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SOURCE TEST REPORT FOR THE TEXACO HEATER TREATER, THE MOBIL STEAM GENERATOR, AND THE SWEPI GAS TURBINE IN THE SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT, CALIFORNIA

FINAL

VOLUME I

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TABLE OF CONTENTS

Page

TABLE OF CONTENTS (Continued)

LIST OF FIGURES

LIST OF TABLES

LIST OF TABLES (Continued)

EXECUTIVE SUMMARY

Source emission testing was conducted on the exhaust stacks of three combustion sources located in Kern County, California, during May 28 through June 10, 1992. Testing was performed by Radian Corporation (Radian) under contract to the Western States Petroleum Association (WSPA). The three sources are identified below:

Source	Facility	Location	Unit ID	Test Dates
Heater Treater	Texaco Exploration and Production, Inc.	Buttonwillow, CA	NA	May 28-30, 1992
Steam Generator	Mobil Exploration and Production, Inc.	Lost Hills, CA	#401A	June 2-4, 1992
Gas Turbine	Shell Western Exploration and Production, Inc.	Bakersfield, CA	#2	June 9-10, 1992

WSPA is sponsoring the pooled testing program to develop air toxics emission data in support of the WSPA-member company's Air Toxics "Hot Spots" Information and Assessment Act, California Assembly Bill 2588 (AB 2588) reporting requirements. Emission data from these facilities may be distributed to other similar facilities.

Results of the test program are summarized in Table 1 (Texaco Heater Treater), Table 2 (Mobil Steam Generator), and Table 3 (SWEPI Gas Turbine); these data represent three-test average emissions, normalized to heat input (i.e., lb/MMBtu). Averages were determined assuming that compounds that were non-detected were present at one-half of the detection limit. Test results for each facility are briefly discussed below; more detailed analyses of the data are presented in Section 3.0 of this report.

Texaco Heater Treater

Emissions of the seven polycyclic aromatic hydrocarbons (PAHs) compounds identified by the California Air Resources Board as carcinogens in AB 2588 were generally below detection limits during all three tests; levels of benz(a)anthracene and chrysene were slightly above the detection limit during Test #1. Formaldehyde, acetaldehyde, acrolein, benzene, and ethylbenzene emissions were generally near (or below) detection limits. Of the remaining volatile organic compounds (VOCs) in the target list, propylene emissions were the highest, averaging 449 x 10^{-6} lb/MMBtu during the three tests; toluene and xylene emissions were substantially less.

Among the pollutants continuously monitored during the sampling, nitrogen oxides (NO_x) and total hydrocarbons (THC) emissions were relatively constant, averaging 0.048 and 0.0021 lb/MMBtu, respectively. Comparable levels of THC were observed in the VOC field blank sample. Carbon monoxide (CO) emissions averaged 0.0013 lb/MMBtu during the tests. Significantly higher CO emissions were observed for relatively short intervals during portions of Tests #1 and #2; these levels were not quantified because they were above the calibration range of the CO monitor.

Mobil Steam Generator

Emissions of the seven carcinogenic PAH compounds were below detection limits during all three tests, with the exception of chrysene and benz(a)anthracene, which were present at low levels during Tests #1 and #2. Similarly, formaldehyde, acetaldehyde, acrolein, and benzene emissions were near (or below) detection limits during the testing. Of the remaining target VOCs, propylene emissions were the highest, averaging 580 x 10^{-6} lb/MMBtu during the three tests; toluene, ethylbenzene, and xylene emissions were much less. Toluene was present in the VOC field blank sample at a level that was comparable to sample quantities.

Hydrogen sulfide (H_2S) was present in the casing gas being fired in the generator, averaging 981 ppmv (i.e., in the casing gas), or 0.65 lb/hr (into the generator). H_2S levels in the exhaust gas stream were substantially less averaging 0.18 ppm, or 0.0079 lb/hr (0.00016 lb/MMBtu). CARB Method 11, which was utilized to perform the testing of both gas streams, is not well-suited for the exhaust gas H_2S testing (refer to the discussion in Section 2.2.4) and therefore, these data should be interpreted with caution. An alternative H_2S test method proposed by WSPA for this test program was not accepted by the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD).

NO_x and THC emissions were relatively constant, averaging 0.040 and 0.0036 lb/MMBtu, respectively. CO emissions were below the detection limit (0.0004 lb/MMBtu) during the testing.

<u>SWEPI Gas Turbine</u>

Emissions of the seven carcinogenic PAH compounds were generally below detection limits during all three tests, with the exception of benz(a)anthracene emissions which were slightly above detection limits during Test #1. Formaldehyde, acetaldehyde, acrolein, benzene, toluene, ethylbenzene, and xylene(s) emissions were generally near (or below) detection limits during the testing. Propylene emissions were consistently higher than the other target VOCs, averaging 1,620 x 10^{-6} lb/MMBtu during the three tests.

NO_x and CO emissions were relatively constant, averaging 0.11 and 0.0097 lb/MMBtu, respectively. THC emissions averaged 0.011 lb/MMBtu, although levels during Test #2A were somewhat higher (i.e., 0.021 lb/MMBtu).

Table 1

Summary of Test Results - Texaco Heater Treater

Compound	Average Emission Factor (lb/MMBtu)[a]	Emission Estimating Code for Pro Form[b]	Average Emission Factor (lb/MMSCF)[a]
Naphthalene	2.31×10^{-7}	1	2.37×10^{-4}
Acenaphthylene	1.2×10^{-8}	98	1.2×10^{-5}
Acenaphthene	1.2×10^{-9}	98	1.2×10^{-6}
Fluorene	4.5×10^{-9}	1	4.6×10^{-6}
Phenanthrene	3.3×10^{-8}	1	3.4×10^{-5}
Anthracene	1.4×10^{-9}	98	1.4×10^{-6}
Fluoranthene	1.2×10^{-8}	1	1.2×10^{-5}
Pyrene	5.5×10^{-9}	1	5.6×10^{-6}
Chrysene*	1.0×10^{-9}	98	1.0×10^{-6}
Benz(a)anthracene*	1.0×10^{-9}	98	1.0×10^{-6}
Benzo(b)fluoranthene*	5.5×10^{-10}	99	5.6×10^{-7}
Benzo(k)fluoranthene*	5.5×10^{-10}	99	5.6×10^{-7}
Benzo(a)pyrene*	5.5×10^{-10}	99	5.6×10^{-7}
Indeno(1,2,3-c,d)pyrene*	5.5×10^{-10}	99	5.6×10^{-7}
Dibenz(a,h)anthracene*	5.5×10^{-10}	99	5.6×10^{-7}
Benzo(g,h,i)perylene	8.5×10^{-10}	98	8.7×10^{-7}
Total (including naphthalene)	3.06 3.1×10^{-7}	NA	3.1×10^{-4}
Total (excluding naphthalene)	7.5 $\cancel{7.4} \times 10^{-8}$	NA	7.7 $\cancel{7.6} \times 10^{-5}$
Total (seven carcinogens [*])	4.8×10^{-9}	NA	4.9×10^{-6}
Formaldehyde	3.2×10^{-6}	98	3.3×10^{-3}
Acetaldehyde	3.0×10^{-6}	98	3.1×10^{-3}
Acrolein	2.2×10^{-6}	99	2.3×10^{-3}
Benzene	1.7×10^{-6}	98	1.7×10^{-3}
Toluene	3.1×10^{-5}	1	3.2×10^{-2}
Ethylbenzene	1.1×10^{-6}	99	1.1×10^{-3}

Table 1

(Continued)

Compound	Average Emission Factor (lb/MMBtu)[a]	Emission Estimating Code for Pro Form[b]	Average Emission Factor (lb/MMSCF)[a]
Total Xylenes	1.8×10^{-5}	1	1.9×10^{-2}
Propylene	4.5×10^{-4}	1	4.6×10^{-1}
NO_x	4.8×10^{-2}	NA	49.4
CO	1.3×10^{-3}	NA	1.3
THC	2.1×10^{-3}	NA	2.1

Note: The heat content of the fuel gas was 1,024 BTU/SCF.

[a] Average and total values were calculated assuming one-half of the detection limit for non-detected compounds. Lb/MMSCF represents pounds per cubic foot (x 10^6) of natural gas fired.

[b] 1 = Compound was detected during all three runs.
98 = Compound was not detected during one (or more) run.
99 = Compound was not detected during all three runs.

* = Carcinogenic PAH.

Table 2

Summary of Test Results - Mobil Steam Generator

Compound	Average Emission Factor (lb/MMBtu)[a]	Emission Estimating Code for Pro Form	Average Emission Factor (lb/MMSCF)[a]
Naphthalene	1.80×10^{-7}	1	1.87×10^{-4}
Acenaphthylene	3.6×10^{-10}	99	3.7×10^{-7}
Acenaphthene	5.2×10^{-10}	98	5.4×10^{-7}
Fluorene	2.4×10^{-9}	1	2.4×10^{-6}
Phenanthrene	1.2×10^{-8}	1	1.2×10^{-5}
Anthracene	2.4×10^{-9}	1	2.4×10^{-6}
Fluoranthene	1.4×10^{-9}	1	1.4×10^{-6}
Pyrene	2.0×10^{-9}	1	2.0×10^{-6}
Chrysene*	1.3×10^{-9}	98	1.13×10^{-6}
Benz(a)anthracene*	1.3×10^{-9}	98	1.3×10^{-6}
Benzo(b)fluoranthene*	3.6×10^{-10}	99	3.7×10^{-7}
Benzo(k)fluoranthene*	3.6×10^{-10}	99	3.7×10^{-7}
Benzo(a)pyrene*	3.6×10^{-10}	99	3.7×10^{-7}
Indeno(1,2,3-c,d)pyrene*	3.6×10^{-10}	99	3.7×10^{-7}
Dibenz(a,h)anthracene*	3.6×10^{-10}	99	3.7×10^{-7}
Benzo(g,h,i)perylene	3.6×10^{-10}	99	3.7×10^{-7}
Total (including naphthalene)	2.0594 2.1×10^{-7}	NA	2.142 2.1×10^{-4}
Total (excluding naphthalene)	2.594 2.6×10^{-8}	NA	2.698 2.7×10^{-5}
Total (seven carcinogens [*])	4.400 4.4×10^{-9}	NA	4.576 4.6×10^{-6}
Formaldehyde	3.9×10^{-6}	98	4.1×10^{-3}
Acetaldehyde	2.9×10^{-6}	99	3.0×10^{-3}
Acrolein	2.9×10^{-6}	99	3.0×10^{-3}
Benzene	1.5×10^{-6}	99	1.6×10^{-3}
Toluene	1.9×10^{-5}	1	2.0×10^{-2}
Ethylbenzene	1.2×10^{-5}	98	1.2×10^{-2}

Table 2

(Continued)

Compound	Average Emission Factor (lb/MMBtu)[a]	Emission Estimating Code for Pro Form	Average Emission Factor (lb/MMSCF)[a]
Total Xylenes	2.4×10^{-5}	1	2.5×10^{-2}
Propylene	5.8×10^{-4}	1	6.0×10^{-1}
Hydrogen Sulfide	1.6×10^{-4}	1	1.7×10^{-1}
NO_x	4.0×10^{-2}	NA	41.6
CO	3.7×10^{-4}	NA	3.8×10^{-1}
THC	3.6×10^{-6}	NA	3.7×10^{-3}

Note: The heat content of the fuel (natural gas) was 1,040 BTU/SCF.

[a] Average and total values were calculated assuming one-half of the detection limit for non-detected compounds. Lb/MMSCF represents pounds per cubic foot (x 10^6) of natural gas fired.
[b] 1 = Compound was detected during all three runs.
98 = Compound was not detected during one (or more) run.
99 = Compound was not detected during all three runs.
* = Carcinogenic PAH.

Table 3

Summary of Test Results - SWEPI Gas Turbine

Compound	Average Emission Factor (lb/MMBtu)[a]	Emission Estimating Code for Pro Form	Average Emission Factor (lb/MMSCF)[a]
Naphthalene	5.55×10^{-7}	1	5.82×10^{-4}
Acenaphthylene	1.8×10^{-9}	98	1.9×10^{-6}
Acenaphthene	4.8×10^{-9}	98	5.0×10^{-6}
Fluorene	1.8×10^{-8}	1	1.9×10^{-5}
Phenanthrene	8.8×10^{-8}	1	9.2×10^{-5}
Anthracene	1.5×10^{-8}	1	1.6×10^{-5}
Fluoranthene	9.5×10^{-9}	1	1.0×10^{-5}
Pyrene	1.1×10^{-8}	1	1.2×10^{-5}
Chrysene*	3.5×10^{-9}	98	3.7×10^{-6}
Benz(a)anthracene*	2.8×10^{-9}	98	2.9×10^{-6}
Benzo(b)fluoranthene*	1.4×10^{-9}	99	1.5×10^{-6}
Benzo(k)fluoranthene*	1.4×10^{-9}	99	1.5×10^{-6}
Benzo(a)pyrene*	1.4×10^{-9}	99	1.5×10^{-6}
Indeno(1,2,3-c,d)pyrene*	1.4×10^{-9}	99	1.5×10^{-6}
Dibenz(a,h)anthracene*	1.4×10^{-9}	99	1.5×10^{-6}
Benzo(g,h,i)perylene	1.4×10^{-9}	99	1.5×10^{-6}
Total (including naphthalene)	$7.18\ \cancel{7.2} \times 10^{-7}$	NA	7.52 7.5×10^{-4}
Total (excluding naphthalene)	1.6×10^{-7}	NA	1.7×10^{-4}
Total (seven carcinogens [*])	1.3×10^{-8}	NA	1.4×10^{-5}
Formaldehyde	1.5×10^{-5}	98	1.5×10^{-2}
Acetaldehyde	3.5×10^{-5}	98	3.7×10^{-2}
Acrolein	8.6×10^{-6}	99	9.0×10^{-3}
Benzene	3.3×10^{-6}	99	3.5×10^{-3}
Toluene	1.6×10^{-5}	98	1.7×10^{-2}
Ethylbenzene	4.6×10^{-6}	99	4.8×10^{-3}

Table 3

(Continued)

Compound	Average Emission Factor (lb/MMBtu)[a]	Emission Estimating Code for Pro Form	Average Emission Factor (lb/MMSCF)[a]
Total Xylenes	2.7×10^{-5}	98	2.8×10^{-2}
Propylene	1.6×10^{-3}	1	~~1.6~~ 1.7
NO_x	1.0×10^{-1}	NA	1.1×10^{2}
CO	$<9.7 \times 10^{-3}$	NA	$<1.0 \times 10^{1}$
THC	1.1×10^{-2}	NA	1.2×10^{1}

Note: The heat content of the fuel gas was 1,048 BTU/SCF.

[a] Average and total values were calculated assuming one-half of the detection limit for non-detected compounds. Lb/MMSCF represents pounds per cubic foot ($\times 10^6$) of natural gas fired.

[b] 1 = Compound was detected during all three runs.
98 = Compound was not detected during one (or more) run.
99 = Compound was not detected during all three runs.

[c] = Carcinogenic PAH.

1.0 INTRODUCTION

Source emission testing was conducted on the exhaust stacks of three combustion sources located in Kern County, California, during May 28 through June 10, 1992. Testing was performed by Radian Corporation (Radian) under contract to the Western States Petroleum Association (WSPA). The three sources tested are identified below:

Source	Facility	Location	Unit ID	Test Dates
Heater Treater	Texaco E&P, Inc.	Buttonwillow, CA	NA	May 28-30, 1992
Steam Generator	Mobil Exploration and Production, Inc.	Lost Hills, CA	#401A	June 2-4, 1992
Gas Turbine	Shell Western Exploration and Production, Inc.	Bakersfield, CA	#2	June 9-10, 1992

Testing of each source was performed to determine emissions of the following air toxic and criteria pollutants:

- Polycyclic Aromatic Hydrocarbons (PAHs);
- Formaldehyde, acetaldehyde, and acrolein;
- Benzene, toluene, ethylbenzene, xylenes (BTEX), and propylene;
- Nitrogen oxides (NO_x);
- Carbon monoxide (CO); and
- Total hydrocarbons (THC).

In addition, testing for hydrogen sulfide (H_2S) was performed on the Mobil Steam Generator exhaust stack. Fuel gas samples were also collected to determine heating value and BTEX, propylene, and H_2S (Mobil Steam Generator CVR gas, only) concentrations.

The purpose of the test program was to develop air toxics emission data to be used in support of the individual WSPA-member company's AB 2588 reporting requirements. Data collected at each source will be distributed to other similar facilities participating in the pooled testing program.

Before testing, a detailed Test Protocol was prepared and submitted to the Kern County and Fresno zones of the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) in a document dated dated April 2, 1992. The plan was conditionally approved by both the Kern and Fresno zones in May 1992, providing that recommended modifications to the test program were adopted. Protocol modifications were submitted to the District on May 22, 1992 (refer to Appendix G in Volume II). These revisions were incorporated into the test program, as discussed in Section 2.0 of this report.

Each source is described in Section 1.1. The technical approach (i.e., operating conditions, test methods) is discussed in Section 2.0, and the results of the test program are presented and discussed in Section 3.0. Supporting documentation is presented in Appendices A through E (Volume II). Project participants are identified in Appendix F. A list of the SJVUAPCD representatives who were present to observe various portions of the testing is also presented in Appendix F. Copies of the correspondences between SJVUAPCD, WSPA, and Radian are presented in Appendix G.

1.1 Process Descriptions

1.1.1 Heater Treater (Texaco; Buttonwillow, CA)

The heater treater is located in the Cymric Field on Texaco's Fitzgerald Lease and is used to enhance separation of crude oil and water extracted from oil production wells. The unit is a 3.6 MMBtu/hour, natural gas-fired heater treater manufactured by CE Natco. It has two burners, each with a heat input rate of 1.8 MMBtu/hour and two exhaust stacks.

This unit is currently exempt from permit requirements because the heat input rate is less than 5 MMBtu/hour. It does not have any emission monitoring or control systems.

The heater treater consists of a large pressure vessel with two separate internal compartments that contain the oil and water to be treated. Exhaust gases from both burners are passed through a heat exchanger pipe that runs through the pressure vessel. Exhaust gases are discharged directly to the atmosphere through two exhaust stacks. A process schematic for the heater treater is presented in Appendix A. Design and operating parameters are also summarized in Appendix A.

1.1.2 Steam Generator #401A (Mobil; Lost Hills, CA)

Steam Generator #401A is one of seven similar units at Mobil's Exploration and Production Facility in Lost Hills, CA. The generators are used to produce steam for steam injection for both cyclic and steam drive operations. The #401A unit was manufactured by Struthers and was fitted with a North American burner. It is fired with a combination of PUC grade natural gas and casing vapors recovered from oil production wells. It has a rated heat input of 62.5 MMBtu/hr and is equipped with a Lo-NO_x flue gas recirculation (FGR) system and O_2 control.

The steam generator consists of two main sections: the radiant section and the convection section. The feedwater enters the water tubes at the top of the convection section where it is heated by the exhaust gas leaving the generator. The water then flows into the tubes in the radiant section where it is further heated by the direct heat from the burner flame.

Natural gas and casing gas flow to the burner in the radiant section. Combustion air is forced into the burner by the blower. The air and the fuel gases are burned together in the radiant section of the generator. This flame heats the tubes carrying the water-producing steam. Hot exhaust gases from the flame exit through the convection section where they pre-heat the incoming water before venting through the stack. In addition, a portion of the generator exhaust gases are fed back to the burner air inlet through the FGR piping to aid in lowering NO_x emissions. A process schematic of the steam generator is presented in Appendix A. Additional design and operating specifications of the generator are also presented in Appendix A.

1.1.3 Gas Turbine #2 (SWEPI; Bakersfield, CA)

Gas Turbine #2 is one of two identical turbines located at SWEPI's Southeast Kern River (SEKR) Cogeneration Plant. These gas turbines are used for the dual purposes of generating electricity for use by Shell Western E&P, Inc. (SWEPI) and for producing steam for oil field injection.

Both units are Allison 501K B5 gas-fired turbines, rated at 4 MW with a heat input rate of 52.5 MMBtu/hour. NO_x emissions are controlled using a water injection system. Neither unit has a CO or selective catalytic reduction (SCR) catalyst control system. Each turbine has its own exhaust stack and is monitored for NO_x, CO, and O_2 using a KVB continuous emission monitor (CEM) system.

The basic process that takes place in the gas turbine system starts by compressing filtered, humidified ambient air in a compressor before feeding it into the combustion chamber. In the combustion chamber, PUC grade natural gas is combined with the compressed air and burned. Water is injected into the chamber for NO_x (peak temperature) control. The exhaust gases from the combustion chamber are fed through the turbine which drives the air compressor and an electrical generator. The exhaust gases then flow through the heat recovery steam generator (HRSG), where the temperature is reduced (via heat exchanger) from approximately 1,000°F to 300°F; the exhaust gases are then discharged to the atmosphere through the exhaust stack. A process schematic for this system is presented in Appendix A. Operating and design parameters are also summarized in Appendix A.

2.0 TECHNICAL APPROACH

Emission testing of the three combustion sources was conducted May 28 through June 10, 1992. Testing was performed during normal process operations. Schedules of the testing activities at each site are summarized in Table 2-1 (Texaco Heater Treater), Table 2-2 (Mobil Steam Generator), and Table 2-3 (SWEPI Gas Turbine); process operating conditions are discussed in Section 2.1. The sampling and analytical methods used during the test program are presented in Section 2.2. Quality assurance and quality control (QA/QC) procedures are presented in Section 2.3, and data reporting formats are given in Section 2.4. Tables in Sections 2.0 and 3.0 are found at the end of each section. Process data records for each source during the testing period are presented in Appendix A. Modifications from the original protocol submitted to the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) are documented in Appendix G.

2.1 Process Operating Conditions

2.1.1 Texaco Heater Treater

Testing of the Texaco Heater Treater exhaust stack was conducted May 28 through May 30, 1992; the testing schedule is presented in Table 2-1. Testing for all parameters was performed in triplicate. In addition to the exhaust gas testing, natural gas (fuel) samples were collected on May 29, 1992.

Testing was conducted during normal heater treater operating conditions. The heater treater was fired automatically (i.e., on demand) and controlled by the temperature of the oil/water effluent stream. The unit was divided into two separate chambers that are each fired with separate burners and exhausted through separate stacks. One of the chambers was taken off-line during the test program to extend the intervals of continuous operation for the chamber being tested. Also, the heater treater was taken off-line for approximately 12 hours prior to Tests #2 and #4 to allow the oil/water mix to cool, thereby extending the intervals of continuous heater operation.

Heater treater operations were interrupted on several occasions during the tests as the oil/water effluent stream reached the target temperature. When the heater burner shut off, sampling was immediately interrupted. Sampling was reinitiated approximately five minutes after heater operations had resumed. Details of the heater operating schedule during each of the tests are presented in Appendix A.

The following operating data were recorded during the testing:

- Natural gas firing rate (cubic feet per day);
- The oil/water effluent temperature (°F); and
- Fuel gas pressure (at the burner, psi).

The fuel firing rate is continuously logged with a strip chart recorder. The other parameters were recorded manually at approximately 20-minute intervals.

Heat input (i.e., MMBtu/hr) to the heater was calculated based on the natural gas firing rate (ft^3/hr) and the heat content of the fuel (MMBtu/ft^3); example calculations are presented in Appendix A.

2.1.2 Mobil Steam Generator

Testing of the Mobil Steam Generator #401A exhaust stack was conducted June 2 through June 4, 1992; the testing schedule is presented in Table 2-2. With the exception of NO_x and CO, testing for all parameters was performed in triplicate. A total of four NO_x and CO emission tests were conducted. In addition to the exhaust gas testing, samples of both the natural gas and casing gas fuels were collected on June 3 and 4.

Testing was conducted during normal generator operating conditions (i.e., 75% of the unit's rated capacity). Natural gas and casing gas were co-fired in the generator. As previously noted, a fraction of the exhaust gas was recirculated through the generator for NO_x emission control. The following operating data were continuously recorded during the testing:

- Natural gas and casing gas firing rates (cubic feet per day);
- Radiant section exit (i.e., tube) temperature (°F);
- Thermal efficiency (%);
- Water flow (gpm);
- Stack temperature (°F);
- Steam flow (barrels per hour);
- Temperature (°F); and
- Pressure (psi).

Thirty-minute averages of these parameters were printed out for each test period. Process data logging was curtailed during Test #1 (i.e., after approximately one hour) due to a power outage. As a result, process data records during Test #1 were limited (refer to Appendix A). The power problem was resolved prior to Test #2. Flue gas recirculation rates and burner temperatures were not monitored.

