std.Dev.) : 0.10

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)]= 0.07

Where : CC = 2.5 percent error Confidence Coefficient.

n , number of valid test runs = 10

t0.975, t–Value from table = 2.262

RELATIVE ACCURACY

RA (%) = ($|\overline{d}|$ + |CC|) / $\overline{RM}$ x 100 = **1.83**

RELATIVE ACCURACY CALCULATIONS – NOx (ppm)

SWEPI – SEKR
UNIT 1, HRSG OUTLET STACK

01–Apr–92

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		9.43		8.00	−1.43
2		9.40		8.00	−1.40
3		8.89		9.00	0.11
4		8.23		8.00	−0.23
5		7.99		7.00	−0.99
6		7.67		7.00	−0.67
7		7.79		7.00	−0.79
8		7.68		8.00	0.32
9		7.90		8.00	0.10
10		7.84		8.00	0.16
11					
12					

$\overline{RM}$: 8.28

$\overline{d}$: −0.48

Standard Deviation (Std.Dev.) : 0.66

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)] = 0.47

Where : CC = 2.5 percent error Confidence Coefficient.

n , number of valid test runs = 10

t0.975, t–Value from table = 2.262

RELATIVE ACCURACY

RA (%) = ($|\overline{d}|$ + |CC|) / $\overline{RM}$ x 100 = **11.53**

RELATIVE ACCURACY CALCULATIONS – CO (ppm)

SWEPI – SEKR
UNIT 1, HRSG OUTLET STACK

01–Apr–92

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		0.39		0.00	–0.39
2		0.34		0.00	–0.34
3		0.33		0.00	–0.33
4		0.25		0.00	–0.25
5		0.26		0.00	–0.26
6		0.30		0.00	–0.30
7		0.30		0.00	–0.30
8		0.30		0.00	–0.30
9		0.29		0.00	–0.29
10		0.28		0.00	–0.28
11					
12					

$\overline{RM}$: 0.30

$\overline{d}$: –0.30
Standard Deviation (Std.Dev.) : 0.04

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)]= 0.03

Where : CC = 2.5 percent error Confidence Coefficient.
n , number of valid test runs = 10
t0.975, t–Value from table = 2.262

RELATIVE ACCURACY

RA (%) = ($|\overline{d}|$ + |CC|) / STD x 100 = **0.77**

Where : STD = Applicable CO Standard of 43.47 ppm

SECTION 4

CONTINUOUS TEST METHODS

GAS ANALYZER DATA

SWEPI – SEKR
UNIT 2, HRSG OUTLET STACK

Date : 31–Mar–92
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	15.00	14.98	3.40	3.40	27.00	27.05	4.45	4.45		
2	15.00	14.94	3.40	3.40	27.20	27.36	4.80	4.79		
3	15.00	14.91	3.40	3.40	27.00	27.26	5.00	4.99		
4	15.00	14.87	3.40	3.40	27.20	27.57	4.90	4.88		
5	15.00	14.83	3.40	3.40	27.20	27.67	5.00	4.98		
6	15.00	14.80	3.40	3.40	27.00	27.58	5.00	4.97		
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30										
MEAN :		14.89		3.40		27.41		4.84		

Zero Check	0.00	0.00	0.00	0.00
Span Check	14.20	8.22	42.80	8.88
Initial Span Value	13.99	8.22	43.80	8.83
Drift, Percent	1.5	0.0	–2.3	0.6
Zero Drift, Zcf	0.00000	0.00000	0.00000	0.00000
Span Drift, Scf	0.00250	0.00000	–0.00381	0.00094

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

SWEPI – SEKR
UNIT 2, HRSG OUTLET STACK

Date : 31–Mar–92
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	14.80	14.81	3.32	3.32	27.40	27.39	4.90	4.90		
2	14.80	14.84	3.32	3.32	27.40	27.37	4.90	4.89		
3	14.80	14.87	3.32	3.32	27.40	27.35	4.95	4.93		
4	14.80	14.90	3.32	3.32	27.40	27.33	4.90	4.87		
5	14.80	14.93	3.32	3.32	27.40	27.31	4.85	4.81		
6	14.80	14.96	3.32	3.32	27.30	27.19	4.95	4.90		
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30										
MEAN :		14.89		3.32		27.32		4.88		

Zero Check	0.00	0.00	0.00	0.00
Span Check	13.83	8.22	44.00	8.93
Initial Span Value	13.99	8.22	43.80	8.83
Drift, Percent	–1.1	0.0	0.5	1.1
Zero Drift, Zcf	0.00000	0.00000	0.00000	0.00000
Span Drift, Scf	–0.00191	0.00000	0.00076	0.00189

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

SWEPI – SEKR
UNIT 3, HRSG OUTLET STACK

Date : 31–Mar–92
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	15.00	14.99	3.44	3.44	28.50	28.48	5.60	5.60		
2	15.20	15.18	3.44	3.44	28.80	28.73	5.65	5.66		
3	15.25	15.22	3.44	3.44	29.30	29.19	5.60	5.62		
4	15.25	15.21	3.44	3.44	29.40	29.24	5.60	5.62		
5	15.25	15.20	3.44	3.43	29.60	29.40	5.55	5.58		
6	15.25	15.19	3.44	3.43	29.70	29.45	5.60	5.64		
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30										
MEAN :		15.17		3.44		29.08		5.62		

Zero Check	0.00	0.00	0.00	–0.10
Span Check	14.05	8.24	44.20	8.82
Initial Span Value	13.99	8.22	43.80	8.83
Drift, Percent	0.4	0.2	0.9	1.0
Zero Drift, Zcf	0.00000	0.00000	0.00000	–0.01667
Span Drift, Scf	0.00071	0.00041	0.00152	0.00170

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

SWEPI – SEKR
UNIT 3, HRSG OUTLET STACK

Date : 31–Mar–92
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	15.25	15.25	3.30	3.30	28.50	28.54	5.60	5.60		
2	15.25	15.24	3.30	3.30	28.50	28.63	5.60	5.60		
3	15.30	15.28	3.30	3.30	28.70	28.92	5.50	5.51		
4	15.30	15.27	3.30	3.30	28.50	28.81	5.50	5.51		
5	15.30	15.27	3.30	3.30	28.50	28.90	5.50	5.51		
6	15.25	15.21	3.30	3.30	28.50	28.99	5.50	5.52		
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MEAN :		15.25		3.30		28.80		5.54		

Zero Check	0.00	0.00	0.00	0.00
Span Check	14.03	8.22	43.00	8.80
Initial Span Value	13.99	8.22	43.80	8.83
Drift, Percent	0.3	0.0	–1.8	–0.3
Zero Drift, Zcf	0.00000	0.00000	0.00000	0.00000
Span Drift, Scf	0.00048	0.00000	–0.00304	–0.00057

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

SWEPI – SEKR
UNIT 1, HRSG OUTLET STACK

Date : 01–Apr–92
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	14.20	14.21	3.58	3.58	8.38	8.40	0.40	0.40		
2	14.18	14.20	3.58	3.57	8.70	8.77	0.38	0.38		
3	14.25	14.28	3.58	3.57	8.00	8.11	0.40	0.40		
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30										
MEAN :		14.23		3.57		8.43		0.39		

Zero Check	0.00	0.00	0.00	0.00
Span Check	13.95	8.26	22.88	12.00
Initial Span Value	13.99	8.22	23.25	12.00
Drift, Percent	–0.3	0.5	–1.6	0.0
Zero Drift, Zcf	0.00000	0.00000	0.00000	0.00000
Span Drift, Scf	–0.00095	0.00162	–0.00530	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

SWEPI – SEKR
UNIT 1, HRSG OUTLET STACK

Date : 01–Apr–92
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	3.58	3.58	8.30	8.30	0.36	0.36		
2	14.50	14.50	3.58	3.59	8.25	8.26	0.36	0.36		
3	14.50	14.50	3.58	3.59	8.63	8.65	0.30	0.30		
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MEAN :		14.50		3.59		8.40		0.34		

Zero Check	0.00	0.00	0.00	0.00
Span Check	13.99	8.18	23.20	12.00
Initial Span Value	13.99	8.22	23.25	12.00
Drift, Percent	0.0	–0.5	–0.2	0.0
Zero Drift, Zcf	0.00000	0.00000	0.00000	0.00000
Span Drift, Scf	0.00000	–0.00162	–0.00072	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

SWEPI – SEKR
UNIT 1, HRSG OUTLET STACK

Date : 01–Apr–92
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	14.20	14.20	3.72	3.72	9.13	9.12	0.40	0.40		
2	14.20	14.19	3.76	3.75	8.75	8.73	0.30	0.30		
3	14.20	14.19	3.76	3.75	8.87	8.83	0.30	0.30		
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MEAN :		14.19		3.74		8.89		0.33		

Zero Check	0.00	0.02	0.00	0.00
Span Check	14.00	8.22	23.38	12.00
Initial Span Value	13.99	8.22	23.25	12.00
Drift, Percent	0.1	–0.2	0.6	0.0
Zero Drift, Zcf	0.00000	0.00667	0.00000	0.00000
Span Drift, Scf	0.00024	–0.00081	0.00186	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

SWEPI – SEKR
UNIT 1, HRSG OUTLET STACK

Date : 01–Apr–92
Run No. : 4

	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	14.20	14.21	3.76	3.76	8.25	8.24	0.28	0.28		
2	14.20	14.23	3.76	3.76	8.25	8.23	0.24	0.24		
3	14.20	14.25	3.76	3.76	8.25	8.22	0.24	0.24		
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MEAN :		14.23		3.76		8.23		0.25		

Zero Check	0.00	0.00	0.00	0.00
Span Check	13.93	8.22	23.35	12.00
Initial Span Value	13.99	8.22	23.25	12.00
Drift, Percent	–0.4	0.0	0.4	0.0
Zero Drift, Zcf	0.00000	0.00000	0.00000	0.00000
Span Drift, Scf	–0.00143	0.00000	0.00143	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

SWEPI – SEKR
UNIT 1, HRSG OUTLET STACK

Date : 01–Apr–92
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	14.23	14.23	3.70	3.70	8.00	8.00	0.24	0.24		
2	14.23	14.23	3.70	3.70	8.25	8.24	0.24	0.24		
3	14.25	14.25	3.70	3.70	7.75	7.74	0.30	0.30		
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MEAN :		14.24		3.70		7.99		0.26		
Zero Check		0.00		0.00		0.00		0.00		
Span Check		13.99		8.22		23.30		12.00		
Initial Span Value		13.99		8.22		23.25		12.00		
Drift, Percent		0.0		0.0		0.2		0.0		
Zero Drift, Zcf		0.00000		0.00000		0.00000		0.00000		
Span Drift, Scf		0.00000		0.00000		0.00072		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

SWEPI – SEKR
UNIT 1, HRSG OUTLET STACK

Date : 01–Apr–92
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	14.33	14.33	3.64	3.64	7.75	7.75	0.30	0.30		
2	14.30	14.30	3.64	3.64	7.75	7.76	0.30	0.30		
3	14.30	14.30	3.64	3.64	7.50	7.51	0.30	0.30		
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MEAN :		14.31		3.64		7.67		0.30		
Zero Check		0.00		0.00		0.00		0.00		
Span Check		13.99		8.22		23.20		12.00		
Initial Span Value		13.99		8.22		23.25		12.00		
Drift, Percent		0.0		0.0		–0.2		0.0		
Zero Drift, Zcf		0.00000		0.00000		0.00000		0.00000		
Span Drift, Scf		0.00000		0.00000		–0.00072		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

SWEPI – SEKR
UNIT 1, HRSG OUTLET STACK

Date : 01–Apr–92
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	14.30	14.30	3.64	3.64	7.88	7.88	0.30	0.30		
2	14.33	14.33	3.64	3.64	7.75	7.75	0.30	0.30		
3	14.35	14.35	3.64	3.64	7.75	7.75	0.30	0.30		
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MEAN :		14.33		3.64		7.79		0.30		
Zero Check		0.00		0.00		0.00		0.00		
Span Check		13.99		8.22		23.25		12.00		
Initial Span Value		13.99		8.22		23.25		12.00		
Drift, Percent		0.0		0.0		0.0		0.0		
Zero Drift, Zcf		0.00000		0.00000		0.00000		0.00000		
Span Drift, Scf		0.00000		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

SWEPI – SEKR
UNIT 1, HRSG OUTLET STACK

Date : 01–Apr–92
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	14.33	14.33	3.64	3.64	7.63	7.62	0.30	0.30		
2	14.33	14.33	3.64	3.64	7.75	7.72	0.30	0.30		
3	14.33	14.33	3.64	3.64	7.75	7.69	0.30	0.30		
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
MEAN :		14.33		3.64		7.68		0.30		

Zero Check	0.00	0.00	0.00	0.00
Span Check	13.99	8.22	23.45	12.00
Initial Span Value	13.99	8.22	23.25	12.00
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	0.00287	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

SWEPI – SEKR
UNIT 1, HRSG OUTLET STACK

Date : 01–Apr–92
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	14.25	14.25	3.64	3.64	7.88	7.88	0.28	0.28		
2	14.25	14.25	3.64	3.64	7.95	7.95	0.30	0.30		
3	14.25	14.25	3.64	3.64	7.88	7.88	0.30	0.30		
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
MEAN :		14.25		3.64		7.90		0.29		

Zero Check	0.00	0.00	0.00	0.00
Span Check	13.99	8.22	23.25	12.00
Initial Span Value	13.99	8.22	23.25	12.00
Drift, Percent	0.0	0.0	0.0	0.0
Zero Drift, Zcf	0.00000	0.00000	0.00000	0.00000
Span Drift, Scf	0.00000	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

SWEPI – SEKR
UNIT 1, HRSG OUTLET STACK

Date : 01–Apr–92
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	14.25	14.26	3.64	3.64	7.88	7.88	0.24	0.24		
2	14.25	14.27	3.64	3.64	7.88	7.88	0.30	0.30		
3	14.25	14.28	3.64	3.64	7.75	7.75	0.30	0.30		
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
MEAN :		14.27		3.64		7.84		0.28		

Zero Check	0.00	0.00	0.00	0.00
Span Check	13.95	8.22	23.25	12.00
Initial Span Value	13.99	8.22	23.25	12.00
Drift, Percent	–0.3	0.0	0.0	0.0
Zero Drift, Zcf	0.00000	0.00000	0.00000	0.00000
Span Drift, Scf	–0.00095	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))]

SECTION 5

LAB ANALYSIS DATA

ZALCO LABORATORIES, INC.

Analytical & Consulting Services

ENGINEERING SCIENCE
2520 Pegasus Drive
Bakersfield, CA 93308

Lab. No.: 031073_001
Received: Apr 3, 1992
Reported: Apr 3, 1992

Attention: Jim Polhamus

Sample Description: SWEPI SEKR BK 9203025 3/31/92

* CHROMATOGRAPHIC ANALYSIS (Z 1635) *

Components	Mole %	Wt %
Hydrogen	0.000	0.000
Carbon Dioxide	.696	1.779
Oxygen	.067	.124
Nitrogen	.834	1.356
Carbon Monoxide	0.000	0.000
Hydrogen Sulfide	0.000	0.000
Methane	93.237	86.839
Ethane	4.256	7.430
Propane	.777	1.989
IsoButane	.049	.166
N-Butane	.050	.168
IsoPentane	.016	.065
N-Pentane	.009	.038
Hexanes+	.009	.045
Totals =	100.000	100.000

CHONS	Wt %
CARBON	73.46
HYDROGEN	23.76
OXYGEN	1.42
NITROGEN	1.36
SULFUR	0.00
Totals	99.99
Total H/C	.32

SPECIFIC GRAVITY (Air = 1)		.5958
SPECIFIC VOLUME, cu.ft./lb	*	21.99
GROSS CALORIFIC VALUE, BTU/cu.ft.	*	1027.75
GROSS CALORIFIC VALUE, BTU/cu.ft.	**	1045.52
GROSS CALORIFIC VALUE, BTU/lb	**	22994.83
NET CALORIFIC VALUE, BTU/cu.ft.	**	942.96
NET CALORIFIC VALUE, BTU/lb	**	20739.03
DSCF EXHAUST PER SCF FUEL (0% Oxygen)		8.8665
COMPRESSIBILITY FACTOR 'Z' (60 F,1 ATM)		.9978
EPA 'F' Factor @ 68 F:	8628.380 DSCF / MM Btu.	
KCAPCD 'F' Factor @ 60 F:	8498.954 DSCF / MM Btu.	

* Water Saturated

** Dry Gas @ 60 F, 14.73 psia

Kathe Zimmerman
Analyst

Jim Etherton
Laboratory Director

4309 Armour Avenue Bakersfield, California 93308

(805) 395-0539 FAX (805) 395-3069

SECTION 6

TEST METHODOLOGY

SECTION 6

TEST METHODOLGY

Continuous Emissions Monitoring

Sample Extraction and Conditioning

Sampling was performed using a system which delivers a conditioned, continuous gas sample to the gas analyzers. The gas sample was extracted through a stainless steel probe, then passed 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 was 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 6-1 describe the CEMS used in the mobile van to analyze the exhaust gases. Calibrations of the CEMS were performed using EPA Protocol 1 or NIST certified calibration gases. Copies of the gas certification are included in the appendix of this report.

Prior to performing the emissions testing, a leak check of the sample system was performed. A check of sampling system bias was 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 was considered acceptable. The leak check was 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 was performed by introducing zero and span gases and making appropriate adjustments. During each test run, analyzer response data was recorded for each instrument. At the conclusion of the test run, a calibration check was performed to verify acceptable zero and span drift limits.

TABLE 6–1
CEM INSTRUMENT SPECIFICATIONS
CEM VAN NO. 1

PARAMETER	MANUFACTURER	MODEL NO.	ANALYZER PRINCIPLE	SENSITIVITY	LINEARITY	SPECIAL NOTES	RESPONSE TIME	NOISE	PRECISION
O2	MSA Instruments	4000	Electroconductivity Detection	+ – .01%	< 2%	Galvanic Fuel Cell	90% Full Scale in 20 sec.	+ – 1%	
CO2	Infrared Industries	732	Non–Dispersive Infrared		< 2%		90% Full Scale in 20 sec.		
NOx	Thermo Environmental Instruments Inc.	10	Chemiluminescent	.05 ppm	+ – 1% from 0.05 to 10,000	High range has 02 feed.	Approx. 1.5 sec NO mode Approx. 1.7 sec NOx mode	< 1% of Full Scale	
CO	Thermo Environmental Instruments Inc.	48	Gas Filter Correlation	.1 ppm	< + – 1%		95% Full Scale in < 60 sec.	< 0.05 ppm	> + – 0.1ppm
SO2									
HC									

Fuel Gas

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

SECTION 7

RAW DATA

ENGINEERING–SCIENCE, INC.
CEM FIELD DATA SHEET

PLANT: SNEPI-SEKR
CEM VAN NO.: 1
DATE: 3 31.92
TEST LOCATION: OUTLET STACK HRSG UNIT #2
OPERATOR: JP

O2, %			CO2, %			NOx, ppm		
Calibration Gases :			Calibration Gases :			Calibration Gases :		
High	13.99	Cyl. # CC60282	High	8.22	Cyl. # CC60282	High	43.8	Cyl. # CC10-249
Mid		Cyl. #	Mid		Cyl. #	Mid		Cyl. #
Low		Cyl. #	Low		Cyl. #	Low		Cyl. #

CO, ppm			SO2, ppm			Calibration Gases :		
Calibration Gases :			Calibration Gases :					
High	8.53	Cyl. # CC12823	High		Cyl. #	High		Cyl. #
Mid		Cyl. #	Mid		Cyl. #	Mid		Cyl. #
Low		Cyl. #	Low		Cyl. #	Low		Cyl. #

TIME	SAMPLE POINT	O2 (%)	CO2 (%)	NOx (ppm)	CO (ppm)	SO2 (ppm)		COMMENTS / RUN #
		13.99	8.22	43.8	8.53			Span gas values used for test.
								INT CAL ✓
		0.0	0.0	0.0	0.0			ZERO
		13.99	8.22	43.8	8.53			SPAN
								LEAK ✓ @ 15" HG = 0.0"
0935		15.0	3.40	27.0	4.45			START RUN 1
0945		15.0	3.40	27.2	4.80			
0955		15.0	3.40	27.0	5.00			
1005		15.0	3.40	27.2	4.90			
1015		15.0	3.40	27.2	5.00			
1025		16.0	3.40	27.0	5.00			
1035								INT CAL ✓
		0.0	0.0	0.0	0.0			ZERO
		14.2	8.22	42.8	8.85			SPAN

ENGINEERING–SCIENCE, INC.
CEM FIELD DATA SHEET

PLANT: SWEPI - SEKR
CEM VAN NO.: 1
DATE: 3-31-92
TEST LOCATION: HRSG UNIT #2 & 3
OPERATOR: JP

TIME	SAMPLE POINT	O2 (%)	CO2 (%)	NOx (ppm)	CO (ppm)	SO2 (ppm)		COMMENTS / RUN #
		13.99	8.22	43.8	8.83			Span gas values used for test.
								INT COL ADJ
		0.0	0.0	0.0	0.0			ZERO
		13.99	8.22	43.8	8.83			SPAN
1105		14.8	3.32	27.4	4.9			START RUN 2
1115		14.8	3.32	27.4	4.9			
1125		14.8	3.32	27.4	4.95			
1135		14.8	3.32	27.4	4.9			
1145		14.8	3.32	27.4	4.85			
1155		14.8	3.32	27.3	4.95			
1205								INT COL
		0.0	0.0	0.0	0.0			ZERO
		13.83	8.22	44.0	8.93			SPAN
								LEAK CHECK @ 15" WG - 0.0
								INT COL ADJ
		0.0	0.0	0.0	0.0			ZERO
		13.99	8.22	43.8	8.83			SPAN
								@ UNIT 3
1320		15.0	3.44	28.5	5.6			START RUN 3
1330		15.20	3.44	28.8	5.65			
1340		15.25	3.44	29.3	5.60			
1350		15.25	3.44	29.4	5.60			
1400		15.25	3.44	29.6	5.55			
1410		15.25	3.44	29.7	5.60			
1420								INT COL
		0.0	0.0	0.0	-.1			ZERO
		14.05	8.24	44.2	8.82			SPAN

ENGINEERING–SCIENCE, INC.
CEM FIELD DATA SHEET

PLANT: SWEPI-SEKR
CEM VAN NO.: 1
DATE: 5-31-92
TEST LOCATION: HRSG UNIT #3
OPERATOR: JP

TIME	SAMPLE POINT	O2 (%)	CO2 (%)	NOx (ppm)	CO (ppm)	SO2 (ppm)		COMMENTS / RUN #
		13.99	8.22	43.8	8.83			Span gas values used for test.
								INTCCI AVG
		0.0	0.0	0.0	0.0			ZERO
		13.99	8.22	43.8	8.83			SPAN
1530		15.25	3.30	28.5	5.60			START RUN 4
1540		15.25	3.30	28.5	5.60			
1550		15.30	3.30	28.7	5.50			
1600		15.30	3.30	28.5	5.50			
1610		15.30	3.30	28.5	5.50			
1620		15.25	3.30	28.5	5.50			
1630								INT CCI ✓
		.05	0.0	0.0	0.0			ZERO
		14.03	8.22	43.0	8.8			SPAN
								LEAK ✓ OK

ENGINEERING–SCIENCE, INC.
CEM FIELD DATA SHEET

PLANT: SWEPI-SKR
TEST LOCATION: HRSG UNIT #1
CEM VAN NO.: 1
DATE: 4-1-92
OPERATOR: JP & CM

O2, %			
Calibration Gases :			
High	13.99%	Cyl. #	CC60282
Mid	3.00	Cyl. #	CC811417
Low		Cyl. #	

CO2, %			
Calibration Gases :			
High	8.22	Cyl. #	CC60282
Mid	2.81	Cyl. #	CC811417
Low		Cyl. #	

NOx, ppm			
Calibration Gases :			
High	23.25	Cyl. #	CC108778
Mid	12.10	Cyl. #	CC108779
Low		Cyl. #	

CO, ppm			
Calibration Gases :			
High	12.00	Cyl. #	CC108779
Mid	8.53	Cyl. #	CC12823
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 #
		13.99	8.22	23.25	12.00			Span gas values used for test.
								INT CALV
		0.0	0.0	0.0	0.0			ZERO
		13.99	8.22	23.25	12.00			SPAN
								LINEARITY ✓
		13.99	8.22	23.25	12.00			HIGH
		3.05	2.90	12.20	8.64			MID
		0.0	0.0	0.0	0.0			ZERO
								LEAK ✓ @ 15" Hg = 0.0"
0900		14.2	3.58	8.38	.4			START RUN 1
0910		14.18	3.56	8.70	.38			
0920		14.25	3.58	8.00	.40			
0930								INT CALV
		0.0	0.0	0.0	0.0			ZERO
		13.95	8.20	22.88	12.0			SPAN

ENGINEERING–SCIENCE, INC.
CEM FIELD DATA SHEET

PLANT: SUEZ-SEKR
CEM VAN NO.: 1
DATE: 4-1-92
TEST LOCATION: HRSG UNIT 1
OPERATOR: JP & CM

TIME	SAMPLE POINT	O2 (%)	CO2 (%)	NOx (ppm)	CO (ppm)	SO2 (ppm)		COMMENTS / RUN #
		13.99	8.22	23.25	12.00			Span gas values used for test.
								CGI ADJ
		0.0	0.0	0.0	0.0			ZERO
		13.99	8.22	23.25	12.00			SPAN
0945		14.5	3.58	8.3	.36			START RUN 2
0955		14.5	3.58	8.25	.36			
1005		14.5	3.58	8.63	.30			
1015								INT CGI ✓
		0.0	0.0	0.0	0.0			ZERO
		13.99	8.18	23.2	12.0			SPAN
								CGI ADJ
		0	0	0.0	0.0			ZERO
		13.99	8.22	23.25	12.0			SPAN
1040		14.20	3.72	9.13	.4			START RUN 3
1050		14.20	3.76	8.75	.3			PRESSOR UNIT LOAD CHANGE FROM 10.1 MW TO 8 MW
1100		14.20	3.76	8.87	.3			
1110								INT CGI ✓
		0.0	.02	0.0	0			ZERO
		14.00	8.22	23.38	12.0			SPAN
								CGI ADJ
		0.0	0.0	0.0	0.0			ZERO
		13.99	8.22	23.25	12.0			SPAN
1130		14.20	3.76	8.25	.28			START RUN 4
1140		14.20	3.76	8.25	.24			
1150		14.20	3.76	8.25	.24			
1200								INT CGI ✓
		0.0	0.0	0.0	0.0			ZERO
		13.93	8.22	23.35	12.00			SPAN

ENGINEERING–SCIENCE, INC.
CEM FIELD DATA SHEET

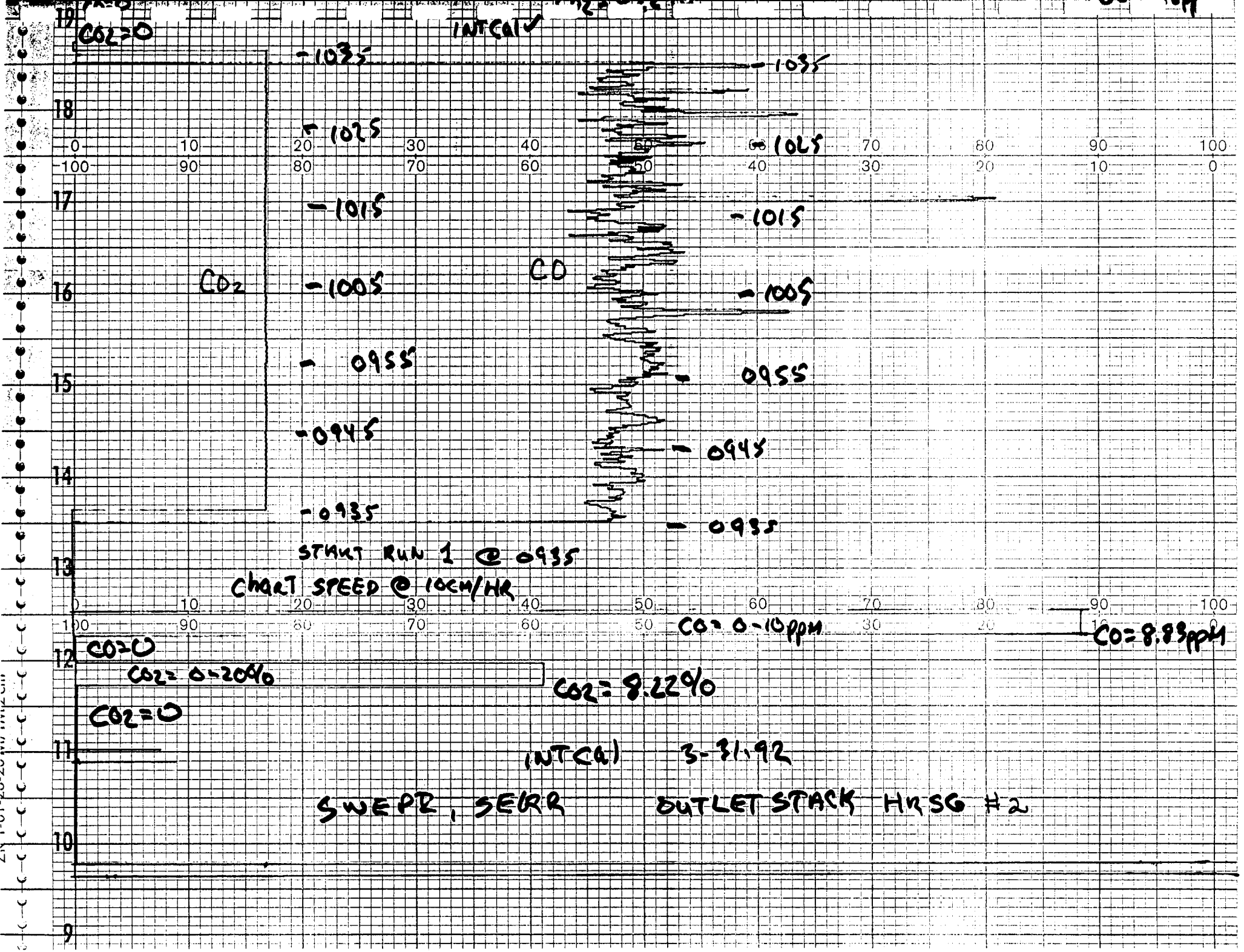
PLANT: SWEPI-SEKR
CEM VAN NO.: 1
DATE: 4-1-92
TEST LOCATION: HRSG UNIT 1
OPERATOR: JP & CM

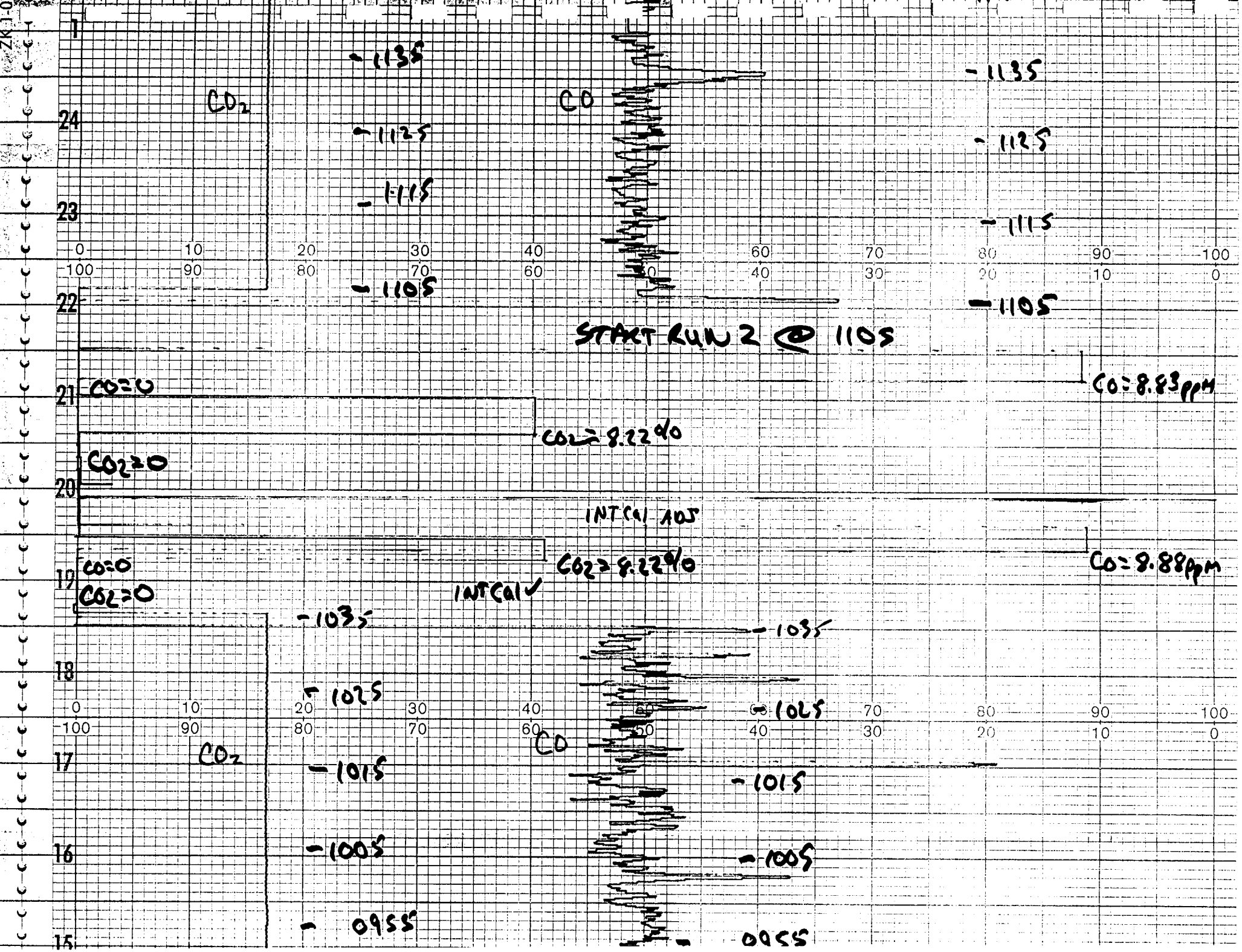
TIME	SAMPLE POINT	O2 (%)	CO2 (%)	NOx (ppm)	CO (ppm)	SO2 (ppm)		COMMENTS / RUN #
		13.99	8.22	23.25	12.00			Span gas values used for test.
								CAL ADJ
		0.0	0.0	0.0	0.0			ZERO
		13.99	8.22	23.25	12.0			SPAN
1215		14.23	3.7	8.0	.240			START RUN 5
1225		14.23	3.7	8.25	.24			
1235		14.25	3.7	7.75	.30			
1245								INT CAL ✓
		0.0	0.0	0.0	0.0			ZERO
		13.99	8.22	23.3	12.0			SPAN
								CAL ADJ
				0.0				ZERO
				23.25				SPAN
1300		14.33	3.64	7.75	.3			START RUN 6
1310		14.30	3.64	7.75	.3			
1320		14.30	3.64	7.5	.3			
1330								INT CAL ✓
		0.0	0.0	0.0	0			ZERO
		13.99	8.22	23.2	12.0			SPAN
								CAL ADJ
				0.0				ZERO
				23.25				SPAN
1345		14.30	3.64	7.88	.3			START RUN 7
1355		14.33	3.64	7.75	.3			
1405		14.35	3.64	7.75	.3			
1415								INT CAL ✓
		0.0	0.0	0.0	0.0			ZERO
		13.99	8.22	23.25	12.00			SPAN

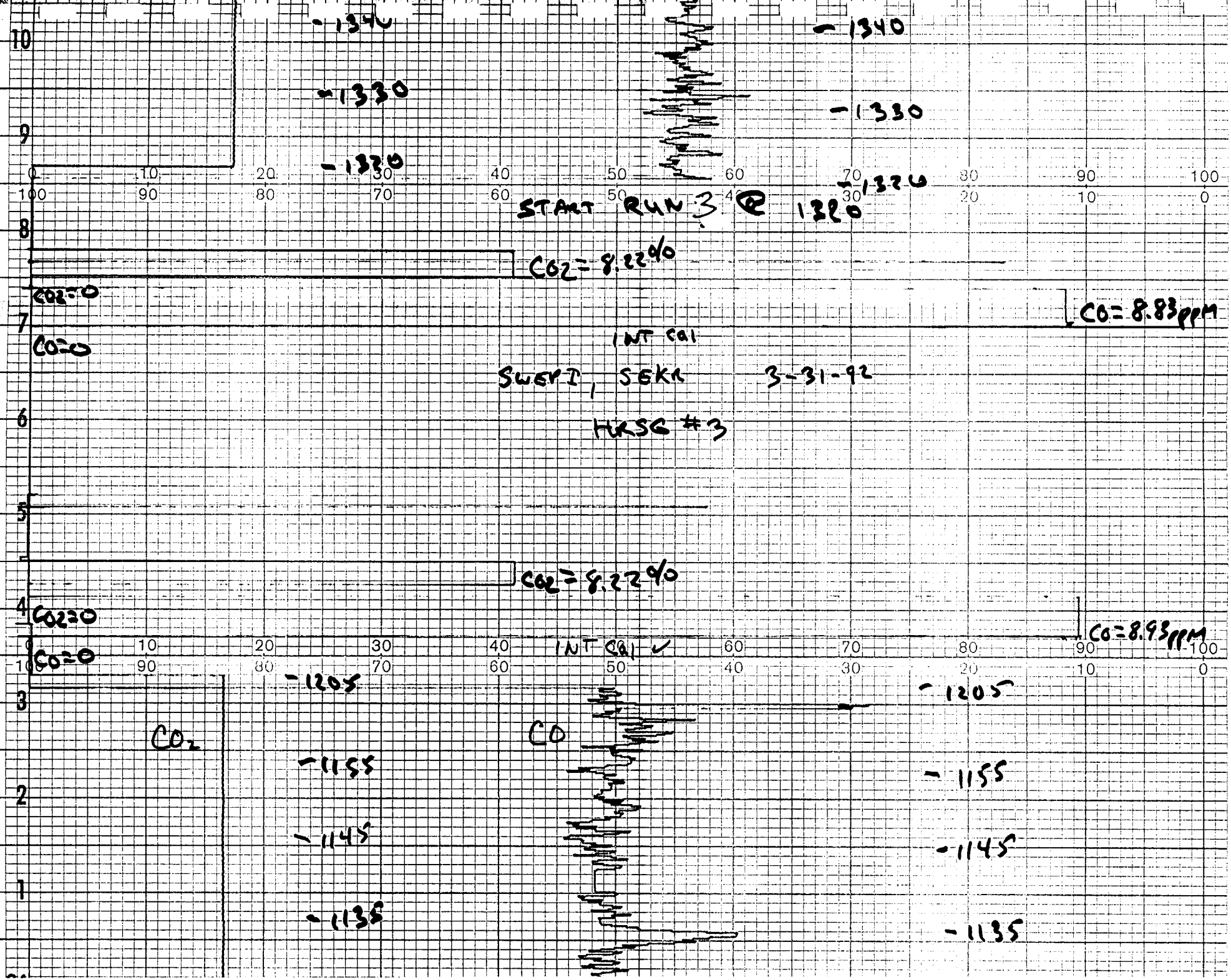
ENGINEERING–SCIENCE, INC.
CEM FIELD DATA SHEET

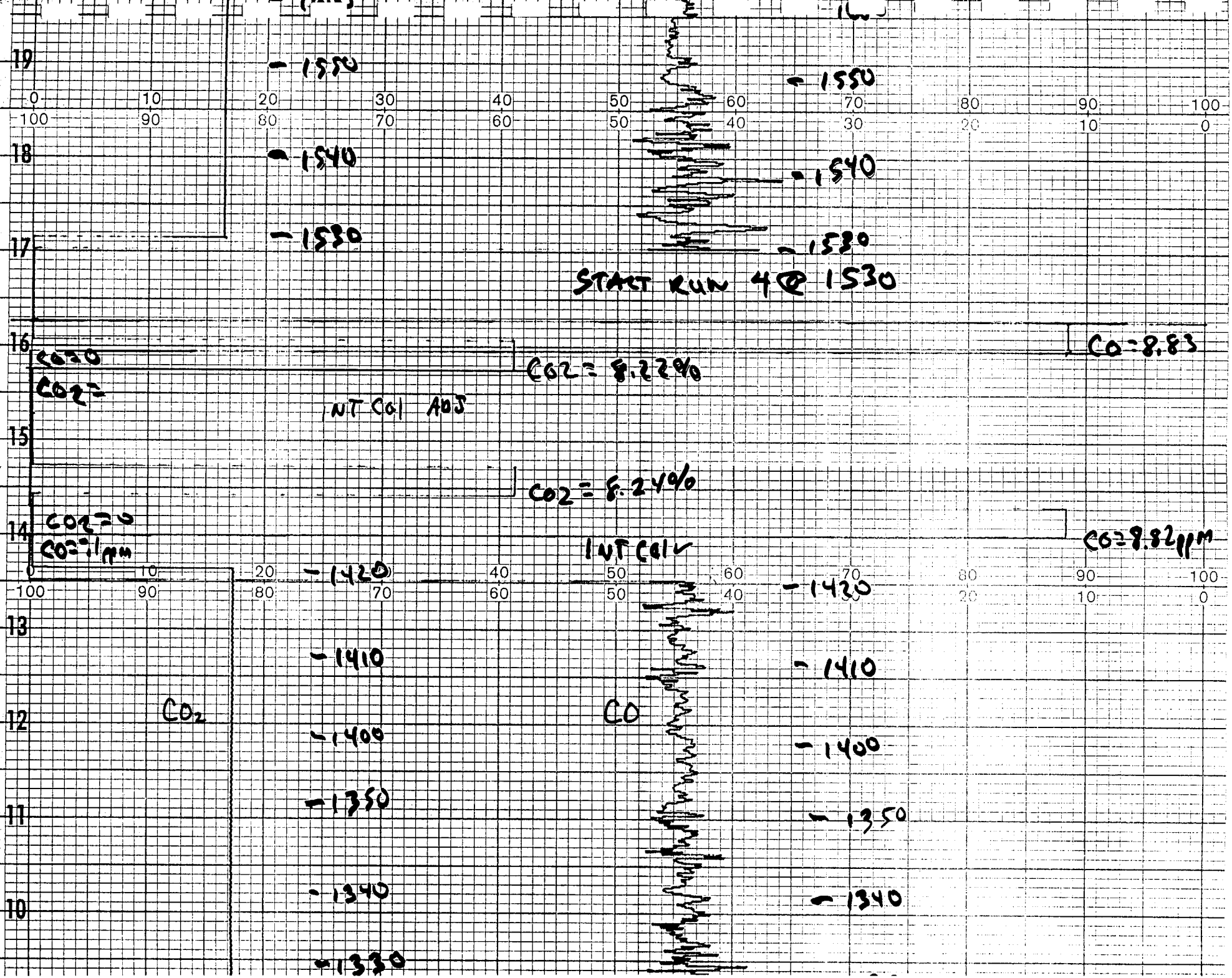
PLANT: SWEPI- SEHR
TEST LOCATION: HRSG UNIT 1
CEM VAN NO.: 1
DATE: 4-1-92
OPERATOR: JP & CM

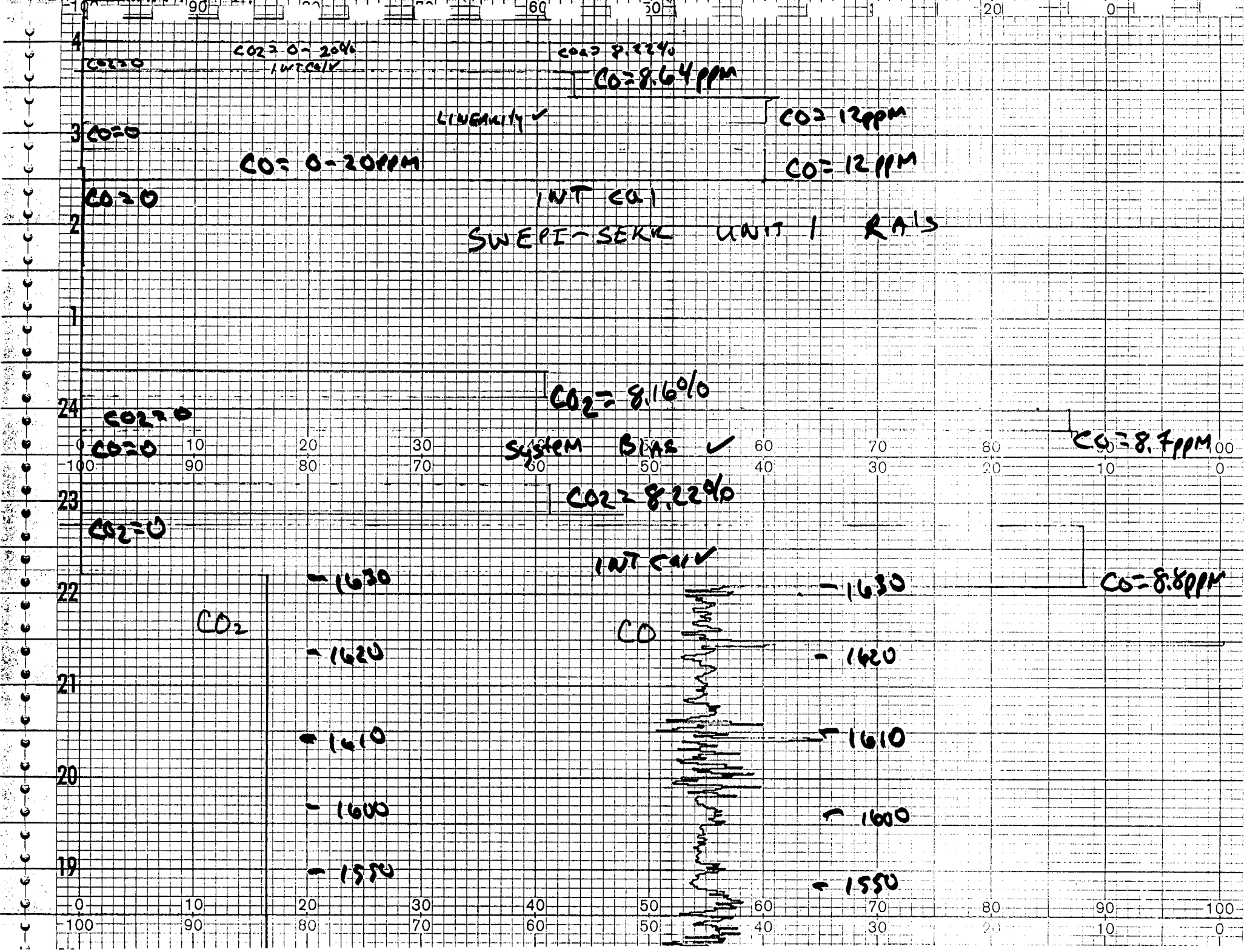
TIME	SAMPLE POINT	O2 (%)	CO2 (%)	NOx (ppm)	CO (ppm)	SO2 (ppm)		COMMENTS / RUN #
		13.99	8.22	23.25	12.00			Span gas values used for test.
1425		14.33	3.64	7.63	.3			START RUN 8
1435		14.33	3.64	7.75	.3			
1445		14.33	3.64	7.75	.3			
1455								INT CAL ✓
		0.0	0.0	0.0	0.0			ZERO
		13.99	8.22	23.45	12.00			SPAN
								CAL ADJ
				0.0				ZERO
				23.25				SPAN
1505		14.25	3.64	7.88	.28			START RUN 9
1515		14.25	3.64	7.95	.30			
1525		14.25	3.64	7.88	.30			
1535								INT CAL ✓
		0.0	0.0	0.0	0.0			ZERO
		13.99	8.22	23.25	12.0			SPAN
1545		14.25	3.64	7.88	.240			START RUN 10
1555		14.25	3.64	7.88	.30			
1605		14.25	3.64	7.75	.30			
1615								
								INT CAL ✓
		0.0	0.0	0.0	0.0			ZERO
		13.99	8.22	23.25	12.0			SPAN
								LEAK ✓ OK