Heat input (i.e., MMBtu/hr) to the generator was calculated based on the fuel gas (natural and casing gas) firing rates (ft^3/hr) and the heat content of the fuels (MMBtu/ft^3); example calculations are presented in Appendix A.

2.1.3 SWEPI Gas Turbine

Testing of the SWEPI Gas Turbine exhaust stack was conducted on June 9 and 10, 1992; the testing schedule is presented in Table 2-3. With the exception of NO_x and CO, testing for all parameters was performed in triplicate. A total of four NO_x and CO emission tests were conducted. In addition to the exhaust gas testing, samples of the natural gas fuel were collected on June 10, 1992.

Testing was conducted during normal turbine operating conditions (i.e., 85% of the unit's rated capacity). Water injection was utilized to control NO_x emissions; normal water injection rates (i.e., a water-to-fuel ratio of approximately 36 pounds of water per MMBtu) were maintained throughout the testing. The following operating data were continuously recorded during the testing:

- Natural gas firing rates (pounds per hour);
- Generator output (MW);
- Turbine exhaust temperature (°F); and
- Injection water flow (pounds per hour).

Thirty-minute averages of these parameters were printed out for each test period except for Test #4. Process data for Test #4 were obtained from hourly average data which are routinely printed out at the end of the day (refer to Appendix A).

Heat input (i.e., MMBtu/hr) to the gas turbine was calculated based on the fuel gas firing rates (lb/hr) and the fuel heat content (MMBtu/lb); example calculations are presented in Appendix A.

2.2 Sampling and Analytical Methods

Emission testing was performed in accordance with California Air Resources Board (CARB) and U.S. Environmental Protection Agency (U.S. EPA) reference methods. Specific methods are identified in Table 2-4 and are briefly discussed below.

2.2.1 Polycyclic Aromatic Hydrocarbons (PAHs)

PAH emissions were determined in accordance with CARB Method 429. In this method, sample gas is collected isokinetically from the stack and passed through a heated glass-lined probe, a heated glass fiber filter, and a cooling condenser followed by an organic sorbent trap (XAD-2 resin). PAH compounds, which condense at ambient temperatures, are captured either as particles on the heated filter, as particles in the resin after cooling, or as individual molecules on the resin.

Sampling during each test run was performed at multiple traverse points established in accordance with CARB Method 1 specifications. Three sequential test runs were conducted at each site. Four-hour test durations were used to collect the samples. Following the test, the sampling train was disassembled and the samples were recovered on site in a clean, mobile laboratory. The filter samples were stored on dry ice, while the rinse and resin trap samples were stored on ice.

The samples were couriered to the analytical laboratory. In the laboratory, the sample fractions (i.e., filters, solutions, resin) were extracted and concentrated in accordance with method specifications. The front-half (i.e., filter and probe rinse) and back-half (i.e, XAD-2 resin, condensate, and impinger solutions) fractions were combined prior to analysis, resulting in one sample analysis per test. The samples were analyzed by high resolution gas chromatography/high resolution mass spectrometry (HRGC/HRMS).

2.2.2 Formaldehyde, Acetaldehyde, and Acrolein Testing

Formaldehyde, acetaldehyde, and acrolein emission testing was performed in accordance with CARB Method 430.[1] The sampling train consisted of a Teflon® probe with a particulate filter (glass wool plug), three midget impingers connected in series, and a dry gas meter/vacuum pump assembly. The sample gas was bubbled through 2,4-dinitrophenylhydrazine (DNPH) solution in the first two impingers. The DNPH reacts with the carbonyl group of the aldehyde forming a stable hydrazone derivative. The third impinger, containing silica gel, served to remove moisture. Sampling was performed at a constant rate of 0.5 liters per minute (lpm) for approximately two hours. Samples were collected from a single-point near the center of the stack. Three sequential test runs were conducted at each site.

Following testing, the samples were recovered on site in a clean, mobile laboratory and were stored on ice. The first and second impinger solutions were collected separately (i.e., as Fractions A and B, respectively). After all the samples were collected, they were express-shipped (on ice) to the analytical laboratory. The solutions were analyzed by high performance liquid chromatography (HPLC) coupled with an ultra-violet absorption (UVA) detector. The A and B fractions were analyzed separately to determine whether break-through occurred.

2.2.3 Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) and Propylene Testing

BTEX and propylene emissions were determined in accordance with CARB Method 410A. Exhaust gas samples were collected in a Tedlar® bag using an evacuated chamber (i.e., lung sampler) apparatus. Samples were collected from a single point near the center of the stack. A constant sampling rate of approximately 0.2 lpm was maintained throughout the thirty-minute test duration, resulting in a six-liter sample volume (approxi-

[1] Method 430 has not been validated by CARB for determining acrolein emissions. CARB has not published a reference method for determining acrolein emissions and therefore, use of Method 430 was approved for this test program by the SJVUAPCD.

mate). Three sequential test runs were conducted at each site. Samples were stored in the dark and express-shipped to the laboratory for analysis.

In the laboratory, the samples were concentrated using a cryogenic trap and then analyzed by gas chromatography coupled with photo ionization and flame ionization detectors (GC/PID-FID). BTEX levels are quantified using the PID (with FID confirmation), while propylene is quantified using the FID (with PID confirmation).[2]

2.2.4 Hydrogen Sulfide (H_2S) Testing

At the Mobil Steam Generator site, H_2S concentrations in the casing gas fuel and the generator stack gas were determined in accordance with CARB Method 11. The sampling train consisted of a Teflon® probe with a particulate filter (glass wool plug), four midget impingers connected in series, and a dry gas meter/vacuum pump assembly. The sample gas was bubbled through hydrogen peroxide (for SO_2 removal), followed by three impingers containing cadmium sulfate. H_2S reacts with the cadmium sulfate to form cadmium sulfide. The fourth impinger, containing silica gel, serves to remove moisture. Sampling was performed at a constant rate of approximately 1 liter per minute. Sampling of the fuel gas was performed until the impinger solution changed color from clear to yellow (i.e., typically 7 to 8 minutes). Sampling durations of approximately 160 minutes were employed at the exhaust stack location. Samples were collected from a single-point in the fuel line pipe and exhaust stack.

Following testing, the samples were recovered on-site in a clean, mobile laboratory, stored on ice, and protected from light. All three cadmium sulfate impinger solutions in each train were combined during recovery. The samples were couriered on ice to the analytical laboratory. The solutions were analyzed titrimetrically using standardized iodine and sodium thiosulfate solutions.

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[2] Lower detection limits can be attained for propylene using the FID for primary quantification.

CARB Method 11 is applicable to the determination of hydrogen sulfide levels in fuel gas streams and is not well-suited for combustion gas stream testing based on sample matrix (i.e., a dilute, oxidizing gas stream with SO_2 present) and stability[3] considerations. An alternative method[4] considered more suitable for combustion gas streams was recommended by WSPA. The alternative method was not approved (refer to Appendix G).

2.2.5 NO_x, CO, THC, CO_2, and O_2 Monitoring

NO_x, CO, CO_2, and O_2 levels were determined in accordance with CARB Method 100; exhaust gas concentrations were continuously monitored using the following instrumentation.

Parameter	Analyzer	Principle
NO_x	TECO Model 10	Chemiluminescence
CO	TECO Model 48	NDIR Absorption
CO_2	Anarad Model AR-600	NDIR Absorption
O_2	Teledyne Model 326	Fuel-type

Samples were collected from a single point near the center of the stack. Exhaust gas sample was continuously drawn through the sampling probe, passed through a heated Teflon® line to a four-pass sample conditioner for moisture removal. The sample gas was then pumped through Teflon® tubing to a manifold, where it was distributed to the above analyzers. Concentration data were continuously recorded using strip chart recorders. The analyzers were calibrated before and after each test using certified protocol calibration gases.

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[3] Sampling durations of nearly three hours were required to attain target detection limits.

[4] Collection of a gas sample in a Tedlar® bag followed by analysis using gas chromatography/flame photometric detection.

Sampling was performed concurrently with the above-described exhaust gas testing; sampling intervals ranged from two to four hours.

Continuous emission monitoring of THC levels was originally planned for the sampling program. The THC monitor malfunctioned throughout the test program and efforts to correct the problem(s) were unsuccessful. Similarly, operating problems were encountered with two "back-up" THC monitors that were obtained during the test program.

Therefore, THC levels were determined in accordance with U.S. EPA Method 18. The Tedlar® bag samples collected for the BTEX and propylene testing (refer to Section 2.3) were further analyzed for THC concentrations using a flame ionization detector. THC levels were reported as methane.

2.2.6 General

Supporting data, such as exhaust gas volumetric flow rate and moisture content, were also collected in conjunction with the testing. Flow rates were determined in accordance with CARB Methods 1 and 2; velocity traverses with an S-type pitot tube were conducted. Exhaust gas moisture content was determined in accordance with CARB Method 4. Exhaust gas molecular weight was determined based on the monitored CO_2 and O_2 concentrations (i.e., the CEM data).

2.2.7 Fuel Gas Sampling and Analysis

Fuel samples were collected in stainless steel cylinders and were analyzed for composition (e.g., C1 through C6, total carbon, hydrogen, etc.) and heat content (calculated in accordance with procedures described in ASTM D-3588). These results have been included with the process characterization data in Appendix A. Fuel gas samples were also collected in Tedlar® bags and were analyzed for BTEX and propylene levels using GC/PID-

FID. As noted above, H_2S testing of the Mobil Steam Generator casing gas was also performed (refer to Section 2.2.4).

2.3 Quality Assurance/Quality Control (QA/QC) Procedures

The overall QA/QC objectives of the test program are to ensure the precision, accuracy, completeness, comparability, and representativeness of the data generated during the project. These objectives were achieved by rigorously adhering to the procedures specified in the methods. In addition to the procedures noted in Section 2.1, the following specific QA/QC measures were implemented:

- All test equipment, including the dry gas meter/orifice meters, thermocouples, pitot tubes, differential pressure gauges and sampling nozzles, were calibrated and thoroughly inspected for proper operation prior to use in the field. Calibration data were logged on standard forms. The equipment was inspected throughout the field testing program for damage.
- A velocity traverse and cyclonic flow check was performed at the test site to ensure the suitability of the sampling locations.
- An on-site check of the dry gas meter calibration coefficient was performed prior to testing.
- All components of the sampling train (i.e., nozzles, probes, glassware) and sample containers were thoroughly pre-cleaned with the appropriate reagents/solvents.
- Pre- and post-test leak checks were conducted on all sampling trains and pitot tube/manometer assemblies.
- Continuous emission monitors (CEMs) were calibrated prior to and following each test with certified calibration gases. System bias checks and interference checks were also performed. Multi-point calibrations of each analyzer were conducted daily.
- Sample filters and impingers were maintained at the temperatures specified in the method(s) during sampling.
- All sampling data were recorded on standard data forms.

- Isokinetic sampling conditions were maintained during the PAH sampling.

- Field blank samples were prepared and recovered using the same equipment, reagents, and procedures used to collect the test samples.

- The BTEX, propylene, and THC field blank sample was collected using nitrogen (or "zero" air) as the hydrocarbon-free gas source.

- Control (or laboratory) blank samples were prepared and analyzed in conjunction with the samples.

- Background aldehyde levels in the DNPH reagent prepared for the aldehyde sampling were measured prior to use to ensure that the solution was not contaminated. Additional procedures (i.e., reagent blank, "trip" blank, "trip" spike, and field blank sample analyses), as described in CARB Method 430, were incorporated into the sampling program to identify and quantify potential reagent contamination and/or degradation problems.

- A duplicate sample of one of the BTEX, propylene, and THC sample was collected and submitted for analysis. Similarly duplicate analyses of one of the aldehyde samples was performed. The duplicate samples served as an indicator of the precision of the method.

- Sample matrices of the PAH and aldehyde samples were spiked with known standards. Results of the spike sample analyses served as indicators of sample recoveries and matrix effects.

- Strict chain-of-custody procedures were adhered to throughout the test program. Following collection, each sample was assigned a unique identification number, and sealed in its shipping container. Sample IDs were logged on a sample submittal/chain-of-custody (COC) form, which accompanied the samples. Prior to shipment, sampling personnel signed off on the COC forms; similarly, laboratory personnel signed off on the COC form, upon receipt of the samples.

- Method requirements pertaining to sample stability (i.e., storage temperature, holding time) were adhered to.

2.4 Data Reporting and Calculation Procedures

In reporting the data for many of the above parameters, special procedures are required to integrate non-detectable quantities and the results of split (i.e., separate fractions) and/or duplicate analyses into the data set. Data reduction procedures utilized during this test program conform with CARB-adopted conventions; these procedures are described below. Final results have been rounded to no more than three significant digits.

Emissions for a single test run in which a parameter was below the detection limit are reported as less than (i.e., "<") the detection limit. Average emissions were calculated assuming that non-detectable quantities were present at one half of the detection limit. Average data are not reported with the less than (i.e., "<") designation. Full non-detectable quantities of the continuously monitored pollutants (i.e., NO_x, CO, THC) were used in averaging the CEM data.

Total PAHs have been determined using three classifications:

- The sum of the seven compounds identified by CARB as carcinogens;[5]
- The sum of all of the CARB Method 429 PAH compounds, except for naphthalene;[6]
- The sum of all of the CARB Method 429 PAH compounds, including naphthalene.

Total PAHs have been determined assuming that non-detectable quantities of the PAH compounds were present at one-half of the detection limit.

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[5] Benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, indeno(1,2,3-c,d)pyrene, and dibenz(a,h)anthracene.

[6] CARB has requested that total PAH concentrations be reported with and without naphthalene because of known limitations of Method 429 for determining naphthalene emissions (refer to Section 3.1.1).

CARB Method 430 has a unique reporting protocol. The results of each test are compared to the field blank levels of aldehydes, and if the sample results are not five times the blank level, then five times the blank level is to be reported with the understanding that it means, "no aldehyde was detected at levels greater than five times the level found in the blanks." If the sample result is greater than five times the blank level, the sample results must be blank corrected. Where no aldehydes were detected in either the blanks or samples, one-half the detection limit is to be used in the calculations.

As noted in Section 2.2, separate analyses of the aldehyde sample fractions were performed to determine whether sample breakthrough occurred. If the aldehyde quantity in the Fraction B sample was below the detection limit, it was assumed that all of the aldehydes were collected in the Fraction A solution. Following CARB recommendations, if aldehydes were detected in Fraction A but not in Fraction B, the Fraction B contribution was set to zero.

For those samples which were analyzed in duplicate, reported results are based on the average of the duplicate analyses. If one of the analyses yielded a detectable quantity while the other result was non-detectable, the non-detectable quantity is assumed to be present at one half of the detection limit for averaging purposes.

Table 2-1

Test Schedule -- Texaco Heater Treater

Date	Time (Approx.)	Test ID	Parameter
5/28/92	1000-1934	#1	PAH, CEM
	1000-1550	#1A	Aldehydes
	1653-2003	#1B	Aldehydes
5/29/92	0851-1644	#2	PAH, CEM
	0846-1205		Aldehydes
5/30/92	0824-1500	#4	PAH, CEM
	0824-0854	#4A	BTEX, Propylene, THC
	0902-0932	#4B	BTEX, Propylene, THC
	0943-1013	#4C	BTEX, Propylene, THC (Duplicate)

Note: Fuel samples (natural gas) were collected on 5/29/92 (composition analyses and heat content) and 5/30/92 (BTEX and propylene analyses. The PAH field blank sample was designated as Test 3; no sampling was performed during Test 3.

PAH = Polycyclic aromatic hydrocarbons
CEM = Continuous emission monitoring
BTEX = Benzene, toluene, ethylbenzene, and xylenes
THC = Total hydrocarbons

Table 2-2

Test Schedule -- Mobil Steam Generator

Date	Time (Approx.)	Test ID	Parameter
6/2/92	1336-1830	#1	PAH, CEM
	1629-1830		Aldehydes
6/3/92	0821-1303	#2	PAH, CEM
	0846-1205		H_2S - Exhaust Stack
	1012-1027		H_2S - Casing Gas
	0824-1025	#2A	Aldehydes
	1108-1304	#2B	Aldehydes
	1407-1904	#3	PAH, CEM
	1419-1757		H_2S - Exhaust Stack
	1530-1545		H_2S - Casing Gas
6/4/92	0800-1040	#4	H_2S, CEM - Exhaust Stack
	0915-0930		H_2S - Casing Gas
	0810-0840	#4A	BTEX, Propylene, THC
	0848-0918	#4B	BTEX, Propylene, THC
	0924-0954	#4C	BTEX, Propylene, THC (Duplicate)

Note: Fuel samples (natural gas and casing gas) were collected on 6/3/92 (composition analyses and heat content) and 6/4/92 (BTEX and propylene analyses).

PAH = Polycyclic aromatic hydrocarbons
CEM = Continuous emission monitoring
H_2S = Hydrogen sulfide
BTEX = Benzene, toluene, ethylbenzene, and xylenes
THC = Total hydrocarbons

Table 2-3

Test Schedule -- SWEPI Gas Turbine

Date	Time (Approx.)	Test ID	Parameter
6/9/92	1025-1440	#1	PAH, CEM
	1025-1238	#1A	Aldehydes
	1247-1501	#1B	Aldehydes
	1523-1743	#2	Aldehydes, CEM
	1614-1644	#2A	BTEX, Propylene, THC
	1657-1727	#2B	BTEX, Propylene, THC
6/10/92	0750-1229	#3	PAH, CEM
	0804-0835	#3A	BTEX, Propylene, THC
	1447-1929	#4	PAH, CEM

Note: A natural gas fuel sample was collected on 6/10/92 and analyzed for composition, heat content, BTEX, and propylene.

PAH = Polycyclic aromatic hydrocarbons
CEM = Continuous emission monitoring
BTEX = Benzene, toluene, ethylbenzene, and xylenes
THC = Total hydrocarbons

Table 2-4

Summary of Test Methods

Parameter	Method	Sample Type	Duration (minutes)	Analysis
PAH	CARB 429	Integrated (filter, XAD-2, impinger)	240	HRGC/HRMS
Aldehydes	CARB 430	Integrated (impinger)	120	HPLC/UVA
BTEX, Propylene	CARB 410A	Integrated (Tedlar® bag)	30	GC/PID-FID
H_2S (exhaust gas)	CARB 11	Integrated (impinger)	160	Titrimetric
NO_x CO, CO_2 O_2	CARB 100	Continuous Monitoring	160-240	Chemiluminescence NDIR Fuel Cell
THC	EPA 18	Integrated (Tedlar® bag)	30	GC/FID
Fuel Gas - Gross Analysis	—	Steel cylinder	<1 minute	GC/FID
Fuel Gas - BTEX	—	Tedlar® bag	<1 minute	GC/PID-FID
Flow	CARB 1 and 2	NA	NA	NA
Moisture	CARB 4	Integrated (impinger)	240	Gravimetric

BTEX = Benzene, Toluene, Ethylbenzene, Xylenes
CARB = California Air Resources Board
FID = Flame Ionization Detection
FPD = Flame Photometric Detection
GC = Gas Chromatography
HPLC/UVA = High Performance Liquid Chromatography/Ultra-Violet Absorption Detection
HRGC = High Resolution Gas Chromatography
HRMS = High Resolution Mass Spectrometry
NA = Not Applicable
PAH = Polycyclic Aromatic Hydrocarbons
THC = Total Hydrocarbons
NDIR = Non-Dispersive Infrared Radiation Absorption
PID = Photoionization Detection

3.0 RESULTS AND DISCUSSION

Results of the test program are summarized in Tables 3-1 through 3-16 and are discussed in Sections 3.1 (Texaco Heater Treater), 3.2 (Mobil Steam Generator), and 3.3 (SWEPI Gas Turbine). All tables are presented at the end of this section. Emission data are expressed in concentration (e.g., parts per million by volume [ppmv], nanograms per dry standard cubic meter [ng/dscm]), mass emission rate (e.g., pounds per hour [lb/hr]) and emission ratio (pounds per million british thermal units [lb/MMBtu]). Supporting calculations and field data sheets are presented in Appendix B, while laboratory data and chain-of-custody records are presented in Appendix C. Calculations have been made keeping all available digits, but final results have been rounded to two or three significant figures depending upon the accuracy of the original numbers.

3.1 Texaco Heater Treater

Heater treater operating data and stack gas parameters are summarized in Table 3-1, while the results of the natural gas analysis are presented in Figure 3-1. Emission data are summarized in Tables 3-2 through 3-5 and are discussed below.

3.1.1 PAH Emission Test Results

PAH results are presented in Table 3-2. Emissions of all seven PAH compounds identified by CARB as carcinogens were below the detection limit (1.1×10^{-9} lb/MMBtu) during all three tests, with the exception of benz(a)anthracene emissions (1.9×10^{-9} lb/MMBtu) and chrysene (1.8×10^{-9} lb/MMBtu) emissions which were detected during Test #1. Emissions of several of the other non-carcinogenic PAH compounds were observed at varying levels during the three tests. Total PAH emissions (excluding naphthalene) ranged from 39×10^{-9} to 124×10^{-9} lb/MMBtu and averaged 74×10^{-9} lb/MMBtu. Naphthalene levels were significantly higher than any of the other compounds, averaging 231×10^{-9} lb/MMBtu during the three tests. CARB recognizes that a limitation of Method 429 is that high background levels of naphthalene, believed to be associated with the sample collection media (i.e., XAD-2 and toluene), often occur. Both the field blank and laboratory blank samples in this study contained naphthalene levels which were comparable with sample quantities (refer to Appendix C), indicating that sample contamination was indeed present. As a result, the naphthalene data are believed to be biased upward by an unknown amount and should therefore be considered suspect. CARB requests that total PAH results be reported with and without naphthalene.

Acenaphthene, fluorene, phenanthrene, and pyrene were also present in the field blank sample at levels which were comparable to sample levels. These data may also be biased upward; reported emissions of these compounds were significantly less than naphthalene. However, these compounds were not present in the laboratory blank sample, and the source of the contamination is not known.

Analysis of deuterated PAH spike results indicate that recovery of the first four PAH non-carcinogenic compounds (naphthalene, acenaphthylene, acenaphthene, fluorene) were slightly below the target range (50-150%). In all cases, signal-to-noise ratios for these compounds were greater than 10:1 and therefore, the data are considered valid, per method specifications (refer to Appendix C).

3.1.2 Aldehyde Emissions

Aldehyde emission data are presented in Table 3-3. Aldehyde emissions were generally below the detection limit during all three tests, with the exceptions of acetaldehyde and formaldehyde that were detected at low levels during Test #1A and Test #1B. Detection limits for all three compounds ranged from 4.2×10^{-6} lb/MMBtu to 4.5×10^{-6} lb/MMBtu. Aldehyde quantities in all of the field blank samples were below detection limits. In Table 3-3, the measured data (not blank corrected) are reported along with the CARB Method 430 reporting result. That is, CARB Method 430 requires that five times the average detection limit (in this case, five times one-half the detection limit) be reported since no value is greater than five times the blank level; see Section 2.4.

An anomaly was noted in Test #1A. Specifically, the acetaldehyde quantity detected in the sample (i.e., 0.51 micrograms) was present in the B fraction (i.e., the second impinger in series), while the acetaldehyde quantity in the A fraction was below the detection limit (i.e., 0.50 micrograms). It is not known why acetaldehyde was detected in the B Fraction, but not in the A Fraction. Sample breakthrough is considered doubtful because no acetaldehyde was detected in the A fraction.

3.1.3 and THC Emissions

3-4, ethylbenzene emissions were below the detection limit (2.2 x 10 ll three tests; similarly, benzene emissions were below the detection lin ltu) during two of the three tests. Propylene emissions were much highe -6 lb/MMBtu during the three tests. Low levels of toluene and xylen ...ved.

Low levels of all five VOCs were present in the field blank sample. As noted, ethylbenzene and benzene quantities in the samples were below the detection limit during the majority of the tests, and therefore, the representativeness of the field blank is in question.[1] The source of the toluene in the field blank (and samples) is believed to be the Tedlar® bag in which the samples were collected. All of the VOC quantities in the laboratory blank were below detection limits.

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[1] The field blank sample was prepared by introducing zero-grade (i.e., certified as less than <0.1 ppm THC) nitrogen into a Tedlar® bag. It is believed that the compounds detected in the field blank were attributable to the nitrogen and were not indicative of sampling train and/or sample handling procedures.

THC emissions were constant during the three tests averaging 2.07 x 10^{-3} lb/MMBtu. Comparable THC levels were observed in the field blank sample; THC levels in the laboratory blank were below the detection limit.

3.1.4 Nitrogen Oxide (NO_x) and Carbon Monoxide (CO) Emissions

Nitrogen oxide (NO_x) and carbon monoxide (CO) emission data are summarized in Table 3-5. Exhaust gas NO_x levels were relatively constant throughout the test program averaging 55.6 ppmv (0.048 lb/MMBtu). CO concentrations were variable throughout the tests. During the majority of the test intervals, CO levels were relatively low (i.e., less than 10 ppmv). However, sporadically high levels (i.e., greater than 10,000 ppmv)[2] were briefly observed during portions of the tests. The CO values reported in Table 3-5 do not include the short-lived transient excursion CO data points. The variability in CO emissions during these intervals is illustrated in the strip chart records presented in Appendix B. The reason for the excursions is not known.

3.2 Mobil Steam Generator

Steam generator operating data and stack gas parameters are summarized in Table 3-6, while the results of the natural gas and casing gas analyses are presented in Figures 3-2 and 3-3, respectively. Emission data are summarized in Tables 3-7 through 3-11 and are discussed below.

3.2.1 PAH Emission Test Results

PAH results are presented in Table 3-7. Emissions of all seven carcinogenic PAH compounds were below the detection limit (0.71 x 10^{-9} lb/MMBtu) during all three tests, with the exception of benz(a)anthracene and chrysene, which were detected at low levels during Tests #1 and #2. Emissions of several of the other non-carcinogenic PAHs

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[2] CO levels exceeded the upper range of the analyzer for brief intervals.

were observed at varying levels during the three tests. Total PAH emissions (excluding naphthalene) ranged from 18 x 10^{-9} to 37 x 10^{-9} lb/MMBtu and averaged 26 x 10^{-9} lb/MMBtu. Naphthalene levels were significantly higher than any of the other compounds, averaging 180 x 10^{-9} lb/MMBtu during the three tests. As previously noted, this is believed to be attributable to a background contamination problem inherent in the method. Both the field blank and laboratory blank samples analyzed contained naphthalene levels which were comparable with sample quantities (refer to Appendix C), indicating that sample contamination was present. As a result, the naphthalene data are believed to be biased upward by an unknown amount and should therefore be considered suspect.

Analysis of the deuterated PAH spike results indicate that all recoveries were within target ranges, and the data are acceptable.

3.2.2 Aldehyde Emissions

Aldehyde emission data are presented in Table 3-8. Aldehyde emissions were generally below the detection limit during all three tests, with the exception of formaldehyde which was present in Test #2A just at the limit of detection. Detection limits ranged from 5.5 x 10^{-6} lb/MMBtu to 6.1 x 10^{-6} lb/MMBtu. Aldehyde quantities in each of the field blank samples were below detection limits. In Table 3-8, the measured data (not blank corrected) are reported along with the CARB Method 430 reporting result (in this case, five times one-half the detection limit); see the discussion in Sections 2.4 and 3.1.2. Aldehyde quantities in all of the Impinger B samples were also below detection limits indicating that sample breakthrough did not occur.

3.2.3 BTEX, Propylene, and THC Emissions

As presented in Table 3-9, benzene emissions were below the detection limit (2.9 x 10^{-6} lb/MMBtu) during all three tests. Propylene emissions were the highest of all target VOCs, averaging 0.58 x 10^{-3} lb/MMBtu during the three tests. Lower levels of toluene, ethyl benzene, and xylenes were observed.

Field blank quantities of benzene, ethyl benzene, and xylenes were below detection limits, although toluene, propylene, and total hydrocarbon were present in the field blank sample (refer to Appendix C). The field blank propylene quantity was low relative to sample quantities (i.e., less than five percent). The field blank toluene and total hydrocarbon levels were comparable to sample quantities and therefore these results may be biased upward (i.e., true emissions may be lower than reported levels). The source of the blank-contained compounds is believed to be the zero-grade nitrogen, which was thought to be hydrocarbon-free (refer to footnote #1 on page 3-3).

3.2.4 Hydrogen Sulfide (H_2S) Emissions

Hydrogen sulfide emission data are summarized in Table 3-10. H_2S levels in the casing gas were relatively constant, ranging from 964 to 1,013 ppmv and averaging 981 ppmv. The H_2S mass emission rates (i.e., lb/hr), however, did vary over a factor of two (0.43 lb/hr to 0.90 lb/hr). This was due to differences in the casing gas firing rates recorded during the Tests (refer to Table 3-6). As noted in Section 2.2.4, the color of the cadmium sulfate impinger solutions changed from clear to yellow during each of the three tests.

H_2S levels in the generator exhaust gas averaged 0.18 ppmv during the three tests. Normalized to heat input, H_2S emissions ranged from 0.08 x 10^{-3} to 0.24 x 10^{-3} lb/MMBtu, averaging 0.16 x 10^{-3} lb/MMBtu. All of the sample quantities were near the detection limit (i.e., within a factor of 3). No visible changes in the color of the cadmium sulfate impinger solutions were noted in any of the exhaust gas samples. The H_2S level in the field blank sample was comparable to sample levels in the exhaust gas and therefore the data may be biased upward (i.e., true emissions may be lower than measured). The accuracy of the low-level H_2S exhaust stack emission data is considered suspect based on the inherent limitations of Method 11 as discussed in Section 2.2.4.

3.2.5 Nitrogen Oxide (NO_x) and Carbon Monoxide (CO) Emissions

Nitrogen oxide (NO_x) and carbon monoxide (CO) emission data are summarized in Table 3-9. Exhaust gas NO_x levels were relatively constant throughout the test program averaging 33.3 ppmv (0.04 lb/MMBtu). CO concentrations were below the detection limit of 0.50 ppmv (0.4 x 10^{-3} lb/MMBtu) during all three tests.

As previously noted, NO_x monitoring was interrupted for approximately one hour (i.e., from 1500 to 1600) on June 2 because the drift in the response of the NO_x analyzer became evident. The temperature in the CEM trailer had increased to 95°F due to inadequate power for the CEM trailer's air conditioning system. NO_x monitoring was resumed when the power problem was resolved; the NO_x monitor was recalibrated prior to sampling. The interruption is not expected to have affected test results based on the consistency in levels observed before and after the interruption.

3.3 SWEPI Gas Turbine

Turbine operating data and stack gas parameters are summarized in Table 3-12, while the results of the natural gas analysis are presented in Figure 3-4. Emission data are summarized in Tables 3-13 through 3-16 and are discussed below.

3.3.1 PAH Emission Test Results

PAH results are presented in Table 3-10. Emissions of all seven carcinogenic PAH compounds were below the detection limit (3 x 10^{-9} lb/MMBtu) during all three tests, with the exception of benz(a)anthracene and chrysene emissions were detected during Tests #1 and #2. Emissions of several of the other non-carcinogenic PAHs were observed at varying levels during the three tests. Total PAH emissions (excluding naphthalene) ranged from 82 x 10^{-9} to 266 x 10^{-9} lb/MMBtu and averaged 163 x 10^{-9} lb/MMBtu. Naphthalene levels were significantly higher than any of the other compounds, averaging 555 x 10^{-9} lb/MMBtu during the three tests. As noted, the naphthalene data are considered suspect due to background contamination problems associated with the method. Both the field blank and laboratory blank samples analyzed contained naphthalene levels which were comparable with sample quantities (refer to Appendix C), indicating that sample contamination was present.

Several of the PAH compounds (other than the seven carcinogenic compounds) were present in the field blank sample at levels which were comparable to those found in the samples (refer to Appendix C). These data may therefore be biased upward; reported emissions of these compounds were significantly less than naphthalene levels. However, these compounds were not present in the laboratory blank sample, and the source of the contamination is not known.

Analysis of the deuterated PAH spike results showed that 3 of the compounds (i.e., fluoranthene, pyrene, chrysene) were slightly below target recovery ranges (50-150%). Signal-to-noise ratios for these compounds were greater than 10:1 and therefore, the data are considered valid, per method specifications.

3.3.2 Aldehyde Emissions

Aldehyde emission data are presented in Table 3-14. Aldehyde emissions were generally below the detection limit during all three tests, with the exceptions of acetaldehyde (Tests #1A and #1B) and formaldehyde (Test #1A). Detection limits were all close to 17 x 10^{-6} lb/MMBtu. Aldehyde quantities in each of the field blank samples were below detection limits. In Table 3-14, the measured data (not blank corrected) are reported along with the CARB Method 430 reporting result (in this case, five times one-half the detection limit); see discussion in Sections 2.4 and 3.1.2.

3.3.3 BTEX, Propylene, and THC Emissions

As presented in Table 3-15, ethylbenzene emissions were below the detection limit (9.1×10^{-6} lb/MMBtu) during all three tests; similarly, benzene emissions were below the detection limit (6.6×10^{-6} lb/MMBtu) during two of the three tests and at that limit during Run #3A. Propylene emissions were the highest, averaging 1.62×10^{-3} lb/MMBtu during the three tests. Lower levels of toluene and xylenes were observed.

Referring to the laboratory data presented in Appendix C, note that ethylbenzene levels in the duplicate samples analyzed (Test #3A) were not in agreement. In particular, ethylbenzene in the A sample was reported at less than 1 ppbv, while in Sample B it was reported at 71 ppbv. Laboratory personnel indicated that the quantification of the B sample ethylbenzene peak was masked by an interfering component in the sample which co-eluted with the ethylbenzene, and, as a result, this quantity may be biased upward. Reported ethylbenzene levels in the B sample were therefore judged invalid and were not used. Ethylbenzene levels observed during Tests #2A and #2B were below the detection limit (ppbv), supporting the result of the Test #3A (Sample A) analysis.

BTEX concentrations in the field blank sample were either near or below the detection limit. Propylene levels in the field blank were low in comparison to sample quantities. All of the VOC quantities in the laboratory blank were below detection limits.

THC emissions averaged 11.3×10^{-3} lb/MMBtu during the three tests with notably higher levels observed during Test #2A. The reason for the variability is not known. Higher THC levels are often accompanied by higher CO levels, but CO emissions were relatively constant during the three test sequence (see Section 3.3.4).

3.3.4 Nitrogen Oxide (NO_x) and Carbon Monoxide (CO) Emissions

Nitrogen oxide (NO_x) and carbon monoxide (CO) emission data are summarized in Table 3-16. Concentrations of both substances were nearly constant during the three test periods and averaged 26.3 ppmv (0.105 lb/MMBtu) for NO_x and 4.0 ppmv (0.010 lb/MMBtu) for CO.

3.4 Results of the Quality Assurance/quality Control (QA/QC) Program

A review of blanks, spikes and duplicate analyses accompanied the discussion for each analyte in previous sections. In general, the results of the QA/QC program indicate that the quality of the data was acceptable, with the exceptions already noted. Of particular note, with respect to the sampling aspects of the program:

- Isokinetic sampling conditions were maintained (100 ±10%) during the PAH testing (refer to Appendix B).
- All sampling train and pitot tube leak checks (pre- and post-tests) were acceptable (refer to Appendix B).
- Pre-test dry gas meter calibration coefficients were acceptable (100 ±2%) and post-test checks were in agreement with the pre-test values (i.e., within 3%); refer to the calibration data presented in Appendix D.
- Calibrations of the CEMs indicated that the drift, linearity, interference and system bias checks yielded acceptable results (refer to Appendix D).
- Except as noted, results of the field blank sample analyses samples were either below detection limits, or low with respect to sample quantities (refer to Appendix C). Results of the laboratory (or control) blank analyses were similarly acceptable.
- All samples were analyzed within method specified hold times.

Table 3-1

Summary of Process Operating Data
Texaco (Cymric Field) Heater Treater

Parameter	Test # - Date (Time)	Heat Input (MMBtu/hr)	Fuel Firing Rate (Mft^3/day)	Stack Gas Flowrate (ACFM)	Stack Temperature (°F)
PAH, CEM	1 - 5/28/92 (1000-1934)	4.25	99.6	1,075	488
	2 - 5/29/92 (0851-1644)	4.13	97.0	1,019	466
	4 - 5/30/92 (0824-1500)	4.13	97.0	1,149	470
	Average	4.17	97.9	1,081	475
Aldehydes	1A - 5/28/92 (1000-1550)	4.37	102.5	1,075	488
	1B - 5/28/92 (1653-2003)	4.13	97.0	1,075	488
	2 - 5/29/92 (0846-1205)	4.13	97.0	1,019	466
	Average	4.21	98.8	1,056	481
BTEX, Propylene, THC	4A - 5/30/92 (0824-0854)	4.13	97.0	1,149	470
	4B - 5/30/92 (0902-0932)	4.13	97.0	1,149	470
	4C - 5/30/92 (0943-1013)	4.13	97.0	1,149	470
	Average	4.13	97.0	1,149	470

Note: The heat content of the natural gas was 1,024 BTU/scf.

Table 3-2

Summary of Results - PAH Emissions From the Texaco (Cymric Field) Heater Treater Exhaust Stack

Test ID (Date):	#1 (5/28/92)			#2 (5/29/92)			#4 (5/30/92)			Average[a]		
Compound	ng/dscm	lb/hr $\times 10^{-9}$	lb/MMBtu $\times 10^{-9}$	ng/dscm	lb/hr $\times 10^{-9}$	lb/MMBtu $\times 10^{-9}$	ng/dscm	lb/hr $\times 10^{-9}$	lb/MMBtu $\times 10^{-9}$	ng/dscm	lb/hr $\times 10^{-9}$	lb/MMBtu $\times 10^{-9}$
Naphthalene	653	1,180	277	534	947	229	387	775	188	525	966	231
Acenaphthylene	75	136	32	6.4	11	2.8	<2.3	<4.6	<1.1	28	50	12
Acenaphthene	3.8	6.8	1.6	3.2	5.6	1.4	<2.3	<4.6	<1.1	2.7	4.9	1.2
Fluorene	14	24	5.7 ?	10	18	4.4	6.9	14	3.4	10	19	4.5
Phenanthrene	110	199	47	75	133	32	41	82	20	75	138	33
Anthracene	4.3	7.7	1.8	4.2	7.4	1.8	<2.3	<4.6	<1.1	3.2	5.8	1.4
Fluoranthene	42	75	18	24	43	10	14	29	6.9	27	49	12
Pyrene	27	49	12	6.4	11	2.8	4.6	9.2	2.2	13	23	5.5
Chrysene*	4.3	7.7	1.8	<2.7	<4.7	<1.1	<2.3	<4.6	<1.1	2.3	4.1	1.0
Benz(a)anthracene*	4.4	8.0	1.9	<2.7	<4.7	<1.1	<2.3	<4.6	<1.1	2.3	4.2	1.0
Benzo(b)fluoranthene*	<2.5	<4.5	<1.1	<2.7	<4.7	<1.1	<2.3	<4.6	<1.1	1.3	2.3	0.55
Benzo(k)fluoranthene*	<2.5	<4.5	<1.1	<2.7	<4.7	<1.1	<2.3	<4.6	<1.1	1.3	2.3	0.55
Benzo(a)pyrene*	<2.5	<4.5	<1.1	<2.7	<4.7	<1.1	<2.3	<4.6	<1.1	1.3	2.3	0.55
Indeno(1,2,3-c,d)pyrene*	<2.5	<4.5	<1.1	<2.7	<4.7	<1.1	<2.3	<4.6	<1.1	1.3	2.3	0.55
Dibenz(a,h)anthracene*	<2.5	<4.5	<1.1	<2.7	<4.7	<1.1	<2.3	<4.6	<1.1	1.3	2.3	0.55
Benzo(g,h,i)perylene	3.3	6.0	1.4	<2.7	<4.7	<1.1	<2.3	<4.6	<1.1	1.9	3.5	0.85
Total (7 Carcinogens [*])[a]	15	27	6.3	9.4	17	4.0	8.1	16	3.9	11	20	4.8
Total (excluding naphthalene)[a]	293	527	124	140	248	60	79	159	39	171	311	74
Total (including naphthalene)[a]	947	1,710	401	674	1,190	289	466	935	226	696	1,280	306

Note: The PAH field blank sample was designated as Test 3.
[a] Av[illegible]ge and total values are computed assuming that compounds below the detection limit are [illegible]nt at one-half of the detection limit.
* [illegible]inogens

Table 3-3

Summary of Results - Aldehyde Emissions From the Texaco (Cymric Field) Heater Treater Exhaust Stack

Test ID - Date (Times)	Parameter	Aldehyde Emissions		
		ppbv	lb/hr x 10^{-3}	lb/MMBtu x 10^{-6}
#1A - 5/28/92 (1000-1550)	Formaldehyde	<8.1	<0.019	<4.2
	Acetaldehyde	5.6	0.019	4.3
	Acrolein	<4.3	<0.019	<4.2
#1B - 5/28/92 (1653-2003)	Formaldehyde	9.3	0.021	5.2
	Acetaldehyde	<5.8	<0.019	<4.7
	Acrolein	<4.3	<0.019	<4.5
#2 - 5/29/92 (0851-1039)	Formaldehyde	<8.2	<0.018	<4.5
	Acetaldehyde	<5.6	<0.018	<4.5
	Acrolein	<4.3	<0.018	<4.4
Average[a]	Formaldehyde	5.8	0.013	3.2
	Acetaldehyde	3.8	0.013	3.0
	Acrolein	2.2	0.009	2.2
CARB Method 430 Result[b]	Formaldehyde	20	0.045	11
	Acetaldehyde	14	0.045	11
	Acrolein	11	0.045	11

[a] Average values are computed assuming that compounds below the detection limit are present at one-half the detection limit.
[b] No aldehydes were detected at levels above five times the detection limit.

Table 3-4

Summary of Results - BTEX, Propylene, and Total Hydrocarbon Emissions From the Texaco (Cymric Field) Heater Treater Exhaust Stack

Test ID (Date):	#4A (5/30/92)			#4B (5/30/92)			#4C (5/30/92)			Average[a]		
Compound	ppbv	lb/hr x 10^{-4}	lb/MMBtu x 10^{-4}	ppbv	lb/hr x 10^{-4}	lb/MMBtu x 10^{-4}	ppbv	lb/hr x 10^{-4}	lb/MMBtu x 10^{-4}	ppbv	lb/hr x 10^{-4}	lb/MMBtu x 10^{-4}
Benzene	<1.0	<6.6	<1.6	<1.0	<6.6	<1.6	2.3	14.9	3.6	1.1	7.2	1.7
Toluene	7.0	55.1	13.3	38.0	299	72.4	4.3	33.5	8.1	16.4	129	31.3
Ethylbenzene	<1.0	<9.1	<2.2	<1.0	<9.1	<2.2	<1.0	<9.1	<2.2	0.5	4.5	1.1
Xylenes	9.0	82.3	19.9	13.0	119	28.8	2.5	22.9	5.5	8.2	74.6	18.1
Propylene	360	1,280	310	700	2,450	593	515	1,830	443	525	1,850	449
Total Hydrocarbons[b]	6,300	8,530	2,066	6,300	8,530	2,066	6,300	8,530	2,066	6,300	8,530	2,066

[a] Average values are computed assuming that compounds below the detection limit, are present at one-half of the detection limit.
[b] Reported as methane.

Table 3-5

Summary of Results - NO_x and CO Emissions From the Texaco (Cymric Field) Heater Treater Exhaust Stack

Test ID - Date (Times)	Parameter	Emission Data		
		ppmv	lb/hr	lb/MMBtu x 10^{-3}
#1 - 5/28/92 (1336-1830)	NO_x	55.3	0.19	45.5
	CO[a]	6.6	0.014	3.3
#2 - 5/29/92 (0821-1303)	NO_x	54.8	0.19	45.6
	CO[a]	0.28	0.001	0.1
#4 - 5/30/92 (1407-1904)	NO_x	56.7	0.22	53.4
	CO	0.71	0.002	0.4
Average	NO_x	55.6	0.20	48.2
	CO	2.5	0.005	1.3

Note: The PAH field blank sample was designated as Test 3 (i.e., no monitoring was performed during Test 3).

[a] CO levels were highly variable (i.e., above the upper measurement range of the analyzer) during portions of Tests #1 and #2 (refer to Appendix B). The above data represent average values during intervals when CO levels were stable.

Table 3-6

Summary of Process Operating Data - Mobil Steam Generator #401A

Parameter	Test # - Date (Time)	Natural Gas Rate (Mft³/day)	Casing Gas Rate (Mft³/day)	Heat Input (MMBtu/hr)	Stack Gas Flowrate (ACFM)	Stack Temperature (°F)
PAH, CEM	1 - 6/2/92 (1336-1830)	1,111	182	49.5	13,871	278
	2 - 6/3/92 (0821-1303)	1,105	226	49.6	14,001	279
	3 - 6/3/92 (1407-1904)	1,134	120	50.0	14,267	279
	Average	1,117	176	49.7	14,046	279
Aldehydes	1 - 6/2/92 (1629-1830)	1,111	182	49.5	13,871	278
	2A - 6/3/92 (0824-1025)	1,102	273	49.8	14,001	279
	2B - 6/3/92 (1108-1304)	1,108	178	49.3	14,001	279
	Average	1,107	211	49.5	13,958	279
H_2S	2 - 6/3/92 (0846-1205)	1,102	237	49.5	14,001	279
	3 - 6/3/92 (1419-1757)	1,132	120	49.9	14,267	279
	4 - 6/4/92 (0800-1040)	1,122	176	49.9	14,555	285
	Average	1,119	177	49.8	14,274	281
BTEX, THC Propylene	4A - 6/4/92 (0810-0840)	1,134	175	50.4	14,555	285
	4B - 6/4/92 (0848-0918)	1,122	177	49.9	14,555	285
	4C - 6/4/92 (0924-0954)	1,110	179	49.4	14,555	285
	Average	1,122	177	49.9	14,555	285

Note: The heat contents of the natural gas and casing gas were 1,040 BUT/ft³ and 177 BTU/ft³, respectively.

Table 3-7

Summary of Results - PAH Emissions from the Mobil Steam Generator #401A Exhaust Stack

Test ID (Date):	#1 (6/2/92)			#2 (6/3/92)			#3 (6/3/92)			Average[a]		
Compound	ng/dscm	lb/hr x 10^{-9}	lb/MMBtu x 10^{-9}	ng/dscm	lb/hr x 10^{-9}	lb/MMBtu x 10^{-9}	ng/dscm	lb/hr x 10^{-9}	lb/MMBtu x 10^{-9}	ng/dscm	lb/hr x 10^{-9}	lb/MMBtu x 10^{-9}
Naphthalene	306	9,200	186	323	9,860	199	254	7,830	157	294	8,960	180
Acenaphthylene	<1.2	<35	<0.71	<1.2	<35	<0.71	<1.2	<36	<0.71	0.58	18	0.36
Acenaphthene	<1.2	<35	<0.71	1.4	42	0.85	<1.2	<36	<0.71	0.85	26	0.52
Fluorene	3.5	106	2.1	5.1	155	3.1	3.0	93	1.9	3.9	118	2.4
Phenanthrene	16	481	9.7	28	845	17.0	15	470	9.4	20	599	12.1
Anthracene	3.1	92	1.9	6.9	211	4.3	1.5	47	0.94	3.8	117	2.4
Fluoranthene	3.3	99	2.0	1.8	56	1.1	1.7	53	1.1	2.3	69	1.4
Pyrene	3.1	92	1.9	5.3	162	3.3	1.4	43	0.85	3.2	99	2.0
Chrysene*	1.6	50	1.0	3.9	120	2.4	<1.2	<36	<0.71	2.0	62	1.3
Benz(a)anthracene*	2.0	60	1.2	3.9	120	2.4	<1.2	<36	<0.71	2.2	66	1.3
Benzo(b)fluoranthene*	<1.2	<35	<0.71	<1.2	<35	<0.71	<1.2	<36	<0.71	0.58	18	0.36
Benzo(k)fluoranthene*	<1.2	<35	<0.71	<1.2	<35	<0.71	<1.2	<36	<0.71	0.58	18	0.36
Benzo(a)pyrene*	<1.2	<35	<0.71	<1.2	<35	<0.71	<1.2	<36	<0.71	0.58	18	0.36
Indeno(1,2,3-c,d)pyrene*	<1.2	<35	<0.71	<1.2	<35	<0.71	<1.2	<36	<0.71	0.58	18	0.36
Dibenz(a,h)anthracene*	<1.2	<35	<0.71	<1.2	<35	<0.71	<1.2	<36	<0.71	0.58	18	0.36
Benzo(g,h,i)perylene	<1.2	<35	<0.71	<1.2	<35	<0.71	<1.2	<36	<0.71	0.58	18	0.36
Total (7 Carcinogens [*])[a]	6.6	198	4.0	10.7	328	6.6	4.0	125	2.5	7.1	217	4.4
Total (excluding naphthalene)[a]	37	1,120	23	60	1,830	37	29	883	18	42	1,280	26
Total (including naphthalene)[a]	343	10,300	208	383	11,700	236	282	8,700	174	336	10,200	206

[a] Average and total values are computed assuming that compounds below the detection limit are present at one-half of the detection limit.