CO2=0
INTCAL
1035
1025
1015
1005
0955
0945
0935
CO2
CO
START RUN 1 @ 0935
CHART SPEED @ 10CM/HR
CO= 0-10ppm
CO=8.83ppm
CO=0
CO2= 0-20%
CO2= 8.22%
CO2=0
INTCAL 3-31-92
SWEPR, SERR
OUTLET STACK HRSG #2

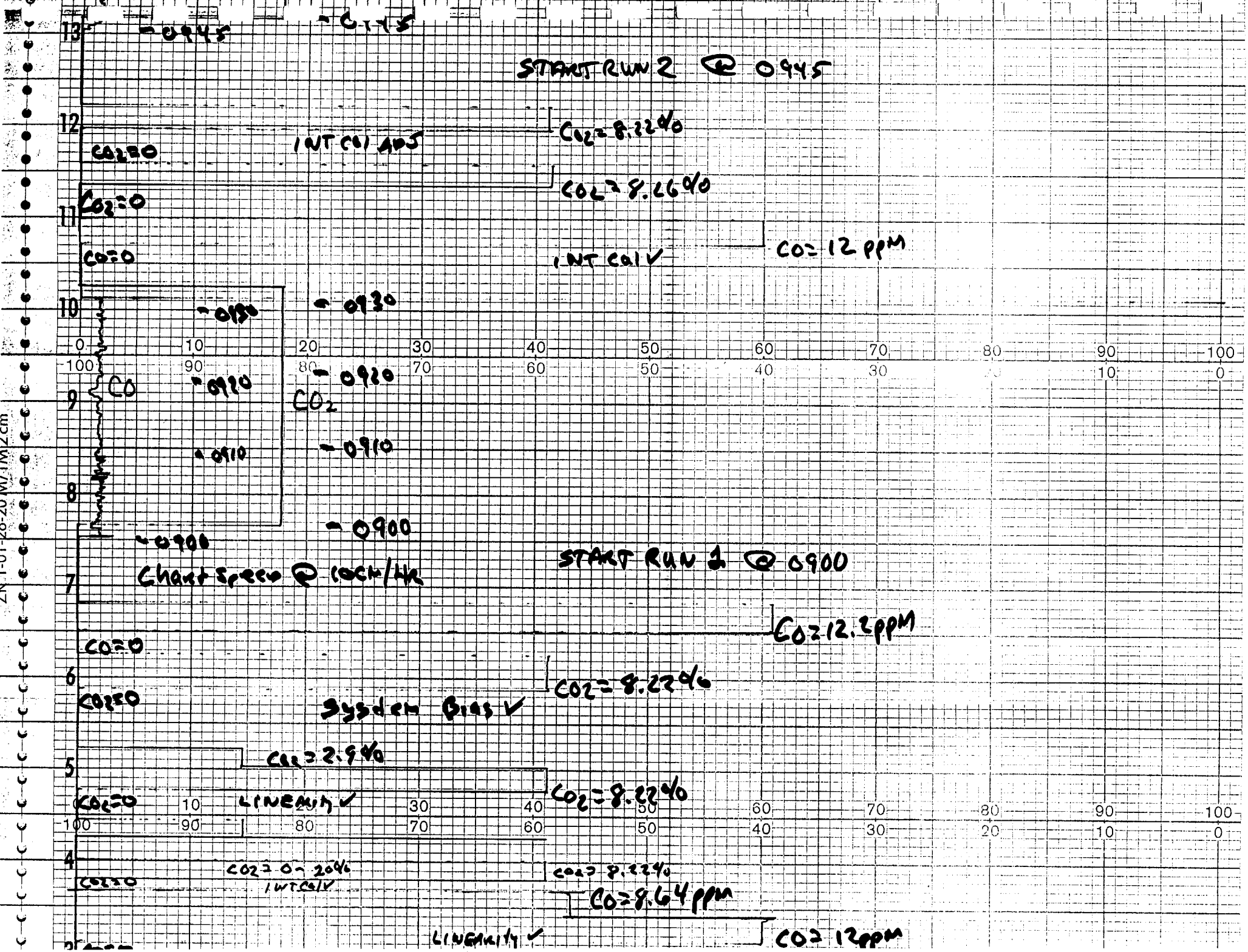

CO2
CO
1135
1125
1115
1105
START RUN 2 @ 1105
CO=8.83ppm
CO=0
CO2=8.22%
CO2=0
INT CAL 1105
CO=8.88ppm
CO=0
CO2=0
CO2=8.22%
INT CAL ✓
1035
1025
1015
1005
0955
CO2
CO

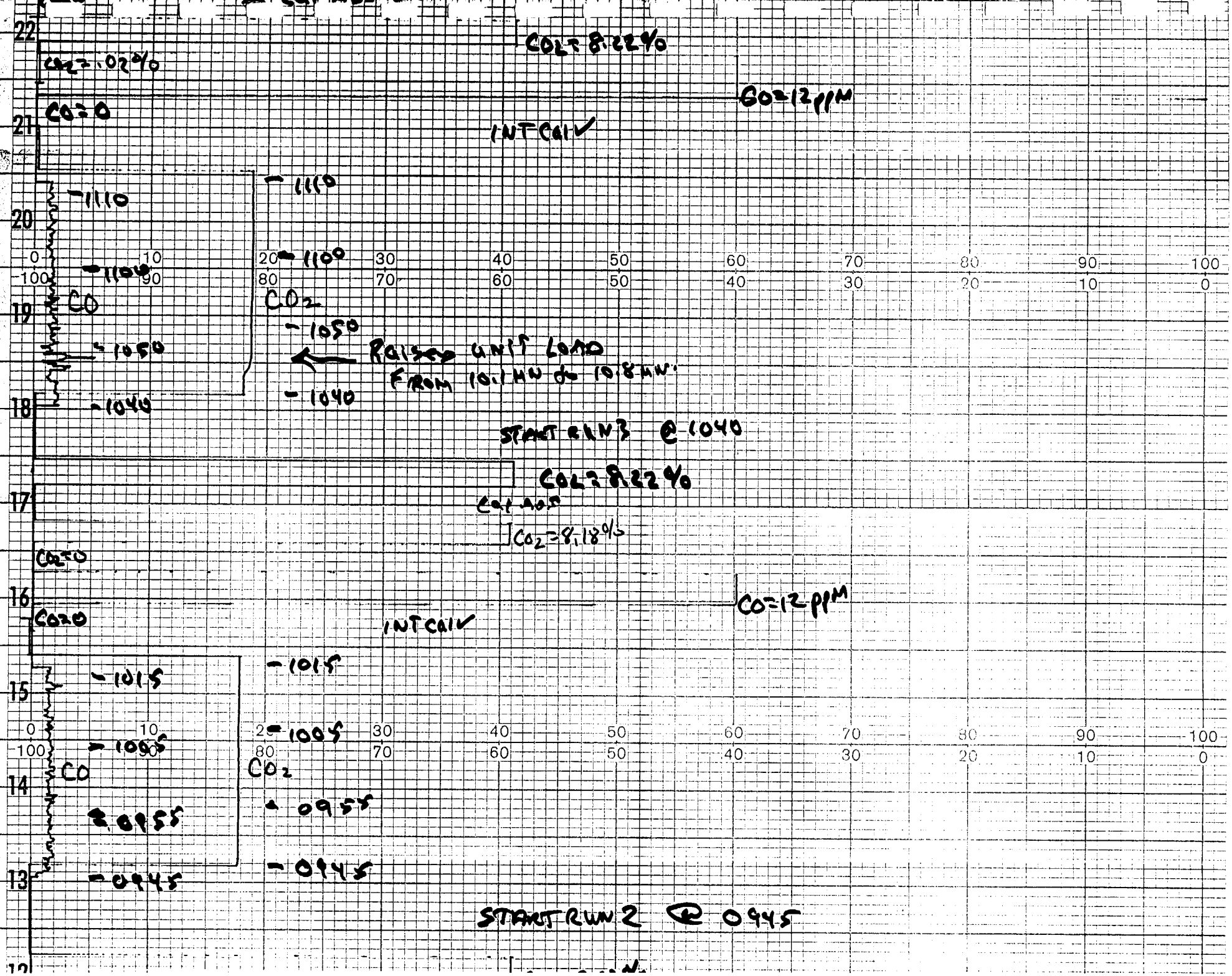

-1340
-1330
-1320
-1340
-1330
-1326
START RUN 3 @ 1320
CO2 = 8.22%
CO2 = 0
CO = 8.83 ppm
CO = 0
INT CAL
SWEPI, SEKA 3-31-92
HRSG #3
CO2 = 8.22%
CO2 = 0
CO = 8.93 ppm
CO = 0
INT CAL ✓
-1205
-1155
-1145
-1135
CO2
CO

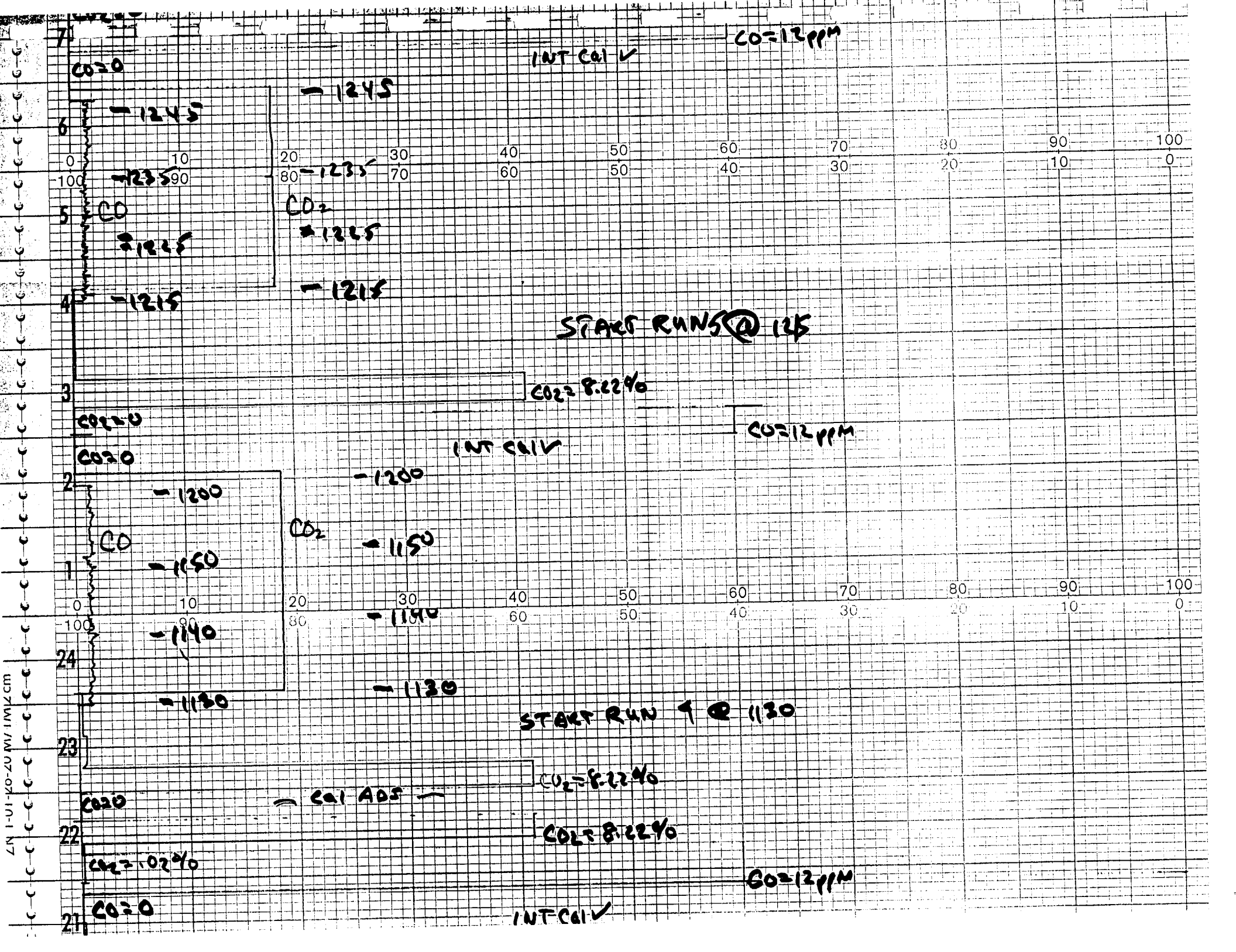

19
18
17
16
15
14
13
12
11
10
1550
1540
1530
START RUN 4 @ 1530
CO=8.83
CO2=8.22%
INT CAL ADJ
CO2=8.24%
CO2=0
CO=.1ppm
CO=8.82ppm
INT CAL
1420
1410
1400
1350
1340
1330
CO2
CO

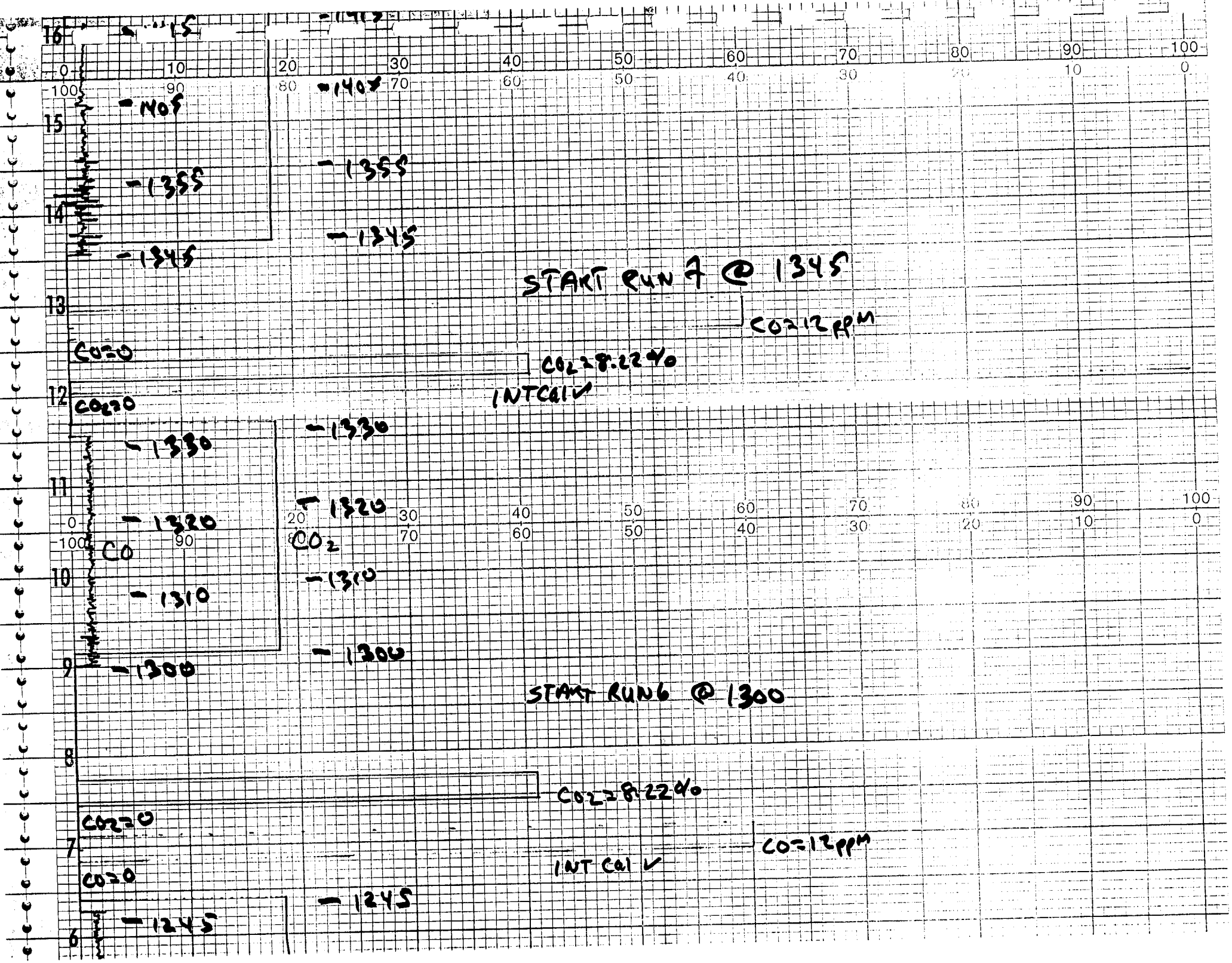


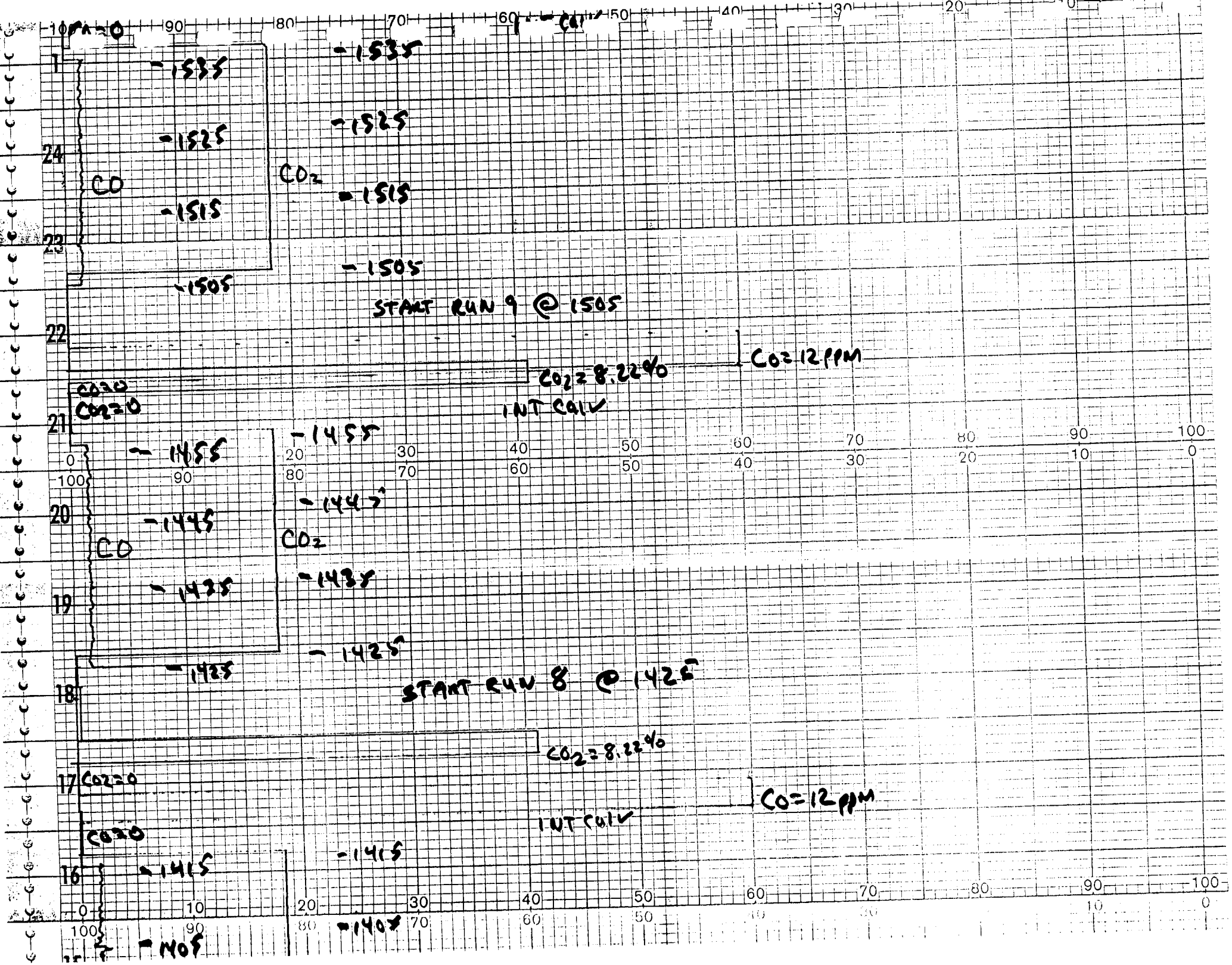
CO2 = 0 - 20%
INT CAL ✓
CO2 = 8.22%
CO = 8.64 ppm
LINEARITY ✓
CO = 12 ppm
CO = 0
CO = 0 - 20 ppm
CO = 12 ppm
CO = 0
INT CAL
SWEPI - SEKR UNIT 1 RAIS
CO2 = 8.16%
CO2 = 0
CO = 0
System BIAS ✓
CO = 8.7 ppm
CO2 = 8.22%
CO2 = 0
INT CAL ✓
CO = 8.8 ppm
CO2
CO
1630
1620
1610
1600
1550

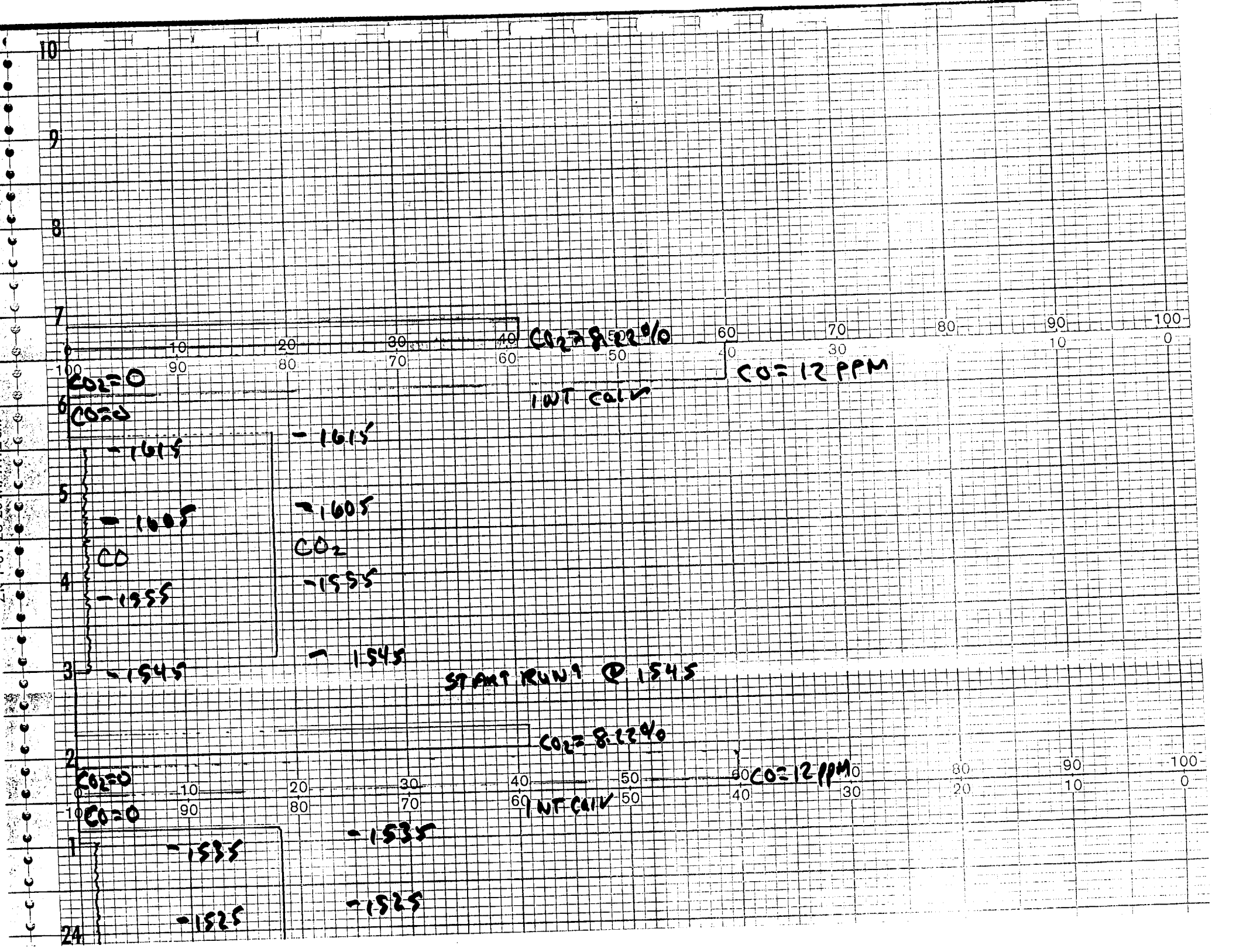

0945
0945
START RUN 2 @ 0945
CO2=8.22%
INT CAL ADJ
CO2=0
CO2=8.26%
CO2=0
CO=12 PPM
INT CAL ✓
CO=0
0930
0930
0920
0920
CO
CO2
0910
0910
0900
0900
START RUN 1 @ 0900
Chart Speed @ 10cm/Hr
CO2=12.2PPM
CO=0
CO2=8.22%
CO2=0
System Bias ✓
CO2=2.9%
CO2=8.22%
CO2=0
LINEARITY ✓
CO2=0-20%
INT CAL ✓
CO2=8.22%
CO=8.64 PPM
CO2=0
LINEARITY ✓
CO=12PPM

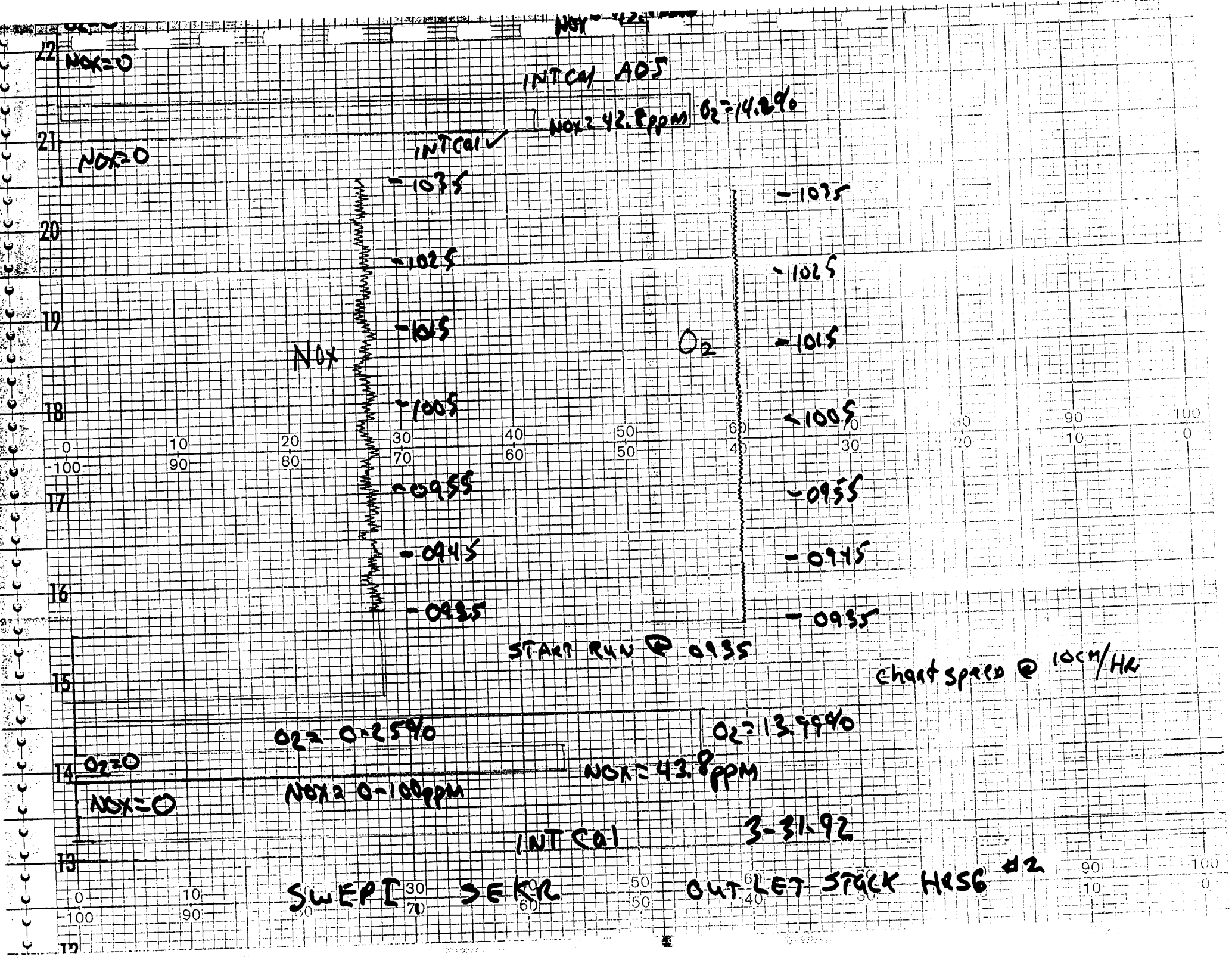

CO2 = 8.22%
CO2 = .02%
CO = 12 ppm
CO = 0
INT CAL ✓
1110
1110
1100
1100
CO
CO2
1050
1050
Raised unit load
from 10.1 MW to 10.8 MW.
1040
1040
START RUN 3 @ 1040
CO2 = 8.22%
Cal .05
CO2 = 8.18%
CO = 0
CO = 12 ppm
CO = 0
INT CAL ✓
1015
1015
1005
1005
CO
CO2
0955
0955
0945
0945
START RUN 2 @ 0945

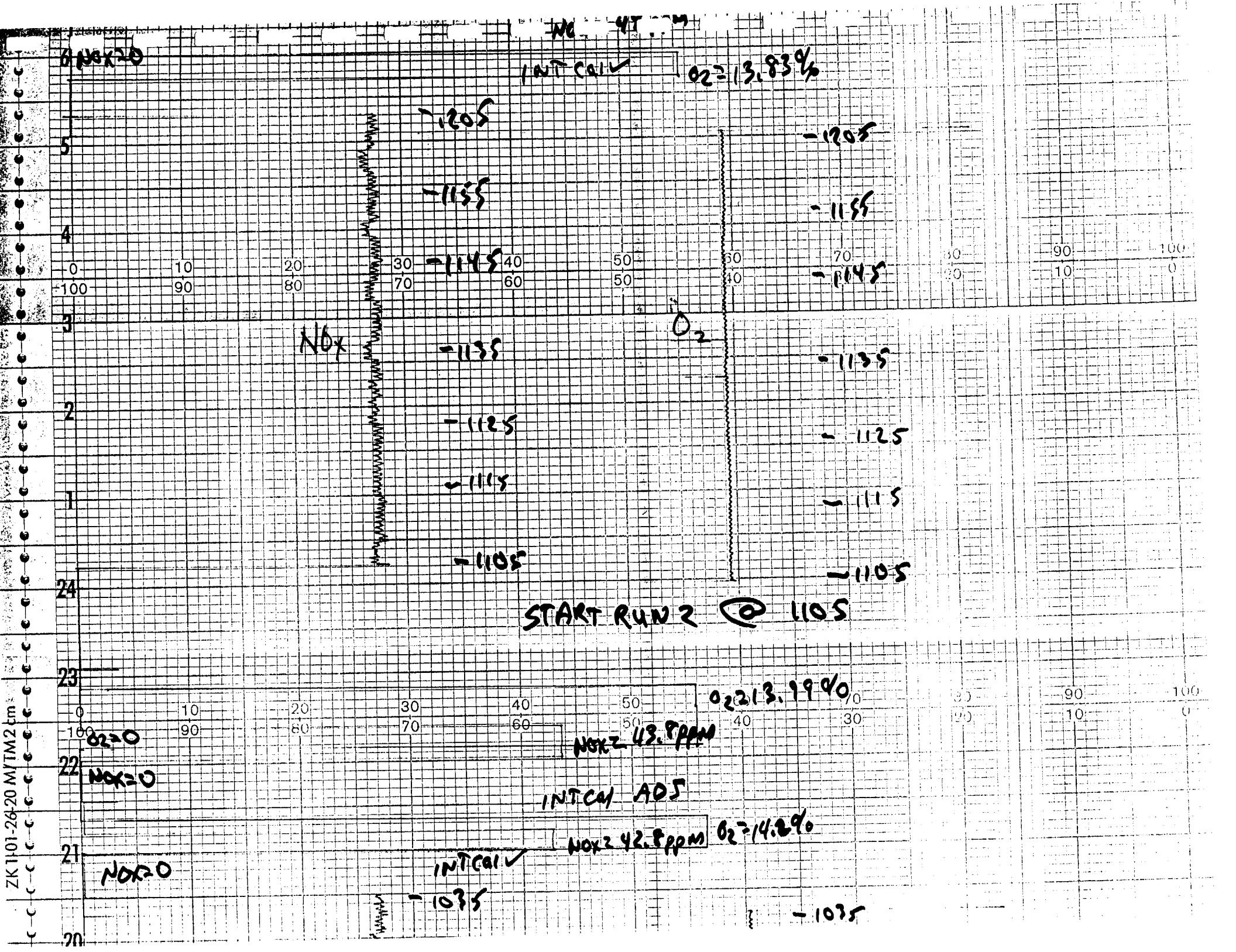

CO=12ppm
INT CAL ✓
CO=0
1245
1245
1235
1235
CO
CO2
1225
1225
1215
1215
START RUNS @ 125
CO2=8.22%
CO=12ppm
CO2=0
CO=0
INT CAL ✓
1200
1200
CO
CO2
1150
1150
1140
1140
1130
1130
START RUN ↑ @ 1130
CO2=8.22%
CAL ADJ
CO=0
CO2=8.22%
CO2=.02%
CO=12ppm
CO=0
INT CAL ✓

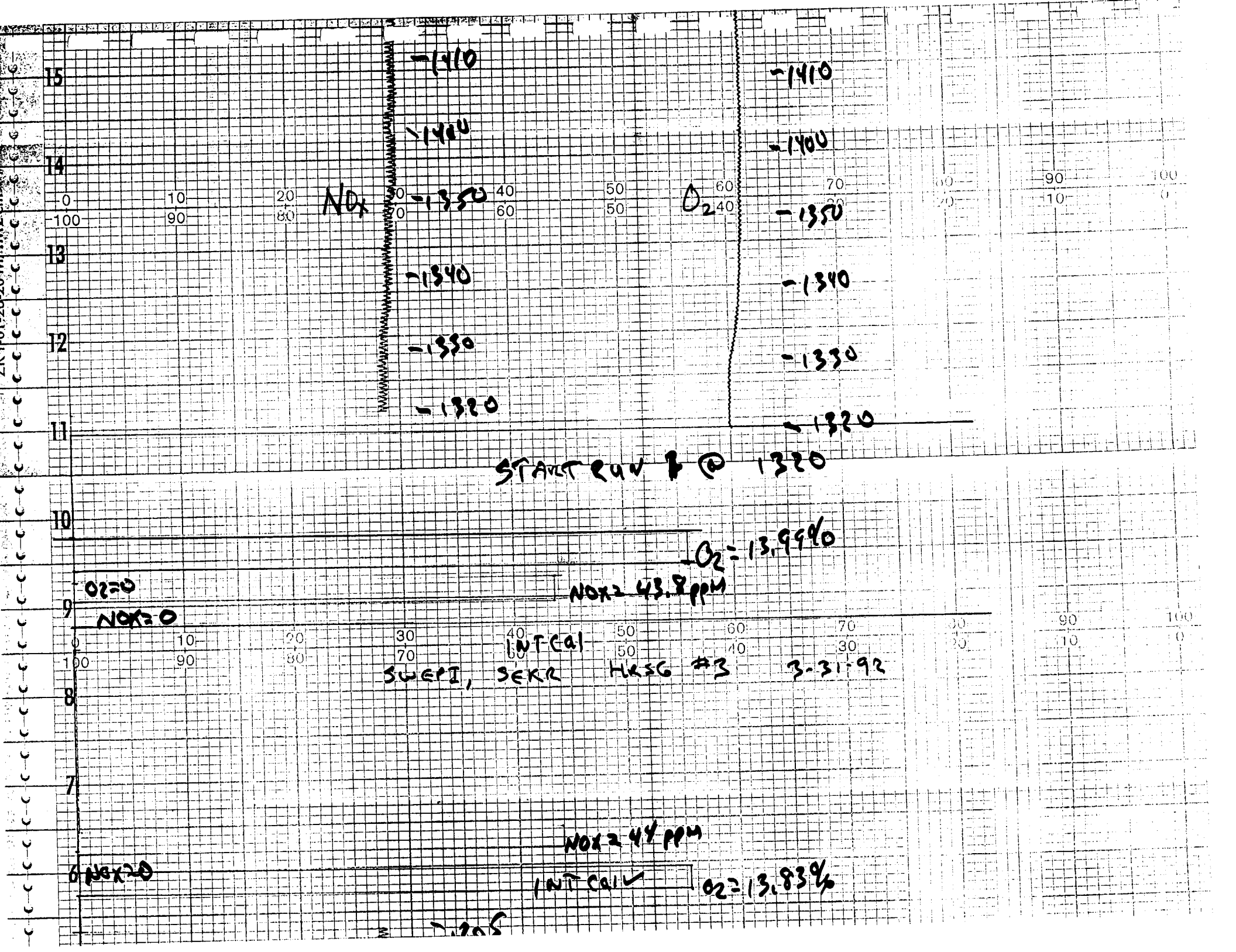

1405
1355
1345
START RUN 7 @ 1345
CO=12 PPM
CO2=8.22%
INT CAL ✓
1330
1320
1310
1300
START RUN 6 @ 1300
CO2=8.22%
CO=12 PPM
INT CAL ✓
1245
CO
CO2

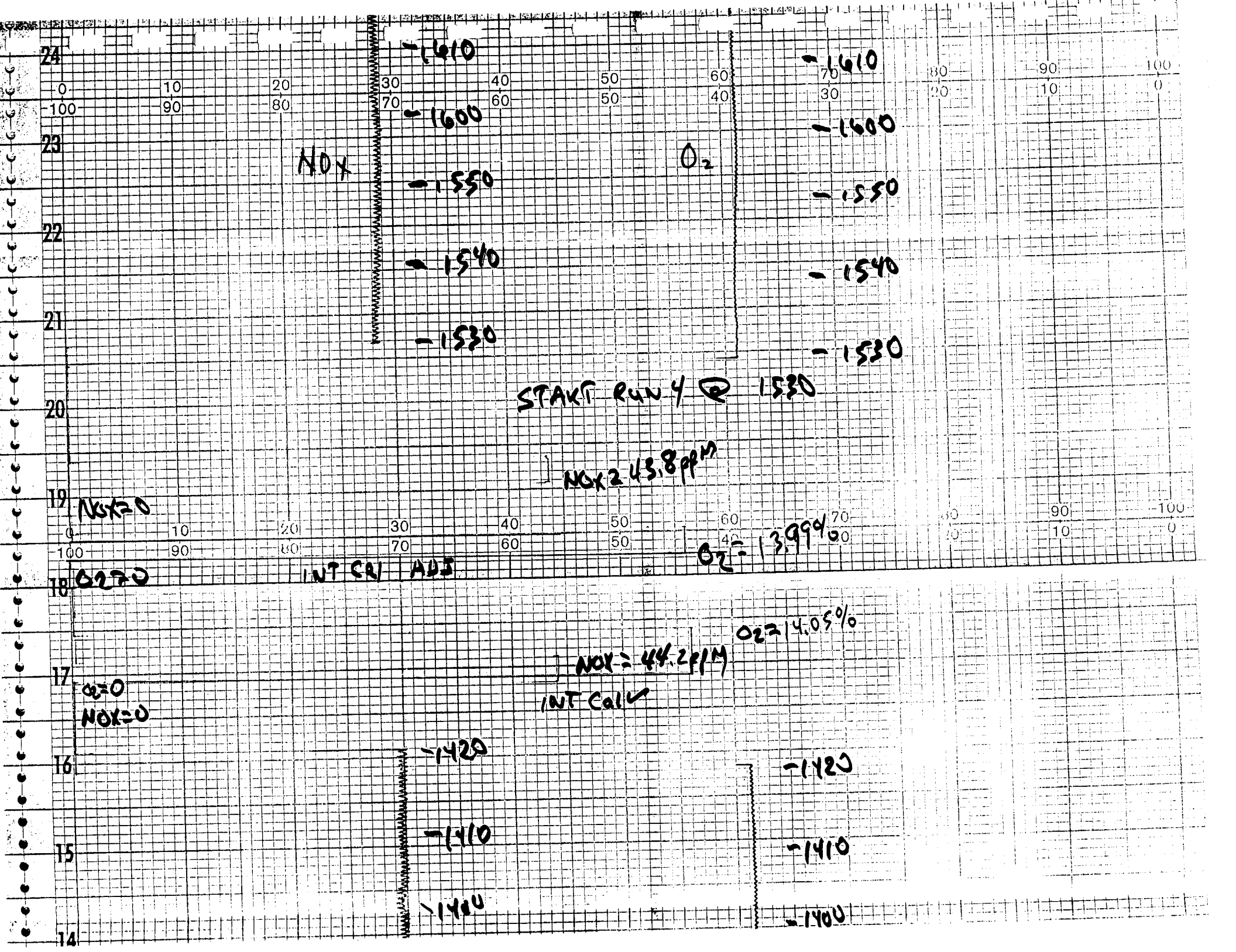

CO
CO2
-1535
-1525
-1515
-1505
START RUN 9 @ 1505
CO2 = 8.22%
CO = 12 PPM
INT CAL
CO2 = 0
CO = 0
-1455
-1445
-1435
-1425
START RUN 8 @ 1425
-1415
-1405

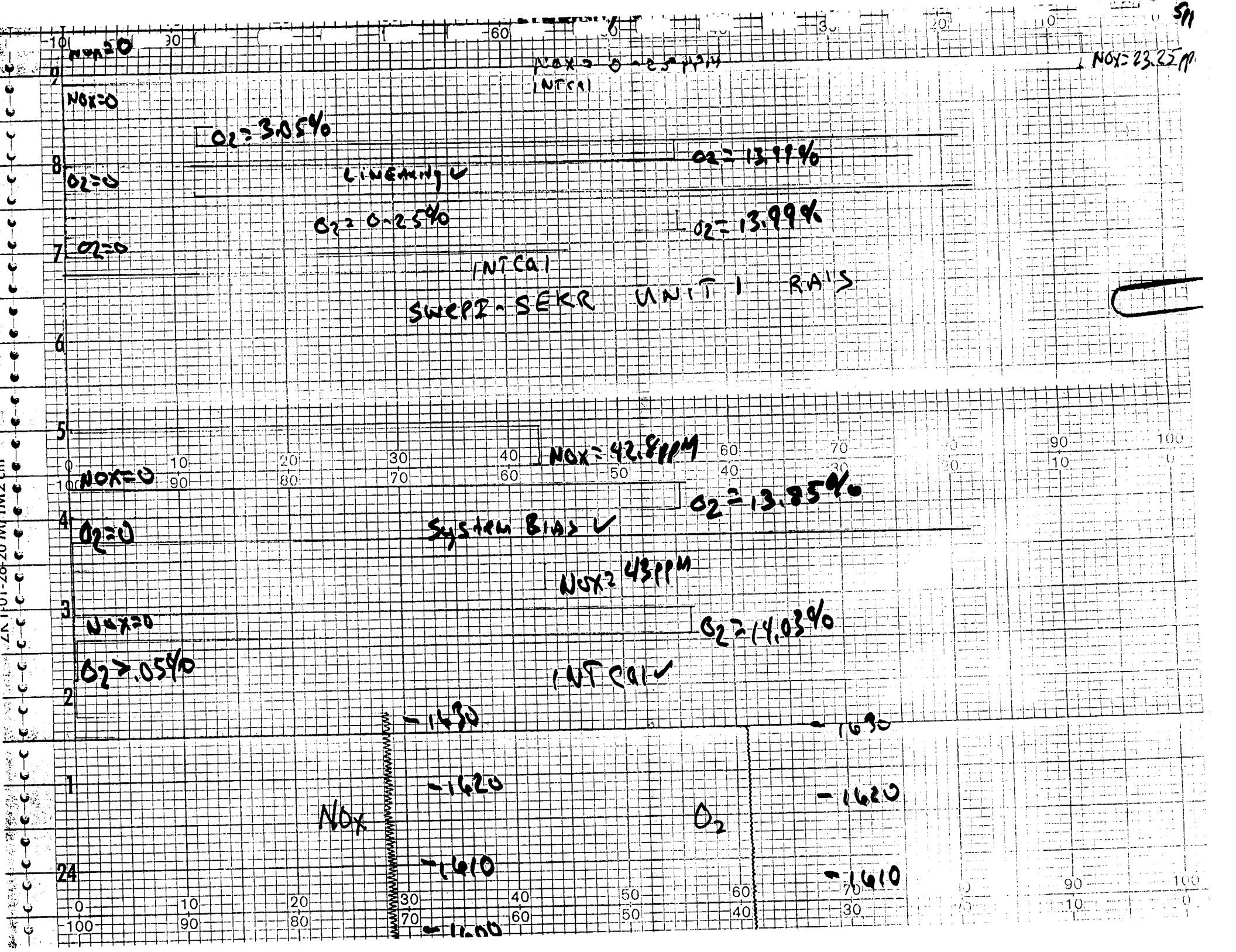

CO2 = 8.22%
CO = 12 PPM
INT CALIB
CO2 = 0
CO = 0
1615
1605
CO2
1555
1545
START RUN @ 1545
CO2 = 8.22%
CO = 12 PPM
INT CALIB
CO2 = 0
CO = 0
1535
1525


NOX=0
INTCAL AOS
NOX=42.8ppm O2=14.8%
INTCAL ✓
NOX=0
-1035
-1025
-1015
-1005
-0955
-0945
-0935
NOX
O2
START RUN @ 0935
chart speed @ 10CM/HR
O2=0-25%
O2=13.99%
O2=0
NOX=43.8ppm
NOX=0
NOX=0-100ppm
INT CAL
3-31-92
SWEPI 3EKR
OUTLET STACK HRSG #2

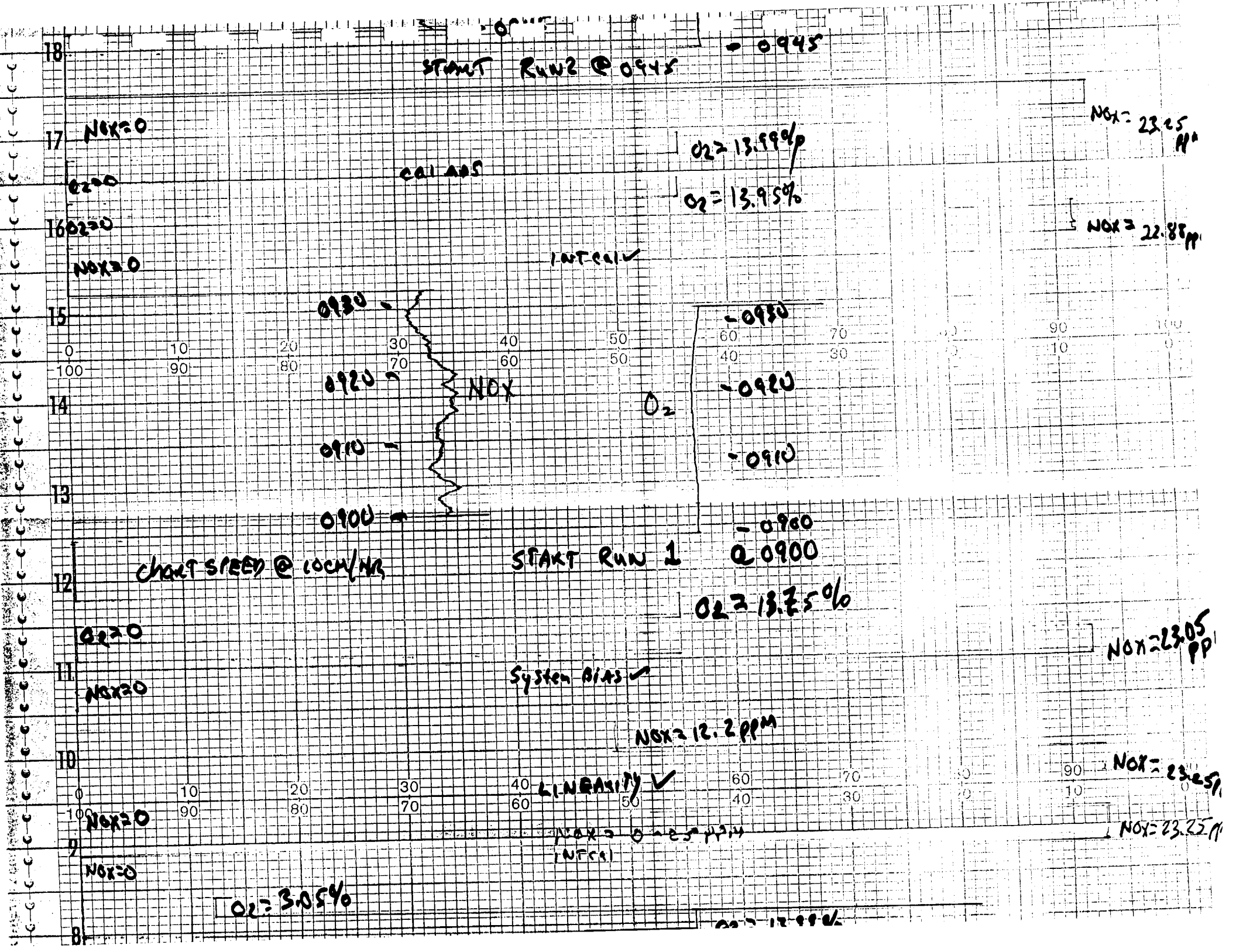

NOX=0
INT CAL ✓
O2=13.83%
1205
1155
1145
1135
1125
1115
1105
NOx
O2
START RUN 2 @ 1105
O2=0
NOX=0
O2=13.99%
NOX=43.8PPM
INT CAL AOS
NOX=42.8PPM
O2=14.2%
INT CAL ✓
1035
ZK1101-26-20 M/TM2 cm²


-1410
-1400
-1350
-1340
-1330
-1320
NOx
O2
-1410
-1400
-1350
-1340
-1330
-1320
START RUN @ 1320
O2 = 13.99%
NOx = 43.8 ppm
O2 = 0
NOx = 0
INT CAL
SWEPT, SEKR
HRSG #3
3-31-92
NOx = 44 ppm
INT CAL
O2 = 13.83%
NOx = 0

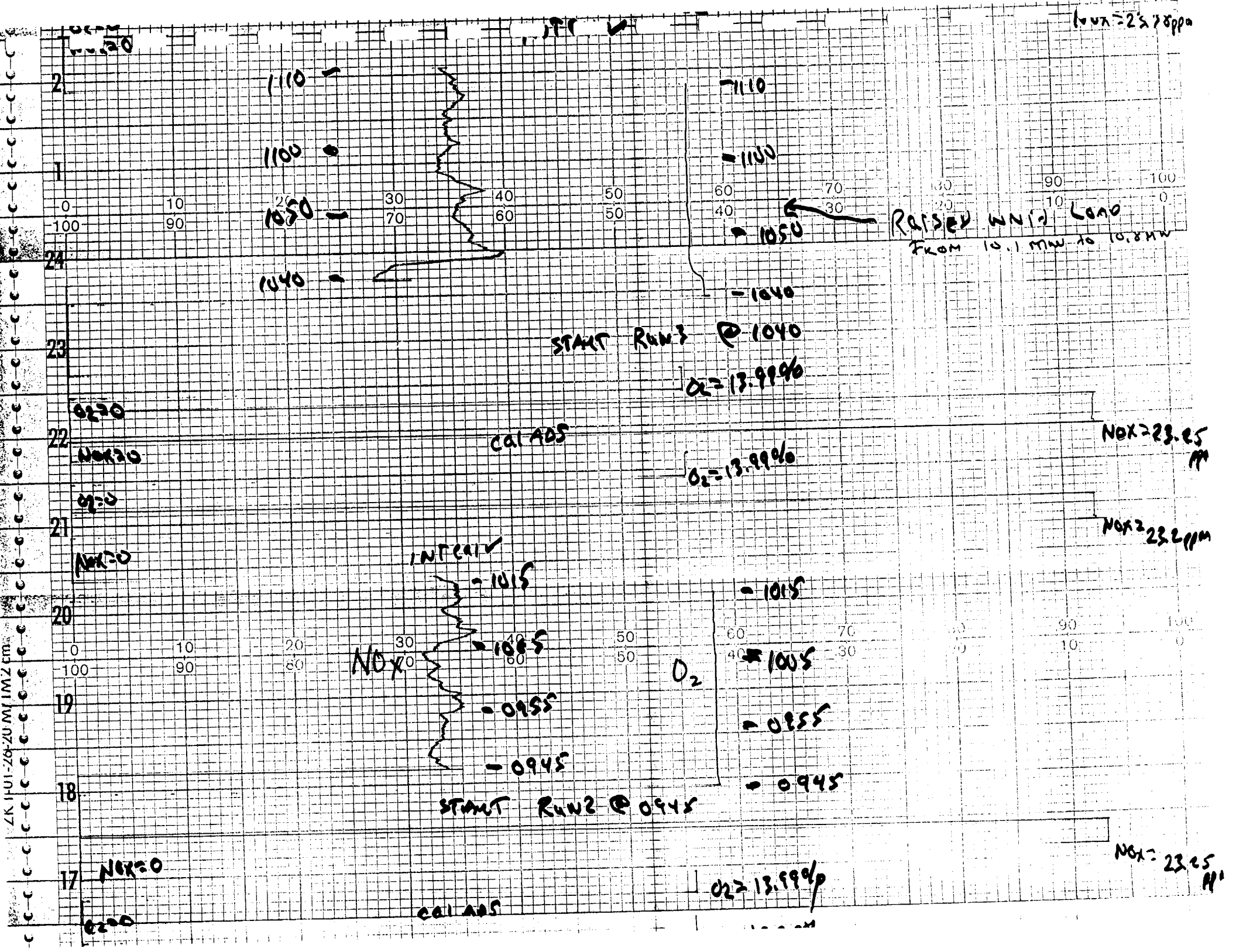

24
23
22
21
20
19
18
17
16
15
14
0
10
20
30
40
50
60
70
80
90
100
100
90
80
70
60
50
40
30
20
10
0
NOX
O2
1610
1600
1550
1540
1530
1420
1410
1400
START RUN 4 @ 1530
NOX = 43.8 PPM
O2 = 13.99%
NOX=0
O2=0
INT CAL ADJ
O2=14.05%
NOX = 44.2 PPM
INT CAL
O2=0
NOX=0



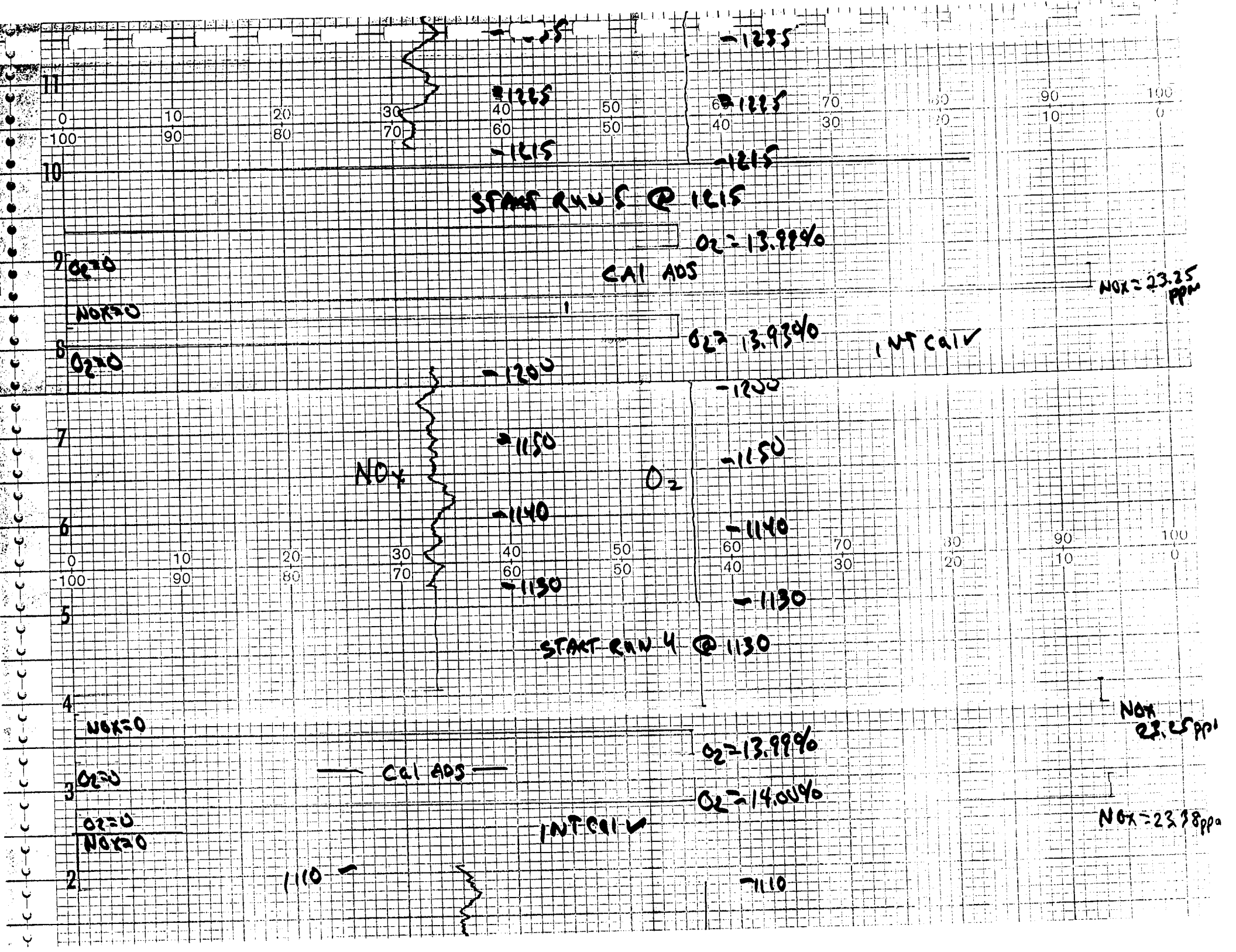
NOx=0
NOx=0
O2=3.05%
O2=0
LINEARITY ✓
O2=0
O2=0
INTCAL
SWEPI-SEKR UNIT 1 RA'S
NOx=0
O2=0
NOx=0
O2>.05%
NOx=42.8ppm
O2=13.85%
System Bias ✓
NOx=43ppm
O2=14.03%
INTCAL ✓
NOx=23.25ppm
O2=13.99%
O2=13.99%
-1630
-1620
-1610
-1600
NOx
O2
-1630
-1620
-1610

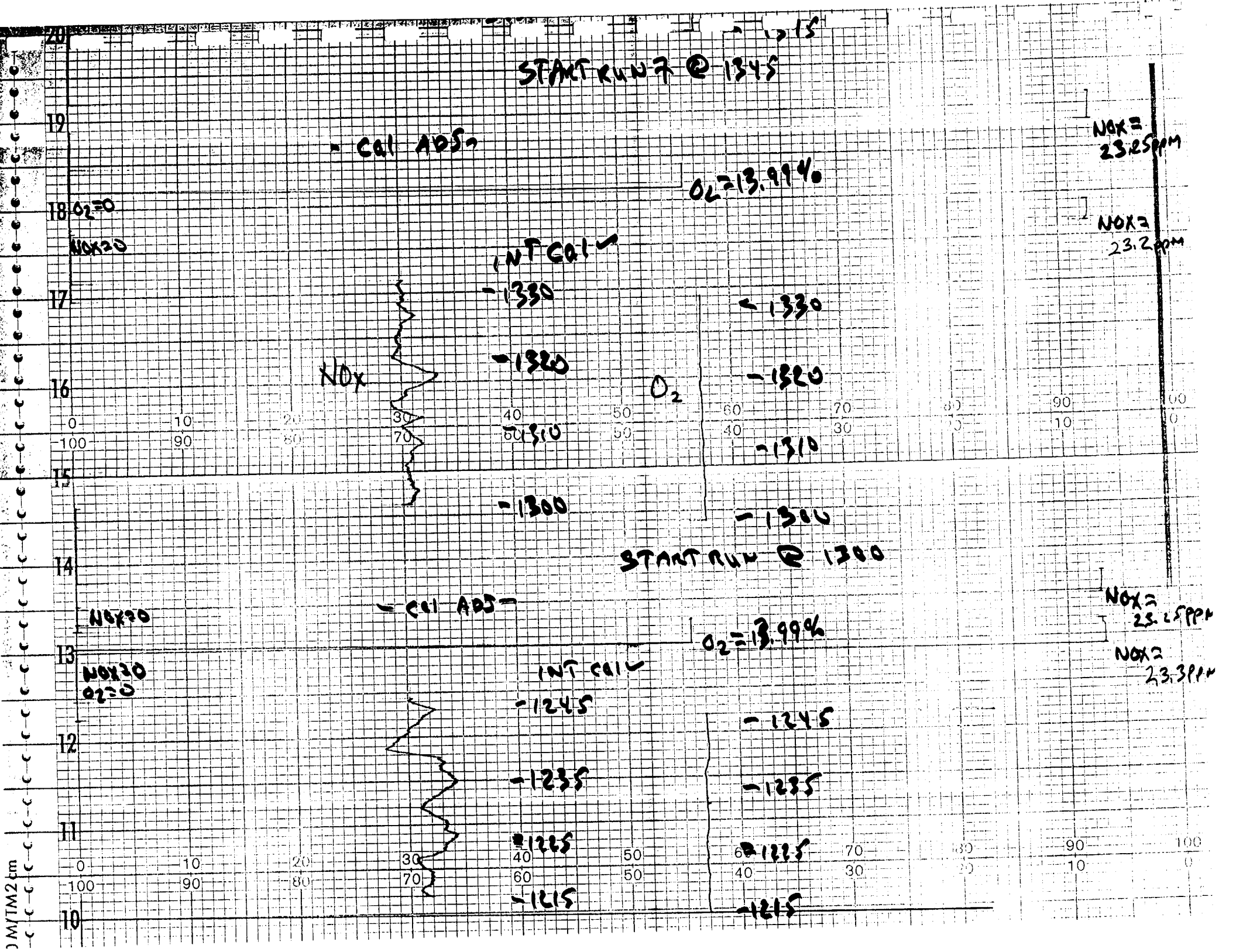


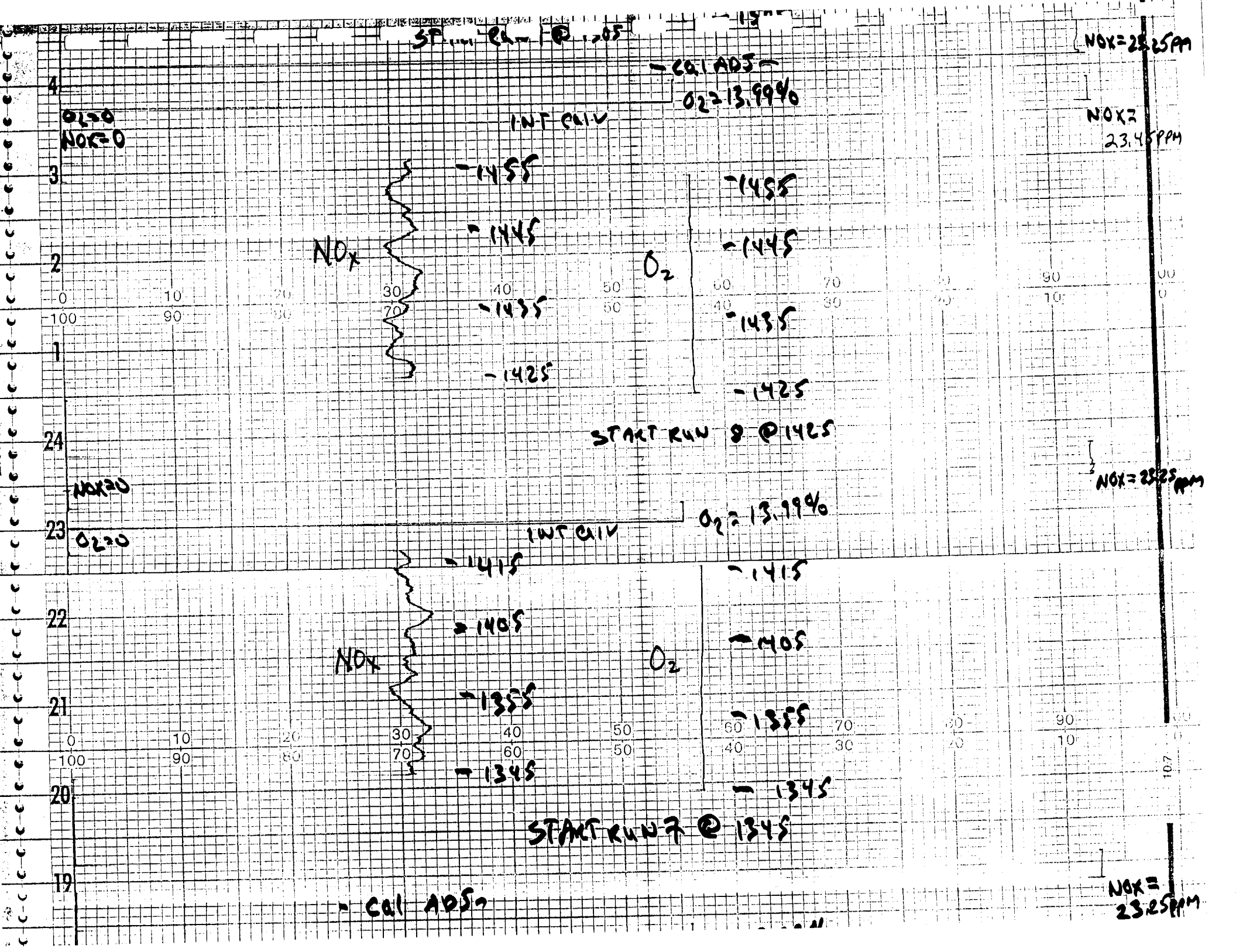
START RUN 2 @ 0945
- 0945
NOX = 0
O2 = 0
O2 = 0
NOX = 0
CAL ADS
O2 = 13.99%
O2 = 13.95%
NOX = 23.25 ppm
NOX = 22.88 ppm
INT CAL ✓
0930
0920
0910
0900
NOX
O2
- 0930
- 0920
- 0910
- 0900
START RUN 1 @ 0900
CHART SPEED @ 10CM/HR
O2 = 13.75%
O2 = 0
NOX = 0
NOX = 23.05 ppm
System BIAS ✓
NOX = 12.2 ppm
LINEARITY ✓
NOX = 23.25 ppm
NOX = 0
NOX = 0 - 25 ppm
INT CAL
NOX = 23.25 ppm
NOX = 0
O2 = 3.05%



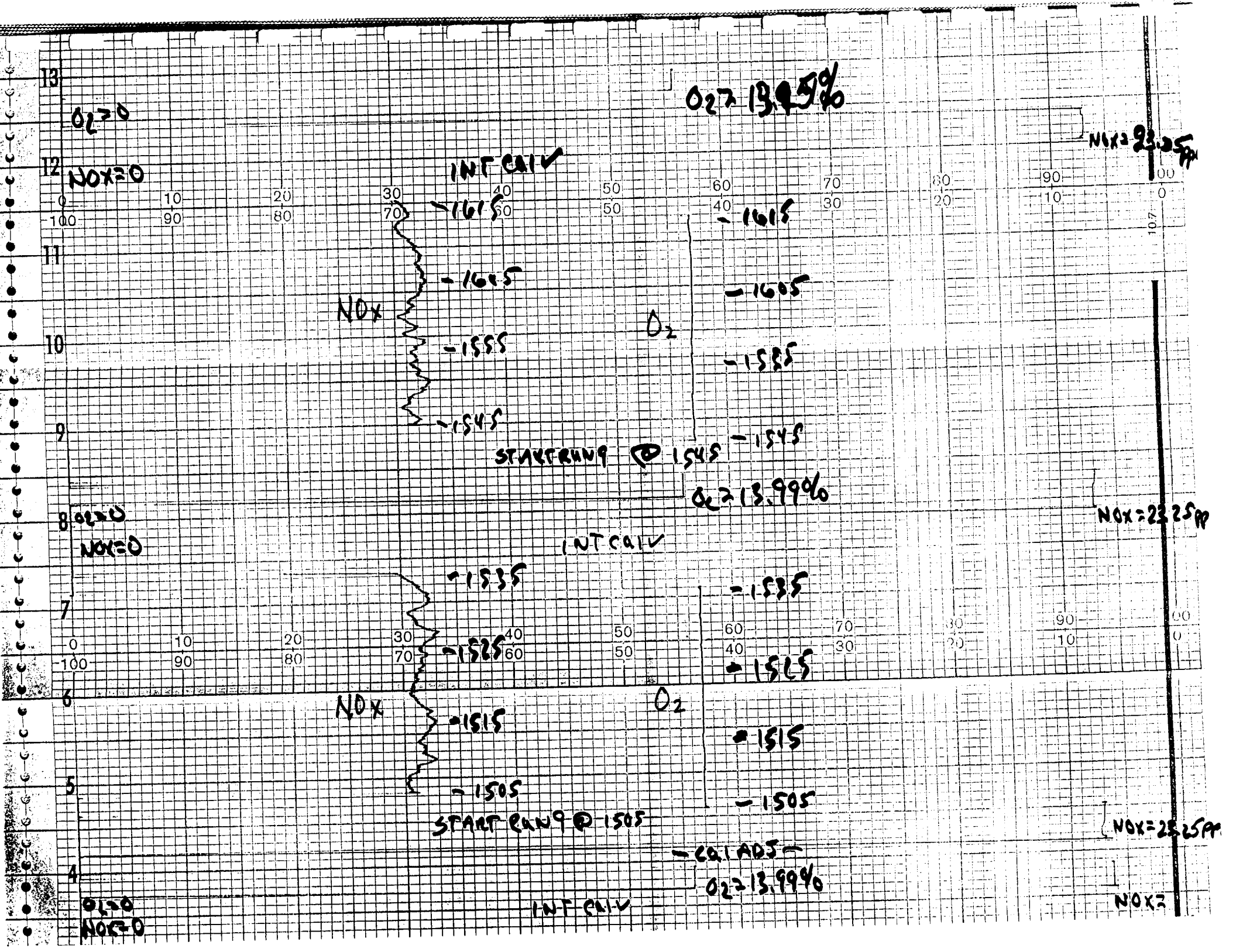
NOx=23.78ppm
1110
1100
1050
1040
1110
1100
1050
1040
RAISED WIND LOAD
FROM 10.1 MW TO 10.8 MW
START RUN 3 @ 1040
O2=13.99%
O2=0
NOX=0
CAL ADS
NOX=23.25 ppm
O2=13.99%
O2=0
NOX=23.2 ppm
NOX=0
INT CAL
1015
1005
0955
0945
NOx
O2
1015
1005
0955
0945
START RUN 2 @ 0945
NOX=0
NOX=23.25 ppm
O2=13.99%
CAL ADS
O2=0


11
10
9
8
7
6
5
4
3
2
0 100
10 90
20 80
30 70
40 60
50 50
60 40
70 30
80 20
90 10
100 0
1235
1225
1215
START RUN 5 @ 1215
O2 = 13.99%
CAL ADS
NOX = 23.25 ppm
O2 = 0
NOX = 0
O2 = 13.93%
INT CAL ✓
1200
1150
1140
1130
NOX
O2
START RUN 4 @ 1130
NOX 23.25 ppm
O2 = 13.99%
CAL ADS
O2 = 14.00%
NOX = 23.38 ppm
INT CAL ✓
1110


START RUN 7 @ 1345
CAL ADJ
O2=13.99%
NOX=23.25PPM
NOX=23.2PPM
O2=0
NOX=0
INT CAL
1330
1320
1310
1300
NOx
O2
START RUN @ 1300
CAL ADJ
O2=13.99%
NOX=23.25PPM
NOX=23.3PPM
NOX=0
O2=0
INT CAL
1245
1235
1225
1215
20
19
18
17
16
15
14
13
12
11
10
0
10
20
30
40
50
60
70
80
90
100
100
90
80
70
60
50
40
30
20
10
0



NOX=23.25PPM
- CAL ADJ -
O2=13.99%
INT CALV
O2=0
NOX=0
NOX=
23.45PPM
-1455
-1445
-1435
-1425
NOx
O2
START RUN 8 @ 1425
NOX=23.25PPM
NOX=0
O2=0
O2=13.99%
INT CALV
-1415
-1405
-1355
-1345
NOx
O2
START RUN 7 @ 1345
- CAL ADJ -
NOX=
23.25PPM



O2=0
NOX=0
INT CAL ✓
-1615
-1605
-1555
-1545
NOx
O2
O2=13.99%
NOX=23.25ppm
STARTRUN9 @ 1545
O2=0
NOX=0
INT CAL ✓
-1535
-1525
-1515
-1505
NOx
O2
START RUN9 @ 1505
-CAL ADJ-
O2=13.99%
NOX=23.25ppm
O2=0
NOX=0
INT CAL ✓
NOX=

DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 03/31/92 TIME: 08:39:47

Turbine Speed	14170
Gen KW Output	3050
Gen Bus Volts	12375
Phase A Volts	12463
Phase B Volts	12434
Phase C Volts	12449
Phase A Current	139
Phase B Current	145
Phase C Current	143
TIT Temperature	[illegible]

Fuel Gas Flow	2058
Gas Supply Prs	[illegible]
Gas Manifld Prs	[illegible]
Comp Inlet Temp	51.9
Turb Exh Temp	[illegible]
Comp Inlet Pres	[illegible]
Turb Exh Press	[illegible]
Inj Water Flow	1707
Inj Water Ratio	[illegible]

SHUTDOWN ALARMS

EMERGENCY S/D	TURB EXH TMP	UNDER SPEED
FAIL TO CRANK	GBOX BRNG TMP	OVER SPEED
FAIL TO FIRE	GEN BRNG TEMP	GEN 86-G FAIL
FLAME OUT	STATOR TEMP	TC FAILURE
LUBE OIL SYS	TURB VIBRATN	TURB STAGNATN
FUEL GAS SYS	G-BOX VIBRATN	ENCLOS FIRE
GOVERN MALFNC	GEN VIBRATION	
LUBE OIL PRS	UNDER VOLTAGE	ALARM SUMMARY
CMP INLET PRS	OVER VOLTAGE	SDOWN SUMMARY
TURB EXH PRS		READY TO STRT

CONTROL 1

- P1 START
- P2 STOP
- P3 OPEN C.B.
- P4 CLOSE C.B
- P5 SPEED/LOAD RAISE
- P6 SPEED/LOAD LOWER
- P7 VOLTS/VARS RAISE
- P8 VOLTS/VARS LOWER

CONTROL 2

- P1 WATER INJ. [illegible]
- P2 WATER INJ. OFF
- P3 WATER INJ. AUTO
- P4 WTR INJ RSE RATIO
- P5 WTR INJ LWR RATIO
- P6 HOT WASH OFF
- P7 MOTOR TURBINE ON
- P8 MOTOR TURBINE OFF

CONTROL 3

- P1 REMOTE MODE ON
- P2 REMOTE MODE OFF
- P3 GOV IN ISOCH MODE
- P4 GOV IN DROOP MODE
- P5 GOV IN KW MODE
- P6 GOV IN TIT MODE
- P7 SYNC MODE [illegible]
- P8 ALARM RESET

CONTROL 4

- P1 GEN. REG. [illegible]
- P2 GEN. REG. OFF
- P3 FIRE SYSTEM ARMED
- P4 FIRE SYSTM DISARM
- P5 HALON DISCHARGE
- P6
- P7 AIR FILTER OFF
- P8

COPY IN PROGRESS

DIAGRAM NUMBER: 2250 VERSION: 1

DATE: 03/31/92 TIME: 08:39:34

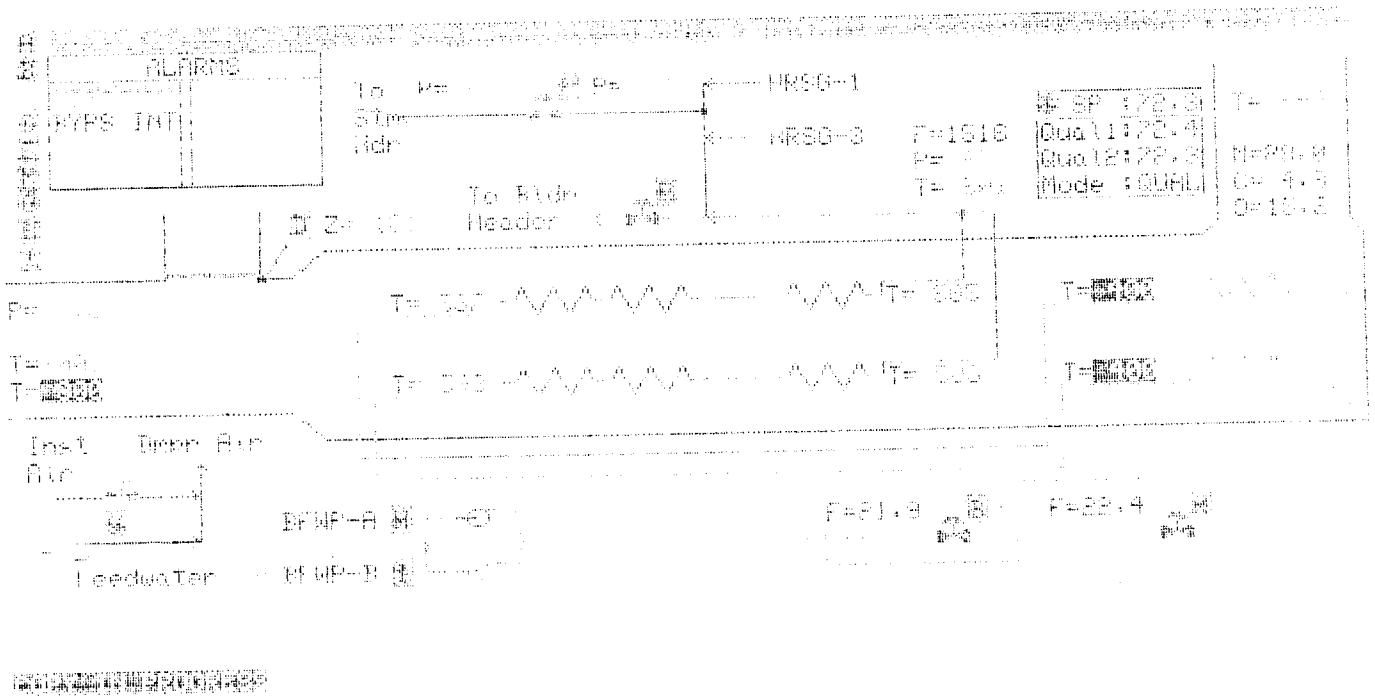
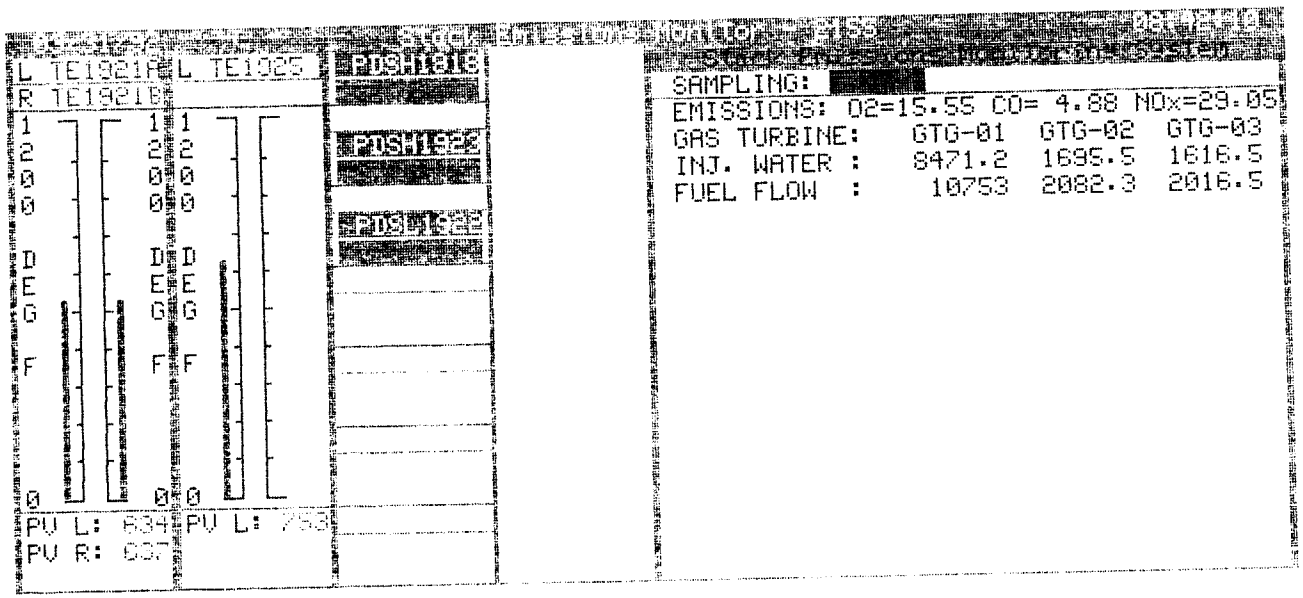


DIAGRAM NUMBER: 2155 VERSION: 2

DATE: 03/31/92 TIME: 08:42:12



COPY IN PROGRESS

DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 03/31/92 TIME: 09:08:13

Turbine Speed	14170	Fuel Gas Flow	2075
Gen KW Output	3040	Gas Supply Prs	[illegible]
Gen Bus Volts	12390	Gas Manifld Prs	161
Phase A Volts	12449	Comp Inlet Temp	51.6
Phase B Volts	12434	Turb Exh Temp	929
Phase C Volts	12434	Comp Inlet Pres	2.7
Phase A Current	140	Turb Exh Press	0.0
Phase B Current	145	Inj Water Flow	1658
Phase C Current	144	Inj Water Ratio	0.80
TIT Temperature	1873		

SHUTDOWN ALARMS

EMERGENCY S/D	TURB EXH TMP	UNDER SPEED
FAIL TO CRANK	GBOX BRNG TMP	OVER SPEED
FAIL TO FIRE	GEN BRNG TEMP	GEN 86-G FAIL
FLAME OUT	STATOR TEMP	TC FAILURE
LUBE OIL SYS	TURB VIBRATN	TURB STAGNATN
FUEL GAS SYS	G-BOX VIBRATN	ENCLOS FIRE
GOVERN MALFNC	GEN VIBRATION	
LUBE OIL PRS	UNDER VOLTAGE	ALARM SUMMARY
CMP INLET PRS	OVER VOLTAGE	SDOWN SUMMARY
TURB EXH PRS		READY TO STRT

CONTROL 1

- P1 START
- P2 STOP
- P3 OPEN C.B.
- P4 CLOSE C.B
- P5 SPEED/LOAD RAISE
- P6 SPEED/LOAD LOWER
- P7 VOLTS/VARS RAISE
- P8 VOLTS/VARS LOWER

CONTROL 2

- P1 WATER INJ. ON
- P2 WATER INJ. OFF
- P3 WATER INJ. AUTO
- P4 WTR INJ RSE RATIO
- P5 WTR INJ LWR RATIO
- P6 HOT WASH OFF
- P7 MOTOR TURBINE ON
- P8 MOTOR TURBINE OFF

CONTROL 3

- P1 REMOTE MODE ON
- P2 REMOTE MODE OFF
- P3 GOV IN ISOCH MODE
- P4 GOV IN DROOP MODE
- P5 GOV IN KW MODE
- P6 GOV IN TIT MODE
- P7 SYNC MODE ON
- P8 ALARM RESET

CONTROL 4

- P1 GEN. REG. ON
- P2 GEN. REG. OFF
- P3 FIRE SYSTEM ARMED
- P4 FIRE SYSTM DISARM
- P5 HALON DISCHARGE
- P6
- P7 AIR FILTER OFF
- P8

COPY IN PROGRESS

DIAGRAM NUMBER: 2250 VERSION: 1

DATE: 03/31/92 TIME: 09:08:00

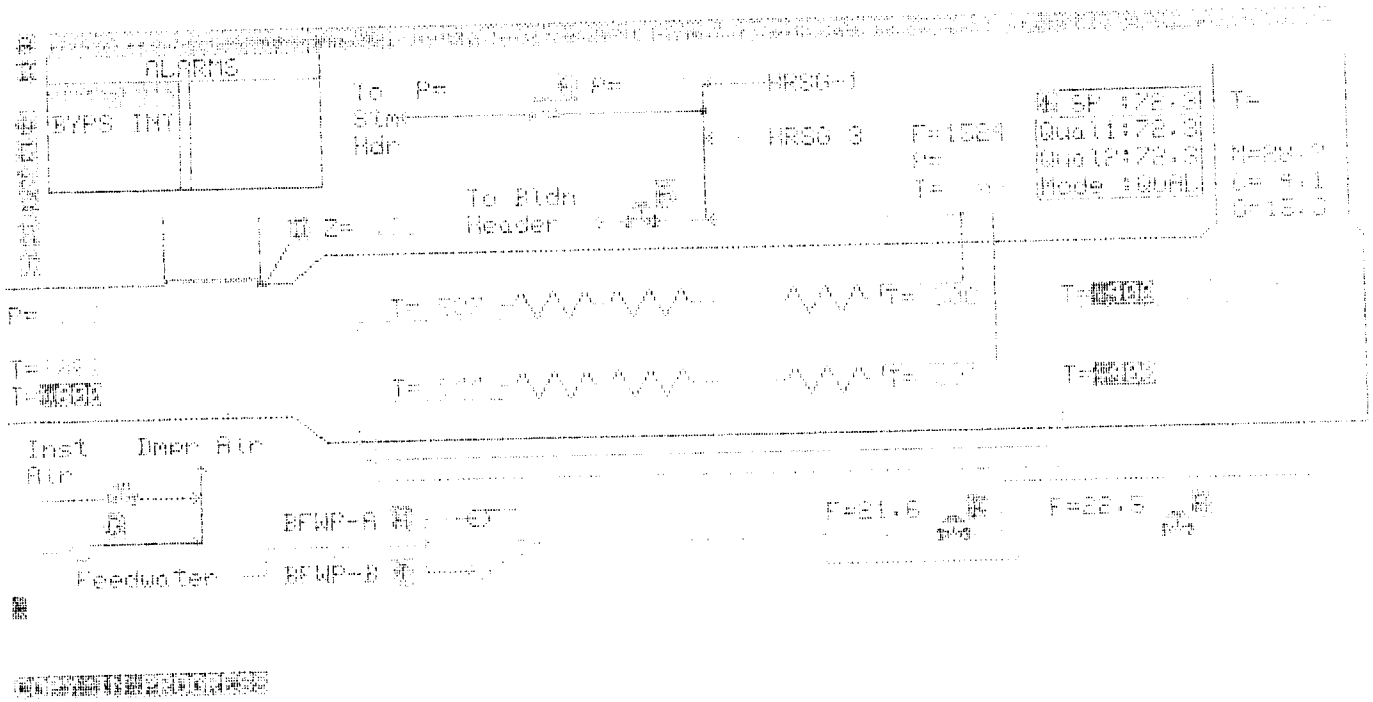


DIAGRAM NUMBER: 2155 VERSION: 2

DATE: 03/31/92 TIME: 09:09:57

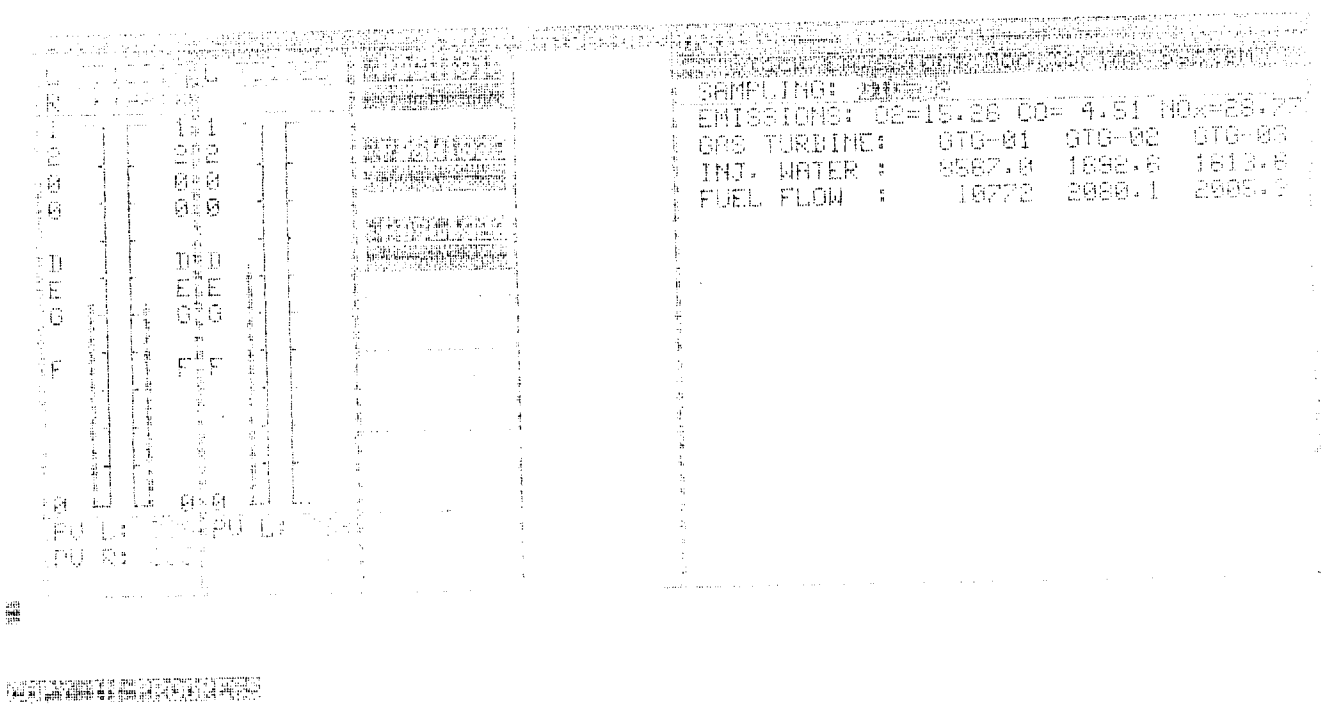


DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 03/31/92 TIME: 09:41:55

Turbine Speed	14170
Gen KW Output	3016
Gen Bus Volts	12346
Phase A Volts	12434
Phase B Volts	12405
Phase C Volts	12405
Phase A Current	138
Phase B Current	143
Phase C Current	142
TIT Temperature	1806

Fuel Gas Flow	2043
Gas Supply Prs	257
Gas Manifld Prs	180
Comp Inlet Temp	52.2
Turb Exh Temp	931
Comp Inlet Pres	2.6
Turb Exh Press	0.0
Inj Water Flow	1664
Inj Water Ratio	0.81

SHUTDOWN ALARMS

EMERGENCY S/D	TURB EXH TMP	UNDER SPEED
FAIL TO CRANK	GBOX BRNG TMP	OVER SPEED
FAIL TO FIRE	GEN BRNG TEMP	GEN 86-G FAIL
FLAME OUT	STATOR TEMP	TC FAILURE
LUBE OIL SYS	TURB VIBRATN	TURB STAGNATN
FUEL GAS SYS	G-BOX VIBRATN	ENCLOS FIRE
GOVERN MALFNC	GEN VIBRATION	
LUBE OIL PRS	UNDER VOLTAGE	ALARM SUMMARY
CMP INLET PRS	OVER VOLTAGE	SDOWN SUMMARY
TURB EXH PRS		READY TO STRT

CONTROL 1

- P1 START
- P2 STOP
- P3 OPEN C.B.
- P4 CLOSE C.B CLOSED
- P5 SPEED/LOAD RAISE
- P6 SPEED/LOAD LOWER
- P7 VOLTS/VARS RAISE
- P8 VOLTS/VARS LOWER

CONTROL 2

- P1 WATER INJ. ON
- P2 WATER INJ. OFF
- P3 WATER INJ. AUTO
- P4 WTR INJ RSE RATIO
- P5 WTR INJ LWR RATIO
- P6 HOT WASH OFF
- P7 MOTOR TURBINE ON
- P8 MOTOR TURBINE OFF

CONTROL 3

- P1 REMOTE MODE ON
- P2 REMOTE MODE OFF
- P3 GOV IN ISOCH MODE
- P4 GOV IN DROOP MODE
- P5 GOV IN KW MODE
- P6 GOV IN TIT MODE
- P7 SYNC MODE ON
- P8 ALARM RESET

CONTROL 4

- P1 GEN. REG. ON
- P2 GEN. REG. OFF
- P3 FIRE SYSTEM ARMED
- P4 FIRE SYSTM DISARMED
- P5 HALON DISCHARGE
- P6
- P7 AIR FILTER OFF
- P8