* = Carcinogens

Table 3-8

Summary of Results - Aldehyde Emissions From the Mobil Steam Generator #401A Exhaust Stack

Test ID - Date (Times)	Parameter	Aldehyde Emissions		
		ppbv	lb/hr x 10^{-3}	lb/MMBtu x 10^{-6}
#1 - 6/2/92 (1629-1830)	Formaldehyde	<7.1	<0.27	<5.5
	Acetaldehyde	<4.9	<0.27	<5.5
	Acrolein	<3.8	<0.27	<5.5
#2A - 6/3/92 (0824-1025)	Formaldehyde	7.5	0.29	5.8
	Acetaldehyde	<5.1	<0.29	<5.8
	Acrolein	<4.0	<0.29	<5.5
#2B - 6/3/92 (1108-1304)	Formaldehyde	<7.8	<0.30	<6.1
	Acetaldehyde	<5.3	<0.30	<6.1
	Acrolein	<4.2	<0.30	<5.6
Average[a]	Formaldehyde	5.0	0.19	3.9
	Acetaldehyde	2.5	0.14	2.9
	Acrolein	2.0	0.14	2.9
CARB Method 430 Results[b]	Formaldehyde	19	.72	15
	Acetaldehyde	13	.72	15
	Acrolein	10	.72	15

[a] Average values are computed assuming that compounds below the detection limit are present at one-half the detection limit.
[b] No aldehydes were detected at levels above five times the detection limit.

Table 3-9

Summary of Results - BTEX, Propylene, and Total Hydrocarbon Emissions From the Mobil Steam Generator #401A Exhaust Stack

Test ID (Date):	#4A (6/4/92)			#4B (6/4/92)			#4C (6/4/92)			Average[a]		
Compound	ppbv	lb/hr x 10^{-3}	lb/MMBtu x 10^{-6}	ppbv	lb/hr x 10^{-3}	lb/MMBtu x 10^{-6}	ppbv	lb/hr x 10^{-3}	lb/MMBtu x 10^{-6}	ppbv	lb/hr x 10^{-3}	lb/MMBtu x 10^{-6}
Benzene	<1.4	<0.15	<2.9	<1.4	<0.15	<2.9	<1.4	<0.15	<2.9	0.70	0.07	1.5
Toluene	6.5	0.80	15.9	6.5	0.80	16.1	9.9	1.22	24.6	7.62	0.94	18.9
Ethylbenzene	4.5	0.64	12.7	7.1	1.01	20.2	<1.4	<0.20	<4.0	4.10	0.58	11.6
Xylenes	16	2.30	45.5	5.1	0.73	14.7	4.2	0.60	12.2	8.4	1.21	24.1
Propylene	430	24.0	476	610	34.0	682	515	28.7	582	518	28.9	580
Total Hydrocarbons[b]	7,500	159	3,160	9,380	199	3,990	8,130	173	3,500	8,330	177	3,550

[a] Average values are computed assuming that compounds below the detection limit, are present at one-half of the detection limit.
[b] Reported as methane.

Table 3-10

Summary of Results - Hydrogen Sulfide (H_2S) Emissions From the Mobil Steam Generator #401A Exhaust Stack

Test ID - Date (Times)	Casing Gas		Exhaust Stack Emissions		
	ppmv[a]	lb/hr	ppmv	lb/hr x 10^{-3}	lb/MMBtu x 10^{-4}
#2 - 6/3/92 (0846-1205)	1,013	0.90	0.18	8.0	0.16
#3 - 6/3/92 (1419-1815)	966	0.43	0.27	11.9	0.24
#4 - 6/4/92 (0800-1040)	964	0.63	0.09	4.0	0.08
Average	981	0.65	0.18	7.9	0.16

[a] Quantities represent the concentration of H_2S in the casing fuel gas stream and the mass rate of H_2S being introduced into the steam generator (via the casing gas), based on the fuel flow rates monitored by Mobil instrumentation.

Table 3-11

Summary of Results - NO_x and CO Emissions From the Mobil Steam Generator #401A Exhaust Stack

Test ID - Date (Times)	Parameter	Emission Data		
		ppmv	lb/hr	lb/MMBtu x 10^{-3}
#1 - 6/2/92 (1336-1830)	NO_x	30.0	1.8	35.4
	CO	<0.50	<0.02	<0.36
#2 - 6/3/92 (0821-1303)	NO_x	34.5	2.1	41.3
	CO	<0.50	<0.02	<0.36
#3 - 6/3/92 (1407-1904)	NO_x	34.8	2.1	41.7
	CO	<0.50	<0.02	<0.36
#4 - 6/4/92 (0800-1004)	NO_x	34.0	2.1	41.6
	CO	<0.50	<0.02	<0.37
Average	NO_x	33.3	2.0	40.0
	CO	<0.50	<0.02	<0.37

NO_x = Nitrogen oxide
CO = Carbon monoxide

Table 3-12

Summary of Process Operating Data - SWEPI (SEKR) Gas Turbine #2

Parameter	Test # - Date (Time)	Fuel Gas Rate (Mft³/day)	Heat Input (MMBtu/hr)	Stack Gas Flow Rate (ACFM)	Stack Gas Temperature (°F)
PAH, CEM	1 - 6/9/92 (1025-1440)	1,043	45.5	39,861	290
	3 - 6/10/92 (0750-1229)	1,048	45.7	41,274	294
	4 - 6/10/921[a] (1447-1929)	1,034	45.0	40,252	291
	Average	1,042	45.4	40,462	292
Aldehydes	1A - 6/9/92 (1025-1238)	1,045	45.6	39,861	290
	1B - 6/9/92 (1247-1501)	1,041	45.4	39,861	290
	2 - 6/9/92 (1523-1743)	1,030	45.0	38,780	286
	Average	1,039	45.3	39,501	289
BTEX, Propylene, THC	2A - 6/9/92 (1614-1644)	1,023	44.7	38,780	286
	2B - 6/9/92 (1657-1727)	1,030	45.0	38,780	286
	3A - 6/10/92 (0804-0835)	1,043	45.5	41,274	294
	Average	1,032	45.1	39,611	289

Note: The heat content of the natural gas was 1048 BTU/scf.

Table 3-13

Summary of Results - PAH Emissions from the SWEPI (SEKR) Gas Turbine #2 Exhaust Stack

Test ID (Date):	#1 (6/9/92)			#3 (6/10/92)			#4 (6/10/92)			Average[a]		
Compound	ng/dscm	lb/hr x 10^6	lb/MMBtu x 10^6	ng/dscm	lb/hr x 10^6	lb/MMBtu x 10^6	ng/dscm	lb/hr x 10^6	lb/MMBtu x 10^6	ng/dscm	lb/hr x 10^6	lb/MMBtu x 10^6
Naphthalene	327	30,200	665	228	21,800	476	254	23,600	524	270	25,200	555
Acenaphthylene	1.8	170	3.7	<1.3	<124	<2.7	<1.3	<124	<2.8	0.86	80	1.8
Acenaphthene	4.2	385	8.5	2.1	203	4.4	<1.3	<124	<2.8	2.3	217	4.8
Fluorene	15	1,370	30	7.0	668	15	4.3	397	8.8	8.7	813	18
Phenanthrene	68	6,320	139	39	3,710	81	21	1,980	44	43	4,000	88
Anthracene	16	1,510	30	4.2	396	8.7	2.0	186	4.1	7.5	698	15
Fluoranthene	6.8	632	14	4.4	421	9.2	2.7	248	5.5	4.6	434	9.5
Pyrene	8.3	770	17	4.9	470	10	2.7	248	5.5	5.3	496	11
Chrysene*	3.0	275	6.0	1.4	136	3.0	<1.3	<124	<2.8	1.7	158	3.5
Benz(a)anthracene*	2.8	256	5.6	<1.3	<124	<2.7	<1.3	<124	<2.8	1.4	126	2.8
Benzo(b)fluoranthene*	<1.5	<137	<3.0	<1.3	<124	<2.7	<1.3	<124	<2.8	0.69	64	1.4
Benzo(k)fluoranthene*	<1.5	<137	<3.0	<1.3	<124	<2.7	<1.3	<124	<2.8	0.69	64	1.4
Benzo(a)pyrene*	<1.5	<137	<3.0	<1.3	<124	<2.7	<1.3	<124	<2.8	0.69	64	1.4
Indeno(1,2,3-c,d)pyrene*	<1.5	<137	<3.0	<1.3	<124	<2.7	<1.3	<124	<2.8	0.69	64	1.4
Dibenz(a,h)anthracene*	<1.5	<137	<3.0	<1.3	<124	<2.7	<1.3	<124	<2.8	0.69	64	1.4
Benzo(g,h,i)perylene	<1.5	<137	<3.0	<1.3	<124	<2.7	<1.3	<124	<2.8	0.69	64	1.4
Total (7 Carcinogens [*])[a]	9.5	874	19	5.3	507	11	4.7	434	9.6	6.5	605	13
Total (excluding naphthalene)[a]	131	12,100	266	68	6,500	142	40	3,680	82	80	7,430	163
Total (including naphthalene)[a]	458	42,300	931	297	28,300	619	294	27,200	605	350	32,600	718

[a] Average and total values are computed assuming that compounds below the detection limit are present at one-half of the detection limit.

* = Carcinogens

Table 3-14

Summary of Results - Aldehyde Emissions From the SWEPI (SEKR) Gas Turbine #2 Exhaust Stack

Test ID - Date (Times)	Parameter	Aldehyde Emissions		
		ppbv	lb/hr x 10^{-3}	lb/MMBtu x 10^{-6}
#1A - 6/9/92 (1025-1238)	Formaldehyde	10.5	1.2	26.9
	Acetaldehyde	13.6	2.3	51.3
	Acrolein	<3.6	<0.78	<17.2
#1B - 6/9/92 (1247-1501)	Formaldehyde	<6.4	<0.75	<16.6
	Acetaldehyde	12.0	2.1	45.4
	Acrolein	<3.6	<0.78	<17.3
#2 - 6/9/92 (1523-1743)	Formaldehyde	<6.5	<0.74	<16.6
	Acetaldehyde	<4.4	<0.74	<16.6
	Acrolein	<3.6	<0.77	<17.1
Average[a]	Formaldehyde	5.6	0.66	14.5
	Acetaldehyde	9.3	1.6	35.0
	Acrolein	1.8	0.39	8.6
CARB Method 430 Results[b]	Formaldehyde	16	1.9	42
	Acetaldehyde	12	2.0	42
	Acrolein	9	1.9	43

[a] Average values are computed assuming that compounds below the detection limit are present at one-half of the detection limit.
[b] Only one aldehyde (acetaldehyde, Run #1B) was detected above five times the detection limit.

Table 3-15

Summary of Results - BTEX, Propylene, and Total Hydrocarbon Emissions From the SWEPI (SEKR) Gas Turbine #2 Exhaust Stack

Test ID (Date):	#2A (6/9/92)			#2B (6/9/92)			#3A (6/10/92)			Average[a]		
Compound	ppbv	lb/hr x 10^{-6}	lb/MMBtu x 10^{-6}	ppbv	lb/hr x 10^{-6}	lb/MMBtu x 10^{-6}	ppbv	lb/hr x 10^{-6}	lb/MMBtu x 10^{-6}	ppbv	lb/hr x 10^{-6}	lb/MMBtu x 10^{-6}
Benzene	<1.0	<298	<6.7	<1.0	<298	<6.6	<1.0	305	6.7	0.50	150	3.3
Toluene	3.0	1,070	23.8	<1.0	<355	<7.9	2.5	910	20.0	2.0	718	15.9
Ethylbenzene	<1.0	<409	<9.1	<1.0	<409	<9.1	<1.0	<419	<9.2	0.50	206	4.6
Xylenes	2.0	825	18.5	<1.0	<412	<9.2	6.3	2,640	58.0	2.9	1,220	27.0
Propylene	530	85,000	1,900	450	72,200	1,600	375	61,600	1,350	452	72,900	1,620
Total Hydrocarbons[b]	15,000	917,000	20,500	5,880	359,000	7,980	3,940	246,000	5,420	8,270	507,000	11,300

[a] Average values are computed assuming that compounds below the detection limit, are present at one-half of the detection limit.
[b] Reported as methane.

Table 3-16

Summary of Results - NO_x and CO Emissions From the SWEPI (SEKR) Gas Turbine #2 Exhaust Stack

Test ID - Date (Times)	Parameter	Emission Data		
		ppmv	lb/hr	lb/MMBtu x 10^3
#1 - 6/9/92 (1025-1501)	NO_x	26.2	4.7	103
	CO	4.1	0.45	9.8
#2 - 6/9/92 (1523-1743)	NO_x	25.6	4.5	100
	CO	4.1	0.44	9.7
#3 - 6/10/92 (0750-1229)	NO_x	27.0	5.0	109
	CO	4.0	0.45	9.9
#4 - 6/10/92 (1447-1929)	NO_x	26.6	4.8	106
	CO	3.8	0.42	9.3
Average	NO_x	26.3	4.7	105
	CO	4.0	0.44	9.7

NO_x = Nitrogen oxide
CO = Carbon monoxide

PACIFIC GAS TECHNOLOGY

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

GAS ANALYSIS BY CHROMATOGRAPH

STEINER ENVIRONMENTAL, INC
4930 Boylan Street
Bakersfield, CA 93308

Attention: Jim Steiner

Sample ID : WSPA\RADIAN
TEXACO HEATER TREATER
NATURAL GAS

SAMPLED: MAY 29, 1992
SUBMITTED: JUNE 1, 1992
REPORTED: JUNE 4, 1992
LAB # 2309
STEINER ID # 32766

ANALYZED GAS	MOLE %	WT %	CHONS	WT %
OXYGEN	0.04	0.06	CARBON	65.33
NITROGEN	0.24	0.31	HYDROGEN	18.38
CARBON DIOXIDE	10.62	21.89	OXYGEN	15.98
HYDROGEN	ND	0.00	NITROGEN	0.31
CARBON MONOXIDE	ND	0.00	SULFUR	0.00
HYDROGEN SULFIDE	ND	0.00		
METHANE	78.35	58.88		
ETHANE	6.47	9.11		
PROPANE	3.17	6.55		
iso-BUTANE	0.31	0.84		
n-BUTANE	0.60	1.63		
iso-PENTANE	0.08	0.27		
n-PENTANE	0.06	0.20		
HEXANE +	0.06	0.24		
TOTAL:	100.00			

SPECIFIC GRAVITY * : 0.737

SPECIFIC VOLUME : 18.32 cu ft/lb

HYDROGEN SULFIDE : ppm (GC/FPD) (STEINER ID)

TOTAL * BTU/cu ft	DRY : 1024		NET * BTU/cu ft	DRY : 925
	WET : 1006			WET : 909
BTU/lb	: 18764		BTU/lb	: 16957

* CALCULATED ACCORDING TO : ASTM D-3588

Figure 3-1. Summary of Results - Natural Gas Analysis Texaco (Cymric Field) Heater Treater

RADIAN CORPORATION

PACIFIC GAS TECHNOLOGY

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Bakersfield, California 93301
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Fax: 805/324-2748

GAS ANALYSIS BY CHROMATOGRAPH

STEINER ENVIRONMENTAL, INC
4930 Boylan Street
Bakersfield, CA 93308

Attention: Vernon McKnight

SAMPLED: JUNE 3, 1992
SUBMITTED: JUNE 5, 1992
REPORTED: JUNE 12, 1992
LAB # 4377-2

Sample ID : RADIAN/WSPA
SG401A FUEL LINE
NATURAL GAS

STEINER ID # 32775

ANALYZED GAS	MOLE %	WT %	CHONS WT %	
OXYGEN	0.03	0.04	CARBON	61.53
NITROGEN	0.20	0.22	HYDROGEN	15.55
CARBON DIOXIDE	17.65	31.16	OXYGEN	22.70
HYDROGEN	ND	0.00	NITROGEN	0.22
CARBON MONOXIDE	ND	0.00	SULFUR	0.00
HYDROGEN SULFIDE	ND	0.00		
METHANE	70.17	45.16		
ETHANE	5.01	6.04		
PROPANE	2.45	4.33		
iso-BUTANE	0.62	1.45		
n-BUTANE	1.15	2.68		
iso-PENTANE	0.43	1.24		
n-PENTANE	0.43	1.24		
HEXANE +	1.86	6.43		
TOTAL:	100.00			

SPECIFIC GRAVITY * : 0.861

SPECIFIC VOLUME : 16.00 cu ft/lb

HYDROGEN SULFIDE : ppm (GC/FPD)
STEINER ID# :

TOTAL * BTU/cu ft	DRY :	1040		NET * BTU/cu ft	DRY :	943
	WET :	1022			WET :	926
BTU/lb	:	16645		BTU/lb	:	15086

* CALCULATED ACCORDING TO : ASTM D-3588

Figure 3-2. Summary of Results - Natural Gas Analysis Mobil Steam Generator #401A

RADIAN CORPORATION

PACIFIC GAS TECHNOLOGY

PGT

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

GAS ANALYSIS BY CHROMATOGRAPH

STEINER ENVIRONMENTAL, INC
4930 Boylan Street
Bakersfield, CA 93308

Attention: Vernon McKnight

SAMPLED: JUNE 3, 1992

SUBMITTED: JUNE 5, 1992

REPORTED: JUNE 12, 1992

LAB # 4377-1

Sample ID : RADIAN/WSPA
SG401A FUEL LINE
CASING GAS

STEINER ID # 32771

ANALYZED GAS

	MOLE %	WT %	CHONS WT %	
OXYGEN	0.31	0.24		
NITROGEN	1.86	1.27	CARBON	30.56
CARBON DIOXIDE	85.28	91.28	HYDROGEN	1.56
HYDROGEN	ND	0.00	OXYGEN	66.61
CARBON MONOXIDE	ND	0.00	NITROGEN	1.27
HYDROGEN SULFIDE	ND	0.00	SULFUR	0.00
METHANE	10.69	4.17		
ETHANE	0.44	0.32		
PROPANE	0.18	0.19		
iso-BUTANE	0.02	0.03		
n-BUTANE	0.04	0.06		
iso-PENTANE	0.05	0.09		
n-PENTANE	0.03	0.05		
HEXANE +	1.10	2.31		
TOTAL:	100.00			

SPECIFIC GRAVITY * : 1.419

SPECIFIC VOLUME : 11.53 cu ft/lb

HYDROGEN SULFIDE : ppm (GC/FPD)
STEINER ID# :

TOTAL * BTU/cu ft	DRY :	177	NET * BTU/cu ft	DRY :	161
	WET :	174		WET :	158
BTU/lb	:	2040	BTU/lb	:	1858

* CALCULATED ACCORDING TO : ASTM D-3588

Figure 3-3. Summary of Results - Casing Gas Analysis
Mobil Steam Generator #401A

PACIFIC GAS TECHNOLOGY

2122 Q Street
Bakersfield, California 93301
805/324-1317
Fax: 805/324-2748

GAS ANALYSIS BY CHROMATOGRAPH

STEINER ENVIRONMENTAL, INC
4930 Boylan Street
Bakersfield, CA 93308

Attention: Jim Steiner

SAMPLED: JUNE 10, 1992
SUBMITTED: JUNE 11, 1992
REPORTED: JUNE 16, 1992
LAB # 4395

RECEIVED
JUN 18 1992
Ans'd............

Sample ID : WSPA/RADIAN
SEKR #2
FUEL GAS

STEINER ID # 32835

ANALYZED GAS	MOLE %	WT %	CHONS WT %	
OXYGEN	0.04	0.07	CARBON	73.40
NITROGEN	1.16	1.87	HYDROGEN	23.67
CARBON DIOXIDE	0.53	1.34	OXYGEN	1.05
HYDROGEN	ND	0.00	NITROGEN	1.87
CARBON MONOXIDE	ND	0.00	SULFUR	0.00
HYDROGEN SULFIDE	ND	0.00		
METHANE	92.39	85.40		
ETHANE	4.79	8.30		
PROPANE	0.87	2.21		
iso-BUTANE	0.09	0.30		
n-BUTANE	0.08	0.27		
iso-PENTANE	0.02	0.08		
n-PENTANE	0.01	0.04		
HEXANE +	0.02	0.10		
TOTAL:	100.00			

SPECIFIC GRAVITY * : 0.599

SPECIFIC VOLUME : 21.90 cu ft/lb

HYDROGEN SULFIDE : ppm (GC/FPD)
STEINER ID# :

TOTAL * BTU/cu ft	DRY :	1048	NET * BTU/cu ft	DRY :	945
	WET :	1030		WET :	928
BTU/lb	:	22947	BTU/lb	:	20687

* CALCULATED ACCORDING TO : ASTM D-3588

Figure 3-4. Summary of Results - Natural Gas Analysis SWEPI (SEKR) Gas Turbine #2

DCN 92-256-227-02
RCN 256-227-04-00

SOURCE TEST REPORT FOR THE THE TEXACO HEATER TREATER, THE MOBIL STEAM GENERATOR, AND THE SWEPI GAS TURBINE IN THE SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT, CALIFORNIA

FINAL

VOLUME II
(APPENDICES)

Prepared for:

Western States Petroleum Association
901 Tower Way, Suite 300
Bakersfield, California 93309-1585

Prepared by:

Radian Corporation
10389 Old Placerville Road
Sacramento, California 95827

September 4, 1992

TABLE OF CONTENTS

APPENDIX A

PROCESS DATA

TEXACO HEATER TREATER TEST DATA

(MAY 28-30, 1992)

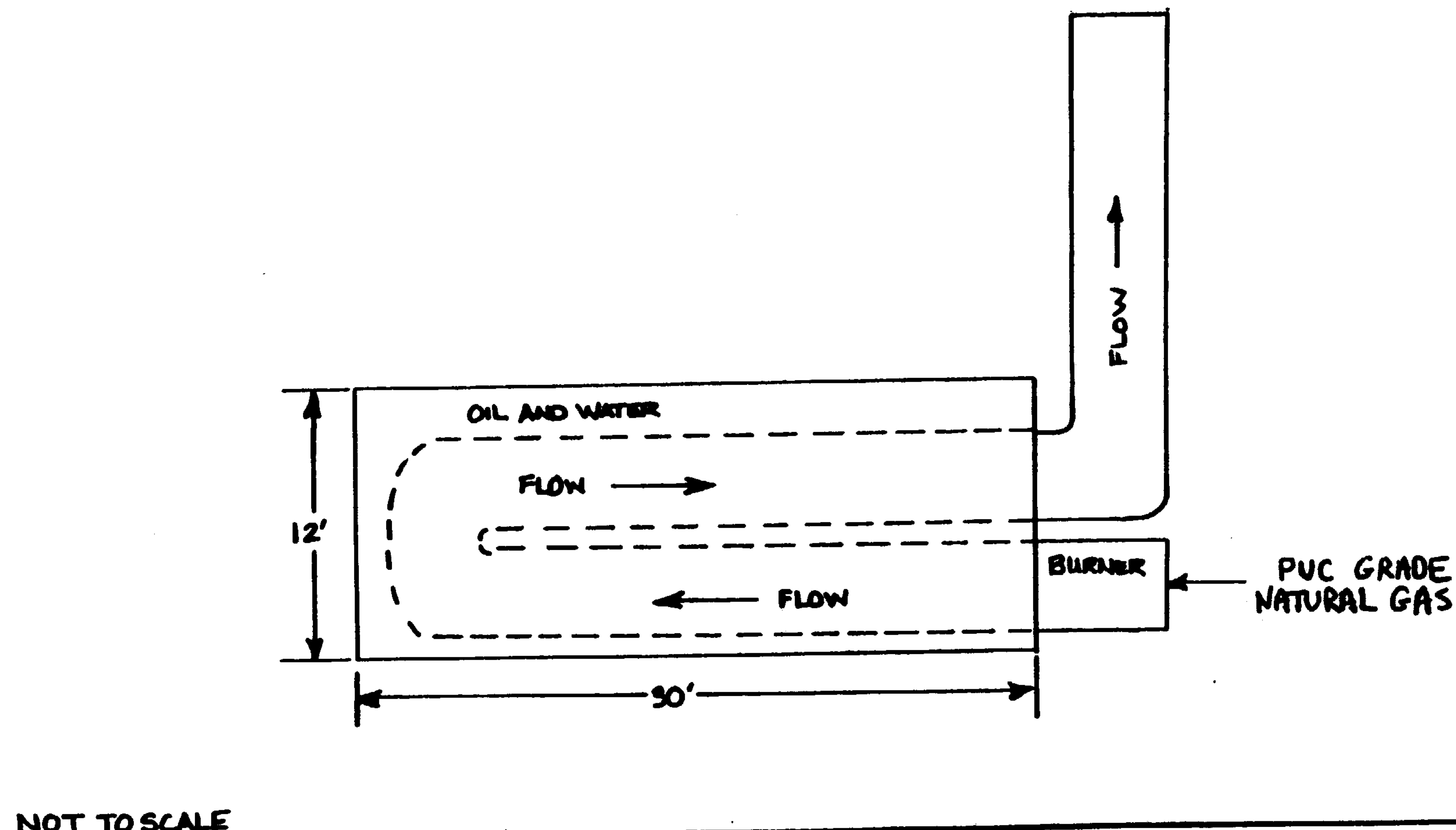

Figure A-1: **Texaco Heater Treater Process Schematic**

Table A-1

Heater Treater Operating and Design Parameters

Parameter	Units	Value
Manufacturer		CE Natco
Model		NA
Unit Identification		NA
Heat Input	MMBtu/hr	3.6
NO_x Control	Yes/No	No
Stack Diameter	inches	~30
Stack Length	feet	~20
Gaseous Fuel Consumption		
(1) Type		PUC grade natural gas
Volume Flow Rate	MCF/hr	3
Temperature	°F	Ambient
Pressure		NA
Exhaust Gas		
Flow Rate		NA
Temperature	°F	400-600
Pressure		Atmospheric