COPY IN PROGRESS

DIAGRAM NUMBER: 2250 VERSION: 1

DATE: 03/31/92 TIME: 09:39:56

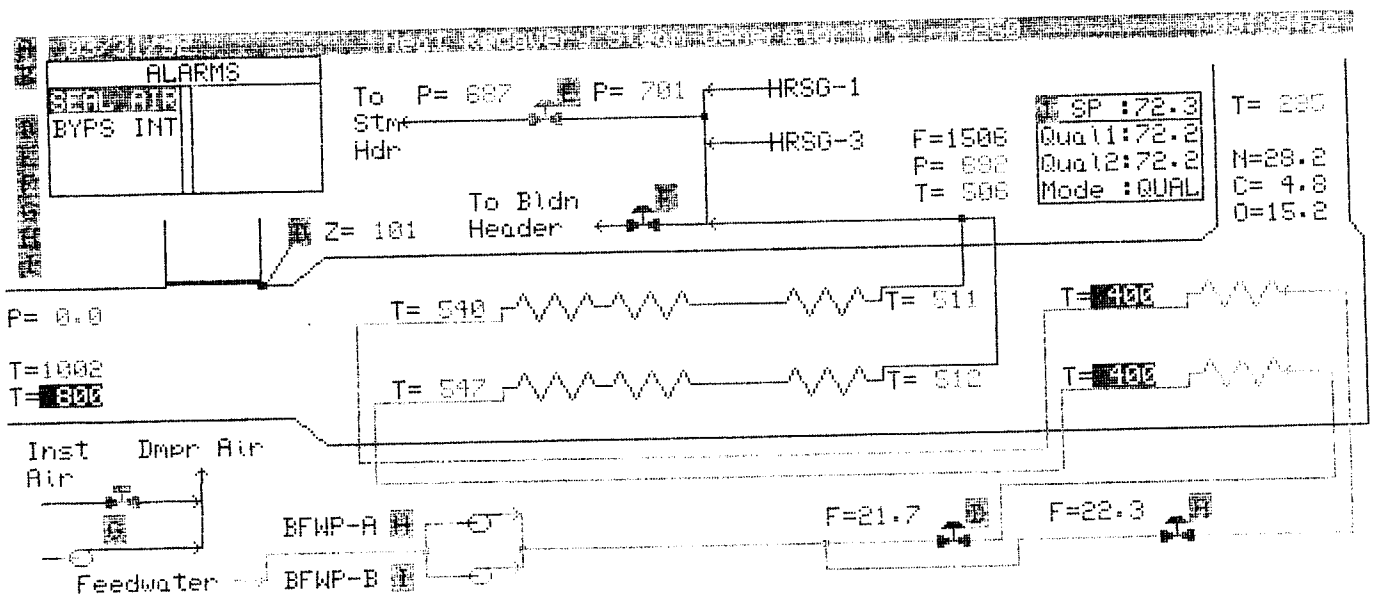


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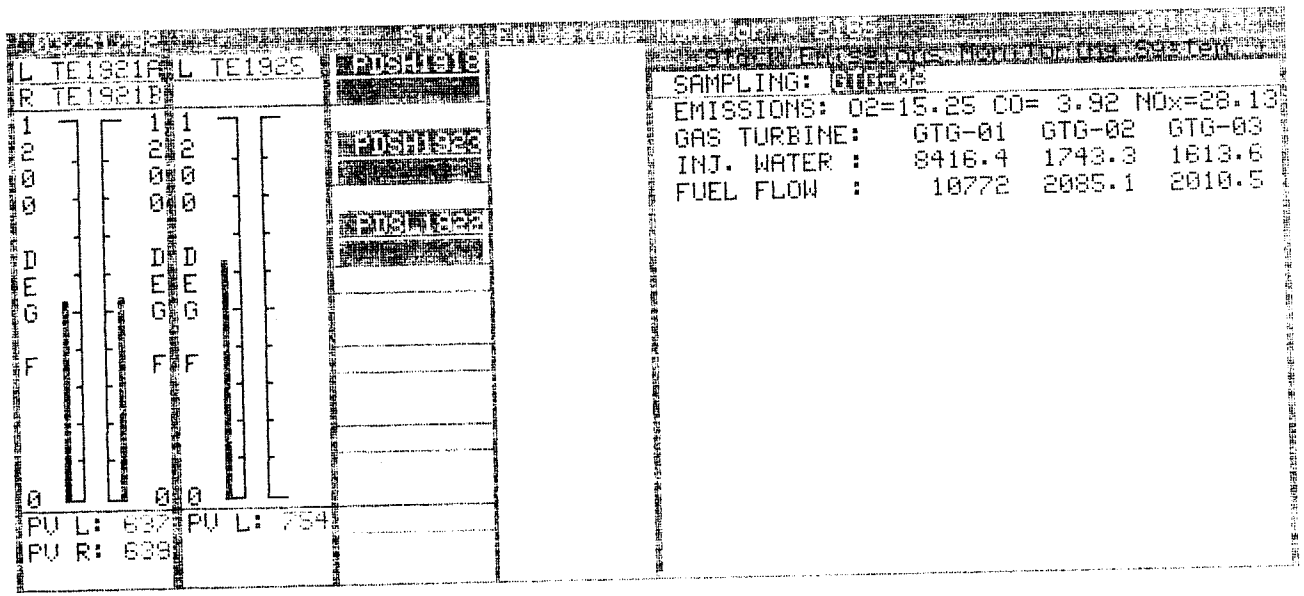
DIAGRAM NUMBER: 2155 VERSION: 2

DATE: 03/31/92 TIME: 09:38:05



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Unit #2

DIAGRAM NUMBER: 2200 VERSION: 4 Begin Run #1

DATE: 03/31/92 TIME: 10:10:19

Turbine Speed	14170
Gen KW Output	3045
Gen Bus Volts	12361
Phase A Volts	12434
Phase B Volts	12419
Phase C Volts	12405
Phase A Current	139
Phase B Current	145
Phase C Current	144
TIT Temperature	[illegible]

Fuel Gas Flow	2058
Gas Supply Prs	[illegible]
Gas Manifld Prs	[illegible]
Comp Inlet Temp	[illegible]
Turb Exh Temp	[illegible]
Comp Inlet Pres	[illegible]
Turb Exh Press	[illegible]
Inj Water Flow	1698
Inj Water Ratio	[illegible]

SHUTDOWN ALARMS

EMERGENCY S/D	TURB EXH TMP	UNDER SPEED
FAIL TO CRANK	GBOX BRNG TMP	OVER SPEED
FAIL TO FIRE	GEN BRNG TEMP	GEN 86-G FAIL
FLAME OUT	STATOR TEMP	TC FAILURE
LUBE OIL SYS	TURB VIBRATN	TURB STAGNATN
FUEL GAS SYS	G-BOX VIBRATN	ENCLOS FIRE
GOVERN MALFNC	GEN VIBRATION	
LUBE OIL PRS	UNDER VOLTAGE	ALARM SUMMARY
CMP INLET PRS	OVER VOLTAGE	SDOWN SUMMARY
TURB EXH PRS		READY TO STRT

CONTROL 1

P1	START
P2	STOP
P3	OPEN C.B.
P4	CLOSE C.B [illegible]
P5	SPEED/LOAD RAISE
P6	SPEED/LOAD LOWER
P7	VOLTS/VARS RAISE
P8	VOLTS/VARS LOWER

CONTROL 2

P1	WATER INJ. ON
P2	WATER INJ. OFF
P3	WATER INJ. AUTO
P4	WTR INJ RSE RATIO
P5	WTR INJ LWR RATIO
P6	HOT WASH OFF
P7	MOTOR TURBINE ON
P8	MOTOR TURBINE OFF

CONTROL 3

P1	REMOTE MODE ON
P2	REMOTE MODE OFF
P3	GOV IN ISOCH MODE
P4	GOV IN DROOP MODE
P5	GOV IN KW MODE
P6	GOV IN [illegible] MODE
P7	SYNC MODE [illegible]
P8	ALARM RESET

CONTROL 4

P1	GEN. REG. [illegible]
P2	GEN. REG. OFF
P3	FIRE SYSTEM ARMED
P4	FIRE SYSTM DISARM
P5	HALON DISCHARGE
P6	
P7	AIR FILTER OFF
P8	

COPY IN PROGRESS

DIAGRAM NUMBER: 2250 VERSION: 1

DATE: 03/31/92 TIME: 10:08:19

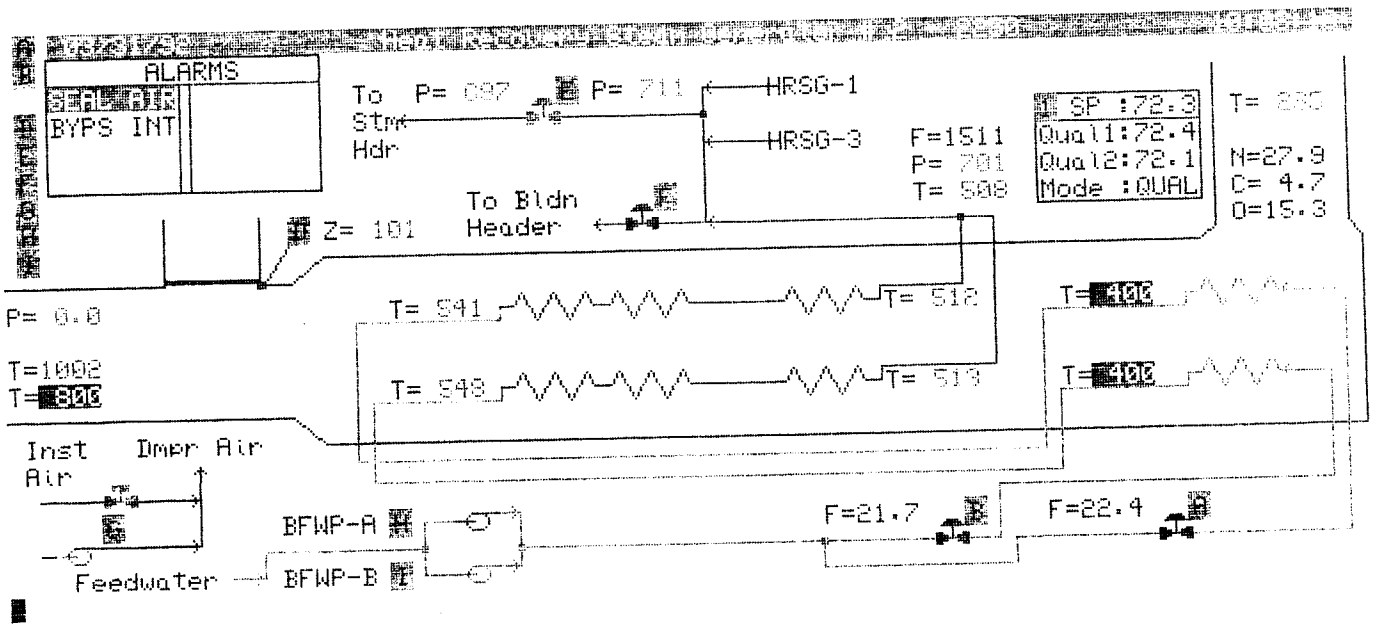

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DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 03/31/92 TIME: 10:42:24

Unit 2
End Run#1
Fuel Flow =
2043 #/hr

Turbine Speed	14170
Gen KW Output	2977
Gen Bus Volts	12361
Phase A Volts	12419
Phase B Volts	12405
Phase C Volts	12405
Phase A Current	136
Phase B Current	142
Phase C Current	141
TIT Temperature	1966

Fuel Gas Flow	2028
Gas Supply Prs	255
Gas Manifld Prs	158
Comp Inlet Temp	59.0
Turb Exh Temp	927
Comp Inlet Pres	2.6
Turb Exh Press	0.0
Inj Water Flow	1667
Inj Water Ratio	0.82

SHUTDOWN ALARMS

EMERGENCY S/D	TURB EXH TMP	UNDER SPEED
FAIL TO CRANK	GBOX BRNG TMP	OVER SPEED
FAIL TO FIRE	GEN BRNG TEMP	GEN 86-G FAIL
FLAME OUT	STATOR TEMP	TC FAILURE
LUBE OIL SYS	TURB VIBRATN	TURB STAGNATN
FUEL GAS SYS	G-BOX VIBRATN	ENCLOS FIRE
GOVERN MALFNC	GEN VIBRATION	
LUBE OIL PRS	UNDER VOLTAGE	ALARM SUMMARY
CMP INLET PRS	OVER VOLTAGE	SDOWN SUMMARY
TURB EXH PRS		READY TO STRT

CONTROL 1

P1	START
P2	STOP
P3	OPEN C.B.
P4	CLOSE C.B
P5	SPEED/LOAD RAISE
P6	SPEED/LOAD LOWER
P7	VOLTS/VARS RAISE
P8	VOLTS/VARS LOWER

CONTROL 2

P1	WATER INJ. ON
P2	WATER INJ. OFF
P3	WATER INJ. AUTO
P4	WTR INJ RSE RATIO
P5	WTR INJ LWR RATIO
P6	HOT WASH OFF
P7	MOTOR TURBINE ON
P8	MOTOR TURBINE OFF

CONTROL 3

P1	REMOTE MODE ON
P2	REMOTE MODE OFF
P3	GOV IN ISOCH MODE
P4	GOV IN DROOP MODE
P5	GOV IN KW MODE
P6	GOV IN TIT MODE
P7	SYNC MODE
P8	ALARM RESET

CONTROL 4

P1	GEN. REG. ON
P2	GEN. REG. OFF
P3	FIRE SYSTEM ARMED
P4	FIRE SYSTM DISARM
P5	HALON DISCHARGE
P6	
P7	AIR FILTER OFF
P8	

COPY IN PROGRESS

DIAGRAM NUMBER: 2250 VERSION: 1

DATE: 03/31/92 TIME: 10:38:13

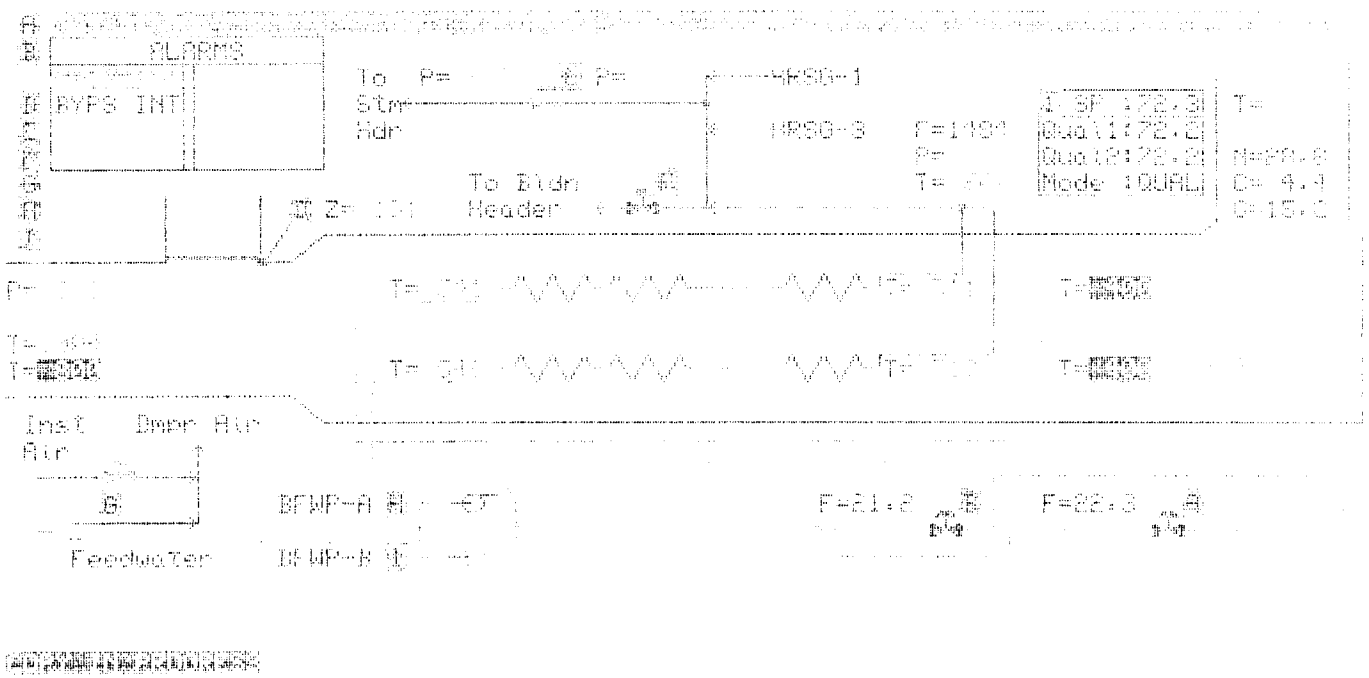

DIAGRAM NUMBER: 2155 VERSION: 2

DATE: 03/31/92 TIME: 10:38:10

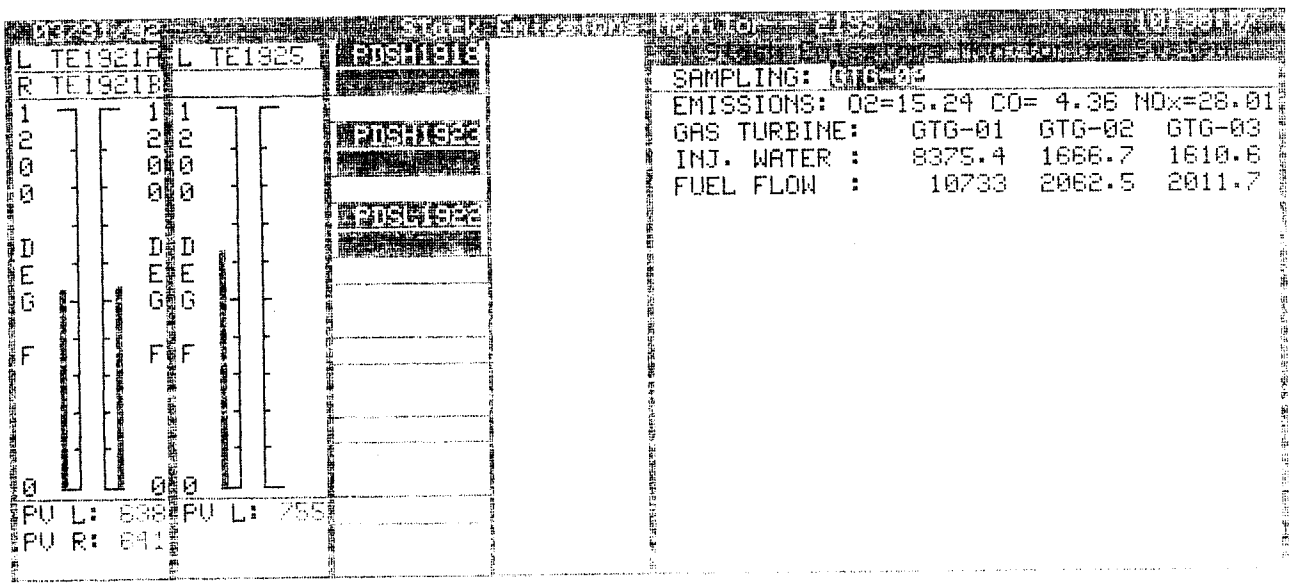

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DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 03/31/92 TIME: 11:11:31

Turbine Speed	14170
Gen KW Output	3011
Gen Bus Volts	12346
Phase A Volts	12419
Phase B Volts	12390
Phase C Volts	12405
Phase A Current	138
Phase B Current	143
Phase C Current	142
TIT Temperature	1877

Fuel Gas Flow	2059
Gas Supply Prs	[illegible]
Gas Manifld Prs	[illegible]
Comp Inlet Temp	55.1
Turb Exh Temp	965
Comp Inlet Pres	[illegible]
Turb Exh Press	0.0
Inj Water Flow	1690
Inj Water Ratio	0.82

SHUTDOWN ALARMS

EMERGENCY S/D	TURB EXH TMP	UNDER SPEED
FAIL TO CRANK	GBOX BRNG TMP	OVER SPEED
FAIL TO FIRE	GEN BRNG TEMP	GEN 86-G FAIL
FLAME OUT	STATOR TEMP	TC FAILURE
LUBE OIL SYS	TURB VIBRATN	TURB STAGNATN
FUEL GAS SYS	G-BOX VIBRATN	ENCLOS FIRE
GOVERN MALFNC	GEN VIBRATION	
LUBE OIL PRS	UNDER VOLTAGE	ALARM SUMMARY
CMP INLET PRS	OVER VOLTAGE	SDOWN SUMMARY
TURB EXH PRS		READY TO STRT

CONTROL 1

P1	START
P2	STOP
P3	OPEN C.B.
P4	CLOSE C.B
P5	SPEED/LOAD RAISE
P6	SPEED/LOAD LOWER
P7	VOLTS/VARS RAISE
P8	VOLTS/VARS LOWER

CONTROL 2

P1	WATER INJ. ON
P2	WATER INJ. OFF
P3	WATER INJ. AUTO
P4	WTR INJ RSE RATIO
P5	WTR INJ LWR RATIO
P6	HOT WASH OFF
P7	MOTOR TURBINE ON
P8	MOTOR TURBINE OFF

CONTROL 3

P1	REMOTE MODE ON
P2	REMOTE MODE OFF
P3	GOV IN ISOCH MODE
P4	GOV IN DROOP MODE
P5	GOV IN KW MODE
P6	GOV IN TIT MODE
P7	SYNC MODE ON
P8	ALARM RESET

CONTROL 4

P1	GEN. REG. ON
P2	GEN. REG. OFF
P3	FIRE SYSTEM ARMED
P4	FIRE SYSTM DISARM
P5	HALON DISCHARGE
P6	
P7	AIR FILTER OFF
P8	

COPY IN PROGRESS

DIAGRAM NUMBER: 2250 VERSION: 1

DATE: 03/31/92 TIME: 11:11:28

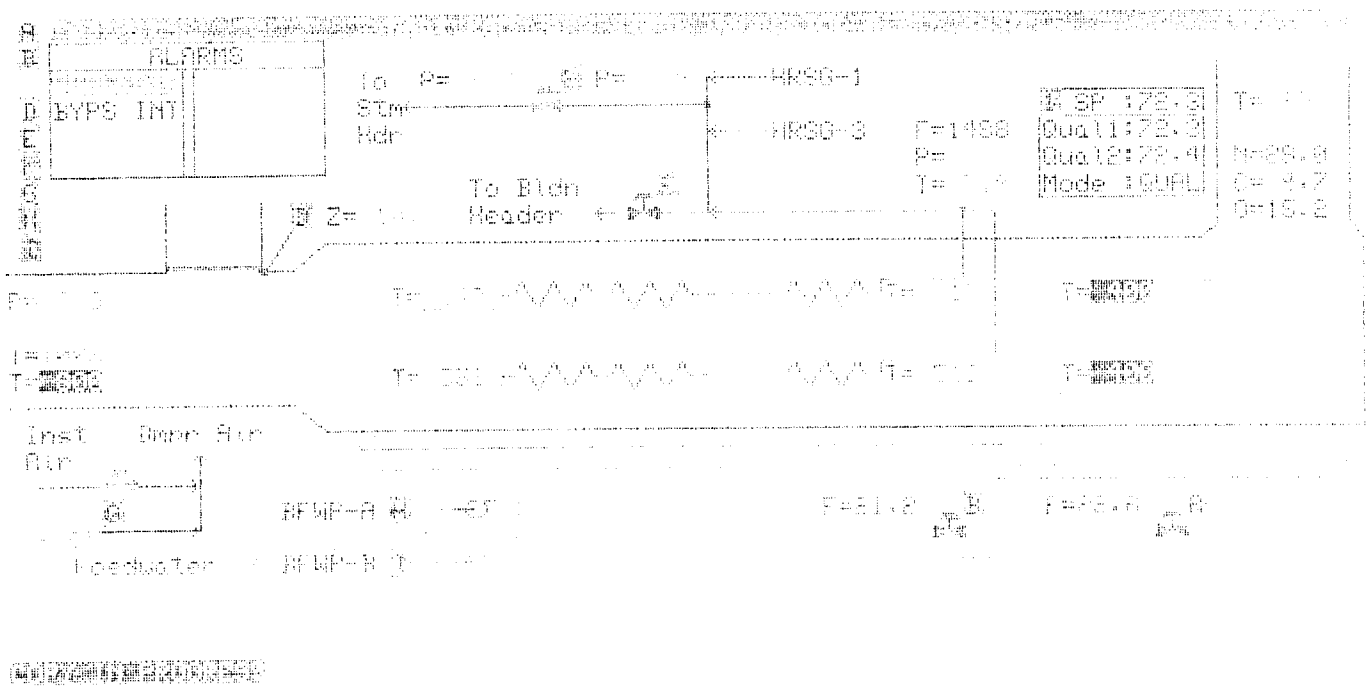

DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 03/31/92 TIME: 11:38:00

Unit 2
Beger Run #2

Turbine Speed	14170
Gen KW Output	3025
Gen Bus Volts	12375
Phase A Volts	12434
Phase B Volts	12419
Phase C Volts	12405
Phase A Current	139
Phase B Current	144
Phase C Current	143
TIT Temperature	[illegible]

Fuel Gas Flow	2064
Gas Supply Prs	[illegible]
Gas Manifld Prs	[illegible]
Comp Inlet Temp	[illegible]
Turb Exh Temp	[illegible]
Comp Inlet Pres	[illegible]
Turb Exh Press	[illegible]
Inj Water Flow	1724
Inj Water Ratio	[illegible]

SHUTDOWN ALARMS

EMERGENCY S/D	TURB EXH TMP	UNDER SPEED
FAIL TO CRANK	GBOX BRNG TMP	OVER SPEED
FAIL TO FIRE	GEN BRNG TEMP	GEN 86-G FAIL
FLAME OUT	STATOR TEMP	TC FAILURE
LUBE OIL SYS	TURB VIBRATN	TURB STAGNATN
FUEL GAS SYS	G-BOX VIBRATN	ENCLOS FIRE
GOVERN MALFNC	GEN VIBRATION	
LUBE OIL PRS	UNDER VOLTAGE	ALARM SUMMARY
CMP INLET PRS	OVER VOLTAGE	SDOWN SUMMARY
TURB EXH PRS		READY TO STRT

CONTROL 1

P1	START
P2	STOP
P3	OPEN C.B.
P4	CLOSE C.B
P5	SPEED/LOAD RAISE
P6	SPEED/LOAD LOWER
P7	VOLTS/VARS RAISE
P8	VOLTS/VARS LOWER

CONTROL 2

P1	WATER INJ. ON
P2	WATER INJ. OFF
P3	WATER INJ. AUTO
P4	WTR INJ RSE RATIO
P5	WTR INJ LWR RATIO
P6	HOT WASH OFF
P7	MOTOR TURBINE ON
P8	MOTOR TURBINE OFF

CONTROL 3

P1	REMOTE MODE ON
P2	REMOTE MODE OFF
P3	GOV IN ISOCH MODE
P4	GOV IN DROOP MODE
P5	GOV IN KW MODE
P6	GOV IN TIT MODE
P7	SYNC MODE ON
P8	ALARM RESET

CONTROL 4

P1	GEN. REG. ON
P2	GEN. REG. OFF
P3	FIRE SYSTEM ARMED
P4	FIRE SYSTM DISARMED
P5	HALON DISCHARGE
P6	
P7	AIR FILTER OFF
P8	

COPY IN PROGRESS

DIAGRAM NUMBER: 2250 VERSION: 1

DATE: 03/31/92 TIME: 11:38:01

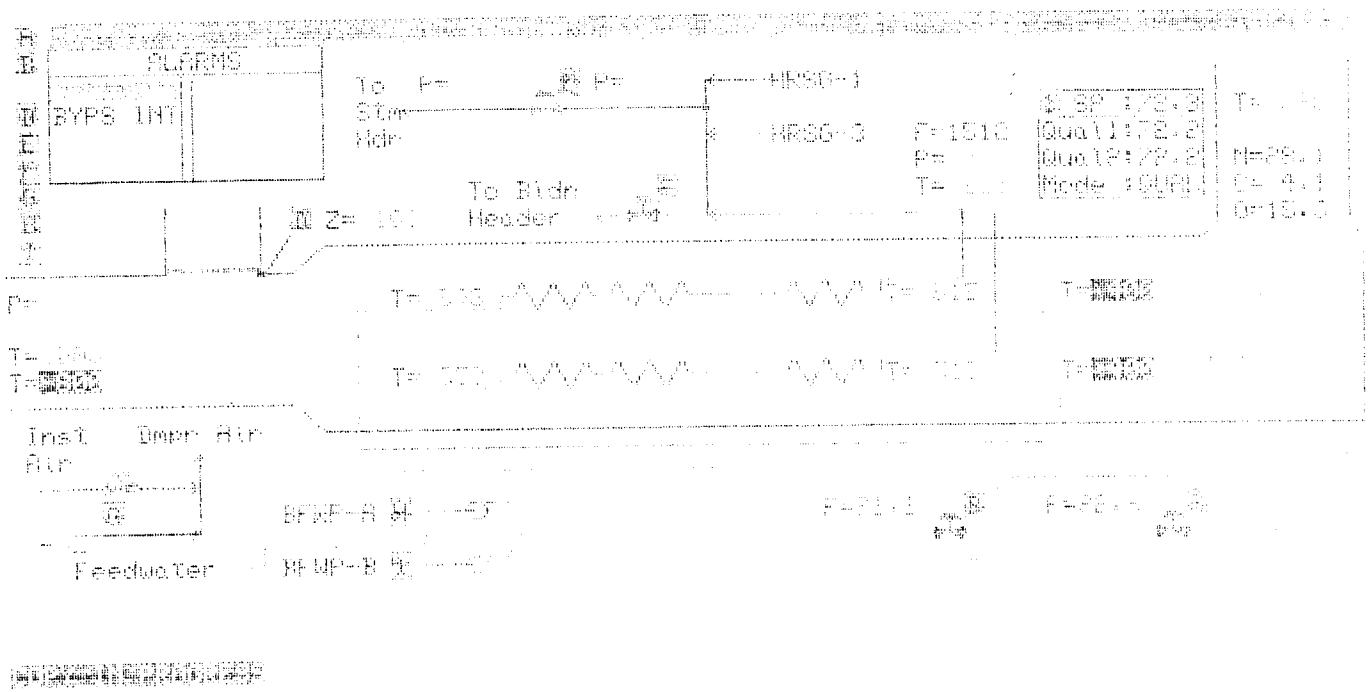

DIAGRAM NUMBER: 2155 VERSION: 2

DATE: 03/31/92 TIME: 11:40:02

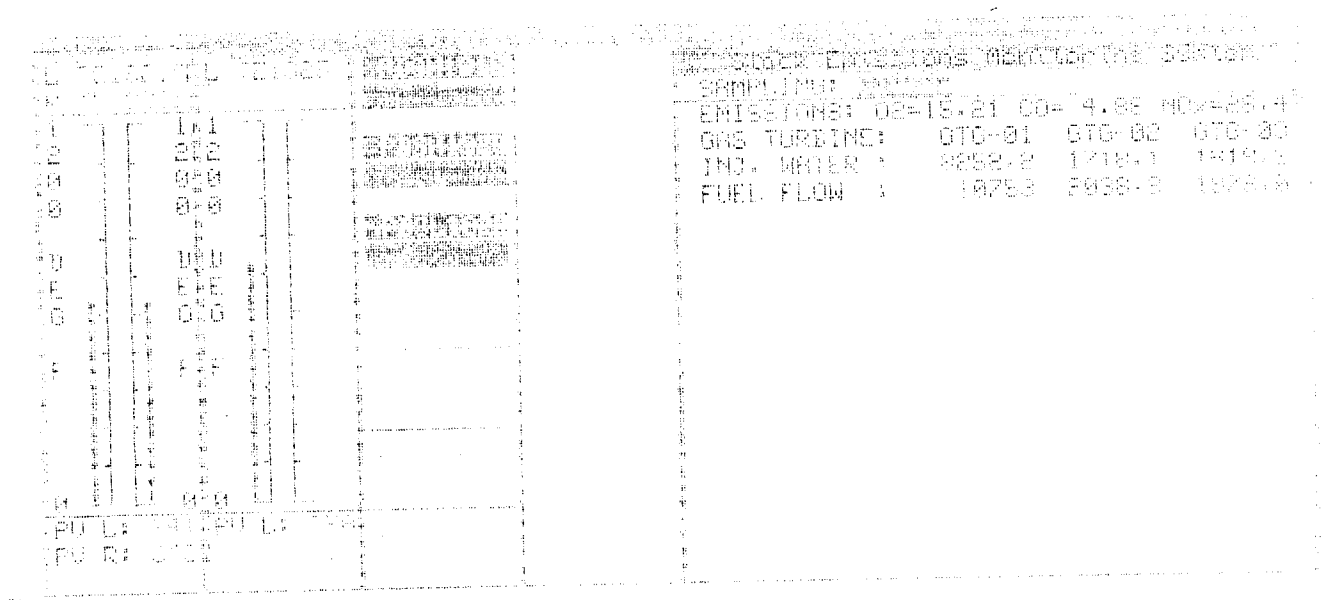

DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 03/31/92 TIME: 12:07:59

Unit #2
End Run #2
Fuel Flow =
2064 #/hr

Turbine Speed	14170	Fuel Gas Flow	2063
Gen KW Output	3045	Gas Supply Prs	255
Gen Bus Volts	12346	Gas Manifld Prs	180
Phase A Volts	12434	Comp Inlet Temp	53.7
Phase B Volts	12419	Turb Exh Temp	927
Phase C Volts	12419	Comp Inlet Pres	2.6
Phase A Current	139	Turb Exh Press	0.0
Phase B Current	144	Inj Water Flow	1690
Phase C Current	143	Inj Water Ratio	0.02
TIT Temperature	1877		

SHUTDOWN ALARMS

EMERGENCY S/D	TURB EXH TMP	UNDER SPEED
FAIL TO CRANK	GBOX BRNG TMP	OVER SPEED
FAIL TO FIRE	GEN BRNG TEMP	GEN 86-G FAIL
FLAME OUT	STATOR TEMP	TC FAILURE
LUBE OIL SYS	TURB VIBRATN	TURB STAGNATN
FUEL GAS SYS	G-BOX VIBRATN	ENCLOS FIRE
GOVERN MALFNC	GEN VIBRATION	
LUBE OIL PRS	UNDER VOLTAGE	ALARM SUMMARY
CMP INLET PRS	OVER VOLTAGE	SDOWN SUMMARY
TURB EXH PRS		READY TO STRT

CONTROL 1	CONTROL 2	CONTROL 3	CONTROL 4
P1 START	P1 WATER INJ. ON	P1 REMOTE MODE ON	P1 GEN. REG. ON
P2 STOP	P2 WATER INJ. OFF	P2 REMOTE MODE OFF	P2 GEN. REG. OFF
P3 OPEN C.B.	P3 WATER INJ. AUTO	P3 GOV IN ISOCH MODE	P3 FIRE SYSTEM ARMED
P4 CLOSE C.B CLOSED	P4 WTR INJ RSE RATIO	P4 GOV IN DROOP MODE	P4 FIRE SYSTM DISARM
P5 SPEED/LOAD RAISE	P5 WTR INJ LWR RATIO	P5 GOV IN KW MODE	P5 HALON DISCHARGE
P6 SPEED/LOAD LOWER	P6 HOT WASH OFF	P6 GOV IN TIT MODE	P6
P7 VOLTS/VARS RAISE	P7 MOTOR TURBINE ON	P7 SYNC MODE MAN	P7 AIR FILTER OFF
P8 VOLTS/VARS LOWER	P8 MOTOR TURBINE OFF	P8 ALARM RESET	P8

COPY IN PROGRESS

DIAGRAM NUMBER: 2250 VERSION: 1

DATE: 03/31/92 TIME: 12:08:06

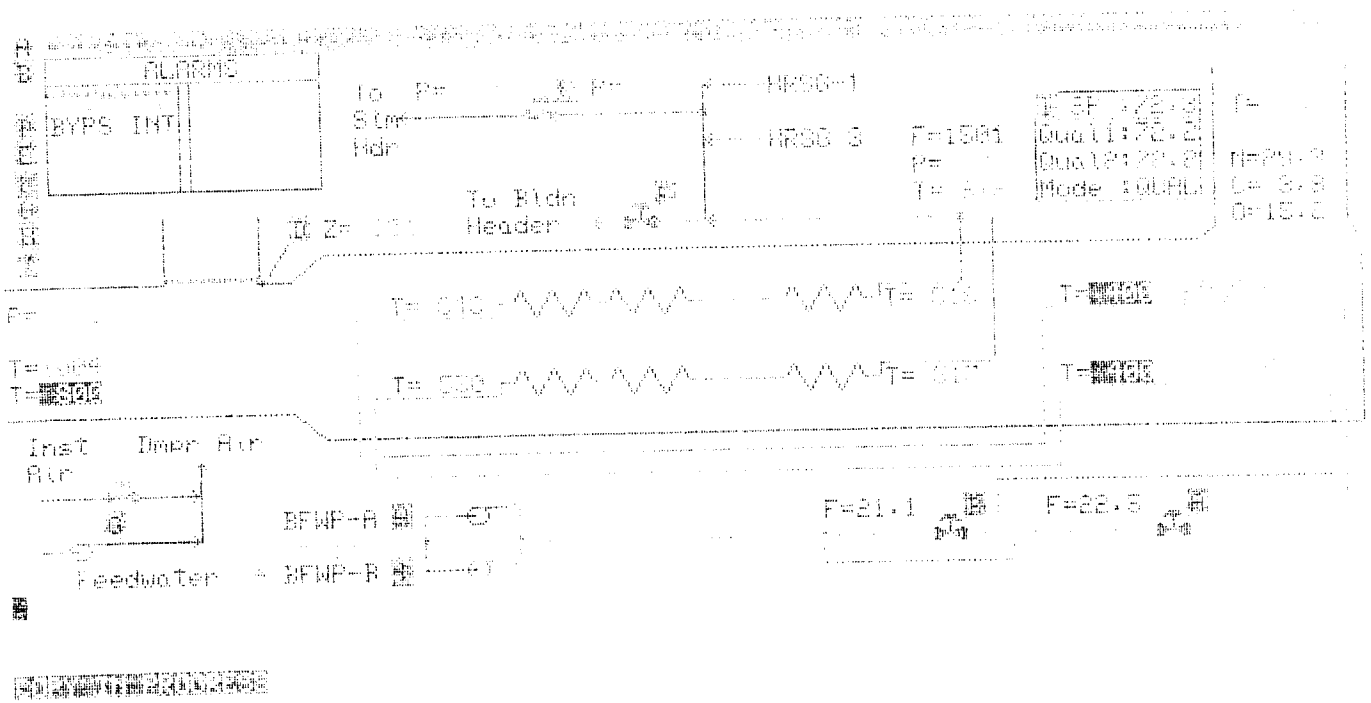

DIAGRAM NUMBER: 2155 VERSION: 2

DATE: 03/31/92 TIME: 12:10:08

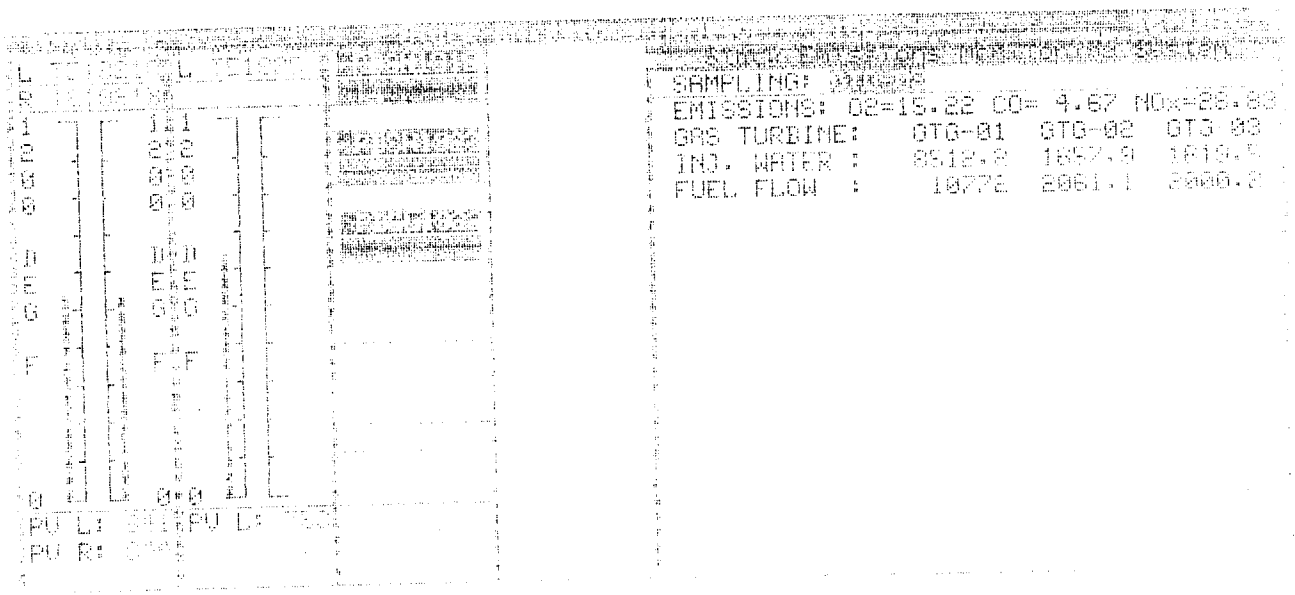

DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 03/31/92 TIME: 12:38:25

Turbine Speed	14170
Gen KW Output	2981
Gen Bus Volts	12346
Phase A Volts	12419
Phase B Volts	12405
Phase C Volts	12405
Phase A Current	136
Phase B Current	142
Phase C Current	140
TIT Temperature	1866

Fuel Gas Flow	2033
Gas Supply Prs	257
Gas Manifld Prs	158
Comp Inlet Temp	54.3
Turb Exh Temp	988
Comp Inlet Pres	0.6
Turb Exh Press	0.0
Inj Water Flow	1727
Inj Water Ratio	0.85

SHUTDOWN ALARMS

EMERGENCY S/D	TURB EXH TMP	UNDER SPEED
FAIL TO CRANK	GBOX BRNG TMP	OVER SPEED
FAIL TO FIRE	GEN BRNG TEMP	GEN 86-G FAIL
FLAME OUT	STATOR TEMP	TC FAILURE
LUBE OIL SYS	TURB VIBRATN	TURB STAGNATN
FUEL GAS SYS	G-BOX VIBRATN	ENCLOS FIRE
GOVERN MALFNC	GEN VIBRATION	
LUBE OIL PRS	UNDER VOLTAGE	ALARM SUMMARY
CMP INLET PRS	OVER VOLTAGE	SDOWN SUMMARY
TURB EXH PRS		READY TO STRT

CONTROL 1

- P1 START
- P2 STOP
- P3 OPEN C.B.
- P4 CLOSE C.B [DISABLED]
- P5 SPEED/LOAD RAISE
- P6 SPEED/LOAD LOWER
- P7 VOLTS/VARS RAISE
- P8 VOLTS/VARS LOWER

CONTROL 2

- P1 WATER INJ. ON
- P2 WATER INJ. OFF
- P3 WATER INJ. AUTO
- P4 WTR INJ RSE RATIO
- P5 WTR INJ LWR RATIO
- P6 HOT WASH OFF
- P7 MOTOR TURBINE ON
- P8 MOTOR TURBINE OFF

CONTROL 3

- P1 REMOTE MODE ON
- P2 REMOTE MODE OFF
- P3 GOV IN ISOCH MODE
- P4 GOV IN DROOP MODE
- P5 GOV IN KW MODE
- P6 GOV IN TIT MODE
- P7 SYNC MODE MAN
- P8 ALARM RESET

CONTROL 4

- P1 GEN. REG. ON
- P2 GEN. REG. OFF
- P3 FIRE SYSTEM ARMED
- P4 FIRE SYSTM DISARM
- P5 HALON DISCHARGE
- P6
- P7 AIR FILTER OFF
- P8

COPY IN PROGRESS

DIAGRAM NUMBER: 2155 VERSION: 2

DATE: 03/31/92 TIME: 12:41:16

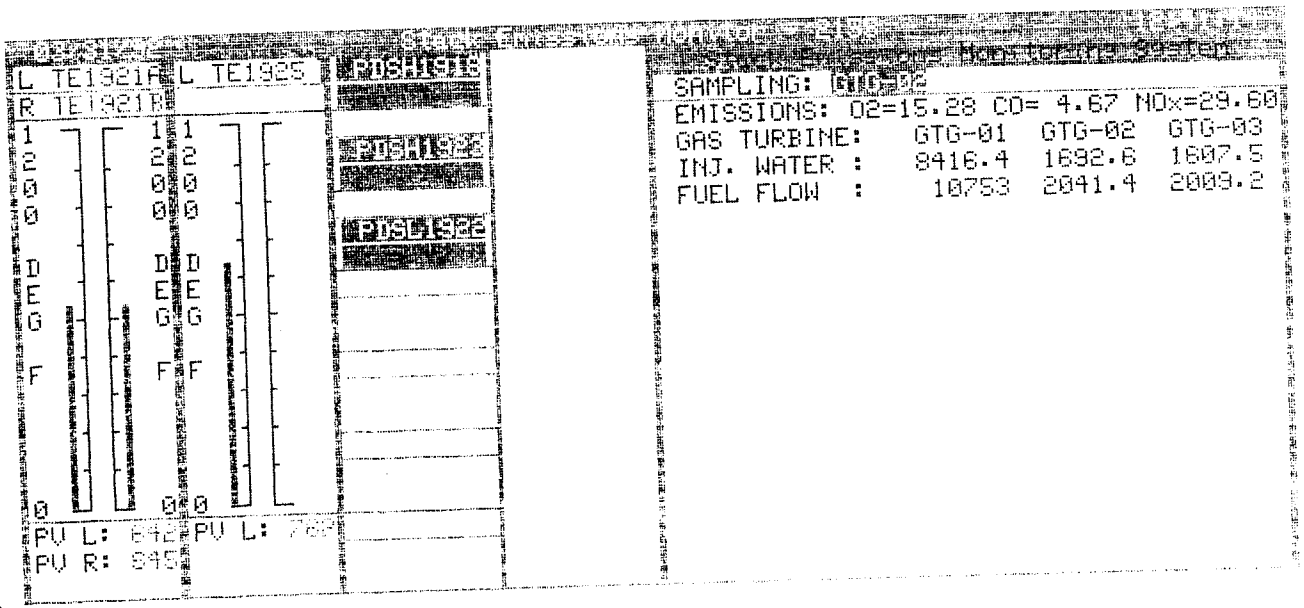

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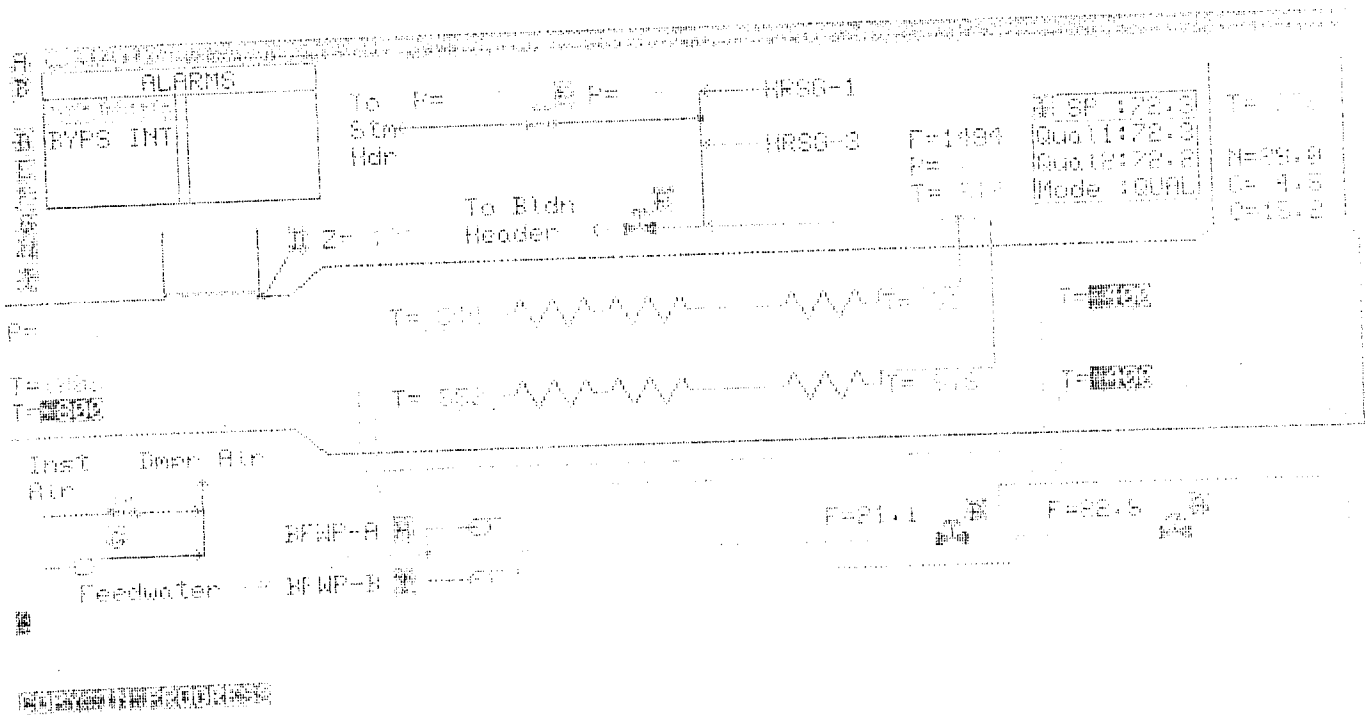
DIAGRAM NUMBER: 2250 VERSION: 1

DATE: 03/31/92 TIME: 12:38:32



#2

DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 03/31/92 TIME: 15:44:35

Unit 3
Begin Run #2

Turbine Speed	14139
Gen KW Output	3006
Gen Bus Volts	12346
Phase A Volts	12419
Phase B Volts	12463
Phase C Volts	12449
Phase A Current	140
Phase B Current	139
Phase C Current	139
TIT Temperature	1381

Fuel Gas Flow	2018
Gas Supply Prs	258
Gas Manifld Prs	152
Comp Inlet Temp	53.7
Turb Exh Temp	903
Comp Inlet Pres	[illegible]
Turb Exh Press	1.7
Inj Water Flow	1614
Inj Water Ratio	[illegible]

SHUTDOWN ALARMS

EMERGENCY S/D	TURB EXH TMP	UNDER SPEED
FAIL TO CRANK	GBOX BRNG TMP	OVER SPEED
FAIL TO FIRE	GEN BRNG TEMP	GEN 86-G FAIL
FLAME OUT	STATOR TEMP	TC FAILURE
LUBE OIL SYS	TURB VIBRATN	TURB STAGNATN
FUEL GAS SYS	G-BOX VIBRATN	ENCLOS FIRE
GOVERN MALFNC	GEN VIBRATION	
LUBE OIL PRS	UNDER VOLTAGE	ALARM SUMMARY
CMP INLET PRS	OVER VOLTAGE	SDOWN SUMMARY
TURB EXH PRS		READY TO STRT

CONTROL 1

P1	START
P2	STOP
P3	OPEN C.B.
P4	CLOSE C.B [illegible]
P5	SPEED/LOAD RAISE
P6	SPEED/LOAD LOWER
P7	VOLTS/VARS RAISE
P8	VOLTS/VARS LOWER

CONTROL 2

P1	WATER INJ. [illegible]
P2	WATER INJ. OFF
P3	WATER INJ. AUTO
P4	WTR INJ RSE RATIO
P5	WTR INJ LWR RATIO
P6	HOT WASH OFF
P7	MOTOR TURBINE ON
P8	MOTOR TURBINE OFF

CONTROL 3

P1	REMOTE MODE ON
P2	REMOTE MODE OFF
P3	GOV IN ISOCH MODE
P4	GOV IN DROOP MODE
P5	GOV IN KW MODE
P6	GOV IN [illegible] MODE
P7	SYNC MODE [illegible]
P8	ALARM RESET

CONTROL 4

P1	GEN. REG. [illegible]
P2	GEN. REG. OFF
P3	FIRE SYSTEM ARMED
P4	FIRE SYSTM DISARM
P5	HALON DISCHARGE
P6	
P7	AIR FILTER OFF
P8	

COPY IN PROGRESS

DIAGRAM NUMBER: 2350 VERSION: 1

DATE: 03/31/92 TIME: 15:44:27

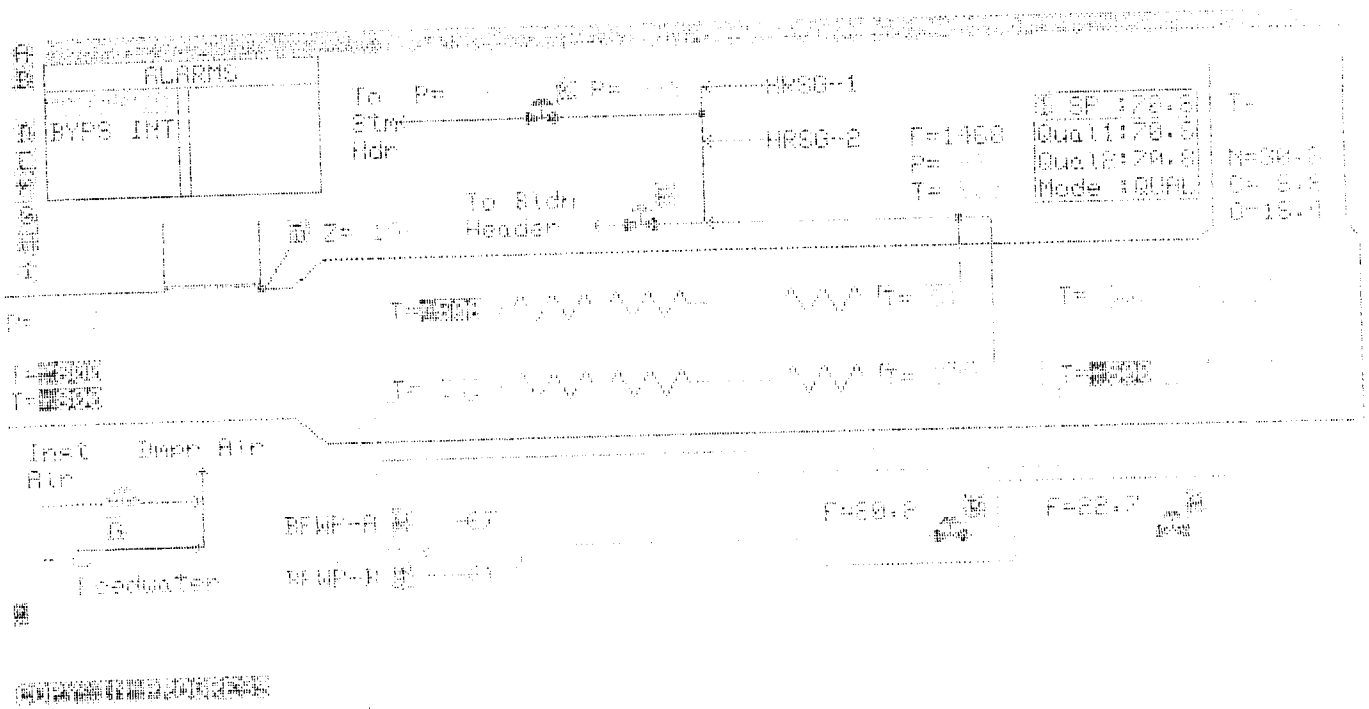


DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 03/31/92 TIME: 16:12:58

Unit 3
Run #2

Turbine Speed	14139
Gen KW Output	2977
Gen Bus Volts	12375
Phase A Volts	12449
Phase B Volts	12463
Phase C Volts	12478
Phase A Current	138
Phase B Current	137
Phase C Current	138
TIT Temperature	1873

Fuel Gas Flow	1928
Gas Supply Prs	[illegible]
Gas Manifld Prs	[illegible]
Comp Inlet Temp	[illegible]
Turb Exh Temp	[illegible]
Comp Inlet Pres	[illegible]
Turb Exh Press	[illegible]
Inj Water Flow	1617
Inj Water Ratio	[illegible]

SHUTDOWN ALARMS

EMERGENCY S/D	TURB EXH TMP	UNDER SPEED
FAIL TO CRANK	GBOX BRNG TMP	OVER SPEED
FAIL TO FIRE	GEN BRNG TEMP	GEN 86-G FAIL
FLAME OUT	STATOR TEMP	TC FAILURE
LUBE OIL SYS	TURB VIBRATN	TURB STAGNATN
FUEL GAS SYS	G-BOX VIBRATN	ENCLOS FIRE
GOVERN MALFNC	GEN VIBRATION	
LUBE OIL PRS	UNDER VOLTAGE	ALARM SUMMARY
CMP INLET PRS	OVER VOLTAGE	SDOWN SUMMARY
TURB EXH PRS		READY TO STRT

CONTROL 1

- P1 START
- P2 STOP
- P3 OPEN C.B.
- P4 CLOSE C.B
- P5 SPEED/LOAD RAISE
- P6 SPEED/LOAD LOWER
- P7 VOLTS/VARS RAISE
- P8 VOLTS/VARS LOWER

CONTROL 2

- P1 WATER INJ. ON
- P2 WATER INJ. OFF
- P3 WATER INJ. AUTO
- P4 WTR INJ RSE RATIO
- P5 WTR INJ LWR RATIO
- P6 HOT WASH OFF
- P7 MOTOR TURBINE ON
- P8 MOTOR TURBINE OFF

CONTROL 3

- P1 REMOTE MODE ON
- P2 REMOTE MODE OFF
- P3 GOV IN ISOCH MODE
- P4 GOV IN DROOP MODE
- P5 GOV IN KW MODE
- P6 GOV IN TIT MODE
- P7 SYNC MODE ON
- P8 ALARM RESET

CONTROL 4

- P1 GEN. REG. ON
- P2 GEN. REG. OFF
- P3 FIRE SYSTEM ARMED
- P4 FIRE SYSTM DISARM
- P5 HALON DISCHARGE
- P6
- P7 AIR FILTER DIFF
- P8

COPY IN PROGRESS

DIAGRAM NUMBER: 2350 VERSION: 1

DATE: 03/31/92 TIME: 16:12:56

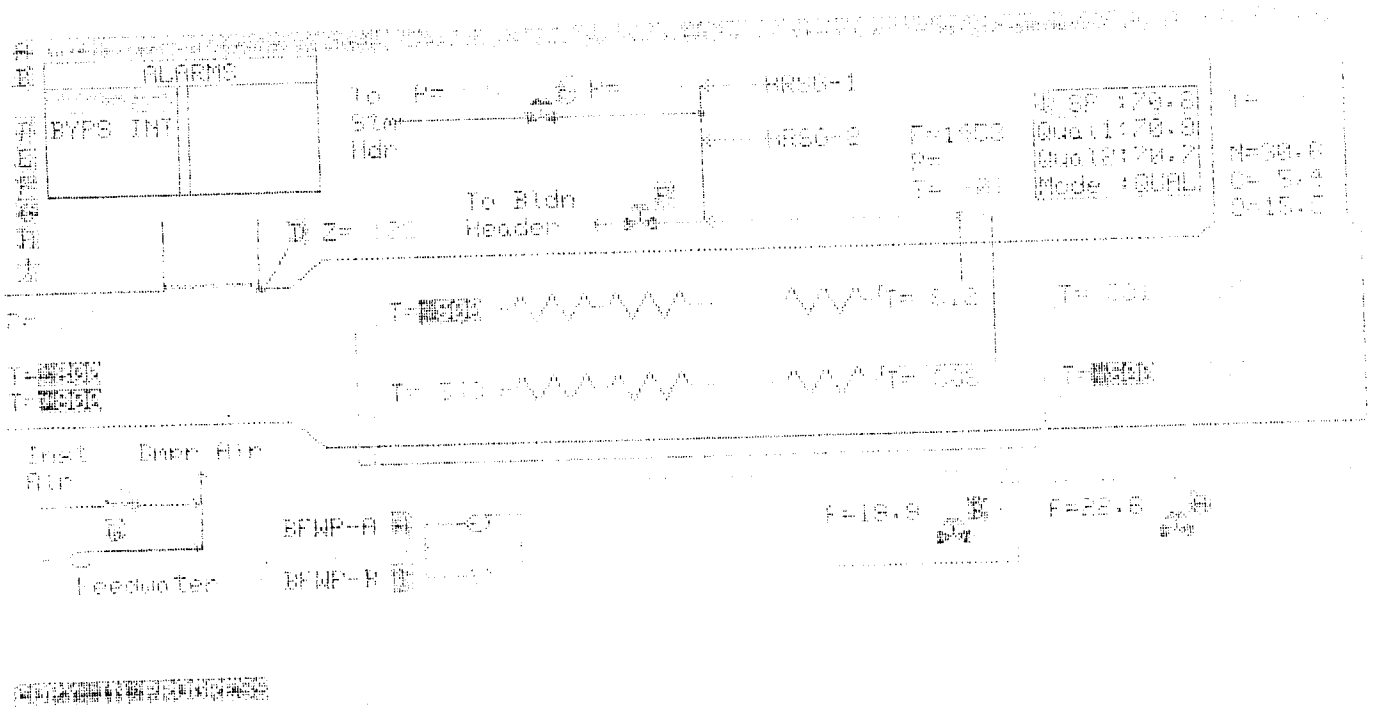


DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 03/31/92 TIME: 16:27:54

Unit #3

End Run #2

Fuel Flow = 2004 #/hr

Turbine Speed	14139
Gen KW Output	2986
Gen Bus Volts	12375
Phase A Volts	12449
Phase B Volts	12463
Phase C Volts	12478
Phase A Current	138
Phase B Current	137
Phase C Current	137
TIT Temperature	1381

Fuel Gas Flow	2008
Gas Supply Prs	[illegible]
Gas Manifld Prs	151
Comp Inlet Temp	59.0
Turb Exh Temp	903
Comp Inlet Pres	[illegible]
Turb Exh Press	1.6
Inj Water Flow	1620
Inj Water Ratio	0.61

SHUTDOWN ALARMS

EMERGENCY S/D	TURB EXH TMP	UNDER SPEED
FAIL TO CRANK	GBOX BRNG TMP	OVER SPEED
FAIL TO FIRE	GEN BRNG TEMP	GEN 86-G FAIL
FLAME OUT	STATOR TEMP	TC FAILURE
LUBE OIL SYS	TURB VIBRATN	TURB STAGNATN
FUEL GAS SYS	G-BOX VIBRATN	ENCLOS FIRE
GOVERN MALFNC	GEN VIBRATION	
LUBE OIL PRS	UNDER VOLTAGE	ALARM SUMMARY
CMP INLET PRS	OVER VOLTAGE	SDOWN SUMMARY
TURB EXH PRS		READY TO STRT

CONTROL 1

P1	START
P2	STOP
P3	OPEN C.B.
P4	CLOSE C.B CLOSED
P5	SPEED/LOAD RAISE
P6	SPEED/LOAD LOWER
P7	VOLTS/VARS RAISE
P8	VOLTS/VARS LOWER

CONTROL 2

P1	WATER INJ. ON
P2	WATER INJ. OFF
P3	WATER INJ. AUTO
P4	WTR INJ RSE RATIO
P5	WTR INJ LWR RATIO
P6	HOT WASH OFF
P7	MOTOR TURBINE ON
P8	MOTOR TURBINE OFF

CONTROL 3

P1	REMOTE MODE ON
P2	REMOTE MODE OFF
P3	GOV IN ISOCH MODE
P4	GOV IN DROOP MODE
P5	GOV IN KW MODE
P6	GOV IN TIT MODE
P7	SYNC MODE [illegible]
P8	ALARM RESET

CONTROL 4

P1	GEN. REG. [illegible]
P2	GEN. REG. OFF
P3	FIRE SYSTEM ARMED
P4	FIRE SYSTM DISARM
P5	HALON DISCHARGE
P6	
P7	AIR FILTER OFF
P8	

COPY IN PROGRESS

DIAGRAM NUMBER: 2155 VERSION: 2

DATE: 03/31/92 TIME: 16:30:07

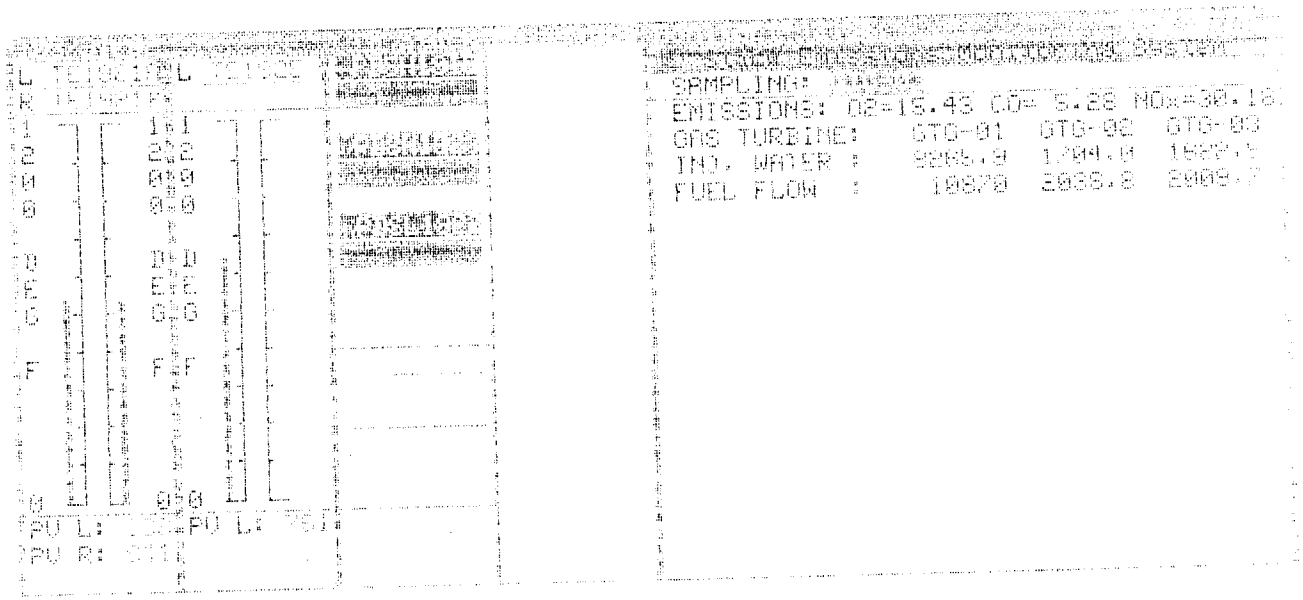


DIAGRAM NUMBER: 2350 VERSION: 1

DATE: 03/31/92 TIME: 16:27:51

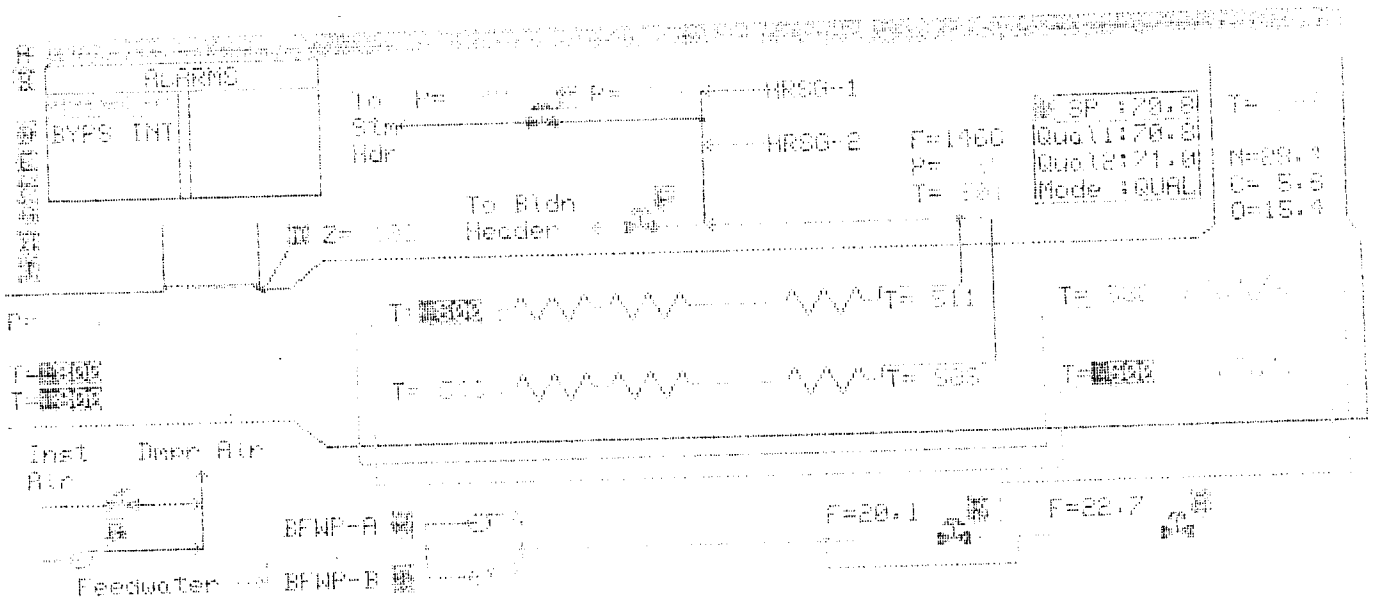


DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 03/31/92 TIME: 16:43:04

Turbine Speed	14139
Gen KW Output	2991
Gen Bus Volts	12375
Phase A Volts	12449
Phase B Volts	12463
Phase C Volts	12478
Phase A Current	138
Phase B Current	137
Phase C Current	137
TIT Temperature	1873

Fuel Gas Flow	1992
Gas Supply Prs	259
Gas Manifld Prs	151
Comp Inlet Temp	54.0
Turb Exh Temp	904
Comp Inlet Pres	2.2
Turb Exh Press	1.8
Inj Water Flow	1626
Inj Water Ratio	0.82

SHUTDOWN ALARMS

EMERGENCY S/D	TURB EXH TMP	UNDER SPEED
FAIL TO CRANK	GBOX BRNG TMP	OVER SPEED
FAIL TO FIRE	GEN BRNG TEMP	GEN 86-G FAIL
FLAME OUT	STATOR TEMP	TC FAILURE
LUBE OIL SYS	TURB VIBRATN	TURB STAGNATN
FUEL GAS SYS	G-BOX VIBRATN	ENCLOS FIRE
GOVERN MALFNC	GEN VIBRATION	
LUBE OIL PRS	UNDER VOLTAGE	ALARM SUMMARY
CMP INLET PRS	OVER VOLTAGE	SDOWN SUMMARY
TURB EXH PRS		READY TO STRT

CONTROL 1

P1	START
P2	STOP
P3	OPEN C.B.
P4	CLOSE C.B CLOSED
P5	SPEED/LOAD RAISE
P6	SPEED/LOAD LOWER
P7	VOLTS/VARS RAISE
P8	VOLTS/VARS LOWER

CONTROL 2

P1	WATER INJ. ON
P2	WATER INJ. OFF
P3	WATER INJ. AUTO
P4	WTR INJ RSE RATIO
P5	WTR INJ LWR RATIO
P6	HOT WASH OFF
P7	MOTOR TURBINE ON
P8	MOTOR TURBINE OFF

CONTROL 3

P1	REMOTE MODE ON
P2	REMOTE MODE OFF
P3	GOV IN ISOCH MODE
P4	GOV IN DROOP MODE
P5	GOV IN KW MODE
P6	GOV IN TIT MODE
P7	SYNC MODE MAN
P8	ALARM RESET

CONTROL 4

P1	GEN. REG. ON
P2	GEN. REG. OFF
P3	FIRE SYSTEM ARMED
P4	FIRE SYSTM DISARM
P5	HALON DISCHARGE
P6	
P7	AIR FILTER OFF
P8	

COPY IN PROGRESS

DIAGRAM NUMBER: 2155 VERSION: 2

DATE: 03/31/92 TIME: 16:44:58

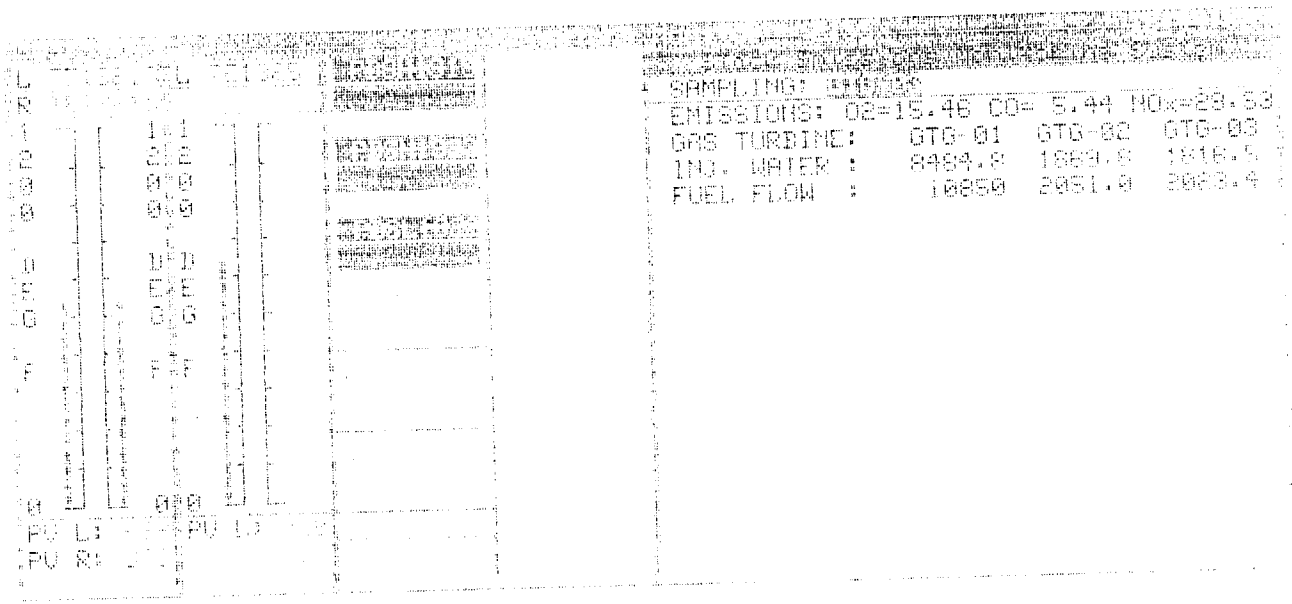


DIAGRAM NUMBER: 2350 VERSION: 1

DATE: 03/31/92 TIME: 16:42:59

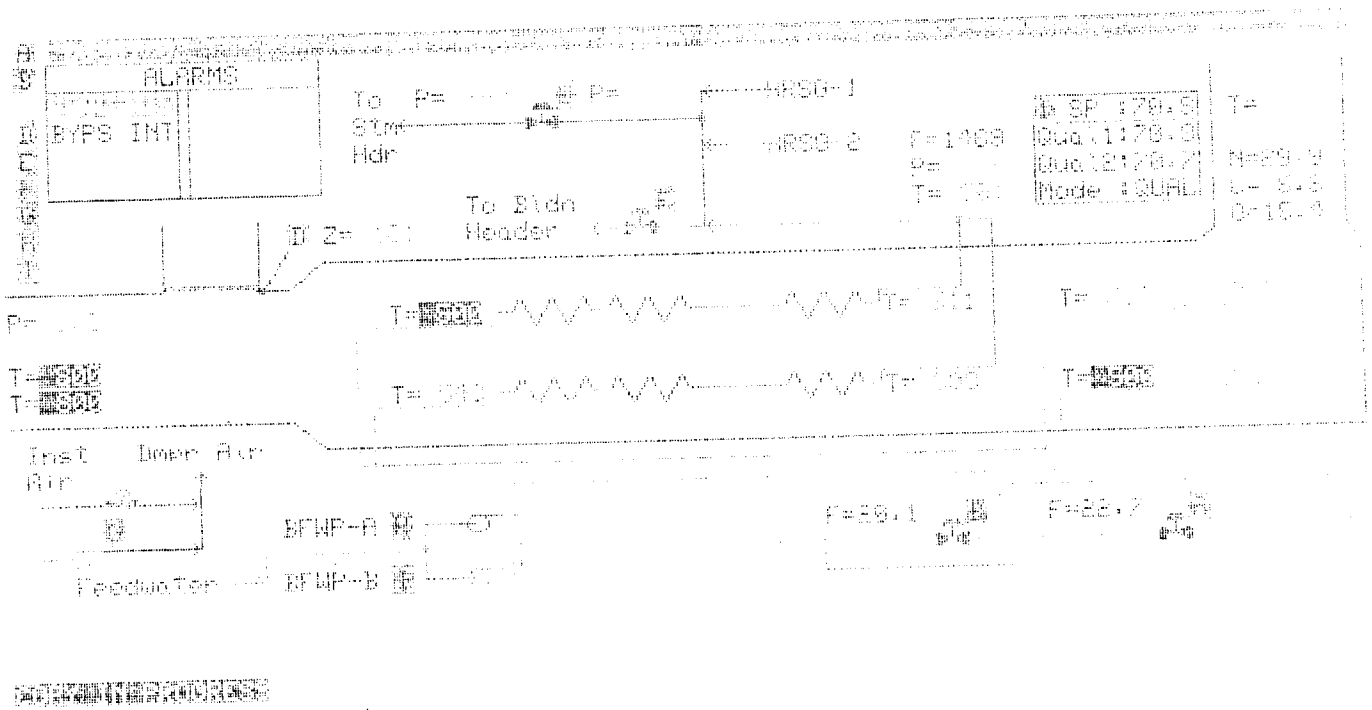


DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 03/31/92 TIME: 16:57:57

Turbine Speed	14133
Gen KW Output	3016
Gen Bus Volts	12390
Phase A Volts	12449
Phase B Volts	12478
Phase C Volts	12478
Phase A Current	140
Phase B Current	139
Phase C Current	139
TIT Temperature	1061

Fuel Gas Flow	2016
Gas Supply Prs	259
Gas Manifld Prs	158
Comp Inlet Temp	59.7
Turb Exh Temp	903
Comp Inlet Pres	2.8
Turb Exh Press	1.0
Inj Water Flow	1614
Inj Water Ratio	0.80

SHUTDOWN ALARMS

EMERGENCY S/D	TURB EXH TMP	UNDER SPEED
FAIL TO CRANK	GBOX BRNG TMP	OVER SPEED
FAIL TO FIRE	GEN BRNG TEMP	GEN SB-G FAIL
FLAME OUT	STATOR TEMP	TC FAILURE
LUBE OIL SYS	TURB VIBRATN	TURB STAGNATN
FUEL GAS SYS	G-BOX VIBRATN	ENCLOS FIRE
GOVERN MALFNC	GEN VIBRATION	
LUBE OIL PRS	UNDER VOLTAGE	ALARM SUMMARY
CMP INLET PRS	OVER VOLTAGE	SDOWN SUMMARY
TURB EXH PRS		READY TO STRT

CONTROL 1

P1	START
P2	STOP
P3	OPEN C.B.
P4	CLOSE C.B
P5	SPEED/LOAD RAISE
P6	SPEED/LOAD LOWER
P7	VOLTS/VARS RAISE
P8	VOLTS/VARS LOWER

CONTROL 2

P1	WATER INJ. ON
P2	WATER INJ. OFF
P3	WATER INJ. AUTO
P4	WTR INJ RSE RATIO
P5	WTR INJ LWR RATIO
P6	HOT WASH OFF
P7	MOTOR TURBINE ON
P8	MOTOR TURBINE OFF

CONTROL 3

P1	REMOTE MODE ON
P2	REMOTE MODE OFF
P3	GOV IN ISOCH MODE
P4	GOV IN DROOP MODE
P5	GOV IN KW MODE
P6	GOV IN PIT MODE
P7	SYNC MODE SWIN
P8	ALARM RESET

CONTROL 4

P1	GEN. REG. ON
P2	GEN. REG. OFF
P3	FIRE SYSTEM ARMED
P4	FIRE SYSTM DISARM
P5	HALON DISCHARGE
P6	
P7	AIR FILTER OFF
P8	

COPY IN PROGRESS

DIAGRAM NUMBER: 2155 VERSION: 2

DATE: 03/31/92 TIME: 16:59:50

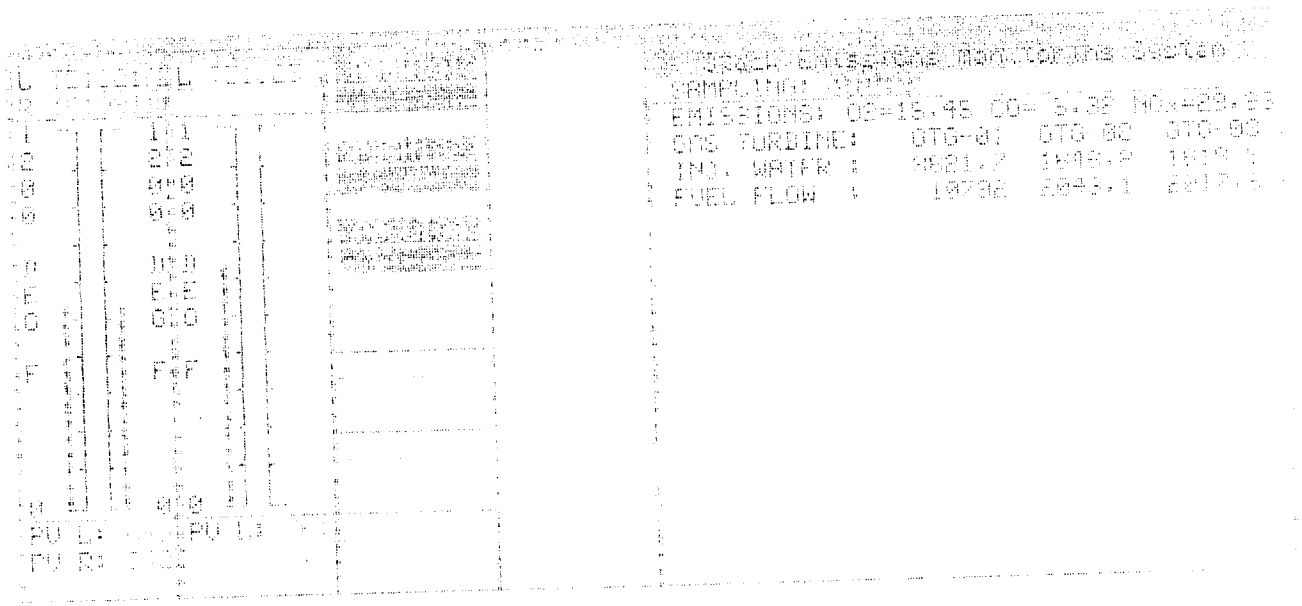


DIAGRAM NUMBER: 2350 VERSION: 1

DATE: 03/31/92 TIME: 16:57:53

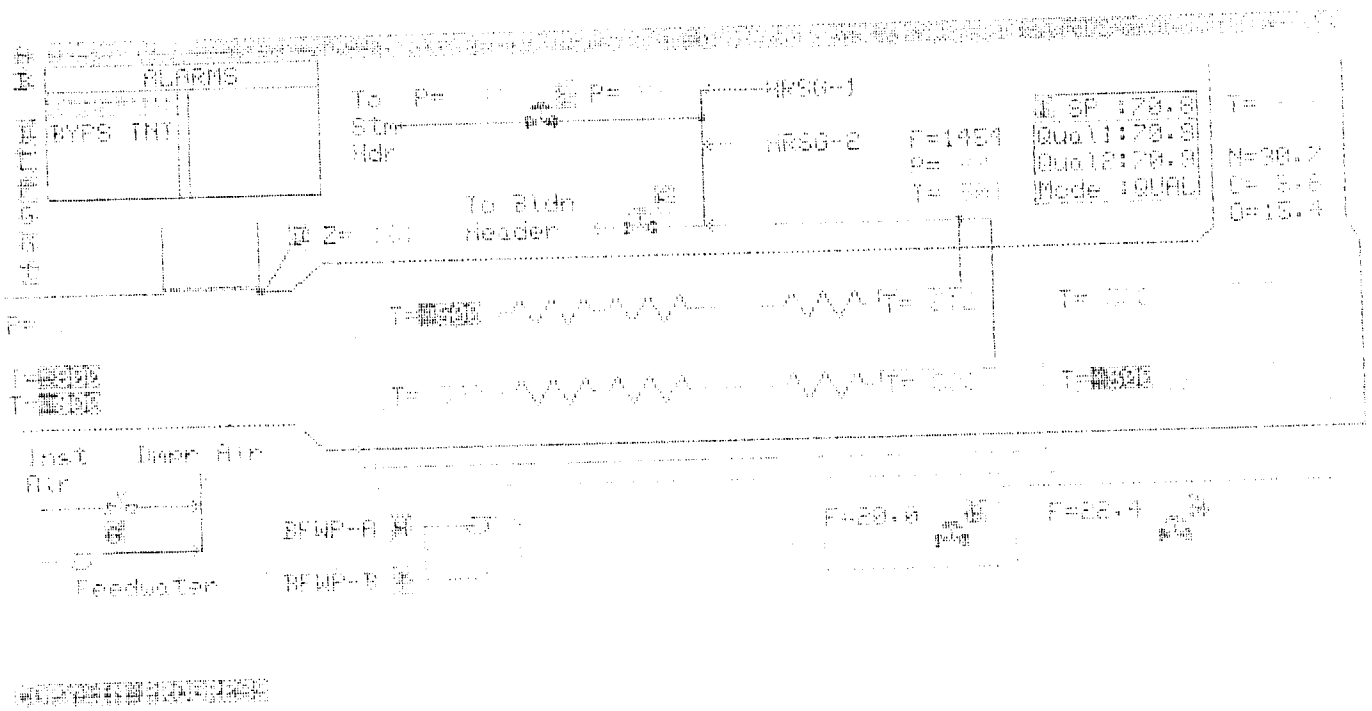


DIAGRAM NUMBER: 2155 VERSION: 2

DATE: 04/01/92 TIME: 08:49:27

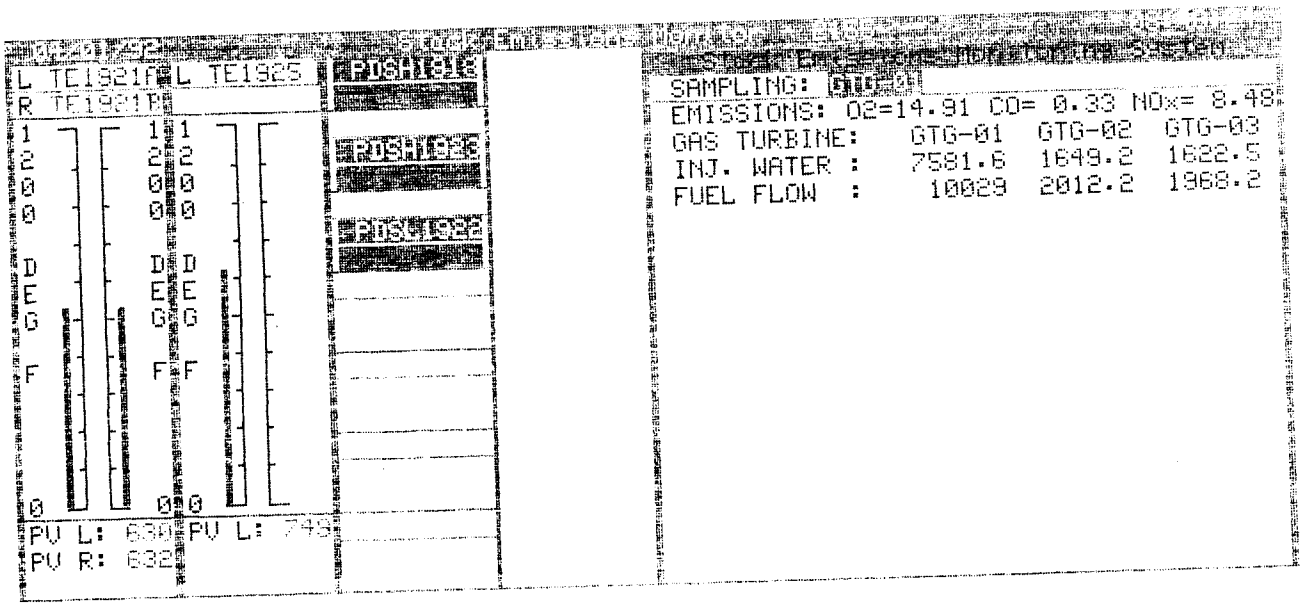


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DIAGRAM NUMBER: 2100 VERSION: 1

DATE: 04/01/92 TIME: 08:51:09

Gas Gen Speed	9243
Pwr Trb Speed	3602
Gen MW Output	19.6
Gen Megavar Out	0.00
Gen Voltage	13.4
Gen Amperesge	865
Turb L.O. Press	48.4
Turb L.O. Temp	144
Trb Scv oil Prs	6.8
Gen L.O. Press	29.6
Gen L.O. Temp	140
Fuel Gas Flow	9990
Inj Water Flow	7650
Inj Water Ratio	0.77
Fuel Manfld Prs	272
Inj Manfld Prs	248
Comp Inlet Temp	64.8
Comp Disch Prs	246
Gas Supply Prs	913
Gas Supply Tmp	82.5

ALARMS & SHUTDOWNS

LOCAL EMER STOP	TURB LOW OIL PRS	STATOR TEMP A1
REMOTE EMER STOP	TURB LOW OIL TMP	STATOR TEMP A2
FIRE	TRB ACC GBOX TMP	STATOR TEMP B1
FAIL TO CRANK	AIR IN FILT D.P.	STATOR TEMP B2
FAIL TO IGNITE	SCV OIL FILT DP	STATOR TEMP C1
FLAME OUT	GEN LOW OIL PRS	STATOR TEMP C2
TURBINE OVERTEMP	GEN LOW OIL TEMP	HALON
GG FAIL TO ACCEL	GEN BRG D.E. TMP	
PT FAIL TO ACCEL	GEN OIL D.E. TMP	TRB ROOM LFL
GAS GEN UNDERSPD	GEN BRG X.E. TMP	GEN ROOM LFL
PWR TRB UNDERSPD	GEN OIL X.E. TMP	120 VOLT BATTERY
VIBRATN SYS MALF	SUMP A SCAV TEMP	24 VOLT BATTERY
FUEL GAS PRS HI	SUMP B SCAV TEMP	START SYS SUMMRY
GOVERNOR SYSTEM	SUMP C SCAV TEMP	UPS FAILURE
TRBN LOCKOUT RLY	SUMP D SCAV TEMP	AC OIL PUMP FAIL
HIGH VIBRATION	GEN ENCL AIR TEMP	DC OIL PUMP FAIL
GAS GEN OVERSPD	TRB ENCL AIR TEMP	AUX OIL PUMP
PWR TRB OVERSPD	GEN AIR OUT TEMP	GEN FAIL TO SYNC
START OVER TEMP	EXCITR AIR TEMP	UTIL FAIL SYNC

COPY IN PROGRESS

DIAGRAM NUMBER: 2150 VERSION: 3

DATE: 04/01/92 TIME: 08:54:20

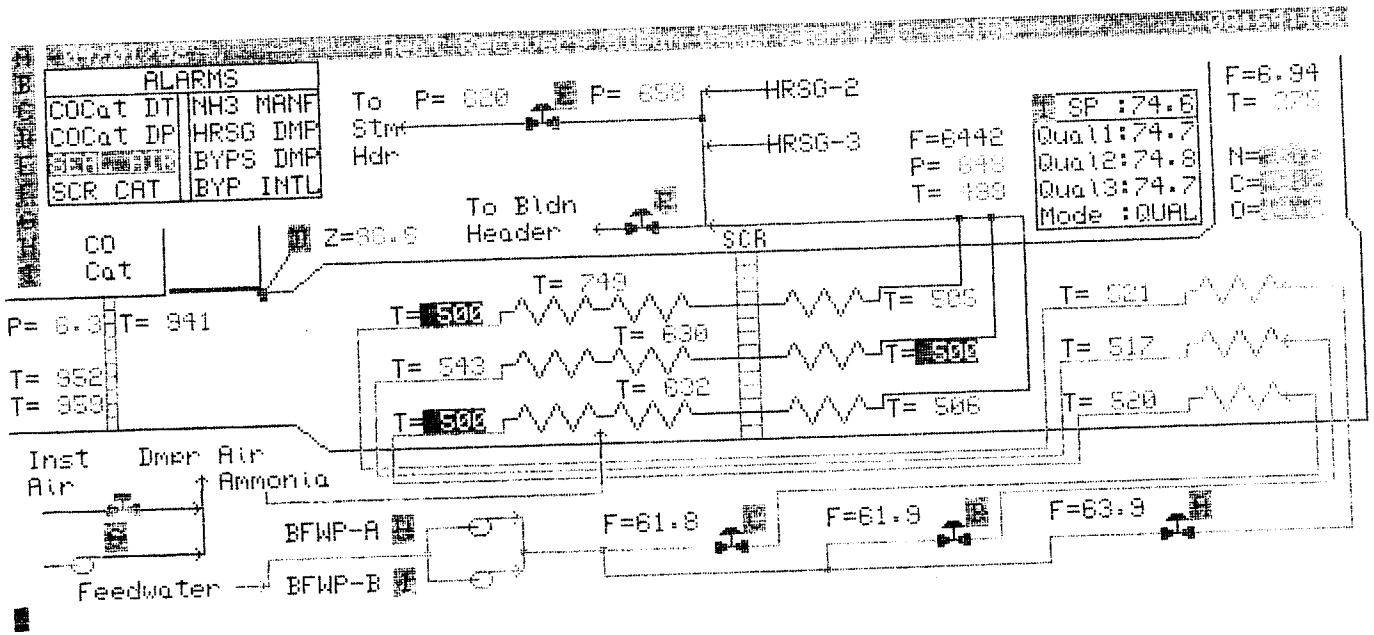

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DIAGRAM NUMBER: 2155 VERSION: 2

DATE: 04/01/92 TIME: 09:18:57

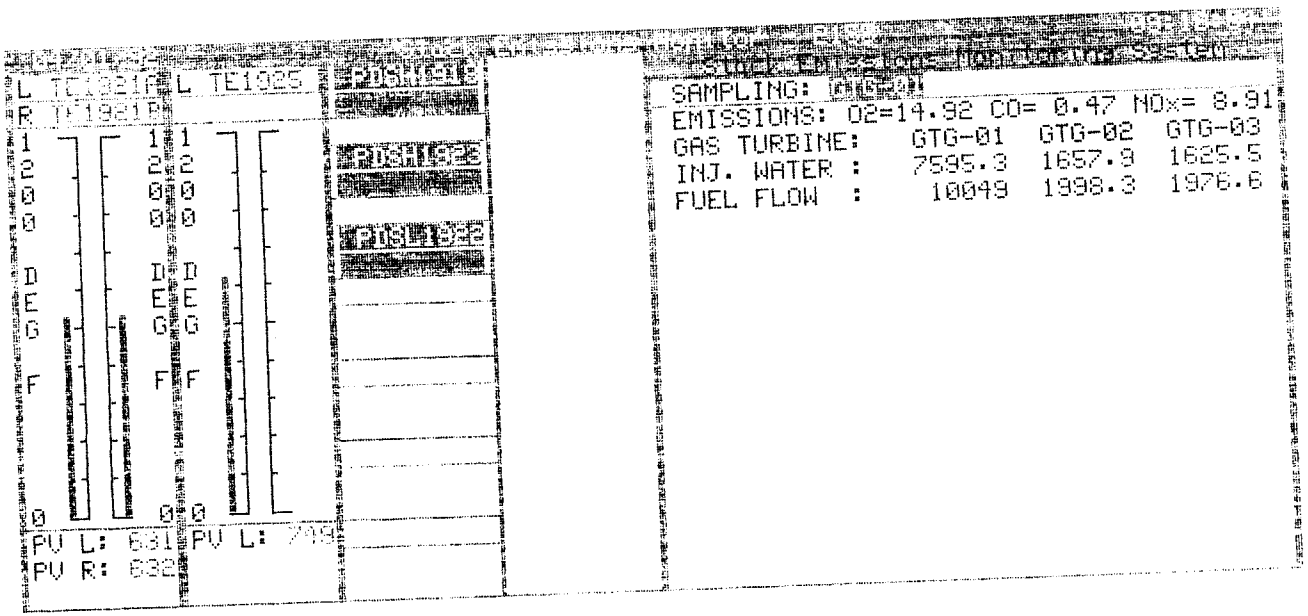

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DIAGRAM NUMBER: 2100 VERSION: 1 Unit #1