NA = Not available

Table A-2

Summary of Process Operating Data - Texaco Heater Treater

Parameter	Test # - Date (Time)	Gas Firing Rate (cfh)	Heat Input (MMBtu)	Treater Temp. (°F)	Percent Water (%)	Burner Pressure (psi)
PAH, CEM	1 - 5/28/92 (1000-1934)	4.15	4.25	214	0.86	14.5
	2 - 5/29/92 (0851-1644)	4.04	4.13	193	3.03	14.5
	4 - 5/30/92 (0824-1500)	4.04	4.13	188	5.3	14.4
	Average	4.08	4.17	198	3.06	14.5
Aldehydes	1A - 5/28/92 (1000-1550)	4.27	4.37	214	0.90	14.5
	1B - 5/28/92 (1653-2003)	4.04	4.13	215	0.82	14.6
	2 - 5/29/92 (0846-1205)	4.04	4.13	178	3.80	14.5
	Average	4.12	4.21	202	1.84	14.5
BTEX, Propylene, THC	4A - 5/30/92 (0824-0854)	4.04	4.13	142	6.20	14.5
	4B - 5/30/92 (0902-0932)	4.04	4.13	176	7.45	14.5
	4C - 5/30/92 (0943-1013)	4.04	4.13	187	7.82	14.5
	Average	4.04	4.13	168	7.16	14.5

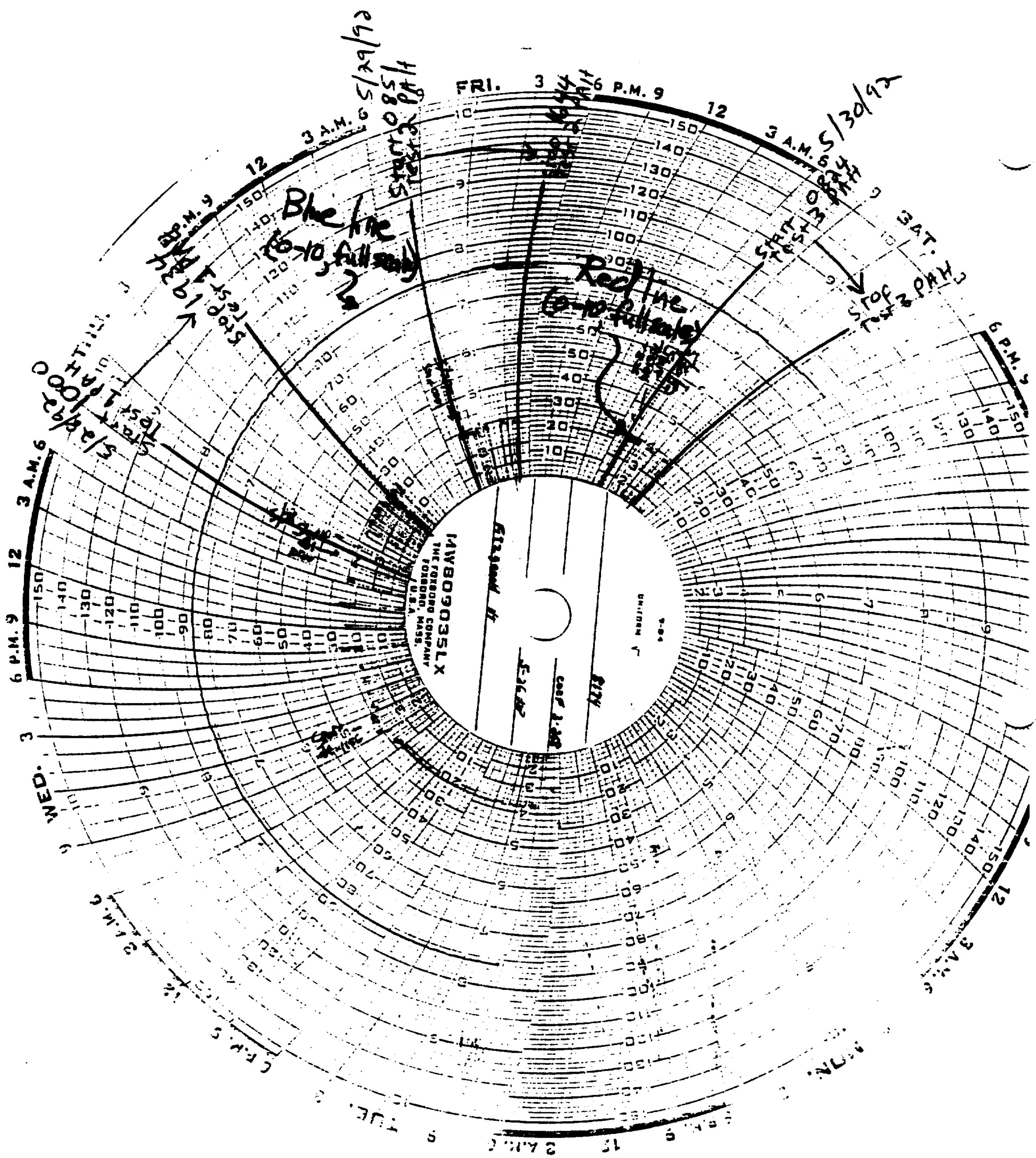

Figure A-2. Gas Firing Rate Data - Texaco (Cymrik Field) Heater Treater

RADIAN
CORPORATION

GENERAL COMPUTATION SHEET

CLIENT NAME WSPA

PROJECT NAME WSPA-AB2588

CALCULATION SET	
Prelim.	
Final	
Sheet 1 Of 2	
Charge #	

Rev.	Comp'd By	Chk'd By
	Date 7/29/92	Date
	Date	Date

Heat Input Calculation - Texaco Heater Treater (Example):

Gas Firing Rate ($1000\,ft^3/day$) = [Red line value] * [Blue line value] * 3.268[a]

where the Red line and Blue line values are obtained from the circular chart traces (refer to Figure A-2).

For the majority of Tests 1, 2, and 4 -

Red line value = 3.9
Blue line value = 7.6

Gas Firing Rate = $3.9 \times 7.6 \times 3.268$
= 96,864 ft^3/day (or, 4,036 ft^3/hr)

The heat content of the gas is 1,024 Btus/ft^3 (refer to fuel analysis data)

Heat Input = Gas Firing Rate × Heat Content
= $4{,}036 \times 1{,}024$
= 4.13×10^6 BTU/hr

(a) per Texaco personnel.

1-85-18743

RADIAN CORPORATION

GENERAL COMPUTATION SHEET

CLIENT NAME WSPA

PROJECT NAME WSPA - AB2588

CALCULATION SET		
Prelim.		
Final		
Sheet 2 Of 2		
Charge #		
Rev.	Comp. By	Chk'd By
	Date	Date
	Date	Date

The Red line and Blue line values were constant (3.9 and 7.6, respectively) during all tests, with the exception of [redacted] 30-minute interval during Test 1 on 5/28/92 (i.e., from 1100-1130), during which the Red line value increased to 4.7. The gas firing rate for this period was:

$$\text{Gas Firing Rate} = 4.7 \times 7.6 \times 3.268$$
$$= 116{,}733 \ ft^3/day, \text{ or}$$
$$= 4{,}864 \ ft^3/hr$$

$$\text{Heat Input} = 4{,}864 \times 1{,}024$$
$$= 4.98 \times 10^6 \ BTU/hr$$

The time-weighted average heat input for Test #1 (PAH) is calculated as follows:

$$\text{Avg Heat Input} = \frac{4.98 \ MMBTU/hr \times 30 \ min + 4.13 \ MMBTU/hr \times 185}{215 \ min.}$$
$$= 4.25 \ MMBTU/hr$$

1-85-18743

Process Operating Data
- Texaco (Fitzgerald Lease) Heater Treater
- 5/28/92

Time	Treater Temp (°F)	Output (?)	Output (?)	Percent Water	Buffer Pressure (psi)
1010	214	64	54	1.17	14.5
1021 - Heater off-line					
11:45 - Heater back on-line					
12:08 - Heater off-line					
13:45 - Heater on-line					
14:05	212	56	55	0.82	14.4
14:22	220	56	57	0.93	
Test 1 14:30 Stop - Heater off-line					
15:03 Heater-on-line					
15:22	210	56	61	0.82	14.5
15:36	212	56	61	0.82	14.6
AVG 15:48	214 — 214	56 — 57	60	0.83 — 0.90	14.6 — 14.5
16:00 - Heater off-line					
16:30 - Heater on-line					
16:52	217	56	60	0.84	14.6
17:00 Heater off-line					
17:16 Heater on-line					
17:28	208	56	~~56~~ 60	0.80	14.4
17:47	214	56	60	0.81	14.5
18:01	219	56	60	0.83	14.7
18:02 - Heater off-line					
18:29 - Heater On-line					
18:43	211	56	60	0.81	14.5
AVG 19:01	219 — 214	56	60	0.81 — 0.86	14.5 — 14.5
19:05 - Stop Heater Off-line					

Process Operating Data (Cont'd)

Time 5/28/92	Treater Temp (°F)	Output	Output (%)	Percent Water (%)	Burner F (p
19:29 - Heater Resumed Operation					
19:41	211	54	60	0.81	14.5
AVG 19:58	218 215	56	58	0.82 0.82	14.7
20:03 - Heater Off-line					

5/29/92

0855	136	48	48	2.80	14.5
0911	149	48	56	3.00	14.5
0926	160	48	56	3.30	14.5
0942	173	48	56	3.68	14.[illegible]
0957	183	48	54	4.10	14.[illegible]
1019	197	48	54	5.06	14.[illegible]
1035	208	48	54	4.88	14.5
1039 Stop - A traverse completed Jim Oblak turned heater off.					
1005 Heater turned ON					
1114 B traverse started					
AVG 1122	219 178	50	54	3.60 3.80	14.5
1124 Unit down					
1213 Heater Resumed operation					
1220 Resumed testing					
1223	206	52	56	2.70	14.[illegible]
1244	218	52	56	2.40	14.5

TEST 2 Aldehyde

TEST 2 PAH

Process Operating Data

Time	Treater Temp (OF)	Output(%)	Output(%)	Percent Water	Burner Press. (psi)
5/29/92					
1442	~~1442~~ Unit refired by Jim Oblak				
1450	Restart Test				
1455	195	52	58	1.94	14.5
Test 2 PAH 1513	207	52	57	1.95	14.5
1531	217	52	58	1.90	14.5
40	Unit down				
1624	Unit started				
1632	Test Restarted				
1634	211	52	58	2.01	14.5
1640 AVG	214 — 193	52	58	2.08 — 3.03	14.5 — 14

Process Operating Data
– Texaco (Fitzgerald Lease) Heater Treater
– 5/30/92

Time	Treater Temp (°F)	Output (%)	Output (%)	% H_2O	Burner Pres
1st 4 0810 – Treater Turned on – Initial Temp – 116°F					
0832	133	51	56	6.30	14.5
AVG 0855	150 _142	51	55	6.10 _6.20	14.5
Start Fuel Sample (Bag) @ 0908-0918					
4B 0925	170	51	54	6.69	14.5
AVG 0945	182 _176	51	55	8.20 _7.45	14.4
4C AVG 1003	192 _187	51	55	7.43 _7.82	14.5
1015 – Treater Turned off					
1125 – Treater Turned on					
1142	191	52	56	5.20	14.3
1207	205	51	56	5.30	14.5
1228	216	52	56	5.45	14.4
~~1406~~ 1234 – Heater off line					
1406 – Heater on-line					
1423	200	52	55	2.65	14.4
1440	210	52	55	2.50	14.5
AVG 1455	217 _188	52	54	2.41 _5.29	14.3

FUEL ANALYSIS DATA

PACIFIC GAS TECHNOLOGY

2122 Q Str
Bakersfield, California 933
805/324-13
Fax: 805/324-274

GAS ANALYSIS BY CHROMATOGRAPH

STEINER ENVIRONMENTAL, INC
4930 Boylan Street
Bakersfield, CA 93308

Attention: Jim Steiner

SAMPLED: MAY 29, 1992
SUBMITTED: JUNE 1, 1992
REPORTED: JUNE 4, 1992
LAB # 2309

Sample ID : WSPA\RADIAN
TEXACO HEATER TREATER
NATURAL GAS

STEINER ID # 32766

ANALYZED GAS

	MOLE %	WT %	CHONS WT %	
OXYGEN	0.04	0.06	CARBON	6
NITROGEN	0.24	0.31	HYDROGEN	1
CARBON DIOXIDE	10.62	21.89	OXYGEN	15.9
HYDROGEN	ND	0.00	NITROGEN	0.3
CARBON MONOXIDE	ND	0.00	SULFUR	0.0
HYDROGEN SULFIDE	ND	0.00		
METHANE	78.35	58.88		
ETHANE	6.47	9.11		
PROPANE	3.17	6.55		
iso-BUTANE	0.31	0.84		
n-BUTANE	0.60	1.63		
iso-PENTANE	0.08	0.27		
n-PENTANE	0.06	0.20		
HEXANE +	0.06	0.24		
TOTAL:	100.00			

SPECIFIC GRAVITY * : 0.737

SPECIFIC VOLUME : 18.32 cu ft/l

HYDROGEN SULFIDE : ppm (GC/FPD) (STEINER ID)

TOTAL * BTU/cu ft	DRY :	1024		NET * BTU/cu ft	DRY :	92
	WET :	1006			WET :	90
BTU/lb	:	18764		BTU/lb	:	169

* CALCULATED ACCORDING TO : ASTM D-3588

AIR TOXICS LTD.

SAMPLE NAME: T30-A

ID#: 9206001A-05A

Stationary Source Test Method - Low Level BTEX & Propylene

(Modified CARB Method 410A)

Cryofocusing GC FID/PID

File Name:	**6060118**	**Date of Collection:**	**5/30/92**
Dil. Factor:	**50**	**Date of Analysis:**	**6/1/92**

Compound	MDL (ppbv)	Amount (ppbv)
Benzene	50	12000
Toluene	50	2100
Ethyl Benzene	50	1400
Total Xylenes	50	2900
Propylene	50	Not Detected

Comments:

Container Type: Tedlar Bag

MOBIL STEAM GENERATOR TEST DATA

(JUNE 2-4, 1992)

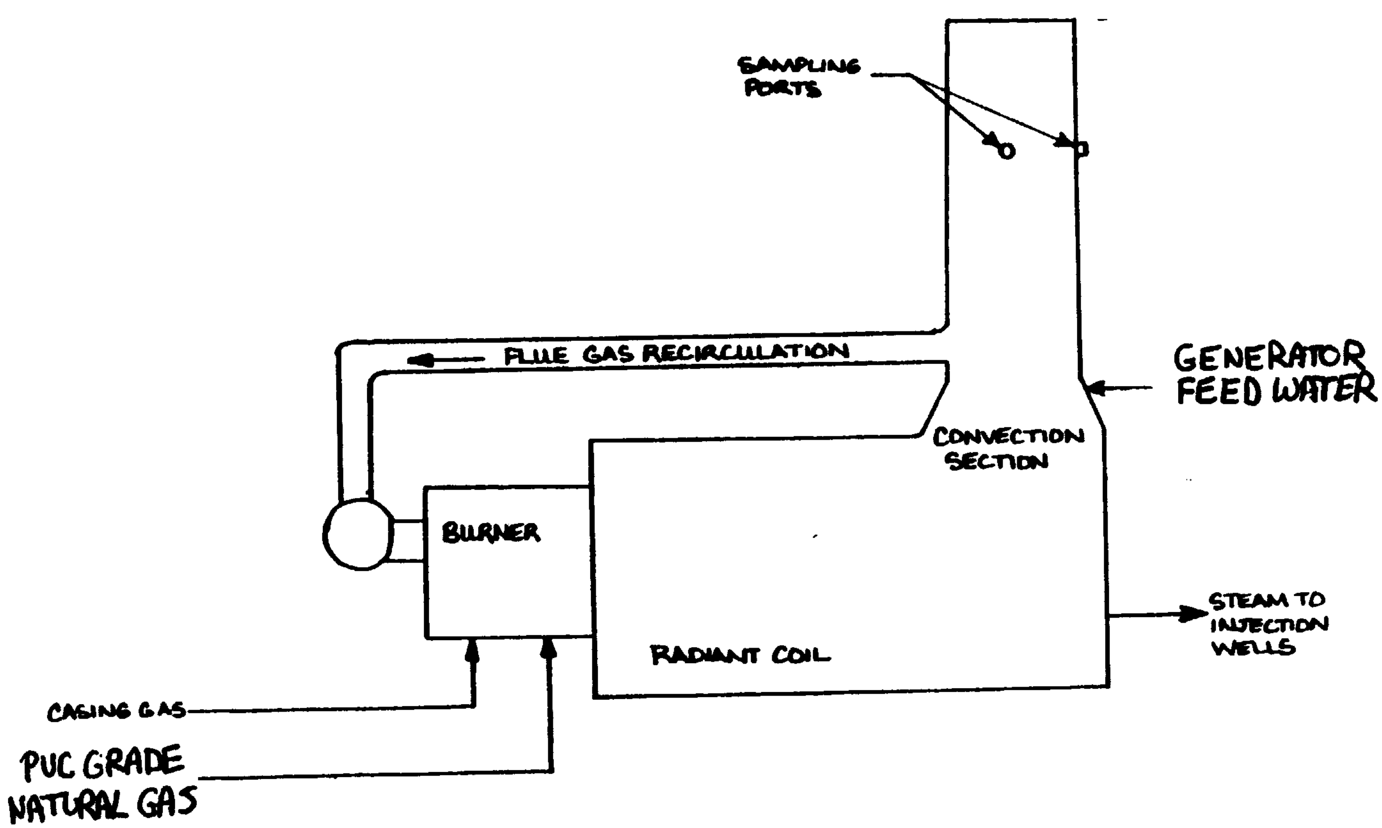

Figure A-3: **Mobil Steam Generator Process Schematic**

RADIAN CORPORATION

Table A-3

Steam Generator Operating and Design Parameters

Parameter	Units	Value
Manufacturer		Struthers
Model		NA
Unit Identification		401A
Heat Input	MMBtu/hr	62.5
Number of Burners		1
Burner Manufacturer		North American
Model		4131GLNXFGR
NO_x Control		
Water Injection	Yes/No	No
Flue Gas Recurculation (FGR)	Yes/No	Yes
Lo-NO_x Burner	Yes/No	Yes
O_2 Control	Yes/No	Yes
Radiant Section Exit Temperature	°F	450-510
Thermal Efficiency		NA
Stack Diameter	inches	~35
Stack Length	feet	~30
Flue Gas Recirculation		
Percent of Total Exhaust Gas	%	10-12
Flow Rate	dscfm	800-1,155
Temperature	°F	300-400
Pressure		NA
Gaseous Fuel Consumption		
(1) Type		PUC grade natural gas
Volume Flow Rate	MCF/hr	~~50~~ 46.3
Temperature	°F	Ambient
Pressure	PSIG	NA

Table A-3

(Continued)

Parameter	Units	Value
(2) Type		Casing Gas
Volume Flow Rate	MCF/hr	~~NA~~ 7.8
Temperature	°F	Ambient
Pressure	PSIG	NA
Water Flow to Steam Generator	gal/min	80-100
Exhaust Gas		
Flow Rate	dscfm	8,000-10,500
Temperature	°F	~~385~~ 297
Pressure	PSIG	Ambient

NA = Not available

Table A-4

Summary of Process Operating Data - Mobil Steam Generator #401A

Parameter	Test # - Date (Time)	Fuel Gas Rate (x 10^3 ft^3/day)	Casing Gas Rate (x 10^3 ft^3/day)	Heat Input[a] (MMBtu/hr)	Tube Temp (°F)	Thermal Efficiency (%)	Waterflow (gpm)	Stack Temp (°F)
PAH, CEM	1 - 6/2/92[b] (1336-1830)	1,111	182	49.5	441	79.6	80.2	297
	2 - 6/3/92 (0821-1303)	1,105	226	49.6	437	79.3	80.1	298
	3 - 6/3/92 (1407-1904)	1,134	120	50.0	430	55.9	80.0	296
	Average	1,117	176	49.7	436	71.6	80.1	297
Aldehydes	1 - 6/2/92[b] (1629-1830)	1,111	182	49.5	441	79.6	80.2	297
	2A - 6/3/92 (0824-1025)	1,102	273	49.8	443	74.5	80.1	298
	2B - 6/3/92 (1108-1304)	1,108	178	49.3	431	84.0	80.0	298
	Average	1,107	211	49.5	438	79.4	80.1	298
H_2S	2 - 6/3/92 (0846-1205)	1,102	237	49.5	439	77.8	80.1	298
	3 - 6/3/92 (1419-1757)	1,132	120	49.9	431	54.5	80.1	296
	4 - 6/4/92 (0800-1040)	1,122	176	49.9	435	51.9	79.7	296
	Average	1,119	177	49.8	435	61.4	80.0	297

Table A-4

(Continued)

Parameter	Test # - Date (Time)	Fuel Gas Rate (x 10^3 ft^3/day)	Casing Gas Rate (x 10^3 ft^3/day)	Heat Input[a] (MMBtu/hr)	Tube Temp (°F)	Thermal Efficiency (%)	Waterflow (gpm)	Stack Temp (°F)
BTEX, THC Propylene	4A - 6/4/92 (0810-0840)	1,134	175	50.4	439	20.0	79.6	296
	4B - 6/4/92 (0848-0918)	1,122	177	49.9	435	61.5	80.4	296
	4C - 6/4/92 (0924-0954)	1,110	179	49.4	430	81.4	79.9	296
	Average	1,122	177	49.9	435	54.3	80.0	296

[a] Heat input values are calculated based on the fuel gas (natural gas and casing gas) firing rates and their respective heating values; refer to the attached calculations.

[b] Process data logging was inadvertently curtailed during Test #1 due to an electrical circuit overload. Test 1 average values are based on the limited data that was available (refer to the attached field records).