DATE: 04/01/92 TIME: 09:20:40 Begin Run #1

Gas Gen Speed	9267
Pwr Trb Speed	3597
Gen MW Output	19.6
Gen Megavar Out	0.00
Gen Voltage	13.4
Gen Amperage	888
Turb L.O. Press	48.8
Turb L.O. Temp	145
Trb Scv oil Prs	7.2
Gen L.O. Press	29.6
Gen L.O. Temp	140
→ Fuel Gas Flow	10088
Inj Water Flow	7541
Inj Water Ratio	0.75
Fuel Manfld Prs	273
Inj Manfld Prs	248
Comp Inlet Temp	64.8
Comp Disch Prs	247
Gas Supply Prs	415
Gas Supply Tmp	53.8

ALARMS & SHUTDOWNS

LOCAL EMER STOP	TURB LOW OIL PRS	STATOR TEMP A1
REMOTE EMER STOP	TURB LOW OIL TMP	STATOR TEMP A2
FIRE	TRB ACC GBOX TMP	STATOR TEMP B1
FAIL TO CRANK	AIR IN FILT D.P.	STATOR TEMP B2
FAIL TO IGNITE	SCV OIL FILT DP	STATOR TEMP C1
FLAME OUT	GEN LOW OIL PRS	STATOR TEMP C2
TURBINE OVERTEMP	GEN LOW OIL TEMP	HALON
GG FAIL TO ACCEL	GEN BRG D.E. TMP	
PT FAIL TO ACCEL	GEN OIL D.E. TMP	TRB ROOM LFL
GAS GEN UNDERSPD	GEN BRG X.E. TMP	GEN ROOM LFL
PWR TRB UNDERSPD	GEN OIL X.E. TMP	120 VOLT BATTERY
VIBRATN SYS MALF	SUMP A SCAV TEMP	24 VOLT BATTERY
FUEL GAS PRS HI	SUMP B SCAV TEMP	START SYS SUMMRY
GOVERNOR SYSTEM	SUMP C SCAV TEMP	UPS FAILURE
TRBN LOCKOUT RLY	SUMP D SCAV TEMP	AC OIL PUMP FAIL
HIGH VIBRATION	GEN ENCL AIR TEMP	DC OIL PUMP FAIL
GAS GEN OVERSPD	TRB ENCL AIR TEMP	AUX OIL PUMP
PWR TRB OVERSPD	GEN AIR OUT TEMP	GEN FAIL TO SYNC
START OVER TEMP	EXCITR AIR TEMP	UTIL FAIL SYNC

COPY IN PROGRESS

DIAGRAM NUMBER: 2150 VERSION: 3

DATE: 04/01/92 TIME: 09:22:46

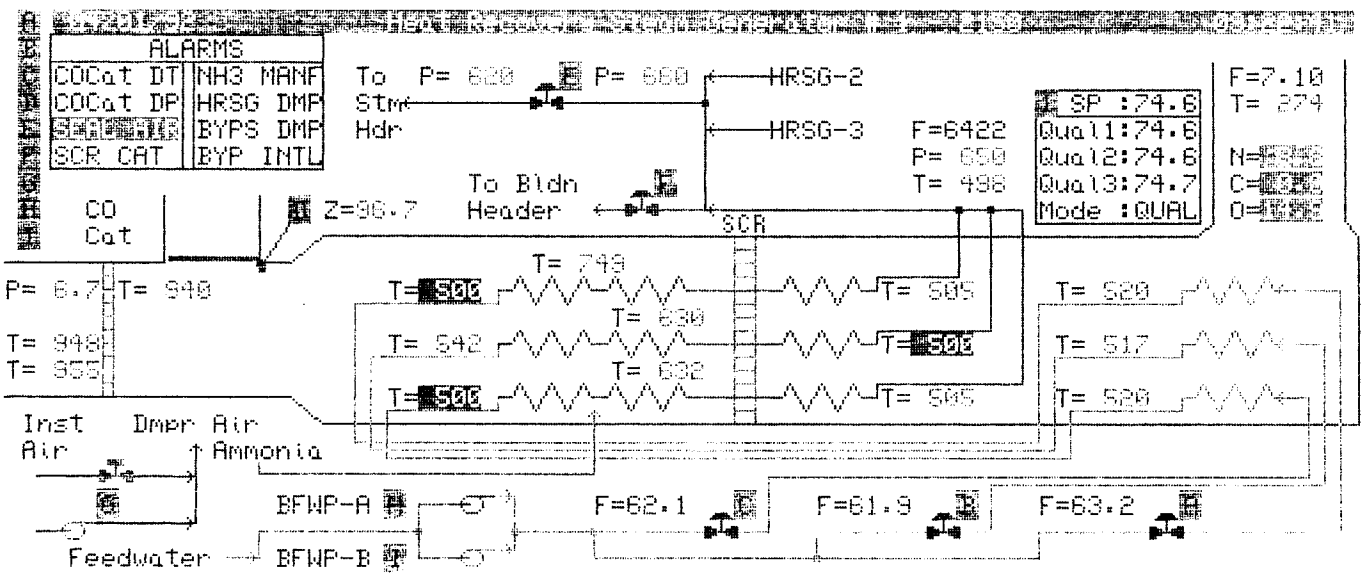

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DIAGRAM NUMBER: 2155 VERSION: 2

DATE: 04/01/92 TIME: 09:50:24

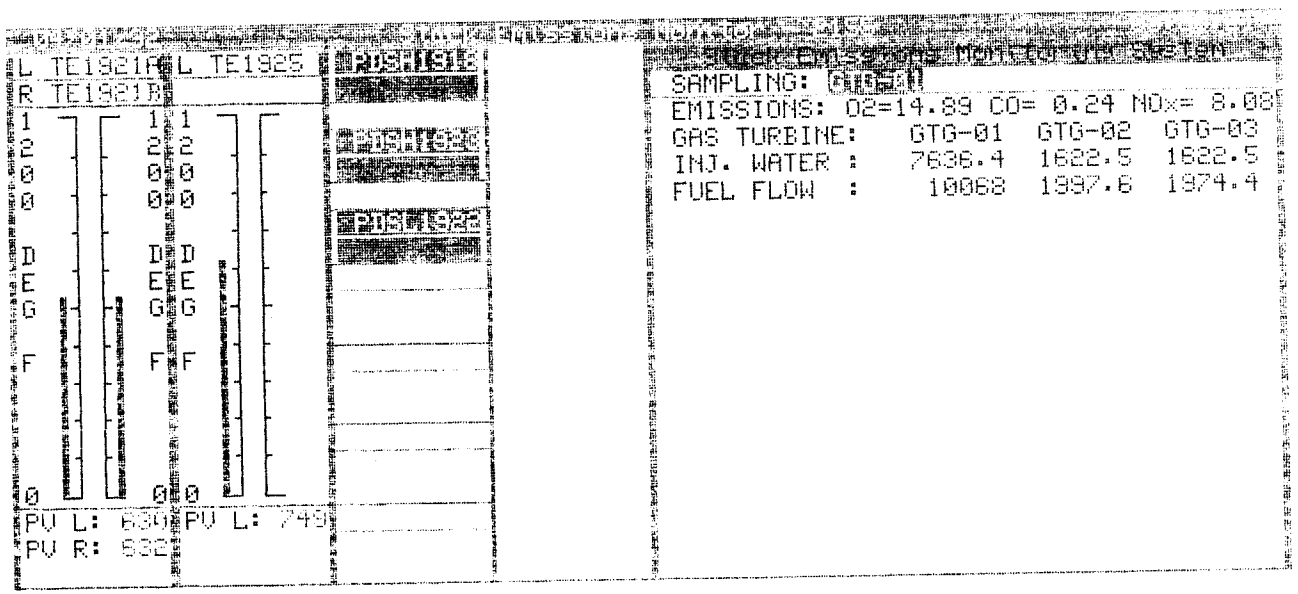

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DIAGRAM NUMBER: 2100 VERSION: 1

DATE: 04/01/92 TIME: 09:52:10

Unit #1
End Run#1 Begin Run#2
Fuel Flow =

04/01/92 GTG-01 Operating Overview 2100 09:52:07

Gas Gen Speed	9290
Pwr Trb Speed	3597
Gen MW Output	19.7
Gen Megavar Out	0.00
Gen Voltage	13.4
Gen Amperease	870
Turb L.O. Press	48.6
Turb L.O. Temp	145
Trb Scv oil Prs	6.8
Gen L.O. Press	29.7
Gen L.O. Temp	140
→ Fuel Gas Flow	10166
Inj Water Flow	7568
Inj Water Ratio	0.74
Fuel Manfld Prs	274
Inj Manfld Prs	248
Comp Inlet Temp	66.1
Comp Disch Prs	248
Gas Supply Prs	418
Gas Supply Tmp	55.5

ALARMS & SHUTDOWNS

LOCAL EMER STOP	TURB LOW OIL PRS	STATOR TEMP A1
REMOTE EMER STOP	TURB LOW OIL TMP	STATOR TEMP A2
FIRE	TRB ACC GBOX TMP	STATOR TEMP B1
FAIL TO CRANK	AIR IN FILT D.P.	STATOR TEMP B2
FAIL TO IGNITE	SCV OIL FILT DP	STATOR TEMP C1
FLAME OUT	GEN LOW OIL PRS	STATOR TEMP C2
TURBINE OVERTEMP	GEN LOW OIL TEMP	HALON
GG FAIL TO ACCEL	GEN BRG D.E. TMP	
PT FAIL TO ACCEL	GEN OIL D.E. TMP	TRB ROOM LFL
GAS GEN UNDERSPD	GEN BRG X.E. TMP	GEN ROOM LFL
PWR TRB UNDERSPD	GEN OIL X.E. TMP	120 VOLT BATTERY
VIBRATN SYS MALF	SUMP A SCAV TEMP	24 VOLT BATTERY
FUEL GAS PRS HI	SUMP B SCAV TEMP	START SYS SUMMRY
GOVERNOR SYSTEM	SUMP C SCAV TEMP	UPS FAILURE
TRBN LOCKOUT RLY	SUMP D SCAV TEMP	AC OIL PUMP FAIL
HIGH VIBRATION	GEN ENCL AIR TEMP	DC OIL PUMP FAIL
GAS GEN OVERSPD	TRB ENCL AIR TEMP	AUX OIL PUMP
PWR TRB OVERSPD	GEN AIR OUT TEMP	GEN FAIL TO SYNC
START OVER TEMP	EXCITR AIR TEMP	UTIL FAIL SYNC

COPY IN PROGRESS

DIAGRAM NUMBER: 2150 VERSION: 3

DATE: 04/01/92 TIME: 09:54:23

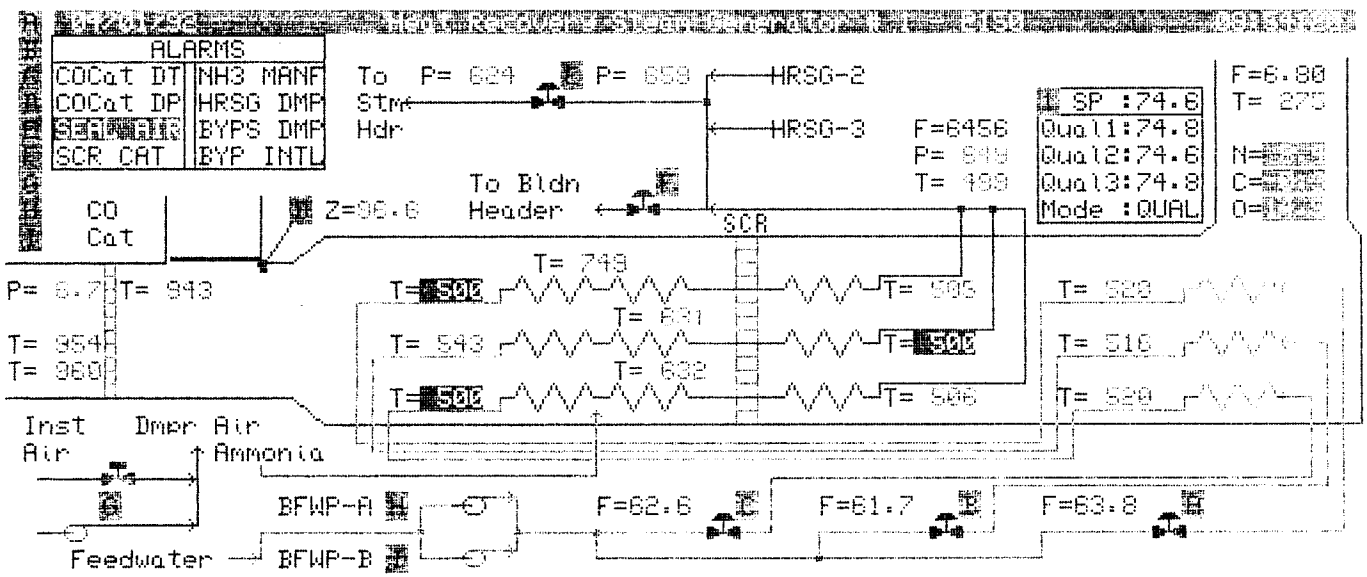

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DIAGRAM NUMBER: 2155 VERSION: 2

DATE: 04/01/92 TIME: 10:18:26

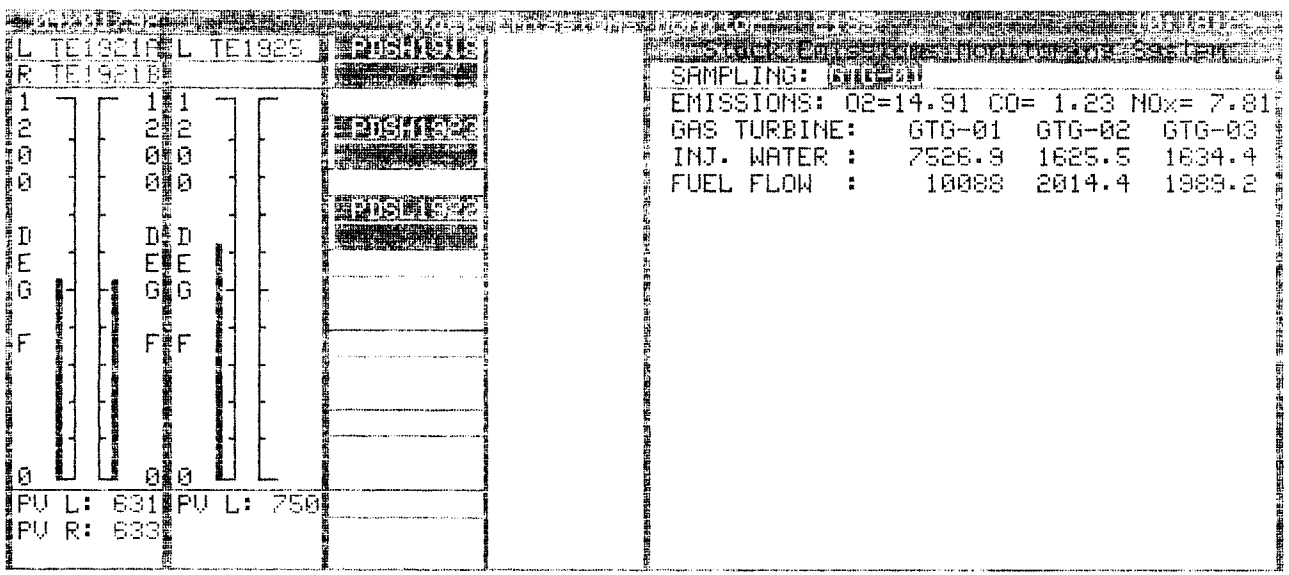

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DIAGRAM NUMBER: 2100 VERSION: 1

DATE: 04/01/92 TIME: 10:20:12

Unit 1
End Run #2
Fuel Flow =
10,117 #/hr

04/01/92 GTG 91 Operations Overview 2100 10:20:12

Gas Gen Speed	9279
Pwr Trb Speed	3597
Gen MW Output	19.7
Gen Megavar Out	0.00
Gen Voltage	13.4
Gen Amperage	872
Turb L.O. Press	48.4
Turb L.O. Temp	145
Trb Scv oil Prs	7.2
Gen L.O. Press	29.6
Gen L.O. Temp	140
→ Fuel Gas Flow	10068
Inj Water Flow	7568
Inj Water Ratio	0.75
Fuel Manfld Prs	275
Inj Manfld Prs	249
Comp Inlet Temp	83.8
Comp Disch Prs	249
Gas Supply Prs	412
Gas Supply Tmp	85.7

ALARMS & SHUTDOWNS

LOCAL EMER STOP	TURB LOW OIL PRS	STATOR TEMP A1
REMOTE EMER STOP	TURB LOW OIL TMP	STATOR TEMP A2
FIRE	TRB ACC GBOX TMP	STATOR TEMP B1
FAIL TO CRANK	AIR IN FILT D.P.	STATOR TEMP B2
FAIL TO IGNITE	SCV OIL FILT DP	STATOR TEMP C1
FLAME OUT	GEN LOW OIL PRS	STATOR TEMP C2
TURBINE OVERTEMP	GEN LOW OIL TEMP	HALON
GG FAIL TO ACCEL	GEN BRG D.E. TMP	
PT FAIL TO ACCEL	GEN OIL D.E. TMP	TRB ROOM LFL
GAS GEN UNDERSPD	GEN BRG X.E. TMP	GEN ROOM LFL
PWR TRB UNDERSPD	GEN OIL X.E. TMP	120 VOLT BATTERY
VIBRATN SYS MALF	SUMP A SCAV TEMP	24 VOLT BATTERY
FUEL GAS PRS HI	SUMP B SCAV TEMP	START SYS SUMMRY
GOVERNOR SYSTEM	SUMP C SCAV TEMP	UPS FAILURE
TRBN LOCKOUT RLY	SUMP D SCAV TEMP	AC OIL PUMP FAIL
HIGH VIBRATION	GEN ENCL AIR TEMP	DC OIL PUMP FAIL
GAS GEN OVERSPD	TRB ENCL AIR TEMP	AUX OIL PUMP
PWR TRB OVERSPD	GEN AIR OUT TEMP	GEN FAIL TO SYNC
START OVER TEMP	EXCITR AIR TEMP	UTIL FAIL SYNC

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DIAGRAM NUMBER: 2150 VERSION: 3

DATE: 04/01/92 TIME: 10:22:21

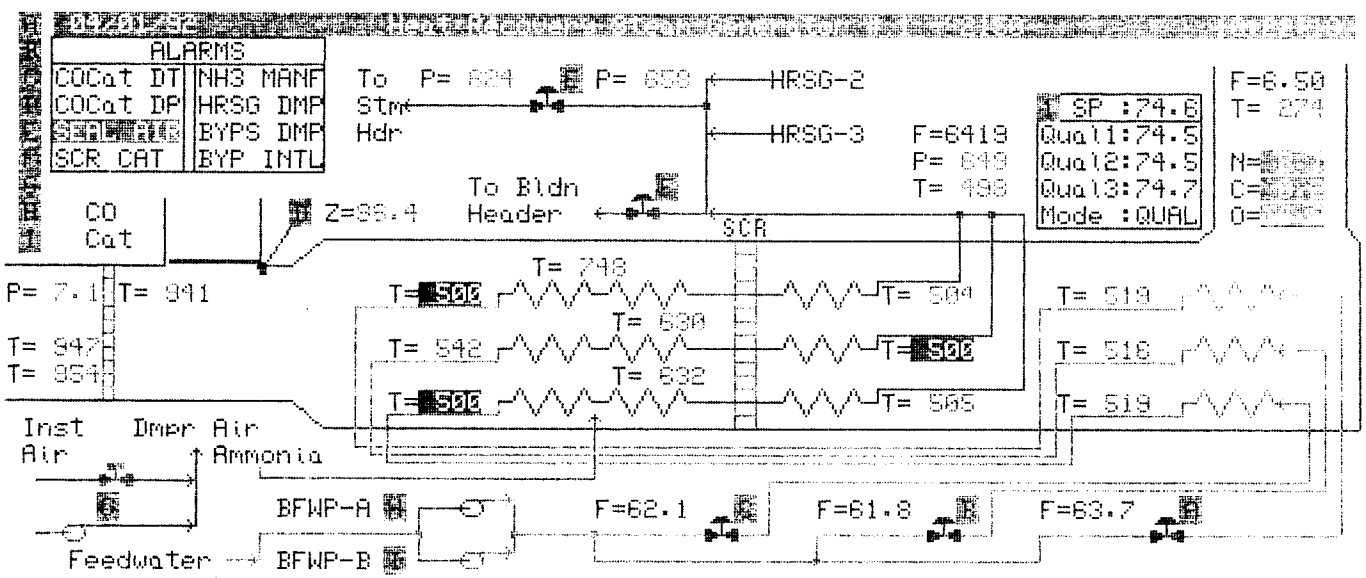

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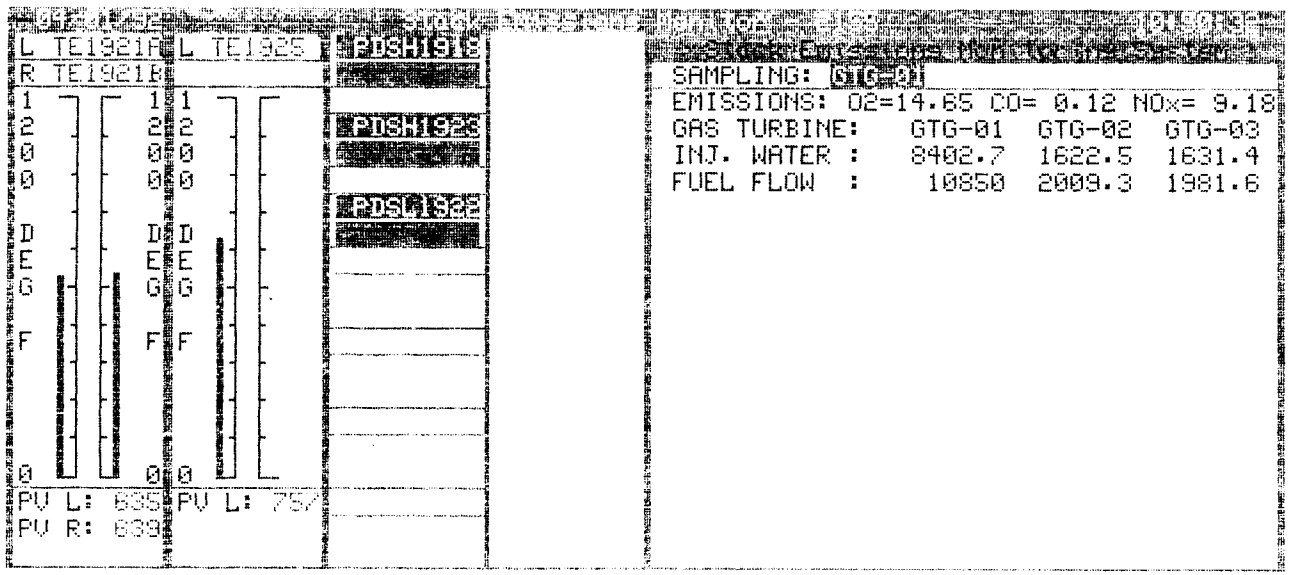
DIAGRAM NUMBER: 2155 VERSION: 2

DATE: 04/01/92 TIME: 10:50:35



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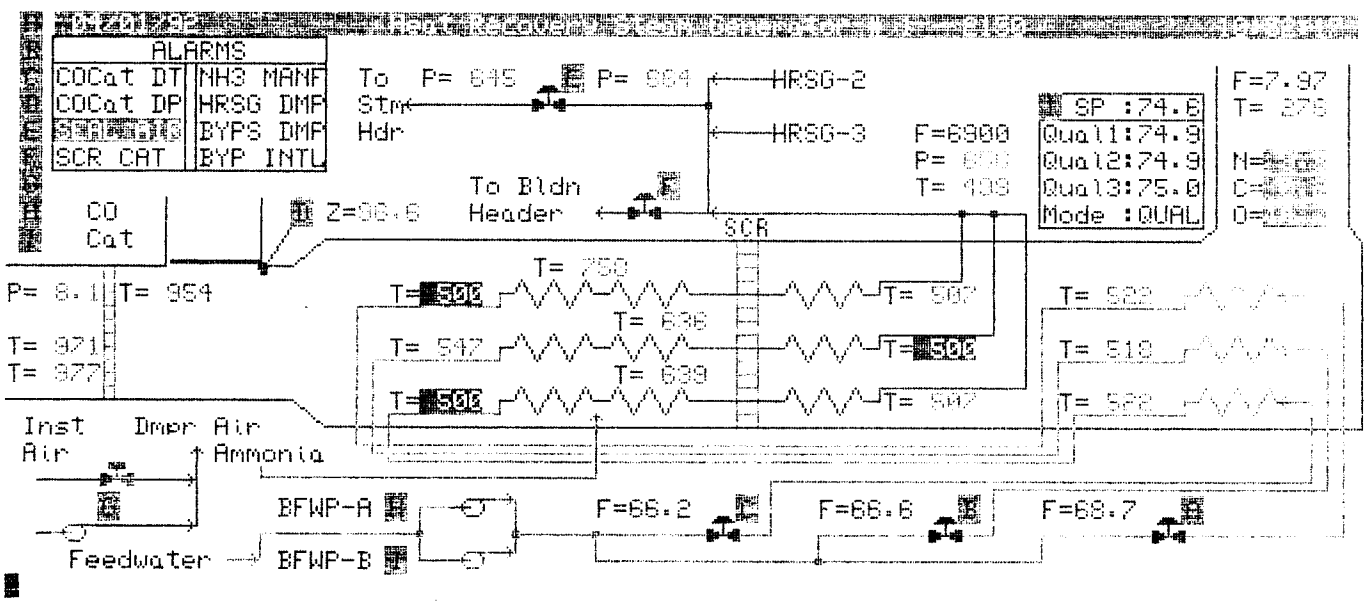
DATE: 04/01/92 TIME: 10:52:18



COPY IN PROGRESS

DIAGRAM NUMBER: 2100 VERSION: 1

DATE: 04/01/92 TIME: 10:54:50

Unit 1
Start Run #3
End Run #3

Fuel Flow=
10,831 #/hr

04/01/92 GTG-01 Operating Overview - 2100 10:54:47

Gas Gen Speed	9607
Pwr Trb Speed	3602
Gen MW Output	21.5
Gen Megavar Out	0.00
Gen Voltage	13.4
Gen Amperage	952
Turb L.O. Press	51.0
Turb L.O. Temp	145
Trb Scv oil Prs	7.4
Gen L.O. Press	29.7
Gen L.O. Temp	140
→ Fuel Gas Flow	10831
Inj Water Flow	8635
Inj Water Ratio	0.80
Fuel Manfld Prs	291
Inj Manfld Prs	265
Comp Inlet Temp	61.5
Comp Disch Prs	251
Gas Supply Prs	411
Gas Supply Tmp	65.7

ALARMS & SHUTDOWNS

LOCAL EMER STOP	TURB LOW OIL PRS	STATOR TEMP A1
REMOTE EMER STOP	TURB LOW OIL TMP	STATOR TEMP A2
FIRE	TRB ACC GBOX TMP	STATOR TEMP B1
FAIL TO CRANK	AIR IN FILT D.P.	STATOR TEMP B2
FAIL TO IGNITE	SCV OIL FILT DP	STATOR TEMP C1
FLAME OUT	GEN LOW OIL PRS	STATOR TEMP C2
TURBINE OVERTEMP	GEN LOW OIL TEMP	HALON
GG FAIL TO ACCEL	GEN BRG D.E. TMP	
PT FAIL TO ACCEL	GEN OIL D.E. TMP	TRB ROOM LFL
GAS GEN UNDERSPD	GEN BRG X.E. TMP	GEN ROOM LFL
PWR TRB UNDERSPD	GEN OIL X.E. TMP	120 VOLT BATTERY
VIBRATN SYS MALF	SUMP A SCAV TEMP	24 VOLT BATTERY
FUEL GAS PRS HI	SUMP B SCAV TEMP	START SYS SUMMRY
GOVERNOR SYSTEM	SUMP C SCAV TEMP	UPS FAILURE
TRBN LOCKOUT RLY	SUMP D SCAV TEMP	AC OIL PUMP FAIL
HIGH VIBRATION	GEN ENCL AIR TEMP	DC OIL PUMP FAIL
GAS GEN OVERSPD	TRB ENCL AIR TEMP	AUX OIL PUMP
PWR TRB OVERSPD	GEN AIR OUT TEMP	GEN FAIL TO SYNC
START OVER TEMP	EXCITR AIR TEMP	UTIL FAIL SYNC

COPY IN PROGRESS

DIAGRAM NUMBER: 2155 VERSION: 2

DATE: 04/01/92 TIME: 11:19:09

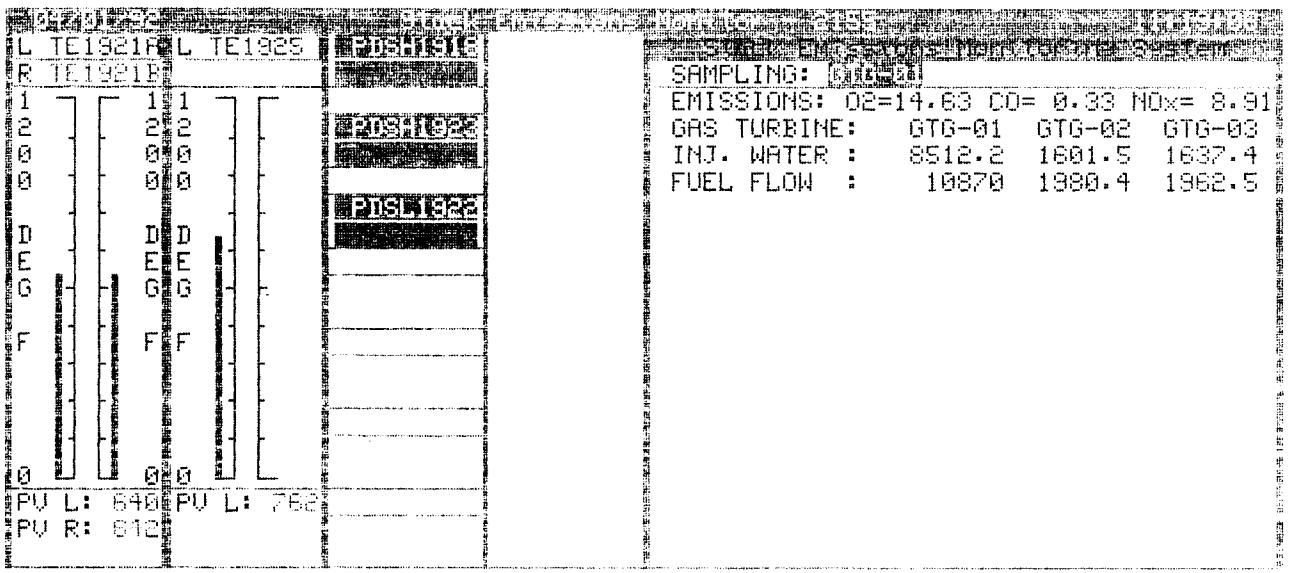


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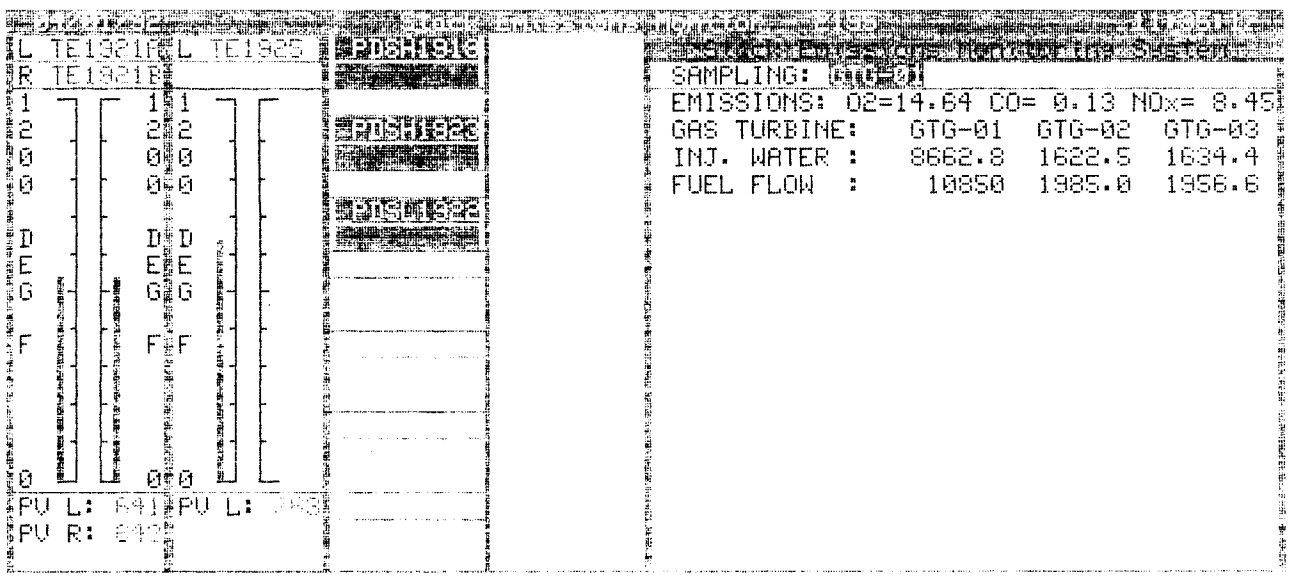
DIAGRAM NUMBER: 2155 VERSION: 2

DATE: 04/01/92 TIME: 11:35:20



COPY IN PROGRESS

DIAGRAM NUMBER: 2100 VERSION: 1

DATE: 04/01/92 TIME: 11:37:16

Gas Gen Speed	9619	ALARMS & SHUTDOWNS		
Pwr Trb Speed	3602	LOCAL EMER STOP	TURB LOW OIL PRS	STATOR TEMP A1
Gen MW Output	21.5	REMOTE EMER STOP	TURB LOW OIL TMP	STATOR TEMP A2
Gen Megavar Out	0.00	FIRE	TRB ACC GBOX TMP	STATOR TEMP B1
Gen Voltage	13.3	FAIL TO CRANK	AIR IN FILT D.P.	STATOR TEMP B2
Gen Amperage	950	FAIL TO IGNITE	SCV OIL FILT DP	STATOR TEMP C1
Turb L.O. Press	51.1	FLAME OUT	GEN LOW OIL PRS	STATOR TEMP C2
Turb L.O. Temp	146	TURBINE OVERTEMP	GEN LOW OIL TEMP	HALON
Trb Scv oil Prs	8.8	GG FAIL TO ACCEL	GEN BRG D.E. TMP	
Gen L.O. Press	23.4	PT FAIL TO ACCEL	GEN OIL D.E. TMP	TRB ROOM LFL
Gen L.O. Temp	149	GAS GEN UNDERSPD	GEN BRG X.E. TMP	GEN ROOM LFL
Fuel Gas Flow	10929	PWR TRB UNDERSPD	GEN OIL X.E. TMP	120 VOLT BATTERY
Inj Water Flow	8649	VIBRATN SYS MALF	SUMP A SCAV TEMP	24 VOLT BATTERY
Inj Water Ratio	0.79	FUEL GAS PRS HI	SUMP B SCAV TEMP	START SYS SUMMRY
Fuel Manfld Prs	291	GOVERNOR SYSTEM	SUMP C SCAV TEMP	UPS FAILURE
Inj Manfld Prs	266	TRBN LOCKOUT RLY	SUMP D SCAV TEMP	AC OIL PUMP FAIL
Comp Inlet Temp	82.1	HIGH VIBRATION	GEN ENCL AIR TEMP	DC OIL PUMP FAIL
Comp Disch Prs	262	GAS GEN OVERSPD	TRB ENCL AIR TEMP	AUX OIL PUMP
Gas Supply Prs	409	PWR TRB OVERSPD	GEN AIR OUT TEMP	GEN FAIL TO SYNC
Gas Supply Tmp	68.6	START OVER TEMP	EXCITR AIR TEMP	UTIL FAIL SYNC

COPY IN PROGRESS

DIAGRAM NUMBER: 2150 VERSION: 3

DATE: 04/01/92 TIME: 11:39:25

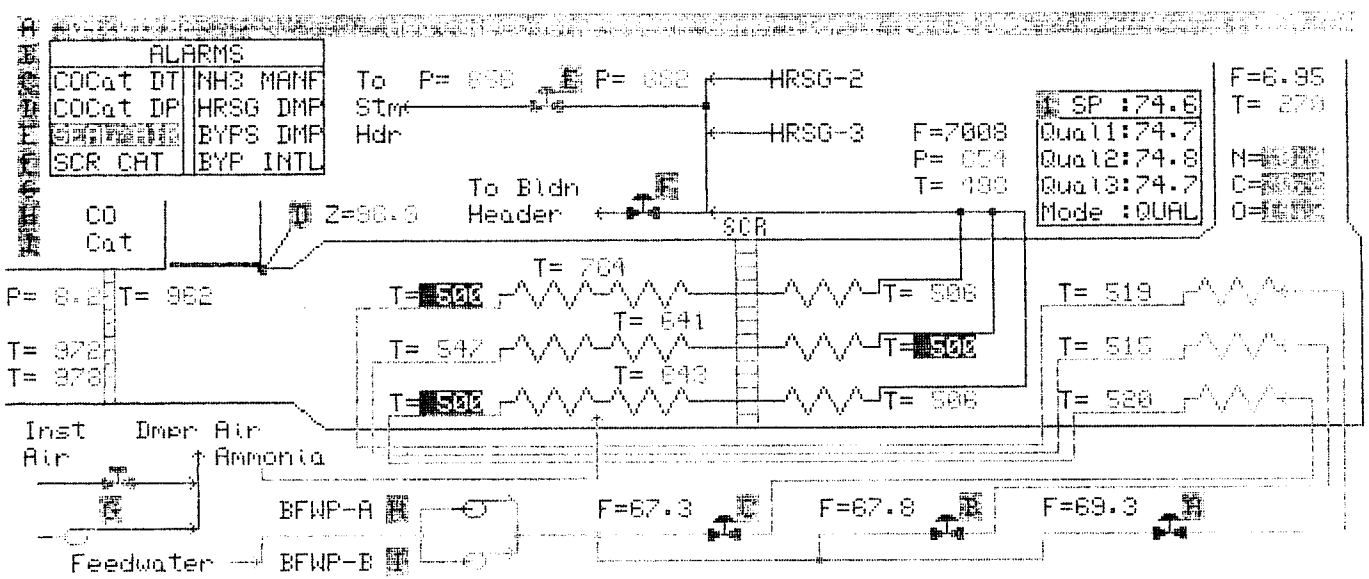


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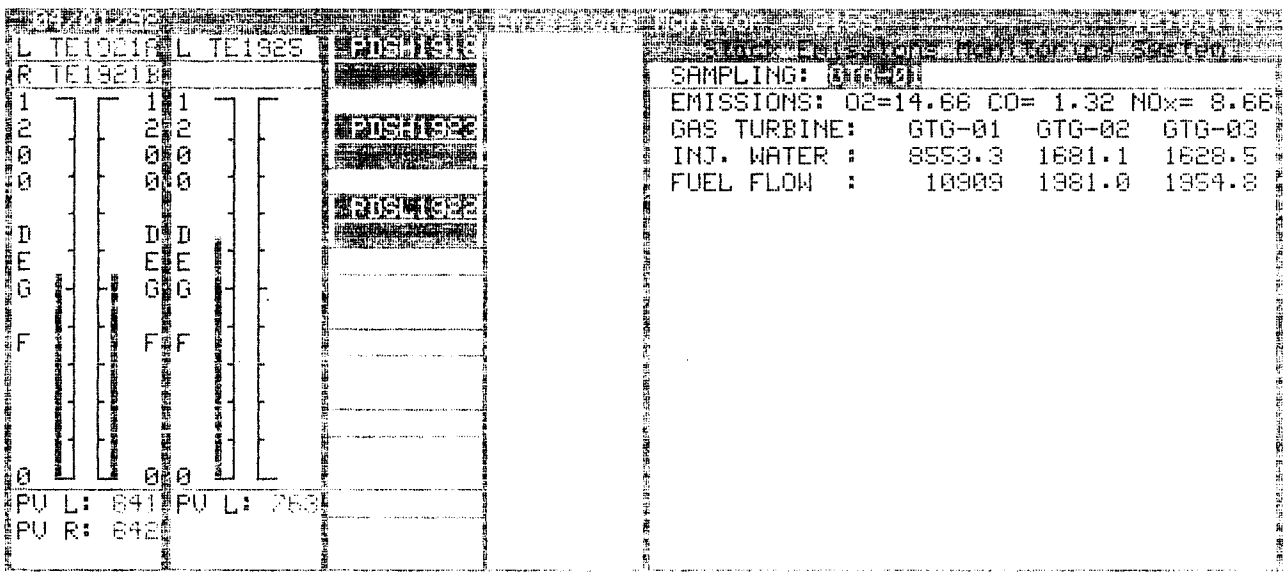
DIAGRAM NUMBER: 2155 VERSION: 2

DATE: 04/01/92 TIME: 12:03:48



COPY IN PROGRESS

DIAGRAM NUMBER: 2100 VERSION: 1

DATE: 04/01/92 TIME: 12:05:48

Unit 1

Run #4

Fuel Flow =

10,870 #/hr

Gas Gen Speed	9595
Pwr Trb Speed	3602
Gen MW Output	21.4
Gen Megavar Out	0.00
Gen Voltage	13.4
Gen Amperage	946
Turb L.O. Press	51.0
Turb L.O. Temp	146
Trb Scv oil Prs	7.2
Gen L.O. Press	29.8
Gen L.O. Temp	140
→ Fuel Gas Flow	10870
Inj Water Flow	8663
Inj Water Ratio	0.80
Fuel Manfld Prs	290
Inj Manfld Prs	265
Comp Inlet Temp	62.3
Comp Disch Prs	261
Gas Supply Prs	411
Gas Supply Tmp	69.7

ALARMS & SHUTDOWNS

LOCAL EMER STOP	TURB LOW OIL PRS	STATOR TEMP A1
REMOTE EMER STOP	TURB LOW OIL TMP	STATOR TEMP A2
FIRE	TRB ACC GBOX TMP	STATOR TEMP B1
FAIL TO CRANK	AIR IN FILT D.P.	STATOR TEMP B2
FAIL TO IGNITE	SCV OIL FILT DP	STATOR TEMP C1
FLAME OUT	GEN LOW OIL PRS	STATOR TEMP C2
TURBINE OVERTEMP	GEN LOW OIL TEMP	HALON
GG FAIL TO ACCEL	GEN BRG D.E. TMP	
PT FAIL TO ACCEL	GEN OIL D.E. TMP	TRB ROOM LFL
GAS GEN UNDERSPD	GEN BRG X.E. TMP	GEN ROOM LFL
PWR TRB UNDERSPD	GEN OIL X.E. TMP	120 VOLT BATTERY
VIBRATN SYS MALF	SUMP A SCAV TEMP	24 VOLT BATTERY
FUEL GAS PRS HI	SUMP B SCAV TEMP	START SYS SUMMRY
GOVERNOR SYSTEM	SUMP C SCAV TEMP	UPS FAILURE
TRBN LOCKOUT RLY	SUMP D SCAV TEMP	AC OIL PUMP FAIL
HIGH VIBRATION	GEN ENCL AIR TEMP	DC OIL PUMP FAIL
GAS GEN OVERSPD	TRB ENCL AIR TEMP	AUX OIL PUMP
PWR TRB OVERSPD	GEN AIR OUT TEMP	GEN FAIL TO SYNC
START OVER TEMP	EXCITR AIR TEMP	UTIL FAIL SYNC

COPY IN PROGRESS

DIAGRAM NUMBER: 2150 VERSION: 3

DATE: 04/01/92 TIME: 12:08:46

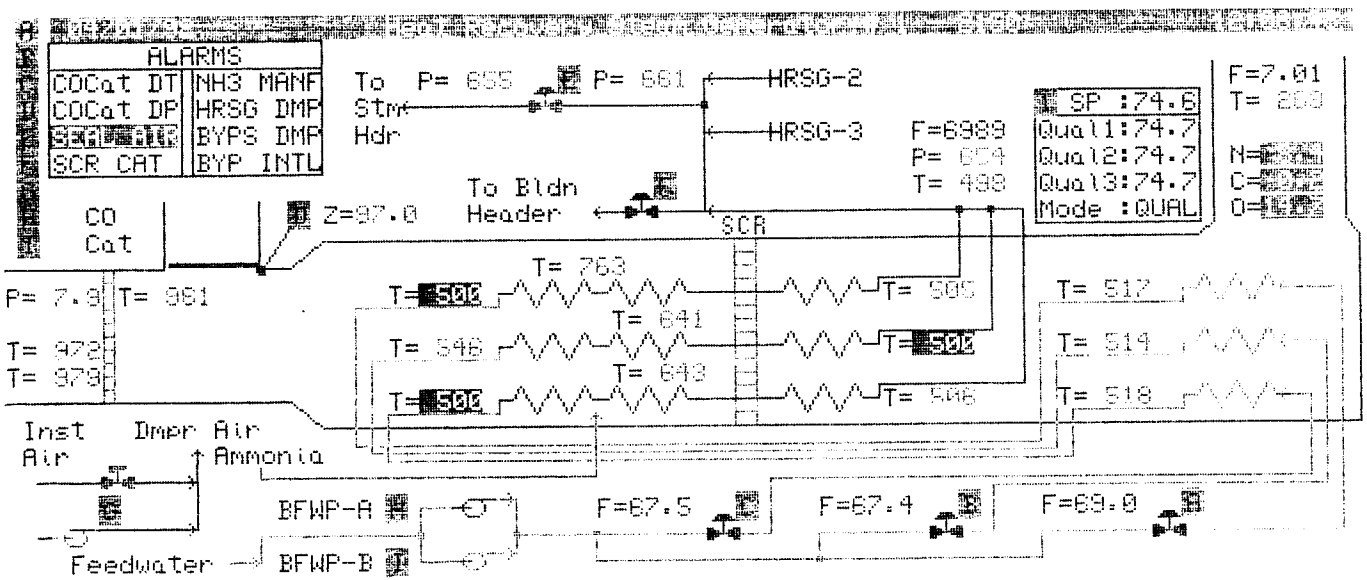


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DIAGRAM NUMBER: 2155 VERSION: 2

DATE: 04/01/92 TIME: 12:33:20

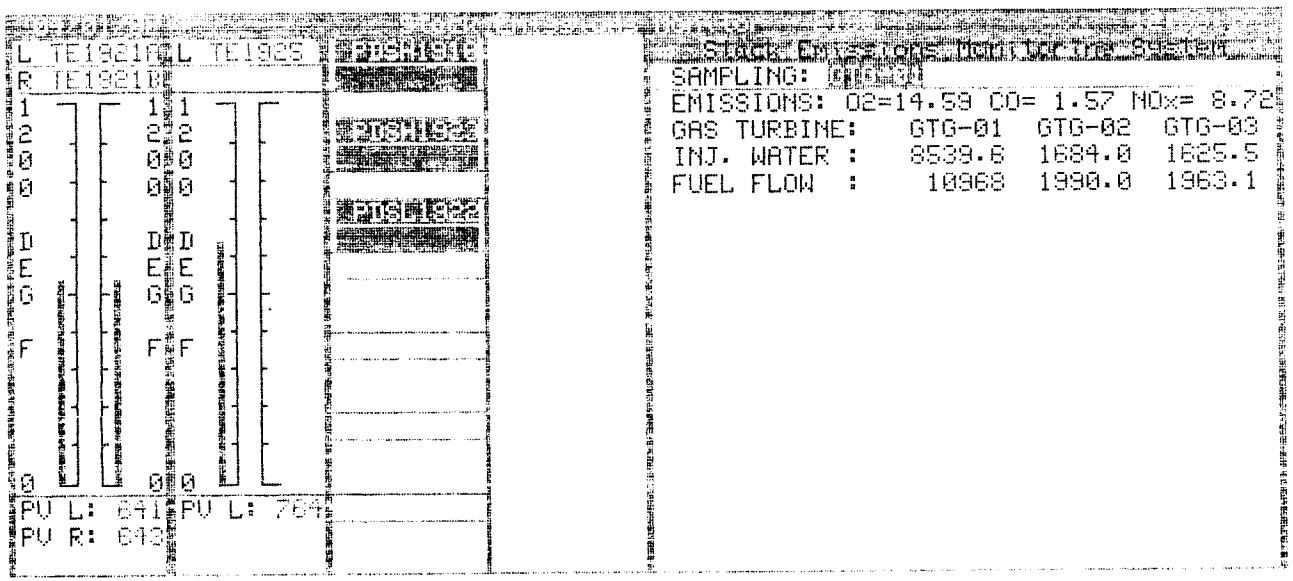

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DIAGRAM NUMBER: 2100 VERSION: 1

DATE: 04/01/92 TIME: 12:35:09

Unit #1

Start Run#5

Gas Gen Speed	9537
Pwr Trb Speed	3602
Gen MW Output	21.1
Gen Megavar Out	0.00
Gen Voltage	13.4
Gen Amperease	937
Turb L.O. Press	50.3
Turb L.O. Temp	146
Trb Scv oil Prs	7.2
Gen L.O. Press	29.5
Gen L.O. Temp	140
Fuel Gas Flow	10733
Inj Water Flow	8594
Inj Water Ratio	0.80
Fuel Manfld Prs	288
Inj Manfld Prs	264
Comp Inlet Temp	63.3
Comp Disch Prs	259
Gas Supply Prs	413
Gas Supply Tmp	69.5

ALARMS & SHUTDOWNS

LOCAL EMER STOP	TURB LOW OIL PRS	STATOR TEMP A1
REMOTE EMER STOP	TURB LOW OIL TMP	STATOR TEMP A2
FIRE	TRB ACC GBOX TMP	STATOR TEMP B1
FAIL TO CRANK	AIR IN FILT D.P.	STATOR TEMP B2
FAIL TO IGNITE	SCV OIL FILT DP	STATOR TEMP C1
FLAME OUT	GEN LOW OIL PRS	STATOR TEMP C2
TURBINE OVERTEMP	GEN LOW OIL TEMP	HALON
GG FAIL TO ACCEL	GEN BRG D.E. TMP	
PT FAIL TO ACCEL	GEN OIL D.E. TMP	TRB ROOM LFL
GAS GEN UNDERSPD	GEN BRG X.E. TMP	GEN ROOM LFL
PWR TRB UNDERSPD	GEN OIL X.E. TMP	120 VOLT BATTERY
VIBRATN SYS MALF	SUMP A SCAV TEMP	24 VOLT BATTERY
FUEL GAS PRS HI	SUMP B SCAV TEMP	START SYS SUMMRY
GOVERNOR SYSTEM	SUMP C SCAV TEMP	UPS FAILURE
TRBN LOCKOUT RLY	SUMP D SCAV TEMP	AC OIL PUMP FAIL
HIGH VIBRATION	GEN ENCL AIR TEMP	DC OIL PUMP FAIL
GAS GEN OVERSPD	TRB ENCL AIR TEMP	AUX OIL PUMP
PWR TRB OVERSPD	GEN AIR OUT TEMP	GEN FAIL TO SYNC
START OVER TEMP	EXCITR AIR TEMP	UTIL FAIL SYNC

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DIAGRAM NUMBER: 2150 VERSION: 3

DATE: 04/01/92 TIME: 12:37:40

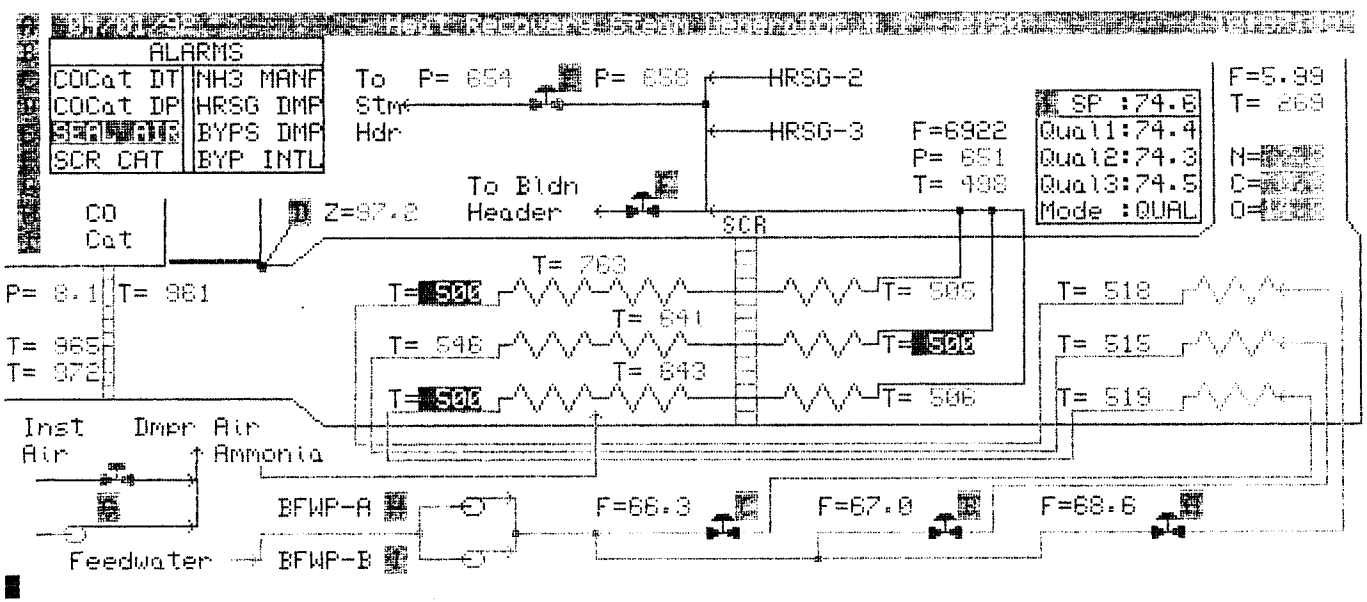

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DIAGRAM NUMBER: 2155 VERSION: 2

DATE: 04/01/92 TIME: 13:05:01

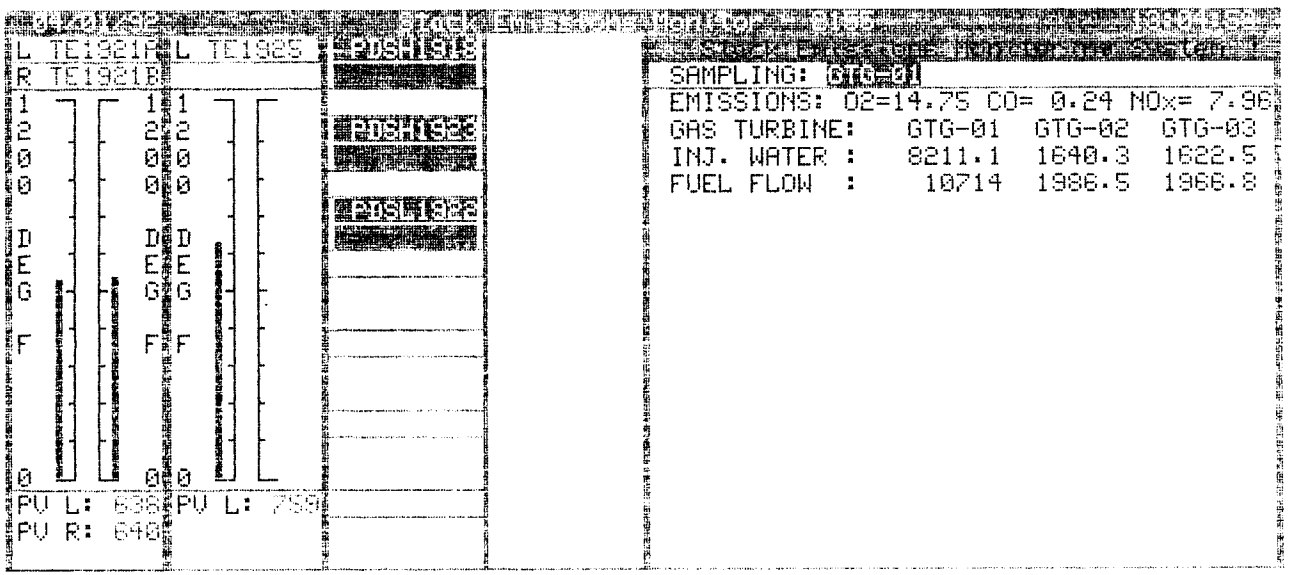

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DIAGRAM NUMBER: 2100 VERSION: 1

DATE: 04/01/92 TIME: 13:10:32

Unit 1

End Run #5

Fuel Flow = 10,704 #/hr

Start Run #6

		ALARMS & SHUTDOWNS		
Gas Gen Speed	9490			
Pwr Trb Speed	3597	LOCAL EMER STOP	TURB LOW OIL PRS	STATOR TEMP A1
Gen MW Output	21.0	REMOTE EMER STOP	TURB LOW OIL TMP	STATOR TEMP A2
Gen Megavar Out	0.00	FIRE	TRB ACC GBOX TMP	STATOR TEMP B1
Gen Voltage	13.3	FAIL TO CRANK	AIR IN FILT D.P.	STATOR TEMP B2
Gen Amperage	933	FAIL TO IGNITE	SCV OIL FILT DP	STATOR TEMP C1
Turb L.O. Press	50.5	FLAME OUT	GEN LOW OIL PRS	STATOR TEMP C2
Turb L.O. Temp	145	TURBINE OVERTEMP	GEN LOW OIL TEMP	HALON
Trb Scv oil Prs	7.2	GG FAIL TO ACCEL	GEN BRG D.E. TMP	
Gen L.O. Press	29.8	PT FAIL TO ACCEL	GEN OIL D.E. TMP	TRB ROOM LFL
Gen L.O. Temp	140	GAS GEN UNDERSPD	GEN BRG X.E. TMP	GEN ROOM LFL
→ Fuel Gas Flow	10674	PWR TRB UNDERSPD	GEN OIL X.E. TMP	120 VOLT BATTERY
Inj Water Flow	8635	VIBRATN SYS MALF	SUMP A SCAV TEMP	24 VOLT BATTERY
Inj Water Ratio	0.78	FUEL GAS PRS HI	SUMP B SCAV TEMP	START SYS SUMMRY
Fuel Manfld Prs	286	GOVERNOR SYSTEM	SUMP C SCAV TEMP	UPS FAILURE
Inj Manfld Prs	264	TRBN LOCKOUT RLY	SUMP D SCAV TEMP	AC OIL PUMP FAIL
Comp Inlet Temp	62.6	HIGH VIBRATION	GEN ENCL AIR TEMP	DC OIL PUMP FAIL
Comp Disch Prs	258	GAS GEN OVERSPD	TRB ENCL AIR TEMP	AUX OIL PUMP
Gas Supply Prs	414	PWR TRB OVERSPD	GEN AIR OUT TEMP	GEN FAIL TO SYNC
Gas Supply Tmp	70.8	START OVER TEMP	EXCITR AIR TEMP	UTIL FAIL SYNC

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DIAGRAM NUMBER: 2150 VERSION: 3

DATE: 04/01/92 TIME: 13:13:16

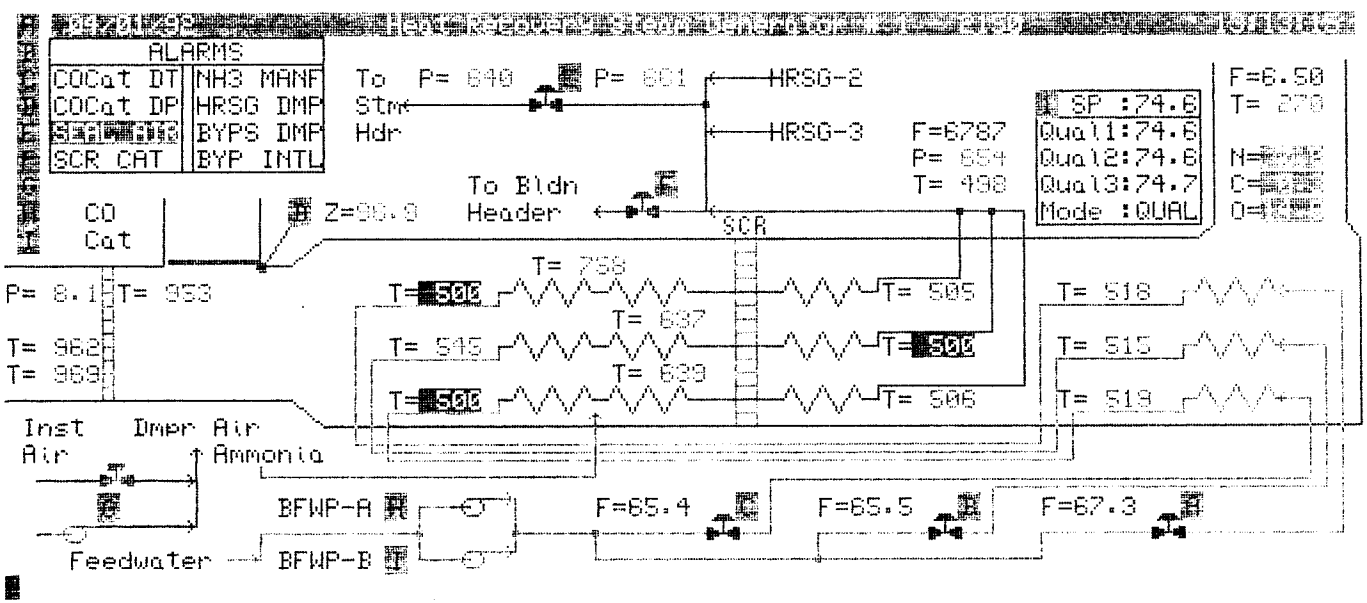

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DIAGRAM NUMBER: 2155 VERSION: 2

DATE: 04/01/92 TIME: 13:49:28

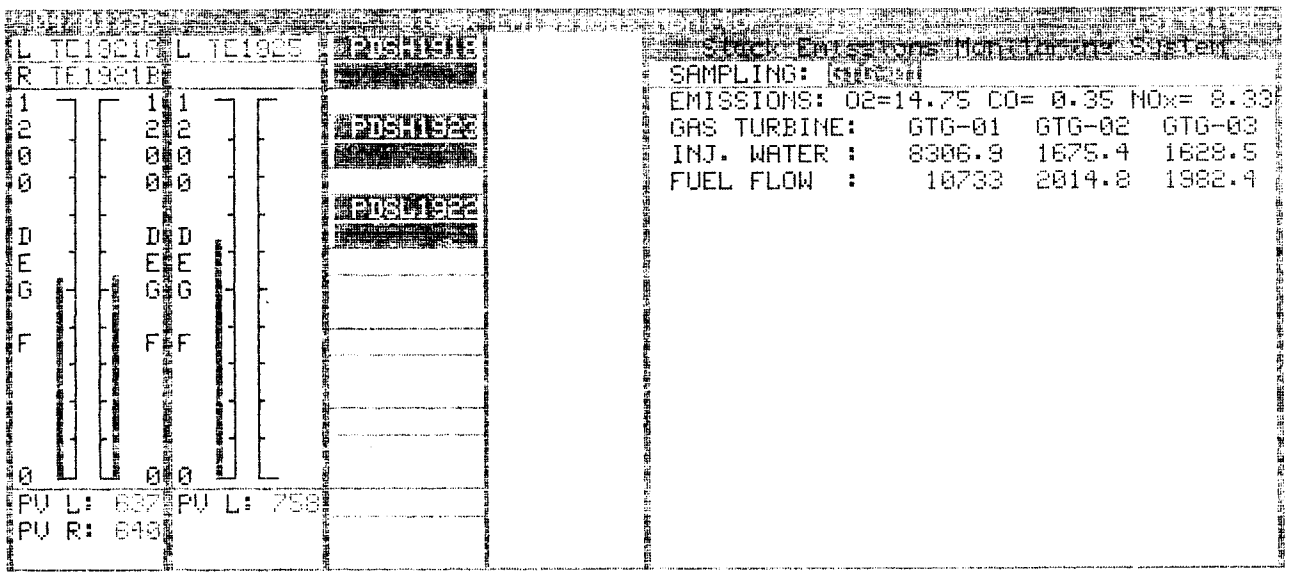

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DIAGRAM NUMBER: 2100 VERSION: 1

DATE: 04/01/92 TIME: 13:51:08

Unit #1

End Run #6
Fuel Flow=
10,762 #/hr

Gas Gen Speed	9537
Pwr Trb Speed	3597
Gen MW Output	21.1
Gen Megavar Out	0.00
Gen Voltage	13.3
Gen Amperage	941
Turb L.O. Press	59.5
Turb L.O. Temp	145
Trb Scv oil Prs	7.2
Gen L.O. Press	29.8
Gen L.O. Temp	140
→ Fuel Gas Flow	10850
Inj Water Flow	8622
Inj Water Ratio	0.79
Fuel Manfld Prs	287
Inj Manfld Prs	266
Comp Inlet Temp	62.8
Comp Disch Prs	258
Gas Supply Prs	411
Gas Supply Tmp	71.4

ALARMS & SHUTDOWNS

LOCAL EMER STOP	TURB LOW OIL PRS	STATOR TEMP A1
REMOTE EMER STOP	TURB LOW OIL TMP	STATOR TEMP A2
FIRE	TRB ACC GBOX TMP	STATOR TEMP B1
FAIL TO CRANK	AIR IN FILT D.P.	STATOR TEMP B2
FAIL TO IGNITE	SCV OIL FILT DP	STATOR TEMP C1
FLAME OUT	GEN LOW OIL PRS	STATOR TEMP C2
TURBINE OVERTEMP	GEN LOW OIL TEMP	HALON
GG FAIL TO ACCEL	GEN BRG D.E. TMP	
PT FAIL TO ACCEL	GEN OIL D.E. TMP	TRB ROOM LFL
GAS GEN UNDERSPD	GEN BRG X.E. TMP	GEN ROOM LFL
PWR TRB UNDERSPD	GEN OIL X.E. TMP	120 VOLT BATTERY
VIBRATN SYS MALF	SUMP A SCAV TEMP	24 VOLT BATTERY
FUEL GAS PRS HI	SUMP B SCAV TEMP	START SYS SUMMRY
GOVERNOR SYSTEM	SUMP C SCAV TEMP	UPS FAILURE
TRBN LOCKOUT RLY	SUMP D SCAV TEMP	AC OIL PUMP FAIL
HIGH VIBRATION	GEN ENCL AIR TEMP	DC OIL PUMP FAIL
GAS GEN OVERSPD	TRB ENCL AIR TEMP	AUX OIL PUMP
PWR TRB OVERSPD	GEN AIR OUT TEMP	GEN FAIL TO SYNC
START OVER TEMP	EXCITR AIR TEMP	UTIL FAIL SYNC

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DIAGRAM NUMBER: 2155 VERSION: 2

DATE: 04/01/92 TIME: 14:34:46

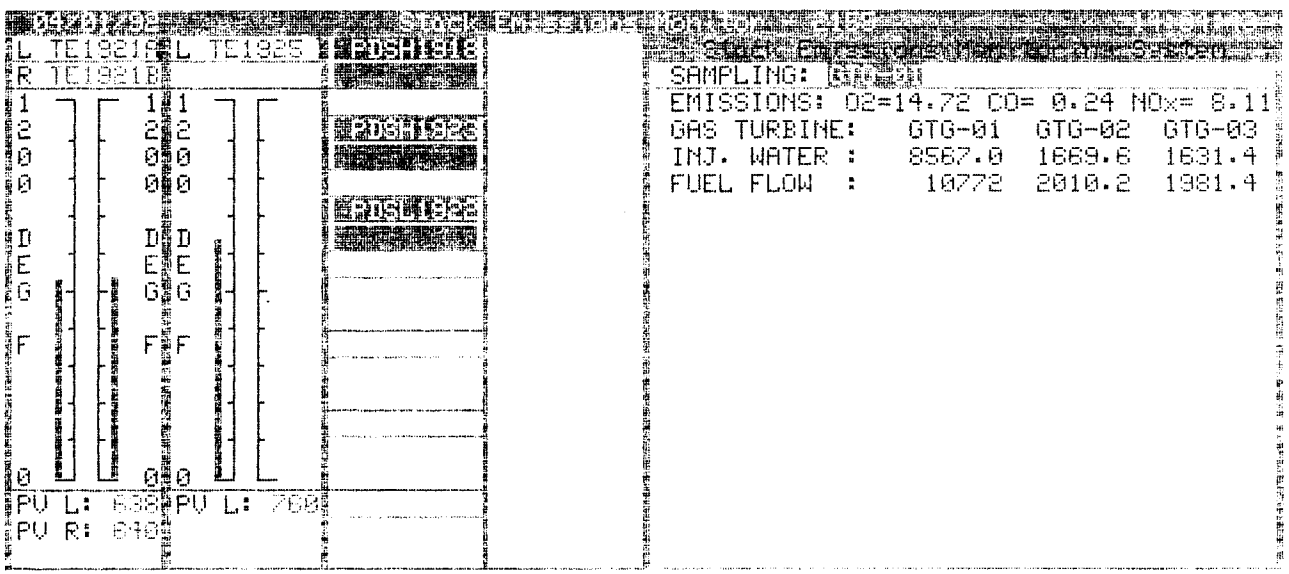

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DIAGRAM NUMBER: 2100 VERSION: 1

DATE: 04/01/92 TIME: 14:41:55

Unit #1

Run #7

Fuel Flow=

10,792 #/hr

Begin Run #8

04/01/92 DTD-01 Operating Overview 2100 14:41:53

		ALARMS & SHUTDOWNS		
Gas Gen Speed	9560			
Pwr Trb Speed	3597	LOCAL EMER STOP	TURB LOW OIL PRS	STATOR TEMP A1
Gen MW Output	21.1	REMOTE EMER STOP	TURB LOW OIL TMP	STATOR TEMP A2
Gen Megavar Out	0.00	FIRE	TRB ACC GBOX TMP	STATOR TEMP B1
Gen Voltage	13.3	FAIL TO CRANK	AIR IN FILT D.P.	STATOR TEMP B2
Gen Ampereage	937	FAIL TO IGNITE	SCV OIL FILT DP	STATOR TEMP C1
Turb L.O. Press	50.8	FLAME OUT	GEN LOW OIL PRS	STATOR TEMP C2
Turb L.O. Temp	145	TURBINE OVERTEMP	GEN LOW OIL TEMP	HALON
Trb Scv oil Prs	7.2	GG FAIL TO ACCEL	GEN BRG D.E. TMP	
Gen L.O. Press	29.4	PT FAIL TO ACCEL	GEN OIL D.E. TMP	TRB ROOM LFL
Gen L.O. Temp	140	GAS GEN UNDERSPD	GEN BRG X.E. TMP	GEN ROOM LFL
→ Fuel Gas Flow	10792	PWR TRB UNDERSPD	GEN OIL X.E. TMP	120 VOLT BATTERY
Inj Water Flow	8444	VIBRATN SYS MALF	SUMP A SCAV TEMP	24 VOLT BATTERY
Inj Water Ratio	0.78	FUEL GAS PRS HI	SUMP B SCAV TEMP	START SYS SUMMRY
Fuel Manfld Prs	287	GOVERNOR SYSTEM	SUMP C SCAV TEMP	UPS FAILURE
Inj Manfld Prs	263	TRBN LOCKOUT RLY	SUMP D SCAV TEMP	AC OIL PUMP FAIL
Comp Inlet Temp	63.6	HIGH VIBRATION	GEN ENCL AIR TEMP	DC OIL PUMP FAIL
Comp Disch Prs	259	GAS GEN OVERSPD	TRB ENCL AIR TEMP	AUX OIL PUMP
Gas Supply Prs	415	PWR TRB OVERSPD	GEN AIR OUT TEMP	GEN FAIL TO SYNC
Gas Supply Tmp	70.1	START OVER TEMP	EXCITR AIR TEMP	UTIL FAIL SYNC

COPY IN PROGRESS

DIAGRAM NUMBER: 2150 VERSION: 3

DATE: 04/01/92 TIME: 14:44:04

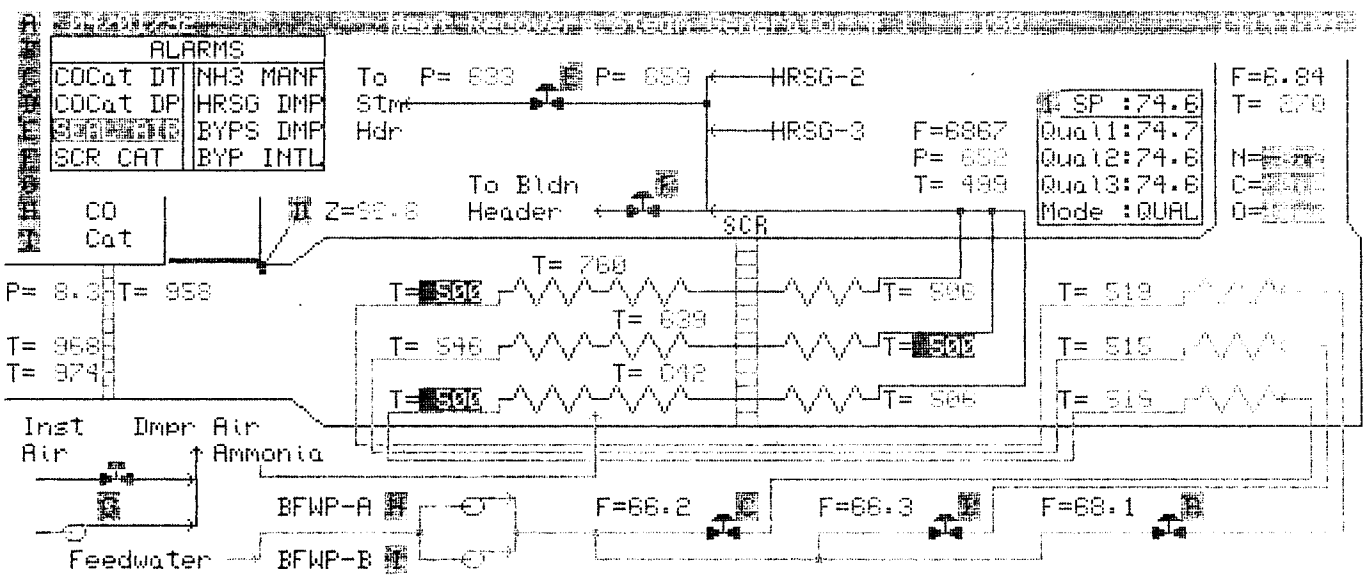

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DIAGRAM NUMBER: 2155 VERSION: 2

DATE: 04/01/92 TIME: 15:06:41

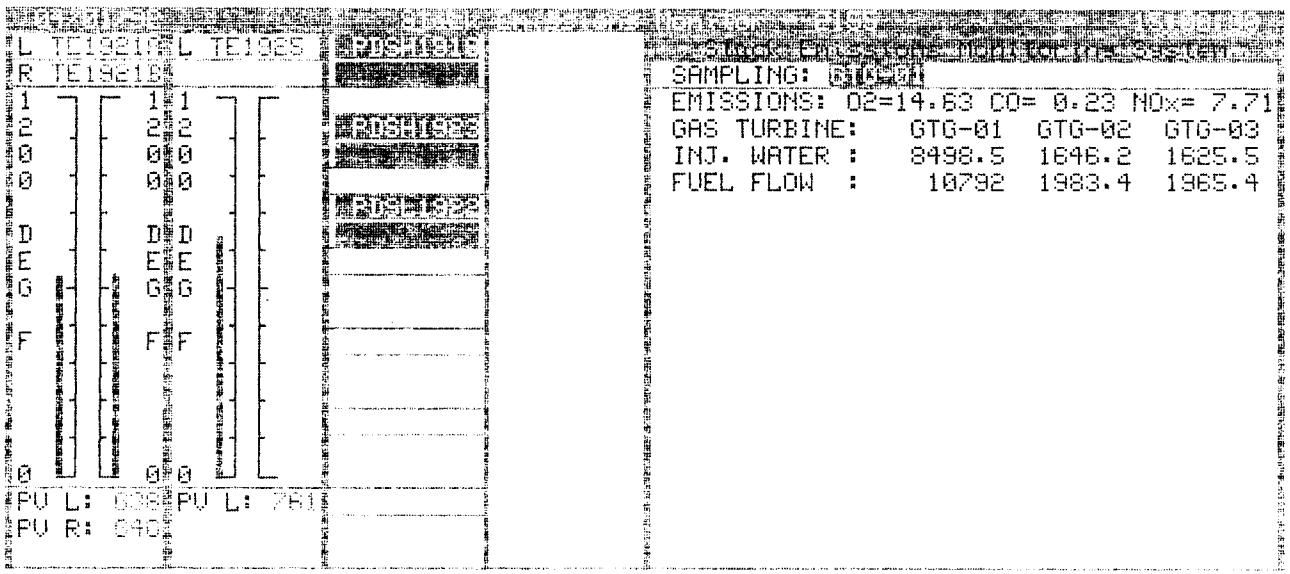

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DIAGRAM NUMBER: 2100 VERSION: 1

DATE: 04/01/92 TIME: 15:08:24

Unit #1

End Run# 8

Fuel Flow=

10,773#/hr

Gas Gen Speed	9537
Pwr Trb Speed	3602
Gen MW Output	21.1
Gen Megavar Out	0.00
Gen Voltage	13.3
Gen Amperage	937
Turb L.O. Press	50.5
Turb L.O. Temp	145
Trb Scv oil Prs	7.0
Gen L.O. Press	29.6
Gen L.O. Temp	140
Fuel Gas Flow	10753
Inj Water Flow	8457
Inj Water Ratio	0.79
Fuel Manfld Prs	287
Inj Manfld Prs	262
Comp Inlet Temp	64.1
Comp Disch Prs	259
Gas Supply Prs	413
Gas Supply Tmp	71.2

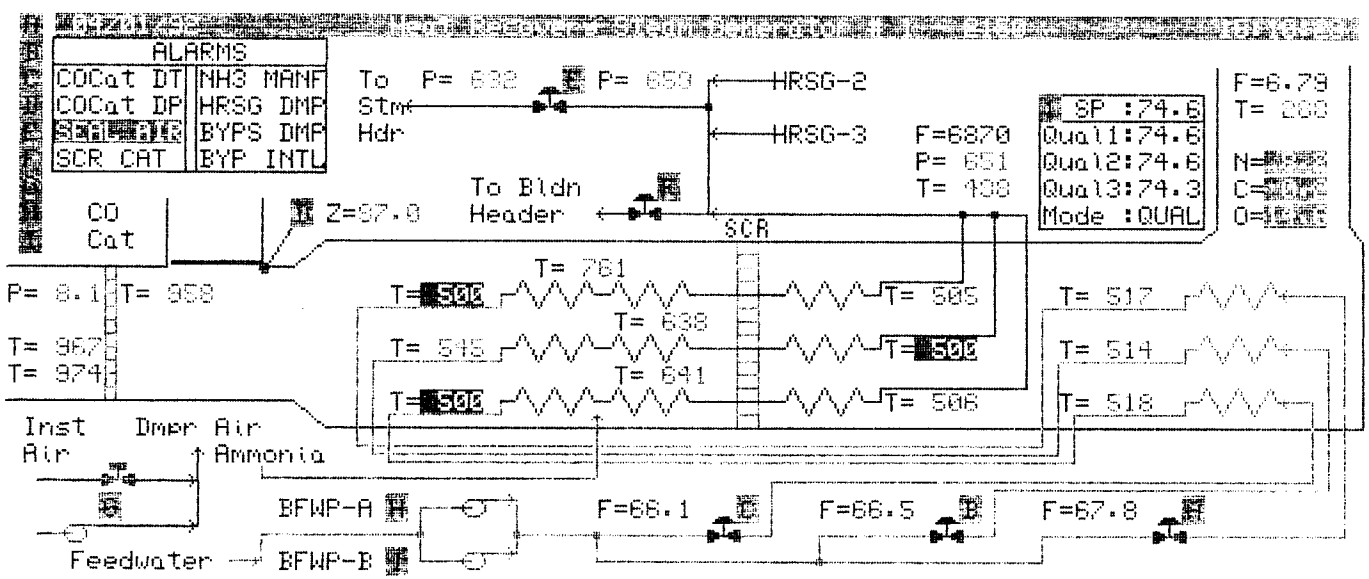
ALARMS & SHUTDOWNS

LOCAL EMER STOP	TURB LOW OIL PRS	STATOR TEMP A1
REMOTE EMER STOP	TURB LOW OIL TMP	STATOR TEMP A2
FIRE	TRB ACC GBOX TMP	STATOR TEMP B1
FAIL TO CRANK	AIR IN FILT D.P.	STATOR TEMP B2
FAIL TO IGNITE	SCV OIL FILT DP	STATOR TEMP C1
FLAME OUT	GEN LOW OIL PRS	STATOR TEMP C2
TURBINE OVERTEMP	GEN LOW OIL TEMP	HALON
GG FAIL TO ACCEL	GEN BRG D.E. TMP	
PT FAIL TO ACCEL	GEN OIL D.E. TMP	TRB ROOM LFL
GAS GEN UNDERSPD	GEN BRG X.E. TMP	GEN ROOM LFL
PWR TRB UNDERSPD	GEN OIL X.E. TMP	120 VOLT BATTERY
VIBRATN SYS MALF	SUMP A SCAV TEMP	24 VOLT BATTERY
FUEL GAS PRS HI	SUMP B SCAV TEMP	START SYS SUMMRY
GOVERNOR SYSTEM	SUMP C SCAV TEMP	UPS FAILURE
TRBN LOCKOUT RLY	SUMP D SCAV TEMP	AC OIL PUMP FAIL
HIGH VIBRATION	GEN ENCL AIR TEMP	DC OIL PUMP FAIL
GAS GEN OVERSPD	TRB ENCL AIR TEMP	AUX OIL PUMP
PWR TRB OVERSPD	GEN AIR OUT TEMP	GEN FAIL TO SYNC
START OVER TEMP	EXCITR AIR TEMP	UTIL FAIL SYNC

COPY IN PROGRESS

DIAGRAM NUMBER: 2150 VERSION: 3

DATE: 04/01/92 TIME: 15:10:32



COPY IN PROGRESS

Shell Western E & P - S. E. Kern River - Enhanced Recovery Oil Field Support Facility 7:30:01 Wednesday April 1, 1992

7:44:50 Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

	CO							NOx							mmbtu/hr			
	ppm		lbs/	lb/hr			O2	ppm		lb/hr			lb/	turbine		water	injection
unit	uncorr	corr	mmbtu	15 min	1-hr	2-hr	pct	uncorr	corr	15 min	1-hr	2-hr	mmbtu	gas	oil	#/hr	ratio
1	0	0	0.00	0.00	0.00	0.00	14.7	6	7	6.19	5.48	5.69	0.03	227.06	0.00	7332.2	0.74
2	4	5	0.01	0.47	0.48	0.49	15.0	27	27	4.63	4.60	4.61	0.10	46.17	0.00	1672.3	0.83
3	5	6	0.01	0.57	0.58	0.58	15.2	28	29	4.86	4.92	4.93	0.11	45.33	0.00	1617.2	0.82

7:59:50 Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

	CO							NOx							mmbtu/hr			
	ppm		lbs/	lb/hr			O2	ppm		lb/hr			lb/	turbine		water	injection
unit	uncorr	corr	mmbtu	15 min	1-hr	2-hr	pct	uncorr	corr	15 min	1-hr	2-hr	mmbtu	gas	oil	#/hr	ratio
1	0	0	0.00	0.00	0.00	0.00	14.7	8	8	6.49	5.93	5.77	0.03	227.25	0.00	7377.8	0.74
2	5	5	0.01	0.49	0.48	0.49	15.0	27	27	4.58	4.60	4.61	0.10	45.97	0.00	1665.5	0.83
3	6	6	0.01	0.60	0.58	0.58	15.2	28	29	4.81	4.88	4.92	0.11	45.18	0.00	1618.9	0.82

8:01:20 START: calibration analyzers
8:07:10 Aanlyzer calibration for units 1-2-3

Readings in ppm (pct for O2) span ratio to nominal, zero difference from nominal in pct FS

			span				zero			
gas	rdng1	rdng2	ratio	drift	limit	xcs	diff	drift	limit	xcs
O2	14.8	-0.0	0.998	0.13	1.2		0.038	-0.04	1.2	
CO	25.8	1.1	1.229	-0.59	2.5		-1.345	-0.11	1.2	
NOX	0.2	63.8	0.949	-0.23	1.2		-0.209	0.04	1.2	

8:07:17 STOP: calibration analyzers
8:29:50 Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

	CO							NOx							mmbtu/hr			
	ppm		lbs/	lb/hr			O2	ppm		lb/hr			lb/	turbine		water	injection
unit	uncorr	corr	mmbtu	15 min	1-hr	2-hr	pct	uncorr	corr	15 min	1-hr	2-hr	mmbtu	gas	oil	#/hr	ratio

Shell Western E & P - S. E. Kern River - Enhanced Recovery Oil Field Support Facility 8:29:57 Wednesday, April 1, 1992

unit	CO ppm uncorr	CO ppm corr	CO lbs/mmbtu	CO lb/hr 15 min	CO lb/hr 1-hr	CO lb/hr 2-hr	O2 pct	NOx ppm uncorr	NOx ppm corr	NOx lb/hr 15 min	NOx lb/hr 1-hr	NOx lb/hr 2-hr	NOx lb/mmbtu	mmbtu/hr turbine gas	mmbtu/hr turbine oil	water #/hr	injection ratio
1	0	0	0.00	0.00	0.00	0.00	14.7	8	8	6.69	6.46	5.85	0.03	228.14	0.00	7445.7	0.73
2	5	5	0.01	0.50	0.49	0.49	15.0	27	27	4.55	4.59	4.60	0.10	45.86	0.00	1657.8	0.83
3	6	6	0.01	0.60	0.59	0.59	15.2	27	28	4.67	4.78	4.87	0.10	45.14	0.00	1619.2	0.82

8:44:50 Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

unit	CO ppm uncorr	CO ppm corr	CO lbs/mmbtu	CO lb/hr 15 min	CO lb/hr 1-hr	CO lb/hr 2-hr	O2 pct	NOx ppm uncorr	NOx ppm corr	NOx lb/hr 15 min	NOx lb/hr 1-hr	NOx lb/hr 2-hr	NOx lb/mmbtu	mmbtu/hr turbine gas	mmbtu/hr turbine oil	water #/hr	injection ratio
1	0	0	0.00	0.00	0.00	0.00	14.7	9	8	6.88	6.69	6.00	0.03	228.47	0.00	7467.0	0.75
2	5	5	0.01	0.52	0.50	0.49	15.0	26	27	4.44	4.53	4.57	0.10	45.85	0.00	1662.3	0.83
3	6	6	0.01	0.59	0.60	0.59	15.2	27	28	4.66	4.71	4.83	0.10	45.18	0.00	1618.8	0.82

8:59:50 Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

unit	CO ppm uncorr	CO ppm corr	CO lbs/mmbtu	CO lb/hr 15 min	CO lb/hr 1-hr	CO lb/hr 2-hr	O2 pct	NOx ppm uncorr	NOx ppm corr	NOx lb/hr 15 min	NOx lb/hr 1-hr	NOx lb/hr 2-hr	NOx lb/mmbtu	mmbtu/hr turbine gas	mmbtu/hr turbine oil	water #/hr	injection ratio
1	0	0	0.00	0.00	0.00	0.00	14.7	8	8	6.37	6.65	6.24	0.03	229.12	0.00	7323.9	0.75
2	5	5	0.01	0.48	0.50	0.49	15.0	27	27	4.50	4.50	4.56	0.10	45.82	0.00	1656.9	0.83
3	6	6	0.01	0.60	0.60	0.59	15.2	28	29	4.71	4.68	4.79	0.10	45.21	0.00	1620.0	0.82

9:14:50 Emissions and Performance

RA Testing
Begin Run #1

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

unit	CO ppm uncorr	CO ppm corr	CO lbs/mmbtu	CO lb/hr 15 min	CO lb/hr 1-hr	CO lb/hr 2-hr	O2 pct	NOx ppm uncorr	NOx ppm corr	NOx lb/hr 15 min	NOx lb/hr 1-hr	NOx lb/hr 2-hr	NOx lb/mmbtu	mmbtu/hr turbine gas	mmbtu/hr turbine oil	water #/hr	injection ratio
1	0	0	0.00	0.00	0.00	0.00	14.7	8	8	6.34	6.57	6.40	0.03	229.15	0.00	7507.2	0.75
2	5	5	0.01	0.49	0.50	0.49	15.0	27	27	4.49	4.49	4.54	0.10	45.81	0.00	1659.2	0.83

unit	CO ppm uncorr	CO ppm corr	CO lbs/mmbtu	CO lb/hr 15 min	CO lb/hr 1-hr	CO lb/hr 2-hr	O2 pct	NOx ppm uncorr	NOx ppm corr	NOx lb/hr 15 min	NOx lb/hr 1-hr	NOx lb/hr 2-hr	NOx lb/mmbtu	mmbtu/hr turbine gas	mmbtu/hr turbine oil	water #/hr	injection ratio
1	0	0	0.00	0.00	0.00	0.00	14.7	8	8	6.34	6.57	6.40	0.03	229.15	0.00	7507.2	0.75
2	5	5	0.01	0.49	0.50	0.49	15.0	27	27	4.49	4.49	4.54	0.10	45.81	0.00	1659.7	0.83
3	6	6	0.01	0.57	0.59	0.58	15.1	28	28	4.70	4.68	4.77	0.10	45.23	0.00	1617.5	0.82

9:29:50

Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

O_2 = 14.7%
NO_x = 8 ppm, 6.34 #/hr
CO = 0 ppm, 0.00 #/hr

End Run #1

Shell Western E & P - S. E. Kern River - Enhanced Recovery Oil Field Support Facility 9:29:53 Wednesday April 1, 1992

unit	CO ppm uncorr	CO ppm corr	CO lbs/mmbtu	CO lb/hr 15 min	CO lb/hr 1-hr	CO lb/hr 2-hr	O2 pct	NOx ppm uncorr	NOx ppm corr	NOx lb/hr 15 min	NOx lb/hr 1-hr	NOx lb/hr 2-hr	NOx lb/mmbtu	mmbtu/hr turbine gas	mmbtu/hr turbine oil	water #/hr	injection ratio
1	0	0	0.00	0.00	0.00	0.00	14.7	8	8	6.44	6.51	6.49	0.03	229.43	0.00	7551.1	0.75
2	5	5	0.01	0.47	0.49	0.49	15.0	26	26	4.43	4.46	4.52	0.10	45.85	0.00	1659.6	0.83
3	5	6	0.01	0.57	0.58	0.59	15.2	28	29	4.76	4.71	4.74	0.11	45.23	0.00	1618.8	0.82

9:44:50

Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

unit	CO ppm uncorr	CO ppm corr	CO lbs/mmbtu	CO lb/hr 15 min	CO lb/hr 1-hr	CO lb/hr 2-hr	O2 pct	NOx ppm uncorr	NOx ppm corr	NOx lb/hr 15 min	NOx lb/hr 1-hr	NOx lb/hr 2-hr	NOx lb/mmbtu	mmbtu/hr turbine gas	mmbtu/hr turbine oil	water #/hr	injection ratio
1	0	0	0.00	0.00	0.00	0.00	14.7	8	8	6.54	6.42	6.34	0.03	229.92	0.00	7561.3	0.75
2	5	5	0.01	0.48	0.48	0.49	15.0	26	26	4.41	4.46	4.49	0.10	45.86	0.00	1662.0	0.83
3	6	6	0.01	0.58	0.58	0.59	15.2	28	29	4.77	4.73	4.72	0.11	45.38	0.00	1621.4	0.82

Begin Run #2

9:59:50

Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

unit	CO ppm uncorr	CO ppm corr	CO lbs/mmbtu	CO lb/hr 15 min	CO lb/hr 1-hr	CO lb/hr 2-hr	O2 pct	NOx ppm uncorr	NOx ppm corr	NOx lb/hr 15 min	NOx lb/hr 1-hr	NOx lb/hr 2-hr	NOx lb/mmbtu	mmbtu/hr turbine gas	mmbtu/hr turbine oil	water #/hr	injection ratio
1	0	0	0.00	0.00	0.00	0.00	14.6	8	7	6.17	6.37	6.49	0.03	230.28	0.00	7600.0	0.75
2	5	5	0.01	0.48	0.48	0.49	15.0	26	27	4.45	4.44	4.47	0.10	45.88	0.00	1655.8	0.83
3	6	6	0.01	0.59	0.58	0.59	15.2	28	28	4.70	4.73	4.71	0.10	45.23	0.00	1624.3	0.82

10:29:50 Emissions and Performance

Shell Western E & P - S. E. Kern River - Enhanced Recovery Oil Field Support Facility 10:29:51 Wednesday, April 1, 1992

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

O_2 = 14.65%
NO_x = 8 ppm, 6.02 #/hr
CO = 0 ppm, 0.00 #/hr

	CO							NOx						mmbtu/hr			
	ppm		lbs/	lb/hr			O2	ppm		lb/hr			lb/	turbine		water	injection
unit	uncorr	corr	mmbtu	15 min	1-hr	2-hr	pct	uncorr	corr	15 min	1-hr	2-hr	mmbtu	gas	oil	#/hr	ratio
1	0	0	0.00	0.00	0.00	0.00	14.7	7	7	5.86	6.30	6.40	0.03	229.22	0.00	7519.3	0.75
2	4	4	0.01	0.45	0.47	0.48	15.0	27	27	4.46	4.43	4.45	0.10	45.65	0.00	1652.8	0.83
3	5	6	0.01	0.57	0.58	0.58	15.2	27	28	4.65	4.69	4.70	0.10	45.11	0.00	1627.6	0.83

End Run #2

10:44:50 Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

	CO							NOx						mmbtu/hr			
	ppm		lbs/	lb/hr			O2	ppm		lb/hr			lb/	turbine		water	injection
unit	uncorr	corr	mmbtu	15 min	1-hr	2-hr	pct	uncorr	corr	15 min	1-hr	2-hr	mmbtu	gas	oil	#/hr	ratio
1	0	0	0.00	0.00	0.00	0.00	14.7	8	7	6.20	6.22	6.32	0.03	234.54	0.00	7769.7	0.76
2	5	5	0.01	0.48	0.47	0.48	15.0	26	26	4.37	4.42	4.44	0.10	45.65	0.00	1651.3	0.83
3	6	6	0.01	0.57	0.58	0.58	15.2	27	28	4.65	4.67	4.70	0.10	45.08	0.00	1628.4	0.83

10:59:50 Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

	CO							NOx						mmbtu/hr			
	ppm		lbs/	lb/hr			O2	ppm		lb/hr			lb/	turbine		water	injection
unit	uncorr	corr	mmbtu	15 min	1-hr	2-hr	pct	uncorr	corr	15 min	1-hr	2-hr	mmbtu	gas	oil	#/hr	ratio
1	0	0	0.00	0.00	0.00	0.00	14.4	9	8	7.21	6.48	6.43	0.03	247.18	0.00	8554.1	0.79
2	5	5	0.01	0.47	0.47	0.47	15.0	27	27	4.45	4.42	4.43	0.10	45.59	0.00	1647.8	0.83
3	6	6	0.01	0.57	0.57	0.58	15.2	27	28	4.64	4.65	4.69	0.10	44.91	0.00	1624.3	0.83