RADIAN CORPORATION

GENERAL COMPUTATION SHEET

CALCULATION SET		
Prelim.		
Final		
Sheet 1 Of 2		
Charge #		
Rev.	Comp. By	Chk'd By
	Date 7/10/92	Date
	Date	Date

CLIENT NAME WSPA - Mobil Steam Generator

PROJECT NAME WSPA-AB2588

Heat Input Calculation (Example):

Heat Input (MMBTU/hr) = [Fuel Gas Rate (cfh) × Fuel Gas Heat Content (BTU/ft³) + Casing Gas Rate (cfh) × Casing Gas Heat Content (BTU ÷ 10^6 (BTU/MMBTU)

Based on the fuel and casing gas analyses, the higher heating values of the two fuels were (dry basis):

Fuel (Natural) Gas : 1,040 BTU/ft^3

Casing Gas : 177 BTU/ft^3

(these values were used for all tests)

For Test 1 (PAH), the average fuel and casing gas firing rates were:

$1{,}111 \times 10^3$ ft^3/day ÷ 24 hours/day = 46,292 cfh (Fue

182×10^3 ÷ 24 hours/day = 7,583 cfh (Casin

Heat Input (MMBTU/hr) = [(46,292 × 1,040) + (7,583 × 177)] / 10^6

= 49.49 MMBTU/hr

1-85-18743

RADIAN CORPORATION

GENERAL COMPUTATION SHEET

CLIENT NAME WSPA

PROJECT NAME WSPA - AB2588

CALCULATION SET		
Prelim.		
Final		
Sheet 2 Of 2		
Charge #		
Rev.	Comp. By	Chk'd By
	MZ	
	Date 7/10/92	Date
	Date	Date

Test 2 (PAH): $[(46{,}050 \times 1{,}040) + (9{,}400 \times 177)] / 10^6$

$= 49.56$ MMBTU/hr

Test 3 (PAH) $= [(47{,}263 \times 1{,}040) + (5{,}013 \times 177)] / 10^6$

$= 50.04$ MMBTU/hr

MOBIL EXPLORATION & PRODUCING US INC
SOURCE TEST FIELD DATA – LOST HILLS

Test Date: 6-2-92

Unit Name:	Mobil Representative(s):		Regulatory Observer(s):	Test Company:
401A	S. ARNOLD / M. Poe		LUIS PAREDES, KARI Fuqua & Barbara Rycerski	Steiner / Radian
Permit #: 4011153(B)	Permit Type(s) (Circle Choice): EPA, APCD, ATC, PTO, Exempt, Other:		Fuel Type(s) (Circle Choice): NG, TEOR, LPG, Oil, Other:	Test Company Representative: MARK Ludwiczak (916) 362-5332
Stm Gen Mfg.: Struthers	Burner Mfg: N. American	Burner Model #: 4131G-LNX-FGR	Maximum Burner Input MM Btu/hr = 62.5	List Pollution Control Devices or Strategies If Any (Circle Choice(s)): FGR, O2 Controller, SCR, Low Sulfur NG, Scrubbed TEOR Gas, Reduced Throttle, Other:
Stack Height Ft: 45'	Stack ID Inches: 35"	Preliminary Test Results (Circle One): Passed Failed		

Very
Mok

Test Purpose: REPRESENTATIVE STEAM GENERATOR TO DETERMINE AIR TOXICS

6/2/92 (ALL OTHER DATA COLLECTED

Run	1st hr					
Time	1527					
NG MCFD	1118					
TEOR MCFD	190					
Feedwater GPM	80.1					
Feedwater Temp F	87					
Stm Qual %	79.0					
Stm Temp F	526					
Stm PSIG	801					
Vessel IWC N/A	—					
Stack Temp F	297					
Tube Temp F	454					
Burner Throat F	159					
Mix Air O2%	~~1.61~~					
Exhaust O2%	1.61					
FGR %	—					
Exhaust DSCFM	—					
Load %						
NOx PPM	32.4					
NOx @ 3% O2						
NOx lb/hr	2.04					
CO PPM	—					
CO PPM @ 3% O2						
CO lb/hr	—					
SO2 PPM	—					
SO2 PPM @ 3% O2						
SO2 lb/hr						
Ambient Temp F	≥100°F					
Barometric Pres						

Emission Limit:	
PM-10 lb/hr	0.35 lbs/hr
PM-10 lb/MMBtu	
SO2 lb/hr	0.36
SO2 lb/MMBtu	
SO4 lb/hr	0.04
SO4 lb/MMBtu	
Sulfur lb/hr	
Sulfur lb/MMBtu	
NOx lb/hr	2.71
NOx lb/MMBtu	
NMHC lb/hr	0.17
NMHC lb/MMBtu	
CO lb/hr	0.04
CO lb/MMBtu	

Fuel Sample Collection Data

Sample Type: gas samples
Sample Label: TEOR and NG
Collected By: pulled 6/3/92
Sample Time: by Mark Ludwiczak

Sample Type:
Sample Label:
Collected By:
Sample Time:

NOTES:

Mark – this is a list of data I took on Tuesday shortly after the Communication failure – the data was collected from the control screen at the 401A generator – I hope it helps –

Susan E Arnold
(805) 665-7106

Mobil

M. K. Poe
c:\apcdcf\e
Original 3/9/

SUSAN E. ARNOLD
Environmental & Safety Specialist

MOBIL EXPLORATION & PRODUCING U.S. INC.
P.O. Box 38
Lost Hills, CA 93249

Business: (805) 665-7106
Cellular: (805) 331-6466
Beeper: (805) 321-2440
Fax: (805) 665-7131

6/15

DATE: 02-JUN-1992

TIME HRS	FUEL GAS MCF	WASTE GAS MCF	WATER RATE BBLS	STACK TEMP F	TUBE TEMP F	THERMAL EFF %	WATER VOL BBLS	STEAM PRESS PSIG	STEAM TEMP F
0	1131	163	80.099998	270	432	12.046667	2610.000244	778	521
50	1144	167	80.099998	271	437	6.366667	2667.000244	778	521
50	1130	163	80.5	271	429	9.286667	2724.000244	778	522
100	1144	160	80.099998	271	426	9.21	37.000004	777	521
150	1131	159	79.599998	269	429	6.346667	94.000008	781	522
200	1140	152	79.599998	270	417	9.103333	152.000015	773	521
250	1140	159	80.099998	270	417	6.423333	209.000015	778	521
300	1133	163	79.599998	270	413	3.57	266.000031	779	522
350	1137	163	80.5	270	440	12.226666	323.000031	776	521
400	1124	159	80.099998	269	427	0.826667	380.000031	782	521
450	1137	159	80.5	270	417	0.806667	437.000031	781	521
500	1114	163	80.099998	270	431	3.596667	495.000031	780	522
550	1137	162	79.599998	270	443	0.7	552.000061	782	522
600	1149	167	79.599998	271	439	0.723333	609.000061	781	521
650	1138	159	79.599998	271	448	3.6	666.000061	780	522
700	1131	160	80.5	273	448	9.21	723.000061	782	522
750	1102	155	79.599998	275	440	0.976667	780.000061	790	523
800	1130	160	79.599998	274	445	1.366667	838.000061	794	524
850	1138	157	79.599998	275	440	3.793333	895.000061	796	525
900	1118	154	80.5	294	443	9.54	952.000061	795	525
950	1150	157	80.099998	296	441	21.56	1009.000061	800	525
1000	1048	158	80.5	296	438	53.693333	1066.000122	798	525
1050	514	0	79.099998	205	411	79.013336	1123.000122	672	507
1100	913	0	80.099998	206	432	73.566666	1180.000122	716	513
1150	915	0	80.099998	208	411	70.736664	1237.000122	688	510
1200	1093	150	79.599998	292	424	75.160004	1294.000122	781	523
1250	1100	158	80.5	295	447	84.393333	1351.000122	792	525
1300	1116	150	80.099998	295	456	84.896667	1408.000122	798	525
1350	1111	154	80.099998	296	429	78.596664	1465.000122	793	524
1400	1105	196	80.5	297	440	81.296669	1522.000122	798	525
1450	1105	191	80.5	296	393	88.146667	1558.000122	796	524
1500	1105	191	80.5	296	393	88.599998	1558.000122	796	524
1550	1105	191	80.5	296	393	88.599998	1558.000122	796	524
1600	1105	191	80.5	296	393	88.599998	1558.000122	796	524
1650	1105	191	80.5	296	393	88.599998	1558.000122	796	524
1700	1105	191	80.5	296	393	88.599998	1558.000122	796	524
1750	1105	191	80.5	296	393	88.599998	1558.000122	796	524
1800	1105	191	80.5	296	393	88.599998	1558.000122	796	524
1850	1105	191	80.5	296	393	88.599998	1558.000122	796	524
1900	1105	191	80.5	296	393	88.599998	1558.000122	796	524
1950	1105	191	80.5	296	393	88.599998	1558.000122	796	524
2000	1105	191	80.5	296	393	88.599998	1558.000122	796	524
2050	1105	191	80.5	296	393	88.599998	1558.000122	796	524
2100	1105	191	80.5	296	393	88.599998	1558.000122	796	524
2150	1105	191	80.5	296	393	88.599998	1558.000122	796	524
2200	1105	191	80.5	296	393	88.599998	1558.000122	796	524
2250	1105	191	80.5	296	393	88.599998	1558.000122	796	524
2300	1105	191	80.5	296	393	88.599998	1558.000122	796	524

Tst#4

DATE: 03-JUN-1992

	TIME	FUEL GAS	WASTE GAS	WATER RATE	STACK TEMP	TUBE TEMP	THERMAL EFF	WATER VOL	STEAM PRESS	STE
	HRS	MCF	MCF	BBLS	F	F	%	BBLS	PSIG	
	0	1105	191	80.5	296	393	88.599998	1558.000122	795	
	50	1105	191	80.5	296	393	88.599998	1558.000122	795	
	100	1105	191	80.5	296	393	88.599998	1558.000122	795	
	150	1105	191	80.5	296	393	88.599998	1558.000122	795	
	200	1105	191	80.5	296	393	88.599998	1558.000122	795	
	250	1105	191	80.5	296	393	88.599998	1558.000122	795	
	300	1105	191	80.5	296	393	88.599998	1558.000122	795	
	350	1105	191	80.5	296	393	88.599998	1558.000122	795	
	400	1105	191	80.5	296	393	88.599998	1558.000122	795	
	450	1105	191	80.5	296	393	88.599998	1558.000122	795	
	500	1105	191	80.5	296	393	88.599998	1558.000122	795	
	550	1105	191	80.5	296	393	88.599998	1558.000122	795	
	600	1105	191	80.5	296	393	88.599998	1558.000122	795	
	650	1105	191	80.5	296	393	88.599998	1558.000122	795	
	700	1105	191	80.5	296	393	88.599998	1558.000122	795	
	750	1133	196	80.099998	290	444	66.860001	723.000061	670	
	800	1100	315	79.599998	295	443	57.413334	780.000061	679	
	850	1112	302	80.099998	297	447	53.27	838.000061	753	
	900	1085	289	80.5	297	455	82.419998	895.000061	774	
2A	950	1090	293	80.5	298	436	88.753334	952.000061	781	
	1000	1109	288	79.599998	299	441	88.553337	1009.000061	778	
Test 2	1050	1116	193	80.099998	298	438	59.330002	1066.000122	755	
	1100	1114	177	80.099998	298	439	75.826668	1123.000122	772	
	1150	1085	170	80.099998	299	433	87.133331	1181.000122	772	
2B	1200	1104	181	79.599998	298	421	86.923332	1238.000122	769	
	1250	1135	182	80.099998	296	426	86.596664	1295.000122	763	
	1300	1102	181	80.099998	297	436	83.73333	1352.000122	759	
	1350	1119	177	79.599998	297	438	38.166668	1409.000122	752	
	1400	1133	173	79.599998	298	450	61.213333	1466.000122	751	
	1450	1111	174	80.099998	297	424	52.243336	1523.000122	756	
	1500	1121	170	80.5	296	444	46.5	1580.000122	752	
3	1550	1128	174	80.099998	297	439	28.969999	1638.000122	752	
Test 3 (4.5)	1600	1130	103	79.599998	295	425	49.556667	1695.000122	750	
	1650	1140	55	80.5	296	439	63.813335	1752.000122	747	
	1700	1137	92	80.099998	296	432	68.82	1809.000122	743	
	1750	1145	97	79.599998	294	428	57.176666	1866.000122	745	
	1800	1145	97	80.099998	294	419	68.720001	1923.000122	744	
	1850	1140	91	79.599998	294	415	65.93	1981.000122	744	
	1900	1147	97	80.5	294	418	51.676666	2038.000122	743	
	1950	1142	103	79.599998	292	433	37.303333	2095.000244	739	
	2000	1142	102	79.599998	293	445	48.836666	2152.000244	744	
	2050	1166	102	80.5	294	456	3.533334	2209.000244	741	
	2100	1131	90	80.5	293	441	6.29	2266.000244	741	
	2150	1118	102	80.099998	293	432	3.553333	2324.000244	747	
	2200	1130	90	80.099998	291	418	0.546667	2381.000244	739	
	2250	1137	101	80.5	292	415	0.666667	2438.000244	742	
	2300	1133	84	80.5	293	419	3.526667	2495.000244	745	
	2350	1128	107	80.099998	291	442	3.466667	2553.000244	758	

DATE: 04-JUN-1992

TIME HRS	FUEL GAS MCF	WASTE GAS MCF	WATER RATE BBLS	STACK TEMP F	TUBE TEMP F	THERMAL EFF %	WATER VOL BBLS	STEAM PRESS PSIG	STEAM TEMP F
0	1119	213	80.099998	294	437	34.953335	2609.000244	771	520
50	1130	192	80.099998	293	426	84.123337	2667.000244	777	521
100	1102	182	80.900002	293	426	88.699997	2724.000244	774	521
150	1131	174	80.5	293	441	86.686668	37.000004	774	521
200	1114	171	80.099998	292	441	83.809998	94.000008	776	522
250	1126	177	80.5	292	432	78.376663	152.000015	788	522
300	1112	174	80.099998	292	415	63.990002	209.000015	795	523
350	1100	177	80.5	291	417	52.57	266.000031	794	524
400	1130	177	80.099998	291	419	61.013332	323.000031	806	524
450	1107	174	80.099998	292	420	52.596668	380.000031	804	525
500	1114	174	80.099998	292	412	49.689999	437.000031	805	525
550	1121	171	80.5	290	432	35.243332	494.000031	802	524
600	1131	174	80.099998	291	428	46.706669	552.000061	806	525
650	1116	174	80.5	291	455	40.893333	609.000061	802	524
700	1119	174	80.099998	292	454	43.636665	666.000061	803	524
750	1138	171	80.099998	293	454	58.003334	723.000061	805	525
800	1119	168	79.099998	294	436	23.803333	780.000061	819	527
850	1144	171	79.599998	296	440	3.543333	837.000061	821	528
Test 4 900	1114	183	79.599998	296	436	52.946667	894.000061	813	527
950	1128	173	80.900002	296	433	67.326668	952.000061	788	523
1000	1105	181	79.599998	296	429	84.870003	1009.000061	788	523
1050	1121	177	79.599998	298	435	78.733337	1066.000122	785	523
1100	1107	173	80.099998	297	438	75.486664	1123.000122	783	523
1150	1097	173	79.599998	297	446	73.056671	1180.000122	784	523
1200	1093	174	80.099998	296	421	87.846664	1237.000122	773	522
1250	1102	174	79.599998	297	433	84.123337	1295.000122	776	522
1300	1119	177	80.099998	297	433	66.620003	1352.000122	774	522
1350	1128	177	80.5	297	458	49.623333	1409.000122	780	522
1400	1137	177	80.099998	296	451	40.773335	1466.000122	779	522

Shaded area shows Communication failure due to 110v breaker being overloaded at test site.

401A. WK1
JADUHON
MOBIL OIL LOS HILLS
co/ S. ARNOLD

FUEL ANALYSIS DATA

PACIFIC GAS TECHNOLOGY

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

GAS ANALYSIS BY CHROMATOGRAPH

STEINER ENVIRONMENTAL, INC
4930 Boylan Street
Bakersfield, CA 93308

Attention: Vernon McKnight

Sample ID : RADIAN/WSPA
SG401A FUEL LINE
NATURAL GAS

SAMPLED: JUNE 3, 1992

SUBMITTED: JUNE 5, 1992

REPORTED: JUNE 12, 1992

LAB # 4377-2

STEINER ID # 32775

ANALYZED GAS	MOLE %	WT %	CHONS WT %	
OXYGEN	0.03	0.04	CARBON	61.53
NITROGEN	0.20	0.22	HYDROGEN	15.55
CARBON DIOXIDE	17.65	31.16	OXYGEN	22.70
HYDROGEN	ND	0.00	NITROGEN	0.22
CARBON MONOXIDE	ND	0.00	SULFUR	0.00
HYDROGEN SULFIDE	ND	0.00		
METHANE	70.17	45.16		
ETHANE	5.01	6.04		
PROPANE	2.45	4.33		
iso-BUTANE	0.62	1.45		
n-BUTANE	1.15	2.68		
iso-PENTANE	0.43	1.24		
n-PENTANE	0.43	1.24		
HEXANE +	1.86	6.43		
TOTAL:	100.00			

SPECIFIC GRAVITY * : 0.861

SPECIFIC VOLUME : 16.00 cu ft/lb

HYDROGEN SULFIDE : ppm (GC/FPD)
STEINER ID# :

TOTAL * BTU/cu ft	DRY :	1040	NET * BTU/cu ft	DRY :	943
	WET :	1022		WET :	926
BTU/lb	:	16645	BTU/lb	:	15086

* CALCULATED ACCORDING TO : ASTM D-3588

PACIFIC GAS TECHNOLOGY

2122 Q Stre
Bakersfield, California 933
805/324-13
Fax: 805/324-274E

GAS ANALYSIS BY CHROMATOGRAPH

STEINER ENVIRONMENTAL, INC
4930 Boylan Street
Bakersfield, CA 93308

Attention: Vernon McKnight

Sample ID : RADIAN/WSPA
SG401A FUEL LINE
CASING GAS

SAMPLED: JUNE 3, 1992
SUBMITTED: JUNE 5, 1992
REPORTED: JUNE 12, 1992
LAB # 4377-1
STEINER ID # 32771

ANALYZED GAS	MOLE %	WT %	CHONS WT %	
OXYGEN	0.31	0.24	CARBON	30
NITROGEN	1.86	1.27	HYDROGEN	1
CARBON DIOXIDE	85.28	91.28	OXYGEN	66.6
HYDROGEN	ND	0.00	NITROGEN	1.2
CARBON MONOXIDE	ND	0.00	SULFUR	0.0
HYDROGEN SULFIDE	ND	0.00		
METHANE	10.69	4.17		
ETHANE	0.44	0.32		
PROPANE	0.18	0.19		
iso-BUTANE	0.02	0.03		
n-BUTANE	0.04	0.06		
iso-PENTANE	0.05	0.09		
n-PENTANE	0.03	0.05		
HEXANE +	1.10	2.31		
TOTAL:	100.00			

SPECIFIC GRAVITY * : 1.419

SPECIFIC VOLUME : 11.53 cu ft/l

HYDROGEN SULFIDE : ppm (GC/FPD)
STEINER ID# :

TOTAL * BTU/cu ft	DRY : 177		NET * BTU/cu ft	DRY :	16
	WET : 174			WET :	15
BTU/lb	: 2040		BTU/lb	:	18

* CALCULATED ACCORDING TO : ASTM D-3588

AIR TOXICS LTD.

SAMPLE NAME: M-32 Natural Gas

ID#: 9206029-06A

Stationary Source Test Method - Low Level BTEX & Propylene

(Modified CARB Method 410A)

Cryofocusing GC FID/PID

File Name: 9060614 **Date of Collection: 6/4/92**
Dil. Factor: 1000 **Date of Analysis: 6/5/92**

Compound	MDL (ppbv)	Amount (ppbv)
Benzene	1000	850000
Toluene	1000	840000
Ethyl Benzene	1000	210000
Total Xylenes	1000	540000
Propylene	1000	Not Detected

Comments:

Container Type: Tedlar Bag

AIR TOXICS LTD.

SAMPLE NAME: M-33 Casing Gas

ID#: 9206029-07A

Stationary Source Test Method - Low Level BTEX & Propylene

(Modified CARB Method 410A)

Cryofocusing GC FID/PID

File Name:	[illegible]	Date of Calibration: [illegible]
Dil. Factor:	2500	Date of Analysis: 6/8/92

Compound	MDL (ppbv)	Amount (ppbv)
Benzene	2500	39000
Toluene	2500	68000
Ethyl Benzene	2500	120000
Total Xylenes	2500	324000
Propylene	2500	130000

Comments:

Container Type: Tedlar Bag

SWEPI GAS TURBINE TEST DATA

(JUNE 9-10, 1992)

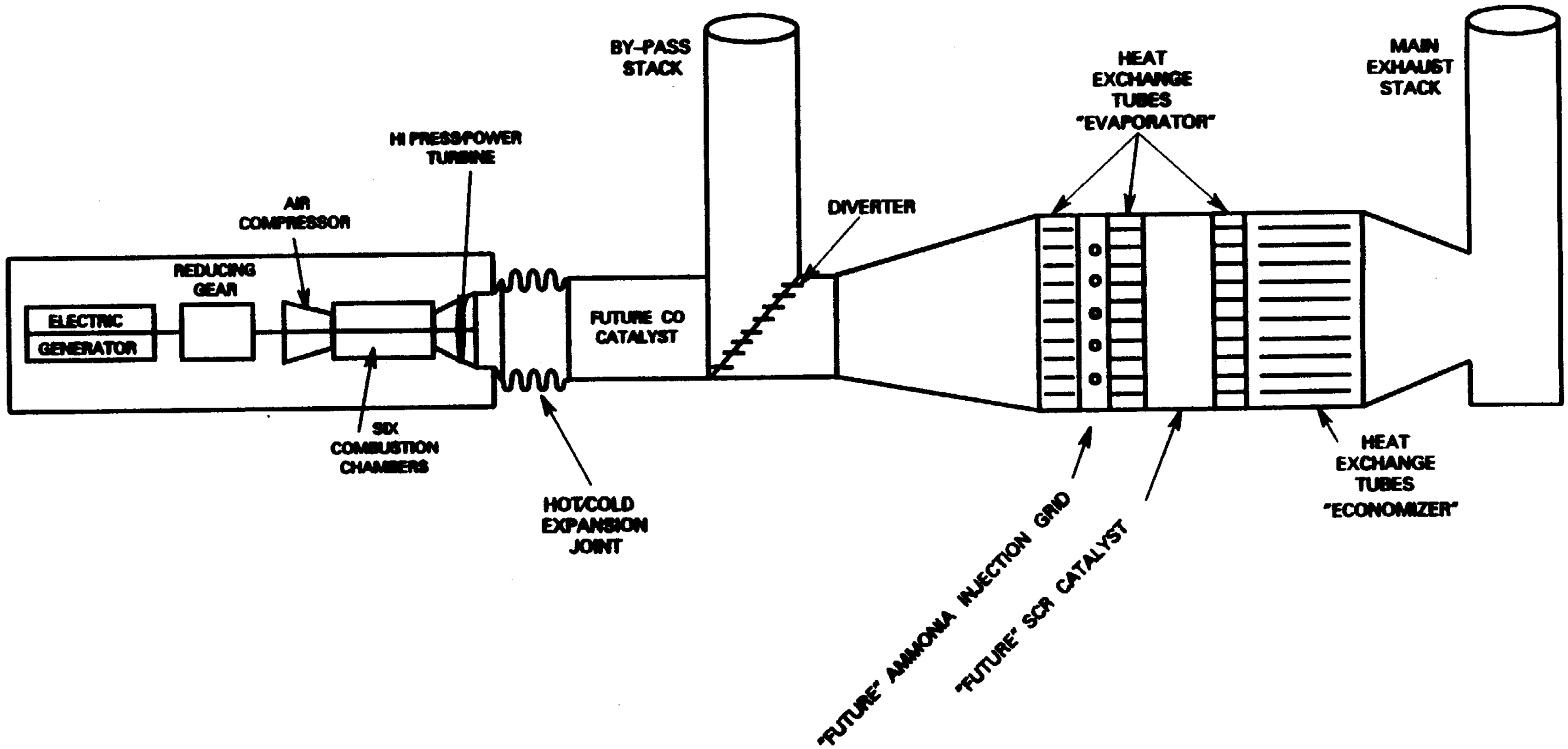

Figure A-4: **SWEPI Gas Turbine Process Schematic**

Table A-5

Gas Turbine Operating and Design Parameters

Parameter	Units	Value
Manufacturer		Allison
Model		501K B5
Unit Identification		GTG/HRSG 102 or 103
Heat Input	MMBtu/hr	52.5
Power Generation	MW	3.75
Number of Burners		NA
NO_x Control		
Ammonia Injection	Yes/No	No
Water Injection	Yes/No	Yes
Flue Gas Recirculation (FGR)	Yes/No	No
Stack Diameter	inches	46.25
Stack Height	feet	30
Water Injection		
Water to Fuel Ratio	lb/lb	0.83
Temperature	°F	Ambient
Flow Rate	lb/hr	1,870
Gaseous Fuel Consumption		
(1) Type		PUC grade natural gas
Volume Flow Rate	MCF/hr	50
Temperature	°F	Ambient
Pressure	PSIG	230
Exhaust Gas		
Flow Rate	dscfm	30,000
Temperature	°F	300
Pressure	inches H_2O	Atmospheric

Table A-6

Summary of Process Operating Data - SWEPI (SEKR) Gas Turbine #2

Parameter	Test # - Date (Time)	Fuel Gas Rate (lb/hr)	Heat Input (MMBtu/hr)	Generator Output (megawatt)	Turbine Exhaust Temp. (°F)	Inj. Water Flow (lb/hr)	Inj. Water Ratio
PAH, CEM	1 - 6/9/92 (1025-1440)	1984	45.5	2.83	941	1642	0.83
	3 - 6/10/92 (0750-1229)	1993	45.7	2.89	943	1650	0.83
	4 - 6/10/921[a] (1447-1929)	1968	45.0	NA	NA	1633	0.83
	Average	1982	45.4	2.86	942	1642	0.83
Aldehydes	1A - 6/9/92 (1025-1238)	1989	45.6	2.84	942	1649	0.83
	1B - 6/9/92 (1247-1501)	1980	45.4	2.81	939	1638	0.83
	2 - 6/9/92 (1523-1743)	1960	45.0	2.78	940	1606	0.82
	Average	1976	45.3	2.81	941	1630	0.83
BTEX, Propylene, THC	2A - 6/9/92 (1614-1644)	1946	44.7	2.77	940	1598	0.82
	2B - 6/9/92 (1657-1727)	1959	45.0	2.79	940	1613	0.83
	3A - 6/10/92 (0804-0835)	1984	45.5	2.88	942	1628	0.82
	Average	1963	45.1	2.81	941	1613	0.82

[a] Thirty-minute average process data records were not available for Test 4. The above data are based on hourly averages (refer to the attached record). Fuel firing rates were calculated based on heat input and the fuel heat content.

DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 06/09/92 TIME: 10:31:51

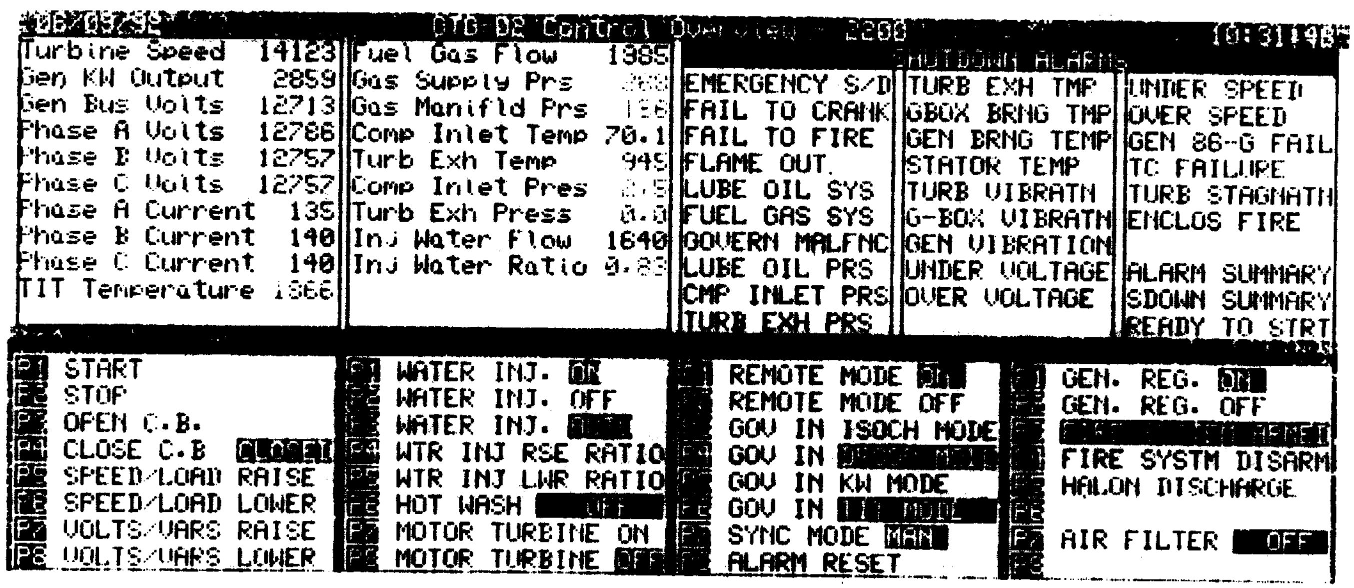

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DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 06/09/92 TIME: 11:00:06

06/09/92 G/G-02 Control [illegible] 2200 11:00:04

Turbine Speed	14123	Fuel Gas Flow	2012
Gen KW Output	2889	Gas Supply Prs	265
Gen Bus Volts	12742	Gas Manifld Prs	157
Phase A Volts	12801	Comp Inlet Temp	70.1
Phase B Volts	12771	Turb Exh Temp	942
Phase C Volts	12771	Comp Inlet Pres	2.5
Phase A Current	135	Turb Exh Press	0.0
Phase B Current	141	Inj Water Flow	1628
Phase C Current	140	Inj Water Ratio	0.81
TIT Temperature	1877		

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

F1 START	F1 WATER INJ. ON	F1 REMOTE MODE ON	F1 GEN. REG. ON
F2 STOP	F2 WATER INJ. OFF	F2 REMOTE MODE OFF	F2 GEN. REG. OFF
F3 OPEN C.B.	F3 WATER INJ. AUTO	F3 GOV IN ISOCH MODE	F3 FIRE SYSTEM ARMED
F4 CLOSE C.B CLOSED	F4 WTR INJ RSE RATIO	F4 GOV IN DROOP MODE	F4 FIRE SYSTM DISARM
F5 SPEED/LOAD RAISE	F5 WTR INJ LWR RATIO	F5 GOV IN KW MODE	F5 HALON DISCHARGE
F6 SPEED/LOAD LOWER	F6 HOT WASH OFF	F6 GOV IN TIT MODE	F6
F7 VOLTS/VARS RAISE	F7 MOTOR TURBINE ON	F7 SYNC MODE MAN	F7 AIR FILTER OFF
F8 VOLTS/VARS LOWER	F8 MOTOR TURBINE OFF	F8 ALARM RESET	F8

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11:00

DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 06/09/92 TIME: 11:30:36

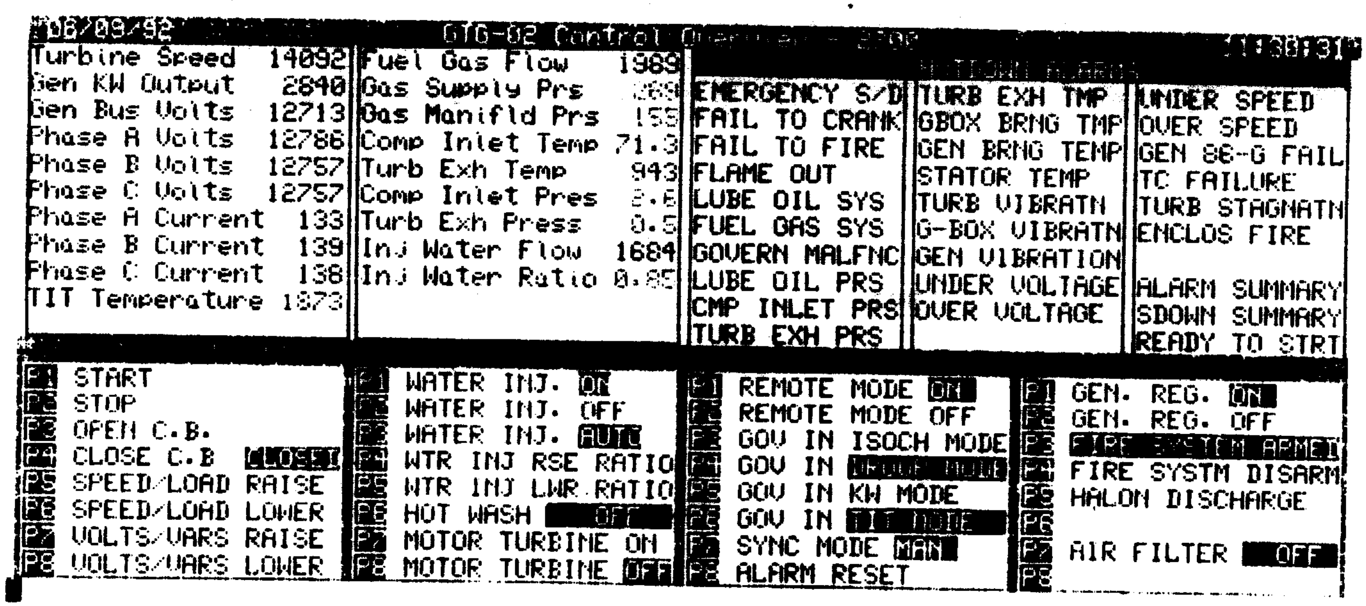

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DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 06/09/92 TIME: 12:00:10

06/09/92 TG 02 Control [illegible] 2200 [illegible] 12:00:08

Turbine Speed	14108	Fuel Gas Flow	1991	EMERGENCY S/D	TURB EXH TMP	UNDER SPEED
Gen KW Output	2830	Gas Supply Prs	270	FAIL TO CRANK	GBOX BRNG TMP	OVER SPEED
Gen Bus Volts	12742	Gas Manifld Prs	155	FAIL TO FIRE	GEN BRNG TEMP	GEN 86-G FAIL
Phase A Volts	12801	Comp Inlet Temp	71.6	FLAME OUT	STATOR TEMP	TC FAILURE
Phase B Volts	12786	Turb Exh Temp	941	LUBE OIL SYS	TURB VIBRATN	TURB STAGNATN
Phase C Volts	12771	Comp Inlet Pres	2.6	FUEL GAS SYS	G-BOX VIBRATN	ENCLOS FIRE
Phase A Current	133	Turb Exh Press	0.4	GOVERN MALFNC	GEN VIBRATION	
Phase B Current	138	Inj Water Flow	1649	LUBE OIL PRS	UNDER VOLTAGE	ALARM SUMMARY
Phase C Current	138	Inj Water Ratio	0.83	CMP INLET PRS	OVER VOLTAGE	SDOWN SUMMARY
TIT Temperature	1873			TURB EXH PRS		READY TO STRT

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 [illegible]
P4 CLOSE C.B CLOSED	P4 WTR INJ RSE RATIO	P4 GOV IN [illegible]	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: 2200 VERSION: 4

DATE: 06/09/92 TIME: 12:30:16

06/09/92 12:30:13

Turbine Speed	14108	Fuel Gas Flow	1969	EMERGENCY S/D	TURB EXH TMP	UNDER SPEED
Gen KW Output	2815	Gas Supply Prs	266	FAIL TO CRANK	GBOX BRNG TMP	OVER SPEED
Gen Bus Volts	12713	Gas Manifld Prs	154	FAIL TO FIRE	GEN BRNG TEMP	GEN 86-G FAIL
Phase A Volts	12786	Comp Inlet Temp	72.7	FLAME OUT	STATOR TEMP	TC FAILURE
Phase B Volts	12771	Turb Exh Temp	943	LUBE OIL SYS	TURB VIBRATN	TURB STAGNATN
Phase C Volts	12757	Comp Inlet Pres	2.5	FUEL GAS SYS	G-BOX VIBRATN	ENCLOS FIRE
Phase A Current	131	Turb Exh Press	0.4	GOVERN MALFNC	GEN VIBRATION	
Phase B Current	137	Inj Water Flow	1631	LUBE OIL PRS	UNDER VOLTAGE	ALARM SUMMARY
Phase C Current	136	Inj Water Ratio	0.83	CMP INLET PRS	OVER VOLTAGE	SDOWN SUMMARY
TIT Temperature	1868			TURB EXH PRS		READY TO STRT

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	
P4	CLOSE C.B CLOSED	P4	WTR INJ RSE RATIO	P4	GOV IN	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	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	

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DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 06/09/92 TIME: 13:01:09

06/09/92 — DIG-82 Control — 2200 — 13:01:06

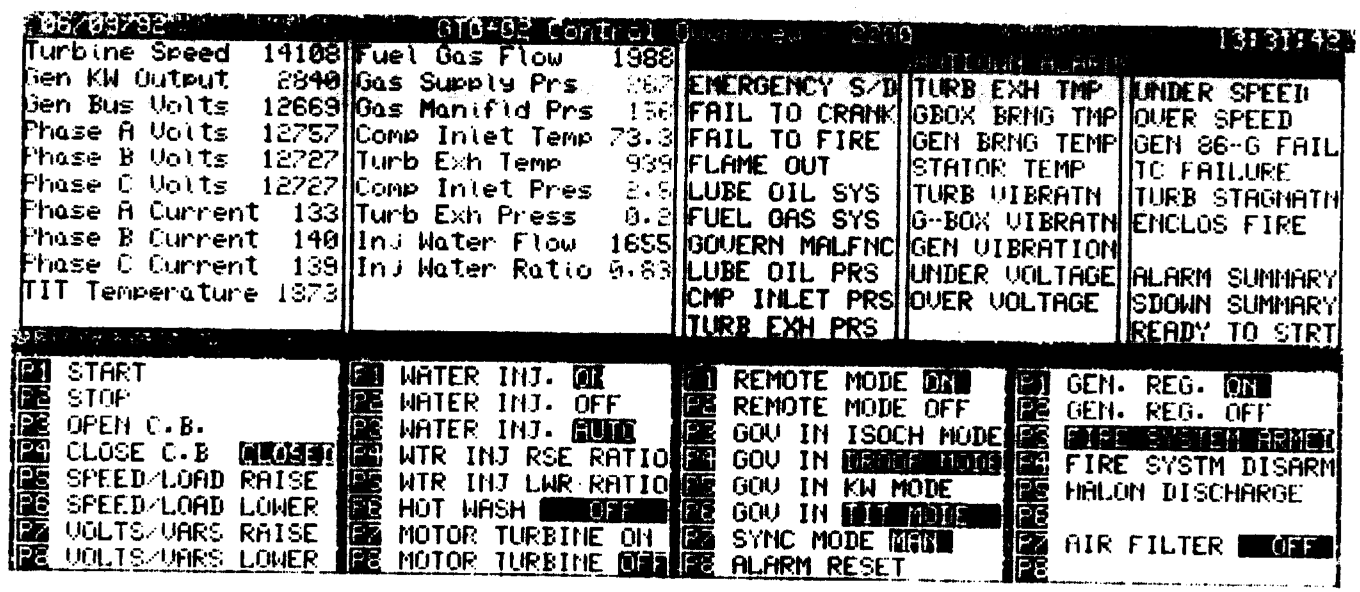
Turbine Speed	14108	Fuel Gas Flow	1984	EMERGENCY S/D	TURB EXH TMP	UNDER SPEED
Gen KW Output	2835	Gas Supply Prs	263	FAIL TO CRANK	GBOX BRNG TMP	OVER SPEED
Gen Bus Volts	12683	Gas Manifld Prs	156	FAIL TO FIRE	GEN BRNG TEMP	GEN 86-G FAIL
Phase A Volts	12786	Comp Inlet Temp	72.4	FLAME OUT	STATOR TEMP	TC FAILURE
Phase B Volts	12742	Turb Exh Temp	940	LUBE OIL SYS	TURB VIBRATN	TURB STAGNATN
Phase C Volts	12742	Comp Inlet Pres	2.5	FUEL GAS SYS	G-BOX VIBRATN	ENCLOS FIRE
Phase A Current	133	Turb Exh Press	0.4	GOVERN MALFNC	GEN VIBRATION	
Phase B Current	139	Inj Water Flow	1655	LUBE OIL PRS	UNDER VOLTAGE	ALARM SUMMARY
Phase C Current	138	Inj Water Ratio	0.83	CMP INLET PRS	OVER VOLTAGE	SDOWN SUMMARY
TIT Temperature	1873			TURB EXH PRS		READY TO STRT

F1 START	F1 WATER INJ. ON	F1 REMOTE MODE ON	F1 GEN. REG. ON
F2 STOP	F2 WATER INJ. OFF	F2 REMOTE MODE OFF	F2 GEN. REG. OFF
F3 OPEN C.B.	F3 WATER INJ. AUTO	F3 GOV IN ISOCH MODE	F3 FIRE SYSTEM ARM
F4 CLOSE C.B CLOSED	F4 WTR INJ RSE RATIO	F4 GOV IN DROOP MODE	F4 FIRE SYSTM DISARM
F5 SPEED/LOAD RAISE	F5 WTR INJ LWR RATIO	F5 GOV IN KW MODE	F5 HALON DISCHARGE
F6 SPEED/LOAD LOWER	F6 HOT WASH OFF	F6 GOV IN TIT MODE	F6
F7 VOLTS/VARS RAISE	F7 MOTOR TURBINE ON	F7 SYNC MODE MAN	F7 AIR FILTER OFF
F8 VOLTS/VARS LOWER	F8 MOTOR TURBINE OFF	F8 ALARM RESET	F8

COPY IN PROGRESS

DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 06/09/92 TIME: 13:31:44



COPY IN PROGRESS

DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 06/09/92 TIME: 14:00:19

06/09/92 STG-02 Control [illegible] 2200 14:00:17

Turbine Speed	14092	Fuel Gas Flow	1985	EMERGENCY S/D	TURB EXH TMP	UNDER SPEED
Gen KW Output	2810	Gas Supply Prs	260	FAIL TO CRANK	GBOX BRNG TMP	OVER SPEED
Gen Bus Volts	12683	Gas Manifld Prs	155	FAIL TO FIRE	GEN BRNG TEMP	GEN 86-G FAIL
Phase A Volts	12757	Comp Inlet Temp	73.6	FLAME OUT	STATOR TEMP	TC FAILURE
Phase B Volts	12727	Turb Exh Temp	939	LUBE OIL SYS	TURB VIBRATN	TURB STAGNATN
Phase C Volts	12727	Comp Inlet Pres	2.5	FUEL GAS SYS	G-BOX VIBRATN	ENCLOS FIRE
Phase A Current	133	Turb Exh Press	0.6	GOVERN MALFNC	GEN VIBRATION	
Phase B Current	139	Inj Water Flow	1655	LUBE OIL PRS	UNDER VOLTAGE	ALARM SUMMARY
Phase C Current	139	Inj Water Ratio	0.83	CMP INLET PRS	OVER VOLTAGE	SDOWN SUMMARY
TIT Temperature	1375			TURB EXH PRS		READY TO STRT

F1 START	F1 WATER INJ. ON	F1 REMOTE MODE ON	F1 GEN. REG. ON
F2 STOP	F2 WATER INJ. OFF	F2 REMOTE MODE OFF	F2 GEN. REG. OFF
F3 OPEN C.B.	F3 WATER INJ. AUTO	F3 GOV IN ISOCH MODE	F3 FIRE SYSTEM ARMED
F4 CLOSE C.B CLOSED	F4 WTR INJ RSE RATIO	F4 GOV IN DROOP MODE	F4 FIRE SYSTM DISARM
F5 SPEED/LOAD RAISE	F5 WTR INJ LWR RATIO	F5 GOV IN KW MODE	F5 HALON DISCHARGE
F6 SPEED/LOAD LOWER	F6 HOT WASH OFF	F6 GOV IN TIT MODE	F6
F7 VOLTS/VARS RAISE	F7 MOTOR TURBINE ON	F7 SYNC MODE MAN	F7 AIR FILTER OFF
F8 VOLTS/VARS LOWER	F8 MOTOR TURBINE OFF	F8 ALARM RESET	F8

COPY IN PROGRESS

DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 06/09/92 TIME: 14:30:40

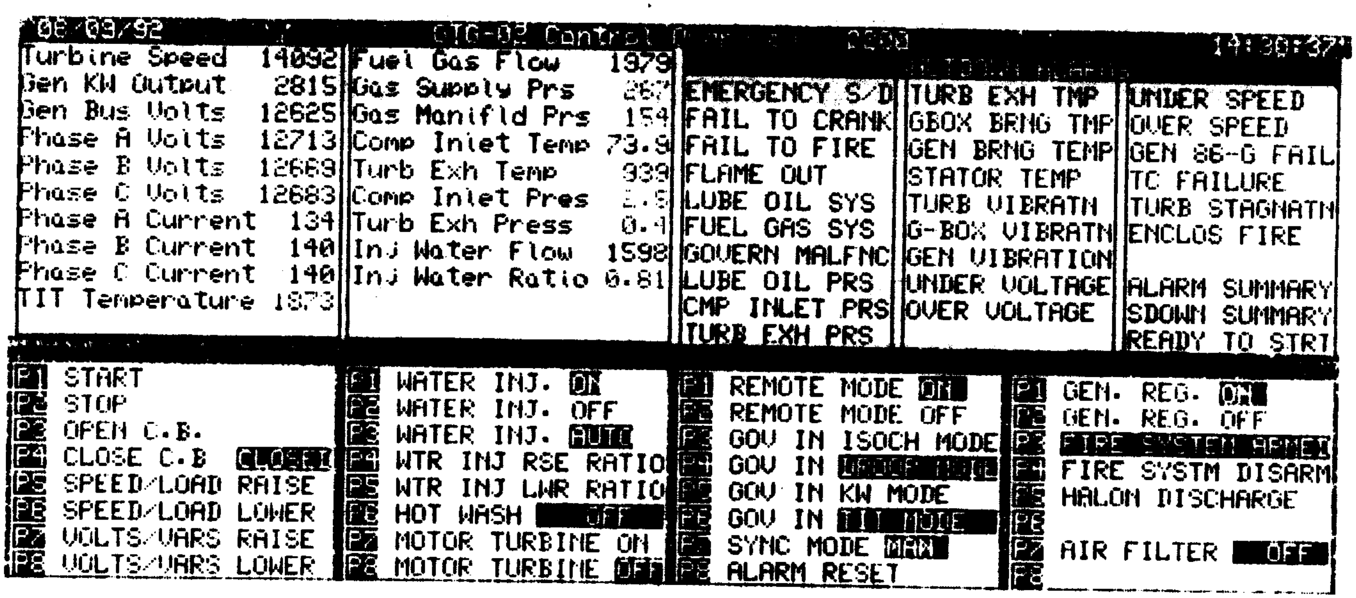


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DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 06/09/92 TIME: 15:00:11

06/09/92 TG-02 Control [illegible] 15:00:09

Turbine Speed	14076	Fuel Gas Flow	1963
Gen KW Output	2757	Gas Supply Prs	264
Gen Bus Volts	12610	Gas Manifld Prs	154
Phase A Volts	12683	Comp Inlet Temp	74.5
Phase B Volts	12639	Turb Exh Temp	939
Phase C Volts	12639	Comp Inlet Pres	2.5
Phase A Current	133	Turb Exh Press	0.1
Phase B Current	139	Inj Water Flow	1626
Phase C Current	138	Inj Water Ratio	0.83
TIT Temperature	1871		

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

F1 START	F1 WATER INJ. ON	F1 REMOTE MODE ON	F1 GEN. REG. ON
F2 STOP	F2 WATER INJ. OFF	F2 REMOTE MODE OFF	F2 GEN. REG. OFF
F3 OPEN C.B.	F3 WATER INJ. AUTO	F3 GOV IN ISOCH MODE	F3 FIRE SYSTEM ARMED
F4 CLOSE C.B CLOSED	F4 WTR INJ RSE RATIO	F4 GOV IN [illegible]	F4 FIRE SYSTM DISARM
F5 SPEED/LOAD RAISE	F5 WTR INJ LWR RATIO	F5 GOV IN KW MODE	F5 HALON DISCHARGE
F6 SPEED/LOAD LOWER	F6 HOT WASH OFF	F6 GOV IN TIT MODE	F6
F7 VOLTS/VARS RAISE	F7 MOTOR TURBINE ON	F7 SYNC MODE MAN	F7 AIR FILTER OFF
F8 VOLTS/VARS LOWER	F8 MOTOR TURBINE OFF	F8 ALARM RESET	F8

COPY IN PROGRESS

DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 06/09/92 TIME: 15:29:54

06/09/92 GTG-02 Control Overview 2200 15:29:52

Turbine Speed	14092	Fuel Gas Flow	1975				
Gen KW Output	2796	Gas Supply Prs	268	EMERGENCY S/D	TURB EXH TMP	UNDER SPEED
Gen Bus Volts	12610	Gas Manifld Prs	154	FAIL TO CRANK	GBOX BRNG TMP	OVER SPEED
Phase A Volts	12683	Comp Inlet Temp	74.2	FAIL TO FIRE	GEN BRNG TEMP	GEN 86-G FAIL
Phase B Volts	12639	Turb Exh Temp	940	FLAME OUT	STATOR TEMP	TC FAILURE
Phase C Volts	12654	Comp Inlet Pres	2.5	LUBE OIL SYS	TURB VIBRATN	TURB STAGNATN
Phase A Current	134	Turb Exh Press	0.0	FUEL GAS SYS	G-BOX VIBRATN	ENCLOS FIRE
Phase B Current	140	Inj Water Flow	1643	GOVERN MALFNC	GEN VIBRATION	
Phase C Current	140	Inj Water Ratio	0.83	LUBE OIL PRS	UNDER VOLTAGE	ALARM SUMMARY
TIT Temperature	1873			CMP INLET PRS	OVER VOLTAGE	SDOWN SUMMARY
				TURB EXH PRS		READY TO STRT

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	

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DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 06/09/92 TIME: 16:02:18

Turbine Speed	14092	Fuel Gas Flow	1970			
Gen KW Output	2791	Gas Supply Prs	265	EMERGENCY S/D	TURB EXH TMP	UNDER SPEED
Gen Bus Volts	12581	Gas Manifld Prs	154	FAIL TO CRANK	GBOX BRNG TMP	OVER SPEED
Phase A Volts	12683	Comp Inlet Temp	74.2	FAIL TO FIRE	GEN BRNG TEMP	GEN 86-G FAIL
Phase B Volts	12654	Turb Exh Temp	937	FLAME OUT	STATOR TEMP	TC FAILURE
Phase C Volts	12639	Comp Inlet Pres	2.5	LUBE OIL SYS	TURB VIBRATN	TURB STAGNATN
Phase A Current	133	Turb Exh Press	0.4	FUEL GAS SYS	G-BOX VIBRATN	ENCLOS FIRE
Phase B Current	140	Inj Water Flow	1580	GOVERN MALFNC	GEN VIBRATION	
Phase C Current	139	Inj Water Ratio	0.81	LUBE OIL PRS	UNDER VOLTAGE	ALARM SUMMARY
TIT Temperature	1873			CMP INLET PRS	OVER VOLTAGE	SDOWN SUMMARY
				TURB EXH PRS		READY TO STRT

START	WATER INJ.	REMOTE MODE	GEN. REG.
STOP	WATER INJ. OFF	REMOTE MODE OFF	GEN. REG. OFF
OPEN C.B.	WATER INJ.	GOV IN ISOCH MODE	
CLOSE C.B	WTR INJ RSE RATIO	GOV IN	FIRE SYSTM DISARM
SPEED/LOAD RAISE	WTR INJ LWR RATIO	GOV IN KW MODE	HALON DISCHARGE
SPEED/LOAD LOWER	HOT WASH	GOV IN	
VOLTS/VARS RAISE	MOTOR TURBINE ON	SYNC MODE	AIR FILTER
VOLTS/VARS LOWER	MOTOR TURBINE	ALARM RESET	

DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 06/09/92 TIME: 16:31:23

Turbine Speed	14092	Fuel Gas Flow	1940
Gen KW Output	2766	Gas Supply Prs	265
Gen Bus Volts	12595	Gas Manifld Prs	153
Phase A Volts	12683	Comp Inlet Temp	74.2
Phase B Volts	12654	Turb Exh Temp	940
Phase C Volts	12654	Comp Inlet Pres	2.5
Phase A Current	132	Turb Exh Press	0.0
Phase B Current	138	Inj Water Flow	1598
Phase C Current	138	Inj Water Ratio	0.82
TIT Temperature	1868		

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	SBDWN SUMMARY
TURB EXH PRS		READY TO STRT

START	WATER INJ.	REMOTE MODE	GEN. REG.
STOP	WATER INJ. OFF	REMOTE MODE OFF	GEN. REG. OFF
OPEN C.B.	WATER INJ.	GOV IN ISOCH MODE	
CLOSE C.B	WTR INJ RSE RATIO	GOV IN	FIRE SYSTM DISARM
SPEED/LOAD RAISE	WTR INJ LWR RATIO	GOV IN KW MODE	HALON DISCHARGE
SPEED/LOAD LOWER	HOT WASH	GOV IN	
VOLTS/VARS RAISE	MOTOR TURBINE ON	SYNC MODE	AIR FILTER
VOLTS/VARS LOWER	MOTOR TURBINE	ALARM RESET	

DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 06/09/92 TIME: 17:06:21

Turbine Speed 14092	Fuel Gas Flow 1944			
Gen KW Output 2757	Gas Supply Prs 267	EMERGENCY S/D	TURB EXH TMP	UNDER SPEED
Gen Bus Volts 12581	Gas Manifld Prs 153	FAIL TO CRANK	GBOX BRNG TMP	OVER SPEED
Phase A Volts 12654	Comp Inlet Temp 73.9	FAIL TO FIRE	GEN BRNG TEMP	GEN 86-G FAIL
Phase B Volts 12610	Turb Exh Temp 940	FLAME OUT	STATOR TEMP	TC FAILURE
Phase C Volts 12639	Comp Inlet Pres 2.5	LUBE OIL SYS	TURB VIBRATN	TURB STAGNATN
Phase A Current 133	Turb Exh Press 0.2	FUEL GAS SYS	G-BOX VIBRATN	ENCLOS FIRE
Phase B Current 139	Inj Water Flow 1598	GOVERN MALFNC	GEN VIBRATION	
Phase C Current 139	Inj Water Ratio 0.82	LUBE OIL PRS	UNDER VOLTAGE	ALARM SUMMARY
TIT Temperature 1866		CMP INLET PRS	OVER VOLTAGE	SDOWN SUMMARY
		TURB EXH PRS		READY TO STRT

START	WATER INJ.	REMOTE MODE	GEN. REG.
STOP	WATER INJ. OFF	REMOTE MODE OFF	GEN. REG. OFF
OPEN C.B.	WATER INJ.	GOV IN ISOCH MODE	
CLOSE C.B	WTR INJ RSE RATIO	GOV IN	FIRE SYSTM DISARM
SPEED/LOAD RAISE	WTR INJ LWR RATIO	GOV IN KW MODE	HALON DISCHARGE
SPEED/LOAD LOWER	HOT WASH	GOV IN	
VOLTS/VARS RAISE	MOTOR TURBINE ON	SYNC MODE	AIR FILTER
VOLTS/VARS LOWER	MOTOR TURBINE	ALARM RESET	

DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 06/09/92 TIME: 17:29:40

06/09/92 GTG-92 Control [illegible] 17:29:38

Turbine Speed	14876
Gen KW Output	2810
Gen Bus Volts	12581
Phase A Volts	12669
Phase B Volts	12639
Phase C Volts	12639
Phase A Current	135
Phase B Current	141
Phase C Current	140
TIT Temperature	1873

Fuel Gas Flow	1973
Gas Supply Prs	263
Gas Manifld Prs	154
Comp Inlet Temp	73.9
Turb Exh Temp	940
Comp Inlet Pres	2.5
Turb Exh Press	0.2
Inj Water Flow	1628
Inj Water Ratio	0.83

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

F1	START
F2	STOP
F3	OPEN C.B.
F4	CLOSE C.B CLOSED
F5	SPEED/LOAD RAISE
F6	SPEED/LOAD LOWER
F7	VOLTS/VARS RAISE
F8	VOLTS/VARS LOWER

F1	WATER INJ. ON
F2	WATER INJ. OFF
F3	WATER INJ. AUTO
F4	WTR INJ RSE RATIO
F5	WTR INJ LWR RATIO
F6	HOT WASH OFF
F7	MOTOR TURBINE ON
F8	MOTOR TURBINE OFF

F1	REMOTE MODE ON
F2	REMOTE MODE OFF
F3	GOV IN ISOCH MODE
F4	GOV IN [illegible]
F5	GOV IN KW MODE
F6	GOV IN [illegible]
F7	SYNC MODE MAN
F8	ALARM RESET

F1	GEN. REG. ON
F2	GEN. REG. OFF
F3	FIRE SYSTEM ARMED
F4	FIRE SYSTM DISARM
F5	HALON DISCHARGE
F6	
F7	AIR FILTER OFF
F8	

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DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 06/09/92 TIME: 17:55:41

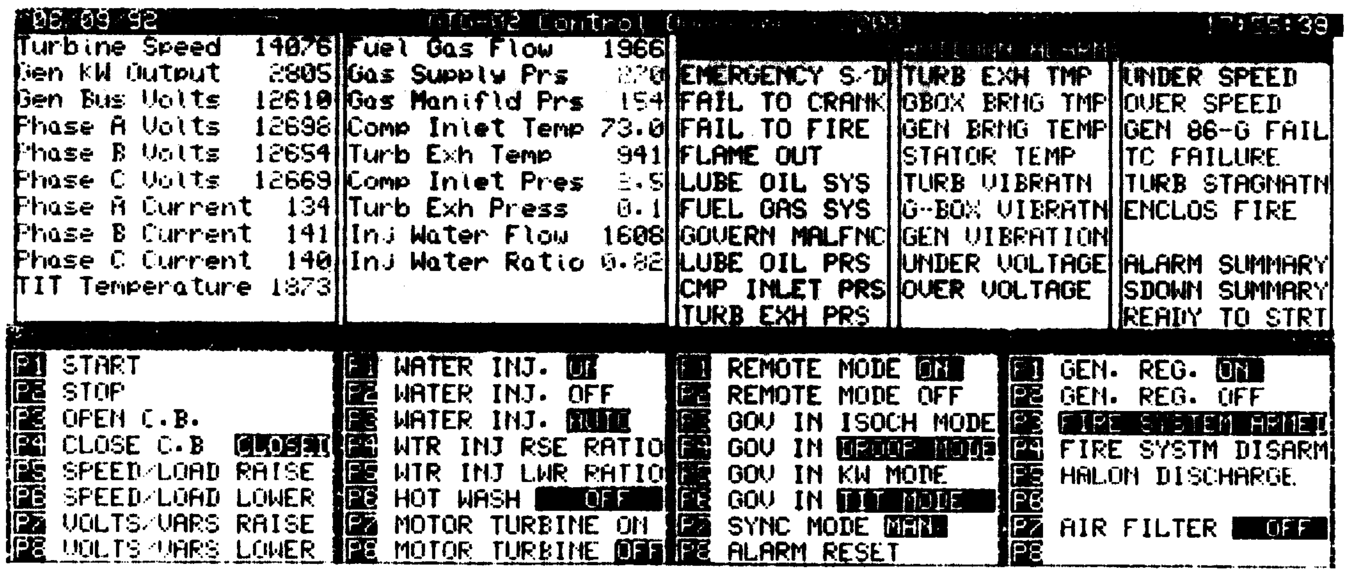

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DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 06/10/92 TIME: 08:02:33

06/10/92 GTG-02 Control Over[illegible] 2200 08:02:30

Turbine Speed	14123	Fuel Gas Flow	1995		
Gen KW Output	2908	Gas Supply Prs	270		
Gen Bus Volts	12713	Gas Manifld Prs	156		
Phase A Volts	12771	Comp Inlet Temp	66.0		
Phase B Volts	12742	Turb Exh Temp	943		
Phase C Volts	12742	Comp Inlet Pres	2.6		
Phase A Current	138	Turb Exh Press	0.0		
Phase B Current	143	Inj Water Flow	1628		
Phase C Current	143	Inj Water Ratio	0.82		
TIT Temperature	1875				

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

F1 START	F1 WATER INJ. ON	F1 REMOTE MODE ON	F1 GEN. REG. ON
F2 STOP	F2 WATER INJ. OFF	F2 REMOTE MODE OFF	F2 GEN. REG. OFF
F3 OPEN C.B.	F3 WATER INJ. AUTO	F3 GOV IN ISOCH MODE	F3 FIRE SYSTEM ARMED
F4 CLOSE C.B CLOSED	F4 WTR INJ RSE RATIO	F4 GOV IN DROOP MODE	F4 FIRE SYSTM DISARM
F5 SPEED/LOAD RAISE	F5 WTR INJ LWR RATIO	F5 GOV IN KW MODE	F5 HALON DISCHARGE
F6 SPEED/LOAD LOWER	F6 HOT WASH OFF	F6 GOV IN TIT MODE	F6
F7 VOLTS/VARS RAISE	F7 MOTOR TURBINE ON	F7 SYNC MODE MAN	F7 AIR FILTER OFF
F8 VOLTS/VARS LOWER	F8 MOTOR TURBINE OFF	F8 ALARM RESET	F8

COPY IN PROGRESS

DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 06/10/92 TIME: 08:42:43

06/10/92 SIG-02 Control 08:42:42

Turbine Speed	14123	Fuel Gas Flow	1984				
Gen KW Output	2884	Gas Supply Prs	264	EMERGENCY S/D	TURB EXH TMP	UNDER SPEED
Gen Bus Volts	12727	Gas Manifld Prs	156	FAIL TO CRANK	GBOX BRNG TMP	OVER SPEED
Phase A Volts	12786	Comp Inlet Temp	66.9	FAIL TO FIRE	GEN BRNG TEMP	GEN 86-G FAIL
Phase B Volts	12757	Turb Exh Temp	942	FLAME OUT	STATOR TEMP	TC FAILURE
Phase C Volts	12757	Comp Inlet Pres	2.6	LUBE OIL SYS	TURB VIBRATN	TURB STAGNATN
Phase A Current	137	Turb Exh Press	0.0	FUEL GAS SYS	G-BOX VIBRATN	ENCLOS FIRE
Phase B Current	142	Inj Water Flow	1628	GOVERN MALFNC	GEN VIBRATION	
Phase C Current	141	Inj Water Ratio	0.82	LUBE OIL PRS	UNDER VOLTAGE	ALARM SUMMARY
TIT Temperature	1866			CMP INLET PRS	OVER VOLTAGE	SDOWN SUMMARY
				TURB EXH PRS		READY TO STRT

F1 START	F1 WATER INJ. ON	F1 REMOTE MODE ON	F1 GEN. REG. ON
F2 STOP	F2 WATER INJ. OFF	F2 REMOTE MODE OFF	F2 GEN. REG. OFF
F3 OPEN C.B.	F3 WATER INJ. AUTO	F3 GOV IN ISOCH MODE	F3 FIRE SYSTEM ARMED
F4 CLOSE C.B CLOSED	F4 WTR INJ RSE RATIO	F4 GOV IN DROOP MODE	F4 FIRE SYSTM DISARM
F5 SPEED/LOAD RAISE	F5 WTR INJ LWR RATIO	F5 GOV IN KW MODE	F5 HALON DISCHARGE
F6 SPEED/LOAD LOWER	F6 HOT WASH OFF	F6 GOV IN TIT MODE	F6
F7 VOLTS/VARS RAISE	F7 MOTOR TURBINE ON	F7 SYNC MODE MAN	F7 AIR FILTER OFF
F8 VOLTS/VARS LOWER	F8 MOTOR TURBINE OFF	F8 ALARM RESET	F8

COPY IN PROGRESS

DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 06/10/92 TIME: 08:57:27

06/10/92 GTG-02 Control [illegible] - 2200 08:57:29

Turbine Speed	14123	Fuel Gas Flow	2009
Gen KW Output	2937	Gas Supply Prs	[illegible]
Gen Bus Volts	12698	Gas Manifld Prs	157
Phase A Volts	12771	Comp Inlet Temp	67.2
Phase B Volts	12742	Turb Exh Temp	944
Phase C Volts	12742	Comp Inlet Pres	2.6
Phase A Current	139	Turb Exh Press	0.0
Phase B Current	144	Inj Water Flow	1661
Phase C Current	143	Inj Water Ratio	0.83
TIT Temperature	1871		

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

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 [illegible]	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	

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DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 06/10/92 TIME: 09:14:02

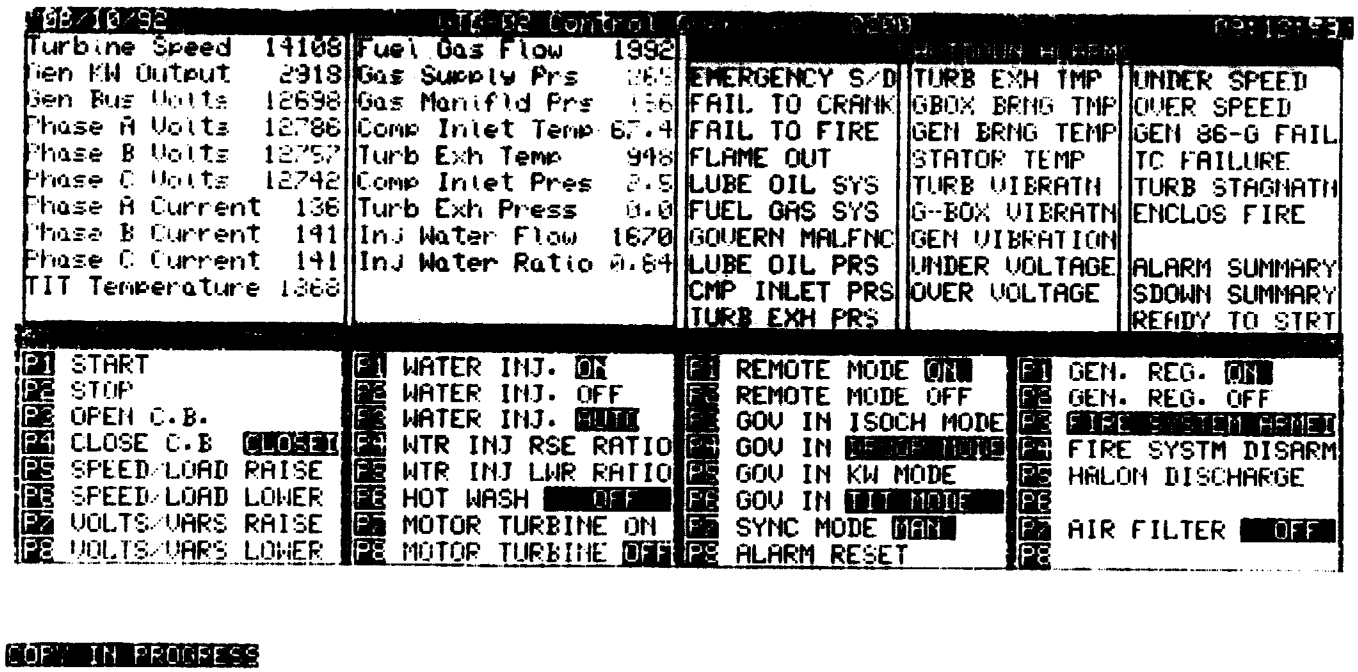

DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 06/10/92 TIME: 09:28:07

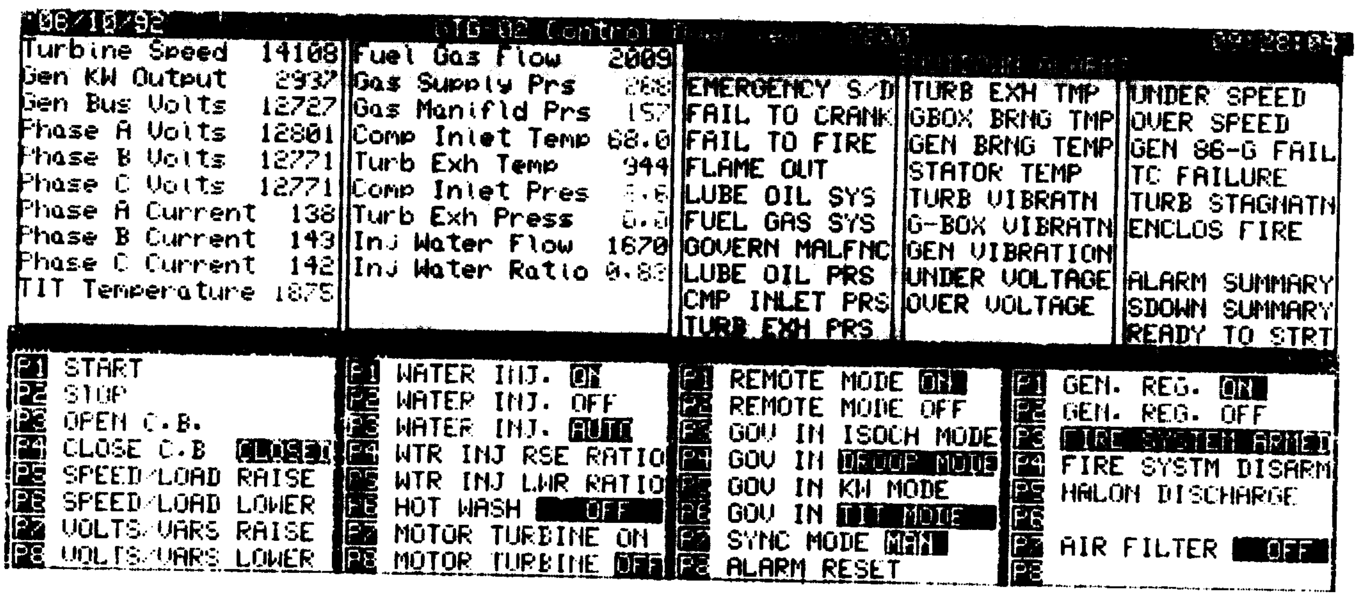

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DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 06/10/92 TIME: 09:43:30

06/10/92 GTG-02 Control [illegible] - 2200 09:43:27

Turbine Speed	14108	Fuel Gas Flow	1984		SHUTDOWN ALARM	
Gen KW Output	2879	Gas Supply Prs	266	EMERGENCY S/D	TURB EXH TMP	UNDER SPEED
Gen Bus Volts	12713	Gas Manifld Prs	156	FAIL TO CRANK	GBOX BRNG TMP	OVER SPEED
Phase A Volts	12786	Comp Inlet Temp	68.9	FAIL TO FIRE	GEN BRNG TEMP	GEN 86-G FAIL
Phase B Volts	12742	Turb Exh Temp	945	FLAME OUT	STATOR TEMP	TC FAILURE
Phase C Volts	12742	Comp Inlet Pres	2.6	LUBE OIL SYS	TURB VIBRATN	TURB STAGNATN
Phase A Current	136	Turb Exh Press	0.0	FUEL GAS SYS	G-BOX VIBRATN	ENCLOS FIRE
Phase B Current	142	Inj Water Flow	1664	GOVERN MALFNC	GEN VIBRATION	
Phase C Current	141	Inj Water Ratio	0.84	LUBE OIL PRS	UNDER VOLTAGE	ALARM SUMMARY
TIT Temperature	1868			CMP INLET PRS	OVER VOLTAGE	SDOWN SUMMARY
				TURB EXH PRS		READY TO STRT

F1	START	F1	WATER INJ. ON	F1	REMOTE MODE ON	P1	GEN. REG. ON
F2	STOP	F2	WATER INJ. OFF	F2	REMOTE MODE OFF	P2	GEN. REG. OFF
F3	OPEN C.B.	F3	WATER INJ. AUTO	F3	GOV IN ISOCH MODE	P3	FIRE SYSTEM ARMED
F4	CLOSE C.B CLOSED	F4	WTR INJ RSE RATIO	F4	GOV IN [illegible]	P4	FIRE SYSTM DISARM
F5	SPEED/LOAD RAISE	F5	WTR INJ LWR RATIO	F5	GOV IN KW MODE	P5	HALON DISCHARGE
F6	SPEED/LOAD LOWER	F6	HOT WASH OFF	F6	GOV IN TIT MODE	P6	
F7	VOLTS/VARS RAISE	F7	MOTOR TURBINE ON	F7	SYNC MODE MAN	P7	AIR FILTER OFF
F8	VOLTS/VARS LOWER	P8	MOTOR TURBINE OFF	P8	ALARM RESET	P8	

COPY IN PROGRESS

DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 06/10/92 TIME: 09:58:08

06/10/92 GTG-02 Control [illegible] 09:58:08

Turbine Speed	14108	Fuel Gas Flow	1994
Gen KW Output	2918	Gas Supply Prs	263
Gen Bus Volts	12683	Gas Manifld Prs	156
Phase A Volts	12771	Comp Inlet Temp	68.0
Phase B Volts	12742	Turb Exh Temp	944
Phase C Volts	12727	Comp Inlet Pres	[illegible]
Phase A Current	137	Turb Exh Press	0.5
Phase B Current	143	Inj Water Flow	1658
Phase C Current	142	Inj Water Ratio	0.83
TIT Temperature	1864		

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

F1 START	F1 WATER INJ. ON	F1 REMOTE MODE ON	F1 GEN. REG. ON
F2 STOP	F2 WATER INJ. OFF	F2 REMOTE MODE OFF	F2 GEN. REG. OFF
F3 OPEN C.B.	F3 WATER INJ. AUTO	F3 GOV IN ISOCH MODE	F3 FIRE SYSTEM ARMED
F4 CLOSE C.B CLOSED	F4 WTR INJ RSE RATIO	F4 GOV IN [illegible]	F4 FIRE SYSTM DISARM
F5 SPEED/LOAD RAISE	F5 WTR INJ LWR RATIO	F5 GOV IN KW MODE	F5 HALON DISCHARGE
F6 SPEED/LOAD LOWER	F6 HOT WASH OFF	F6 GOV IN TIT MODE	F6
F7 VOLTS/VARS RAISE	F7 MOTOR TURBINE ON	F7 SYNC MODE MAN	F7 AIR FILTER OFF
F8 VOLTS/VARS LOWER	F8 MOTOR TURBINE OFF	F8 ALARM RESET	F8

COPY IN PROGRESS

DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 06/10/92 TIME: 10:12:59