11:14:50 Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

CO ---------- NOx ---------- mmbtu/hr

unit	uncorr	corr	mmbtu	15 min	1-hr	2-hr	pct	uncorr	corr	15 min	1-hr	2-hr	mmbtu	gas	oil	#/hr	ratio
1	0	0	0.00	0.00	0.00	0.00	14.7	7	7	5.86	6.30	6.40	0.03	229.22	0.00	7519.3	0.75
2	4	4	0.01	0.45	0.47	0.48	15.0	27	27	4.46	4.43	4.45	0.10	45.65	0.00	1652.8	0.83
3	5	6	0.01	0.57	0.58	0.58	15.2	27	28	4.65	4.69	4.70	0.10	45.11	0.00	1627.6	0.83

10:44:50

Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

	CO							NOx						mmbtu/hr turbine			
	ppm		lbs/	lb/hr			O2	ppm		lb/hr			lb/			water	injection
unit	uncorr	corr	mmbtu	15 min	1-hr	2-hr	pct	uncorr	corr	15 min	1-hr	2-hr	mmbtu	gas	oil	#/hr	ratio
1	0	0	0.00	0.00	0.00	0.00	14.7	8	7	6.20	6.22	6.32	0.03	234.54	0.00	7769.7	0.76
2	5	5	0.01	0.48	0.47	0.48	15.0	26	26	4.37	4.42	4.44	0.10	45.65	0.00	1651.3	0.83
3	6	6	0.01	0.57	0.58	0.58	15.2	27	28	4.65	4.67	4.70	0.10	45.08	0.00	1629.4	0.83

Begin Run #3

10:59:50

Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

	CO							NOx						mmbtu/hr turbine			
	ppm		lbs/	lb/hr			O2	ppm		lb/hr			lb/			water	injection
unit	uncorr	corr	mmbtu	15 min	1-hr	2-hr	pct	uncorr	corr	15 min	1-hr	2-hr	mmbtu	gas	oil	#/hr	ratio
1	0	0	0.00	0.00	0.00	0.00	14.4	9	8	7.21	6.48	6.43	0.03	247.18	0.00	8534.1	0.79
2	5	5	0.01	0.47	0.47	0.47	15.0	27	27	4.45	4.42	4.43	0.10	45.59	0.00	1647.8	0.83
3	6	6	0.01	0.57	0.57	0.58	15.2	27	28	4.64	4.65	4.69	0.10	44.91	0.00	1624.3	0.83

O_2 = 14.4%
NO_x = 9ppm, 7.06 #/hr
CO = 0 ppm, 0.00 #/hr

11:14:50

Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

	CO							NOx						mmbtu/hr turbine			
	ppm		lbs/	lb/hr			O2	ppm		lb/hr			lb/			water	injection
unit	uncorr	corr	mmbtu	15 min	1-hr	2-hr	pct	uncorr	corr	15 min	1-hr	2-hr	mmbtu	gas	oil	#/hr	ratio
1	0	0	0.00	0.00	0.00	0.00	14.4	8	8	6.91	6.55	6.50	0.03	246.61	0.00	8507.6	0.79
2	5	5	0.01	0.48	0.47	0.47	15.0	26	26	4.36	4.41	4.41	0.10	45.58	0.00	1654.5	0.83
3	5	6	0.01	0.57	0.57	0.57	15.2	27	28	4.64	4.64	4.68	0.10	44.92	0.00	1623.1	0.83

End Run #3

Shell Western E & P - S. E. Kern River - Enhanced Recovery Oil Field Support Facility 11:15:01 Wednesday, April 1, 1992

11:29:50

Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

	CO							NOx						mmbtu/hr			
	ppm		lbs/	lb/hr			O2	ppm		lb/hr			lb/	turbine		water	injection
unit	uncorr	corr	mmbtu	15 min	1-hr	2-hr	pct	uncorr	corr	15 min	1-hr	2-hr	mmbtu	gas	oil	#/hr	ratio
1	0	0	0.00	0.00	0.00	0.00	14.4	9	8	6.97	6.82	6.56	0.03	247.16	0.00	8505.3	0.79
2	4	4	0.01	0.46	0.47	0.47	15.0	27	27	4.45	4.41	4.42	0.10	45.60	0.00	1646.5	0.83
3	5	6	0.01	0.57	0.57	0.58	15.2	27	28	4.60	4.63	4.66	0.10	44.96	0.00	1626.0	0.83

Begin Run #4

11:44:50

Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

	CO							NOx						mmbtu/hr			
	ppm		lbs/	lb/hr			O2	ppm		lb/hr			lb/	turbine		water	injection
unit	uncorr	corr	mmbtu	15 min	1-hr	2-hr	pct	uncorr	corr	15 min	1-hr	2-hr	mmbtu	gas	oil	#/hr	ratio
1	0	0	0.00	0.00	0.00	0.00	14.3	8	7	6.31	6.85	6.83	0.03	247.49	0.00	8552.6	0.79
2	5	5	0.01	0.48	0.47	0.47	15.0	26	26	4.38	4.41	4.41	0.10	45.64	0.00	1653.7	0.83
3	5	6	0.01	0.56	0.57	0.57	15.2	27	28	4.60	4.62	4.64	0.10	44.96	0.00	1622.2	0.83

O_2 = 14.35%
NO_x = 8 ppm, 6.34 #/hr
CO = 0 ppm, 0.00 #/hr

11:59:50

Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

	CO							NOx						mmbtu/hr			
	ppm		lbs/	lb/hr			O2	ppm		lb/hr			lb/	turbine		water	injection
unit	uncorr	corr	mmbtu	15 min	1-hr	2-hr	pct	uncorr	corr	15 min	1-hr	2-hr	mmbtu	gas	oil	#/hr	ratio
1	0	0	0.00	0.00	0.00	0.00	14.4	8	7	6.36	6.64	6.56	0.03	247.22	0.00	8564.5	0.79
2	4	4	0.01	0.44	0.46	0.47	15.0	27	27	4.52	4.43	4.42	0.10	45.75	0.00	1652.7	0.83
3	5	6	0.01	0.57	0.57	0.57	15.2	27	28	4.63	4.62	4.63	0.10	45.03	0.00	1621.5	0.82

End Run #4

12:14:50

Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

	CO							NOx						mmbtu/hr			
	ppm		lbs/	lb/hr			O2	ppm		lb/hr			lb/	turbine		water	injection
unit	uncorr	corr	mmbtu	15 min	1-hr	2-hr	pct	uncorr	corr	15 min	1-hr	2-hr	mmbtu	gas	oil	#/hr	ratio

unit	CO ppm uncorr	CO ppm corr	CO lbs/mmbtu	CO lb/hr 15 min	CO lb/hr 1-hr	CO lb/hr 2-hr	O2 pct	NOx ppm uncorr	NOx ppm corr	NOx lb/hr 15 min	NOx lb/hr 1-hr	NOx lb/hr 2-hr	NOx lb/mmbtu	mmbtu/hr turbine gas	mmbtu/hr turbine oil	water #/hr	injection ratio

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1	0	0	0.00	0.00	0.00	0.00	14.4	8	7	6.59	6.56	6.55	0.03	247.50	0.00	8544.1	0.79
2	5	5	0.01	0.46	0.46	0.47	15.0	26	26	4.34	4.42	4.42	0.10	45.61	0.00	1651.8	0.83
3	5	6	0.01	0.57	0.57	0.57	15.2	27	28	4.60	4.61	4.63	0.10	44.96	0.00	1632.3	0.83

12:29:50 Emissions and Performance

Begin Run #5

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

unit	CO ppm uncorr	CO ppm corr	CO lbs/mmbtu	CO lb/hr 15 min	CO lb/hr 1-hr	CO lb/hr 2-hr	O2 pct	NOx ppm uncorr	NOx ppm corr	NOx lb/hr 15 min	NOx lb/hr 1-hr	NOx lb/hr 2-hr	NOx lb/mmbtu	mmbtu/hr turbine gas	mmbtu/hr turbine oil	water #/hr	injection ratio
1	0	0	0.00	0.00	0.00	0.00	14.4	7	7	6.12	6.34	6.58	0.02	247.12	0.00	8533.6	0.79
2	5	5	0.01	0.46	0.47	0.47	15.0	27	27	4.45	4.42	4.41	0.10	45.61	0.00	1645.8	0.83
3	6	6	0.01	0.58	0.57	0.57	15.2	27	28	4.61	4.61	4.62	0.10	45.00	0.00	1623.8	0.83

O_2 = 14.45%
NO_x = 7ppm, 5.81 #/hr
CO = 0ppm, 0.00 #/hr

12:44:50 Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

unit	CO ppm uncorr	CO ppm corr	CO lbs/mmbtu	CO lb/hr 15 min	CO lb/hr 1-hr	CO lb/hr 2-hr	O2 pct	NOx ppm uncorr	NOx ppm corr	NOx lb/hr 15 min	NOx lb/hr 1-hr	NOx lb/hr 2-hr	NOx lb/mmbtu	mmbtu/hr turbine gas	mmbtu/hr turbine oil	water #/hr	injection ratio
1	0	0	0.00	0.00	0.00	0.00	14.5	7	6	5.50	6.14	6.50	0.02	244.36	0.00	8376.0	0.77
2	5	5	0.01	0.47	0.46	0.47	15.0	26	26	4.34	4.41	4.41	0.10	45.52	0.00	1651.0	0.83
3	6	6	0.01	0.57	0.57	0.57	15.2	27	28	4.56	4.60	4.61	0.10	44.87	0.00	1619.2	0.83

End Run #5

12:59:50 Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

unit	CO ppm uncorr	CO ppm corr	CO lbs/mmbtu	CO lb/hr 15 min	CO lb/hr 1-hr	CO lb/hr 2-hr	O2 pct	NOx ppm uncorr	NOx ppm corr	NOx lb/hr 15 min	NOx lb/hr 1-hr	NOx lb/hr 2-hr	NOx lb/mmbtu	mmbtu/hr turbine gas	mmbtu/hr turbine oil	water #/hr	injection ratio
1	0	0	0.00	0.00	0.00	0.00	14.5	7	7	5.94	6.04	6.34	0.02	243.14	0.00	8273.6	0.78
2	4	4	0.01	0.45	0.47	0.47	15.0	27	27	4.45	4.40	4.41	0.10	45.57	0.00	1647.0	0.83
3	6	6	0.01	0.58	0.58	0.57	15.2	27	28	4.63	4.60	4.61	0.10	44.99	0.00	1622.0	0.82

13:14:50 Emissions and Performance

unit	CO ppm uncorr	CO ppm corr	CO lbs/mmbtu	CO lb/hr 15 min	CO lb/hr 1-hr	CO lb/hr 2-hr	O2 pct	NOx ppm uncorr	NOx ppm corr	NOx lb/hr 15 min	NOx lb/hr 1-hr	NOx lb/hr 2-hr	NOx lb/mmbtu	mmbtu/hr turbine gas	mmbtu/hr turbine oil	water #/hr	injection ratio
1	0	0	0.00	0.00	0.00	0.00	14.5	7	7	5.94	6.04	6.34	0.02	243.14	0.00	8293.6	0.78
2	4	4	0.01	0.45	0.47	0.47	15.0	27	27	4.45	4.40	4.41	0.10	45.57	0.00	1647.0	0.83
3	6	6	0.01	0.58	0.58	0.57	15.2	27	28	4.63	4.60	4.61	0.10	44.99	0.00	1622.0	0.82

13:14:50 Emissions and Performance

Begin Run #6

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

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unit	CO ppm uncorr	CO ppm corr	CO lbs/mmbtu	CO lb/hr 15 min	CO lb/hr 1-hr	CO lb/hr 2-hr	O2 pct	NOx ppm uncorr	NOx ppm corr	NOx lb/hr 15 min	NOx lb/hr 1-hr	NOx lb/hr 2-hr	NOx lb/mmbtu	mmbtu/hr turbine gas	mmbtu/hr turbine oil	water #/hr	injection ratio
1	0	0	0.00	0.00	0.00	0.00	14.4	7	7	6.01	5.89	6.22	0.02	244.13	0.00	8354.4	0.78
2	4	4	0.01	0.46	0.46	0.46	15.0	26	26	4.39	4.41	4.42	0.10	45.66	0.00	1652.7	0.83
3	6	6	0.01	0.58	0.58	0.57	15.2	27	28	4.64	4.61	4.61	0.10	44.99	0.00	1617.8	0.82

13:29:50 Emissions and Performance

O_2 = 14.45 %
NO_x = 7 ppm, 5.87 #/hr
CO = 0 ppm, 0.00 #/hr

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

unit	CO ppm uncorr	CO ppm corr	CO lbs/mmbtu	CO lb/hr 15 min	CO lb/hr 1-hr	CO lb/hr 2-hr	O2 pct	NOx ppm uncorr	NOx ppm corr	NOx lb/hr 15 min	NOx lb/hr 1-hr	NOx lb/hr 2-hr	NOx lb/mmbtu	mmbtu/hr turbine gas	mmbtu/hr turbine oil	water #/hr	injection ratio
1	0	0	0.00	0.00	0.00	0.00	14.5	7	6	5.72	5.79	6.07	0.02	244.63	0.00	8375.8	0.78
2	4	4	0.01	0.45	0.46	0.46	15.0	27	27	4.43	4.40	4.41	0.10	45.61	0.00	1647.8	0.83
3	6	6	0.01	0.57	0.58	0.57	15.2	27	28	4.57	4.60	4.60	0.10	45.04	0.00	1631.6	0.82

13:44:50 Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

unit	CO ppm uncorr	CO ppm corr	CO lbs/mmbtu	CO lb/hr 15 min	CO lb/hr 1-hr	CO lb/hr 2-hr	O2 pct	NOx ppm uncorr	NOx ppm corr	NOx lb/hr 15 min	NOx lb/hr 1-hr	NOx lb/hr 2-hr	NOx lb/mmbtu	mmbtu/hr turbine gas	mmbtu/hr turbine oil	water #/hr	injection ratio
1	0	0	0.00	0.00	0.00	0.00	14.4	7	6	5.64	5.83	5.99	0.02	244.96	0.00	8412.3	0.79
2	5	5	0.01	0.47	0.46	0.46	15.0	26	26	4.30	4.39	4.40	0.09	45.63	0.00	1650.3	0.83
3	6	6	0.01	0.58	0.58	0.58	15.2	27	28	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

unit	CO ppm uncorr	CO ppm corr	CO lbs/mmbtu	CO lb/hr 15 min	CO lb/hr 1-hr	CO lb/hr 2-hr	O2 pct	NOx ppm uncorr	NOx ppm corr	NOx lb/hr 15 min	NOx lb/hr 1-hr	NOx lb/hr 2-hr	NOx lb/mmbtu	mmbtu/hr turbine gas	mmbtu/hr turbine oil	water #/hr	injection ratio
1	0	0	0.00	0.00	0.00	0.00	14.4	7	6	5.64	5.83	5.99	0.02	244.76	0.00	8412.3	0.79
2	5	5	0.01	0.47	0.46	0.46	15.0	26	26	4.30	4.39	4.40	0.09	45.65	0.00	1650.5	0.83
3	6	6	0.01	0.58	0.58	0.58	15.2	27	28	4.64	4.62	4.61	0.10	45.00	0.00	1625.3	0.83

Begin Run#7

13:59:50

Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

unit	CO ppm uncorr	CO ppm corr	CO lbs/mmbtu	CO lb/hr 15 min	CO lb/hr 1-hr	CO lb/hr 2-hr	O2 pct	NOx ppm uncorr	NOx ppm corr	NOx lb/hr 15 min	NOx lb/hr 1-hr	NOx lb/hr 2-hr	NOx lb/mmbtu	mmbtu/hr turbine gas	mmbtu/hr turbine oil	water #/hr	injection ratio
1	0	0	0.00	0.00	0.00	0.00	14.4	7	7	5.93	5.83	5.93	0.02	244.70	0.00	8387.0	0.78
2	5	5	0.01	0.46	0.46	0.46	15.0	26	26	4.37	4.37	4.38	0.10	45.53	0.00	1647.6	0.83
3	6	6	0.01	0.58	0.58	0.58	15.2	27	28	4.59	4.61	4.60	0.10	44.95	0.00	1625.5	0.83

O_2 = 14.45%
NO_x = 7ppm, 6.03 #/hr
CO = 0ppm, 0.00 #/hr

14:14:50

Emissions and Performance

Shell Western E & P - S. E. Kern River - Enhanced Recovery Oil Field Support Facility 14:14:51 Wednesday, April 1, 1992

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

unit	CO ppm uncorr	CO ppm corr	CO lbs/mmbtu	CO lb/hr 15 min	CO lb/hr 1-hr	CO lb/hr 2-hr	O2 pct	NOx ppm uncorr	NOx ppm corr	NOx lb/hr 15 min	NOx lb/hr 1-hr	NOx lb/hr 2-hr	NOx lb/mmbtu	mmbtu/hr turbine gas	mmbtu/hr turbine oil	water #/hr	injection ratio
1	0	0	0.00	0.00	0.00	0.00	14.5	7	7	6.12	5.85	5.87	0.03	244.35	0.00	8373.6	0.78
2	5	5	0.01	0.47	0.46	0.46	15.0	26	26	4.35	4.36	4.38	0.10	45.43	0.00	1643.1	0.83
3	6	6	0.01	0.57	0.58	0.58	15.2	27	28	4.54	4.58	4.60	0.10	44.87	0.00	1622.6	0.83

End Run#7

14:29:50

Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

unit	CO ppm uncorr	CO ppm corr	CO lbs/mmbtu	CO lb/hr 15 min	CO lb/hr 1-hr	CO lb/hr 2-hr	O2 pct	NOx ppm uncorr	NOx ppm corr	NOx lb/hr 15 min	NOx lb/hr 1-hr	NOx lb/hr 2-hr	NOx lb/mmbtu	mmbtu/hr turbine gas	mmbtu/hr turbine oil	water #/hr	injection ratio
1	0	0	0.00	0.00	0.00	0.00	14.5	7	7	5.63	5.68	5.84	0.02	244.52	0.00	8390.8	0.78
2	5	5	0.01	0.48	0.47	0.47	15.0	26	26	4.26	4.32	4.36	0.09	45.41	0.00	1639.9	0.83
3	6	6	0.01	0.59	0.58	0.58	15.2	27	28	4.55	4.58	4.59	0.10	44.87	0.00	1627.7	0.83

unit	CO ppm uncorr	CO ppm corr	CO lbs/mmbtu	CO lb/hr 15 min	CO lb/hr 1-hr	CO lb/hr 2-hr	O2 pct	NOx ppm uncorr	NOx ppm corr	NOx lb/hr 15 min	NOx lb/hr 1-hr	NOx lb/hr 2-hr	NOx lb/mmbtu	mmbtu/hr turbine gas	mmbtu/hr turbine oil	water #/hr	injection ratio
1	0	0	0.00	0.00	0.00	0.00	14.5	7	7	5.83	5.88	5.84	0.02	244.52	0.00	8390.8	0.78
2	5	5	0.01	0.48	0.47	0.47	15.0	26	26	4.26	4.32	4.36	0.09	45.41	0.00	1639.9	0.83
3	6	6	0.01	0.59	0.58	0.58	15.2	27	28	4.55	4.58	4.59	0.10	44.87	0.00	1627.7	0.83

Begin Run #8

14:44:50

Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

unit	CO ppm uncorr	CO ppm corr	CO lbs/mmbtu	CO lb/hr 15 min	CO lb/hr 1-hr	CO lb/hr 2-hr	O2 pct	NOx ppm uncorr	NOx ppm corr	NOx lb/hr 15 min	NOx lb/hr 1-hr	NOx lb/hr 2-hr	NOx lb/mmbtu	mmbtu/hr turbine gas	mmbtu/hr turbine oil	water #/hr	injection ratio
1	0	0	0.00	0.00	0.00	0.00	14.5	8	7	6.19	6.02	5.92	0.03	244.77	0.00	8402.0	0.79
2	5	5	0.01	0.48	0.47	0.47	15.0	26	26	4.26	4.31	4.35	0.09	45.37	0.00	1643.5	0.83
3	6	6	0.01	0.57	0.58	0.58	15.2	27	28	4.53	4.55	4.59	0.10	44.80	0.00	1620.3	0.83

14:59:50

Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

unit	CO ppm uncorr	CO ppm corr	CO lbs/mmbtu	CO lb/hr 15 min	CO lb/hr 1-hr	CO lb/hr 2-hr	O2 pct	NOx ppm uncorr	NOx ppm corr	NOx lb/hr 15 min	NOx lb/hr 1-hr	NOx lb/hr 2-hr	NOx lb/mmbtu	mmbtu/hr turbine gas	mmbtu/hr turbine oil	water #/hr	injection ratio
1	0	0	0.00	0.00	0.00	0.00	14.5	7	7	6.02	6.04	5.93	0.02	245.03	0.00	8412.4	0.79
2	5	5	0.01	0.48	0.48	0.47	15.0	26	26	4.33	4.30	4.34	0.10	45.33	0.00	1642.1	0.83
3	6	6	0.01	0.59	0.58	0.58	15.2	27	28	4.55	4.54	4.58	0.10	44.80	0.00	1613.0	0.82

O_2 = 14.5%
NOx = 8 ppm, 6.11 #/hr
CO = 0 ppm, 0.00 #/hr

Shell Western E & P - S. E. Kern River - Enhanced Recovery Oil Field Support Facility 15:00:01 Wednesday April 1, 1992

End Run #8

15:14:50

Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

unit	CO ppm uncorr	CO ppm corr	CO lbs/mmbtu	CO lb/hr 15 min	CO lb/hr 1-hr	CO lb/hr 2-hr	O2 pct	NOx ppm uncorr	NOx ppm corr	NOx lb/hr 15 min	NOx lb/hr 1-hr	NOx lb/hr 2-hr	NOx lb/mmbtu	mmbtu/hr turbine gas	mmbtu/hr turbine oil	water #/hr	injection ratio
1	0	0	0.00	0.00	0.00	0.00	14.4	7	7	5.88	5.98	5.92	0.02	245.00	0.00	8437.6	0.79
2	5	5	0.01	0.46	0.48	0.47	15.1	25	26	4.24	4.27	4.32	0.09	45.29	0.00	1635.8	0.83
3	6	6	0.01	0.60	0.59	0.58	15.1	26	27	4.43	4.52	4.55	0.10	44.80	0.00	1620.2	0.83

15:29:50

Emissions and Performance

Shell Western E & [illegible] - S. E. Kern River - Enhanced Recovery Oil Field Support Facility [illegible]

Start Run #9

15:14:50

Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

	CO							NOx						mmbtu/hr			
	ppm		lbs/	lb/hr			O2	ppm		lb/hr			lb/	turbine		water	injection
unit	uncorr	corr	mmbtu	15 min	1-hr	2-hr	pct	uncorr	corr	15 min	1-hr	2-hr	mmbtu	gas	oil	$/hr	ratio
1	0	0	0.00	0.00	0.00	0.00	14.4	7	7	5.88	5.98	5.92	0.02	245.00	0.00	8437.6	0.79
2	5	5	0.01	0.46	0.48	0.47	15.1	25	26	4.24	4.27	4.32	0.09	45.29	0.00	1635.8	0.83
3	6	6	0.01	0.60	0.59	0.58	15.1	26	27	4.43	4.52	4.55	0.10	44.80	0.00	1620.2	0.83

15:29:50

Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

	CO							NOx						mmbtu/hr			
	ppm		lbs/	lb/hr			O2	ppm		lb/hr			lb/	turbine		water	injection
unit	uncorr	corr	mmbtu	15 min	1-hr	2-hr	pct	uncorr	corr	15 min	1-hr	2-hr	mmbtu	gas	oil	$/hr	ratio
1	0	0	0.00	0.00	0.00	0.00	14.4	8	7	6.21	6.08	5.98	0.03	244.71	0.00	8399.0	0.79
2	5	5	0.01	0.47	0.47	0.47	15.0	26	26	4.24	4.27	4.29	0.09	45.27	0.00	1641.2	0.83
3	6	6	0.01	0.57	0.58	0.58	15.2	27	28	4.51	4.51	4.54	0.10	44.76	0.00	1616.9	0.83

O_2 = 14.4 %
NO_x = 8 ppm, 6.05 #/hr
CO = 0 ppm, 0.00 #/hr
End Run #9

15:44:50

Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

	CO							NOx							mmbtu/hr			
	ppm		lbs/	lb/hr			O2	ppm		lb/hr			lb/	turbine		water	injection
unit	uncorr	corr	mmbtu	15 min	1-hr	2-hr	pct	uncorr	corr	15 min	1-hr	2-hr	mmbtu	gas	oil	#/hr	ratio
1	0	0	0.00	0.00	0.00	0.00	14.4	7	7	6.10	6.06	6.04	0.02	244.19	0.00	8395.6	0.79
2	5	5	0.01	0.46	0.47	0.47	15.1	26	26	4.29	4.28	4.29	0.10	45.15	0.00	1633.6	0.83
3	6	6	0.01	0.58	0.59	0.58	15.2	27	26	4.52	4.50	4.53	0.10	44.70	0.00	1616.9	0.83

Begin Run #10

15:59:50

Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

	CO							NOx							mmbtu/hr			
	ppm		lbs/	lb/hr			O2	ppm		lb/hr			lb/	turbine		water	injection
unit	uncorr	corr	mmbtu	15 min	1-hr	2-hr	pct	uncorr	corr	15 min	1-hr	2-hr	mmbtu	gas	oil	#/hr	ratio

Shell Western E & P - S. E. Kern River - Enhanced Recovery Oil Field Support Facility 15:59:57 Wednesday April 1, 1992

1	0	0	0.00	0.00	0.00	0.00	14.4	8	7	6.18	6.09	6.07	0.03	244.50	0.00	8403.1	0.79
2	4	5	0.01	0.46	0.47	0.47	15.1	26	27	4.38	4.29	4.29	0.10	45.16	0.00	1635.2	0.83
3	6	6	0.01	0.57	0.58	0.58	15.1	27	28	4.54	4.50	4.52	0.10	44.67	0.00	1611.2	0.82

O_2 = 14.4 %
NOx = 8 ppm, 6.26 #/hr
CO = 0 ppm, 0.00 #/hr

16:14:50

Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

	CO							NOx							mmbtu/hr			
	ppm		lbs/	lb/hr			O2	ppm		lb/hr			lb/	turbine		water	injection
unit	uncorr	corr	mmbtu	15 min	1-hr	2-hr	pct	uncorr	corr	15 min	1-hr	2-hr	mmbtu	gas	oil	#/hr	ratio
1	0	0	0.00	0.00	0.00	0.00	14.4	8	7	6.34	6.21	6.09	0.03	244.35	0.00	8403.0	0.79
2	4	5	0.01	0.46	0.46	0.47	15.1	25	26	4.25	4.29	4.28	0.09	45.13	0.00	1636.7	0.83
3	5	6	0.01	0.55	0.57	0.58	15.2	27	27	4.49	4.51	4.51	0.10	44.69	0.00	1614.0	0.83

End Run #10

16:29:50

Emissions and Performance

NOx gas limit - Turb 1: 13.1 - Turb 2: 8.3 - Turb 3: 8.3
CO gas limit - Turb 1: 6.4 - Turb 2: 5.1 - Turb 3: 5.1

CO NOx mmbtu/hr

CO gas limit - Turb 1: 4.4 - Turb 2: 5.1 - Turb 3: 5.1

	CO							NOx						mmbtu/hr turbine		water	injection
	ppm		lbs/	lb/hr			O2	ppm		lb/hr			lb/				
unit	uncorr	corr	mmbtu	15 min	1-hr	2-hr	pct	uncorr	corr	15 min	1-hr	2-hr	mmbtu	gas	oil	#/hr	ratio
1	0	0	0.00	0.00	0.00	0.00	14.4	8	7	6.26	6.22	6.15	0.03	243.81	0.00	8351.0	0.78
2	5	5	0.01	0.47	0.46	0.47	15.0	26	26	4.27	4.30	4.28	0.09	45.10	0.00	1627.4	0.83
3	6	6	0.01	0.57	0.57	0.58	15.1	27	28	4.51	4.51	4.51	0.10	44.66	0.00	1610.1	0.82

SECTION 8

QUALITY ASSURANCE

SECTION 8
QUALITY ASSURANCE

This report has been reviewed for technical and editorial quality and for compliance with project requirements.

The analyzers employed for continuous monitoring of NO_x, CO, CO_2, and O_2 were California Air Resources Board (CARB) approved instruments. Sampling system bias checks of the continuous monitor sampling system was performed using either the EPA protocol 1 or NIST certified calibration gases (certificate copies included). All other checks of the continuous monitor system required by the regulatory agency methodology were also performed.

All field samples were labeled and logged in on a chain-of-custody sheet. Chain-of-custody sheets remained with samples and documented sample movement.

SAMPLE SYSTEM BIAS CHECK

COMPANY SWEPI-SEKR

DATE 3-31-92

TEST LOCATION HRSG UNIT 2&3

OPERATOR JP

Parameter	Instrument Full Scale	Span Gas Value	Scale	Internal Response	System Response	Percent Difference
O2	0-25%		Zero	.05		
		13.99	Upscale	14.03	13.85	1.28
CO2	0-20%		Zero	0.0		
		8.22	Upscale	8.22	8.16	.73
NOx	0-100ppm		Zero	0.0		
		43.8	Upscale	43.0	42.8	.47
CO	0-10ppm		Zero	0.0		
		8.83	Upscale	8.8	8.7	1.14
SO2			Zero			
			Upscale			
HC			Zero			
			Upscale			
			Zero			
			Upscale			

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

✓ For Kern County :
Percent Difference = [(Internal Response – System Response) / Internal Response] x 100

SAMPLE SYSTEM BIAS CHECK

COMPANY SWEPI - SEKR

DATE 4-1-92

TEST LOCATION HRSG UNIT 1

OPERATOR JP & CM

Parameter	Instrument Full Scale	Span Gas Value	Scale	Internal Response	System Response	Percent Difference
O2	0-25%		Zero	0.0		
		13.99	Upscale	13.99	13.75	1.72
CO2	0-20%		Zero	0.0		
		8.22	Upscale	8.22	8.22	0
NOx	0-25 ppm		Zero	0.0		-
		23.25	Upscale	23.25	23.05	.86
CO	0-20 ppm		Zero	0.0		
		12.00	Upscale	12.00	12.2	-1.67
SO2			Zero			
			Upscale			
HC			Zero			
			Upscale			
			Zero			
			Upscale			

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

✓ For Kern County :
Percent Difference = [(Internal Response – System Response) / Internal Response] x 100

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

REPORT OF ANALYSIS
EPA PROTOCOL GAS MIXTURES

ENSI01

TO:

NIK NIELSEN
ENGINEERING SCIENCES, INC.
P.O. BOX 2007
IRWINDALE, CA 91706

DATE : 12/23/91

CUSTOMER ORDER NUMBER: V: NICK NIELSEN

PAGE 1

COMPONENT	CONCENTRATION (v/v)	REFERENCE STANDARD	ANALYZER MAKE, MODEL, S/N, DETECTION	EXPIRATION DATE	REPLICATE ANALYSIS DATA	
CYLINDER NO.:	CC104249					
Nitric Oxide	43.8 ± 0.4 ppm	GMIS	Monitor Labs Model 8440		12/12/91	12/19/91
		Cylinder #	S/N 136	06/19/93	43.6 ppm	43.8 ppm
Nitrogen, O2-Free Balance		CC99513	Continuous		43.9 ppm	43.7 ppm
Cylinder Pressure: 2000 psig		@ 49.1 ppm	Chemiluminescence		43.8 ppm	43.8 ppm
			Last Cal Date: 11/25/91	Mean:	43.8 ppm	43.8 ppm

ppm = umole/mole % = mole-%

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

Analyst: B.E. Gross

Approved: J.T. Marrin

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

STANDARD CALIBRATION GASES IN ALUMINUM CYLINDERS

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

REPORT OF ANALYSIS
EPA PROTOCOL GAS MIXTURES

ENSI01

TO:

DATE : 10/04/91

D.J. WYMAN
ENGINEEERING SCIENCES, INC.
P.O. BOX 2007
IRWINDALE, CA 91706

CUSTOMER ORDER NUMBER: FI-1216-24

PAGE 1

COMPONENT	CONCENTRATION(v/v)	REFERENCE STANDARD	ANALYZER MAKE,MODEL,S/N,DETECTION	EXPIRATION DATE	REPLICATE ANALYSIS DATA	
CYLINDER NO.:	CC60282					
			Varian Model 1860		10/01/91	
Oxygen	13.99 ± 0.14 %	GMIS	S/N None	04/01/93	13.99 %	
		Cylinder #	Thermal Conductivity		13.98 %	
		CC12233	Gas Chromatography		13.98 %	
		@ 23.89 %	Last Cal Date: 10/04/91	Mean:	13.99 %	
			Varian Model 1860		10/03/91	
Carbon Dioxide	8.22 ± 0.08 %	GMIS	S/N None	04/03/93	8.21 %	
		Cylinder #	Thermal Conductivity		8.21 %	
Nitrogen	Balance	CC60263	Gas Chromatography		8.23 %	
Cylinder Pressure: 2000 psig		@ 17.60 %	Last Cal Date: 08/21/91	Mean:	8.22 %	
CYLINDER NO.:	CC192					
			Monitor Labs Model 8440		09/24/91	10/01/91
Nitric Oxide	89.9 ± 0.9 ppm	GMIS	S/N 136	04/01/92	89.7 ppm	90.0 ppm
		Cylinder #	Continuous		89.7 ppm	90.1 ppm
		CC88860	Chemiluminescence		89.9 ppm	89.9 ppm
		@ 107.5 ppm	Last Cal Date: 09/07/91	Mean:	89.8 ppm	90.0 ppm
			Carle Insts Model 8000		09/19/91	10/03/91
Carbon Monoxide	47.4 ± 0.5 ppm	GMIS	S/N 8249	04/03/92	47.0 ppm	47.7 ppm
		Cylinder #	Methanation/FID		47.4 ppm	47.1 ppm
Nitrogen,O2-Free	Balance	CC12564	Gas Chromatography		47.4 ppm	47.7 ppm
Cylinder Pressure: 2000 psig		@ 42.4 ppm	Last Cal Date: 07/19/91	Mean:	47.3 ppm	47.5 ppm

ppm = umole/mole % = mole-%

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

Analyst: Mark Monson
M.J. Monson

Approved:
J.T. Marrin

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

STANDARD CALIBRATION GASES IN ALUMINUM CYLINDERS

REPORT OF ANALYSIS

CUSTOMER ORDER NUMBER: FI-1144-26

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COMPONENT	CONCENTRATION(v/v)	REFERENCE STANDARD	ANALYZER MAKE,MODEL,S/N,DETECTION	EXPIRATION DATE	REPLICATE ANALYSIS DATA	
CYLINDER NO.: CC12823						
			Carle Insts Model 8000		03/25/91	04/02/91
Carbon Monoxide	8.83 ± 0.18 ppm	GMIS	S/N 8249	10/02/92	8.89 ppm	8.80 ppm
		Cylinder #	Methanation/FID		8.86 ppm	8.79 ppm
Nitrogen	Balance	CC163	Gas Chromatography		8.80 ppm	8.82 ppm
Cylinder Pressure: 2000 psig		@ 9.85 ppm	Last Cal Date: 04/16/91	Mean:	8.85 ppm	8.80 ppm
CYLINDER NO.: CC56894						
			Monitor Labs Model 8440		03/26/91	04/02/91
Nitric Oxide	9.29 ± 0.19 ppm	GMIS	S/N 136	10/02/91	9.27 ppm	9.27 ppm
		Cylinder #	Continuous		9.28 ppm	9.29 ppm
Nitrogen,O2-Free Balance		CC7305	Chemiluminescence		9.34 ppm	9.28 ppm
Cylinder Pressure: 2000 psig		@ 10.03 ppm	Last Cal Date: 01/31/91	Mean:	9.30 ppm	9.28 ppm
CYLINDER NO.: CC28278						
			Monitor Labs Model 8440		03/26/91	04/02/91
Nitric Oxide	13.17 ± 0.26 ppm	GMIS	S/N 136	10/02/91	13.21 ppm	13.14 ppm
		Cylinder #	Continuous		13.15 ppm	13.18 ppm
		CC28863	Chemiluminescence		13.23 ppm	13.08 ppm
		@ 19.31 ppm	Last Cal Date: 01/31/91	Mean:	13.20 ppm	13.13 ppm
			Carle Insts Model 8000		03/27/91	04/03/91
Carbon Monoxide	13.05 ± 0.26 ppm	GMIS	S/N 8249	10/03/91	13.16 ppm	13.04 ppm
		Cylinder #	Methanation/FID		13.02 ppm	13.02 ppm
Nitrogen,O2-Free Balance		CC12168	Gas Chromatography		12.94 ppm	13.08 ppm
Cylinder Pressure: 2000 psig		@ 17.79 ppm	Last Cal Date: 04/16/91	Mean:	13.04 ppm	13.05 ppm

ppm = umole/mole   % = mole-%

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

REPORT OF ANALYSIS

CUSTOMER ORDER NUMBER: VERBAL C.HOLT

COMPONENT	CONCENTRATION(v/v)	REFERENCE STANDARD	ANALYZER MAKE,MODEL,S/N,DETECTION	EXPIRATION DATE	REPLICATE ANALYSIS DATA
CYLINDER NO.: CC12333					
			Varian Model 186Ø		Ø9/16/91
Oxygen	2.95Ø ± Ø.Ø3Ø %	GMIS	S/N None	Ø3/16/93	2.956 %
		Cylinder #	Thermal Conductivity		2.935 %
		CC81219	Gas Chromatography		2.96Ø %
		@ 5.12 %	Last Cal Date: 1Ø/Ø4/91		Mean: 2.95Ø %
			Varian Model 186Ø		Ø9/Ø9/91
Carbon Dioxide	2.74Ø ± Ø.Ø27 %	GMIS	S/N None	Ø3/Ø9/93	2.738 %
		Cylinder #	Thermal Conductivity		2.738 %
Nitrogen	Balance	CC28297	Gas Chromatography		2.743 %
Cylinder Pressure: 2ØØØ psig		@ 7.4Ø %	Last Cal Date: Ø8/21/91		Mean: 2.74Ø %
CYLINDER NO.: CC81147					
			Varian Model 186Ø		Ø9/16/91
Oxygen	3.ØØ ± Ø.Ø3 %	GMIS	S/N None	Ø3/16/93	2.983 %
		Cylinder #	Thermal Conductivity		3.ØØ %
		CC81219	Gas Chromatography		3.Ø3 %
		@ 5.12 %	Last Cal Date: 1Ø/Ø4/91		Mean: 3.ØØ %
			Varian Model 186Ø		Ø9/Ø9/91
Carbon Dioxide	2.811 ± Ø.Ø28 %	GMIS	S/N None	Ø3/Ø9/93	2.811 %
		Cylinder #	Thermal Conductivity		2.8ØØ %
Nitrogen	Balance	CC28297	Gas Chromatography		2.815 %
Cylinder Pressure: 2ØØØ psig		@ 7.4Ø %	Last Cal Date: Ø8/21/91		Mean: 2.811 %
CYLINDER NO.: CC67257					
			Varian Model 186Ø		Ø9/17/91
Oxygen	2Ø.9Ø ± Ø.21 %	GMIS	S/N None	Ø3/17/93	2Ø.95 %
		Cylinder #	Thermal Conductivity		2Ø.91 %
Ultrazero Air	Balance	CC12233	Gas Chromatography		2Ø.84 %
Cylinder Pressure: 2ØØØ psig		@ 23.89 %	Last Cal Date: 1Ø/Ø4/91		Mean: 2Ø.9Ø %
CYLINDER NO.: CC28515					
			Varian Model 186Ø		Ø9/17/91
Oxygen	2Ø.94 ± Ø.21 %	GMIS	S/N None	Ø3/17/93	2Ø.9Ø %
		Cylinder #	Thermal Conductivity		21.Ø2 %
Ultrazero Air	Balance	CC12233	Gas Chromatography		2Ø.89 %
Cylinder Pressure: 2ØØØ psig		@ 23.89 %	Last Cal Date: 1Ø/Ø4/91		Mean: 2Ø.94 %

ppm = umole/mole   % = mole-%

The above analyses were performed in accordance with EPA-1987 Traceability Protocol # 1, Section 3.Ø.4, Procedure G1.

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

REPORT OF ANALYSIS
EPA PROTOCOL GAS MIXTURES

ENSI01
TO: D.J. WYMAN
ENGINEERING SCIENCE, INC.
6060 N. IRWINDALE AVE.
SUITE J
IRWINDALE, CA 91706-

DATE : 03/05/92

CUSTOMER ORDER NUMBER: NICK NIELSEN

PAGE 1

COMPONENT	CONCENTRATION(v/v)	REFERENCE STANDARD	ANALYZER MAKE,MODEL,S/N,DETECTION	EXPIRATION DATE	REPLICATE ANALYSIS DATA	
CYLINDER NO.:	CC108778					
			Carle Instr Model 8000		02/26/92	03/04/92
Carbon Monoxide	23.36 ± 0.23 ppm	GMIS	S/N 8240	09/04/92	23.67 ppm	23.48 ppm
		Cylinder #	Methanation/FID		23.18 ppm	23.21 ppm
		CC12564	Gas Chromatography		23.36 ppm	23.30 ppm
		@ 42.2 ppm	Last Cal Date: 01/29/92	Mean:	23.48 ppm	23.31 ppm
			Monitor Labs Model 8440		02/26/92	03/04/92
Nitric Oxide	23.25 ± 0.23 ppm	GMIS	S/N 126	09/04/92	23.28 ppm	23.22 ppm
		Cylinder #	Continuous		23.17 ppm	23.15 ppm
Nitrogen,O2-Free Balance		CC12981	Chemiluminescence		23.36 ppm	23.33 ppm
Cylinder Pressure: 2000 psig		@ 21.43 ppm	Last Cal Date: 02/28/92	Mean:	23.27 ppm	23.23 ppm

ppm = umole/mole % = mole-%

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

Analyst: B.E. Gross

Approved: J.T. Marrin

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

STANDARD CALIBRATION GASES IN ALUMINUM CYLINDERS

REPORT OF ANALYSIS

CUSTOMER ORDER NUMBER: V: N. NIELSEN

COMPONENT	CONCENTRATION(v/v)	REFERENCE STANDARD	ANALYZER MAKE,MODEL,S/N,DETECTION	EXPIRATION DATE	REPLICATE ANALYSIS DATA	
CYLINDER NO.: CC106802						
Nitric Oxide	90.7 ± 0.9 ppm	GMIS	Monitor Labs Model 8440	09/04/92	02/26/92	03/04/92
		Cylinder #	S/N 136		90.7 ppm	90.3 ppm
		CC88868	Continuous		90.9 ppm	90.8 ppm
		@ 102.7 0	Chemiluminescence		90.5 ppm	90.8 ppm
			Last Cal Date: 03/05/92	Mean:	90.7 ppm	90.6 ppm
Carbon Monoxide	126.1 ± 1.3 ppm	GMIS	Carle Insts Model 8000	09/04/92	02/26/92	03/04/92
Nitrogen,O2-Free Balance		Cylinder #	S/N 8249		126.4 ppm	126.6 ppm
Cylinder Pressure: 2000 psig		CC87840	Methanation/FID		125.3 ppm	126.1 ppm
		@ 277.1 0	Gas Chromatography		126.1 ppm	126.0 ppm
			Last Cal Date: 12/11/91	Mean:	125.9 ppm	126.2 ppm
CYLINDER NO.: CC108782						
Nitric Oxide	12.05 ± 0.12 ppm	GMIS	Monitor Labs Model 8440	09/04/92	02/26/92	03/04/92
		Cylinder #	S/N 136		12.03 ppm	12.03 ppm
		CC12981	Continuous		11.98 ppm	12.07 ppm
		@ 21.43 0	Chemiluminescence		12.14 ppm	12.05 ppm
			Last Cal Date: 02/28/92	Mean:	12.05 ppm	12.05 ppm
Carbon Monoxide	11.83 ± 0.24 ppm	GMIS	Carle Insts Model 8000	09/04/92	02/26/92	03/04/92
Nitrogen,O2-Free Balance		Cylinder #	S/N 8249		11.78 ppm	11.85 ppm
Cylinder Pressure: 2000 psig		CC12168	Methanation/FID		11.92 ppm	11.78 ppm
		@ 17.73 0	Gas Chromatography		11.84 ppm	11.80 ppm
			Last Cal Date: 01/29/92	Mean:	11.84 ppm	11.81 ppm
CYLINDER NO.: CC108779						
Nitric Oxide	12.10 ± 0.12 ppm	GMIS	Monitor Labs Model 8440	09/04/92	02/26/92	03/04/92
		Cylinder #	S/N 136		12.09 ppm	12.08 ppm
		CC12981	Continuous		12.05 ppm	12.00 ppm
		@ 21.43 0	Chemiluminescence		12.19 ppm	12.11 ppm
			Last Cal Date: 02/28/92	Mean:	12.11 ppm	12.09 ppm
Carbon Monoxide	12.00 ± 0.24 ppm	GMIS	Carle Insts Model 8000	09/04/92	02/26/92	03/04/92
Nitrogen,O2-Free Balance		Cylinder #	S/N 8249		11.97 ppm	12.06 ppm
Cylinder Pressure: 2000 psig		CC12168	Methanation/FID		11.90 ppm	11.99 ppm
		@ 17.73 0	Gas Chromatography		12.00 ppm	12.05 ppm
			Last Cal Date: 01/29/92	Mean:	11.96 ppm	12.03 ppm
CYLINDER NO.: CC108778						
Nitric Oxide	23.25 ± 0.23 ppm	GMIS	Monitor Labs Model 8440	09/04/92	02/26/92	03/04/92
		Cylinder #	S/N 136		23.28 ppm	23.22 ppm
		CC12981	Continuous		23.17 ppm	23.15 ppm
		@ 21.43 0	Chemiluminoscence		23.36 ppm	23.33 ppm
			Last Cal Date: 02/28/92	Mean:	23.27 ppm	23.23 ppm

ppm = umole/mole   % = mole-%

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

2520 Pegasus Drive
Bakersfield, CA 93308
(805) 393-0272

31073

CHAIN OF CUSTODY RECORD

Project No.	Project Name	Project Manager	Samples Sent To:	Analysis Required
BK023	SWEPI SEKR	J. Polhamus	Zalco Laboratories	CHONS / Heating Value
Samples Collected By: J. Polhamus/C. Mangaong	Regulatory Agency (EPA, CARB, SCAQMD, etc.): KCAPCD		By: J. Polhamus	

ES Lab Control No.	Test Date	Field Sample ID (Method-Run#-Sample Source)	Sample Amount	Sample Medium	Comments	CHONS	Heating Value			
BK9203025	3/31/92	Fuel Gas	500cc	Gas	Bomb #23	X	X			
BK9203026	3/31/92	Fuel Gas	500cc	Gas	Bomb #15 Back-up only					

Relinquished By: (Sign & Print)	Date/Time	Received By: (Sign & Print)	Comments:
Jim Polhamus JIM Polhamus Phone: (805) 393-0272	4-3-92/1155	Sheila Rawlins SHEILA RAWLINS Of: ZALCO 4 3 92 11:55	
Relinquished By: (Sign & Print) Phone:	Date/Time	Received By: (Sign & Print) Of:	Comments:
Relinquished By: (Sign & Print) Phone:	Date/Time	Received By: (Sign & Print) Of:	Comments: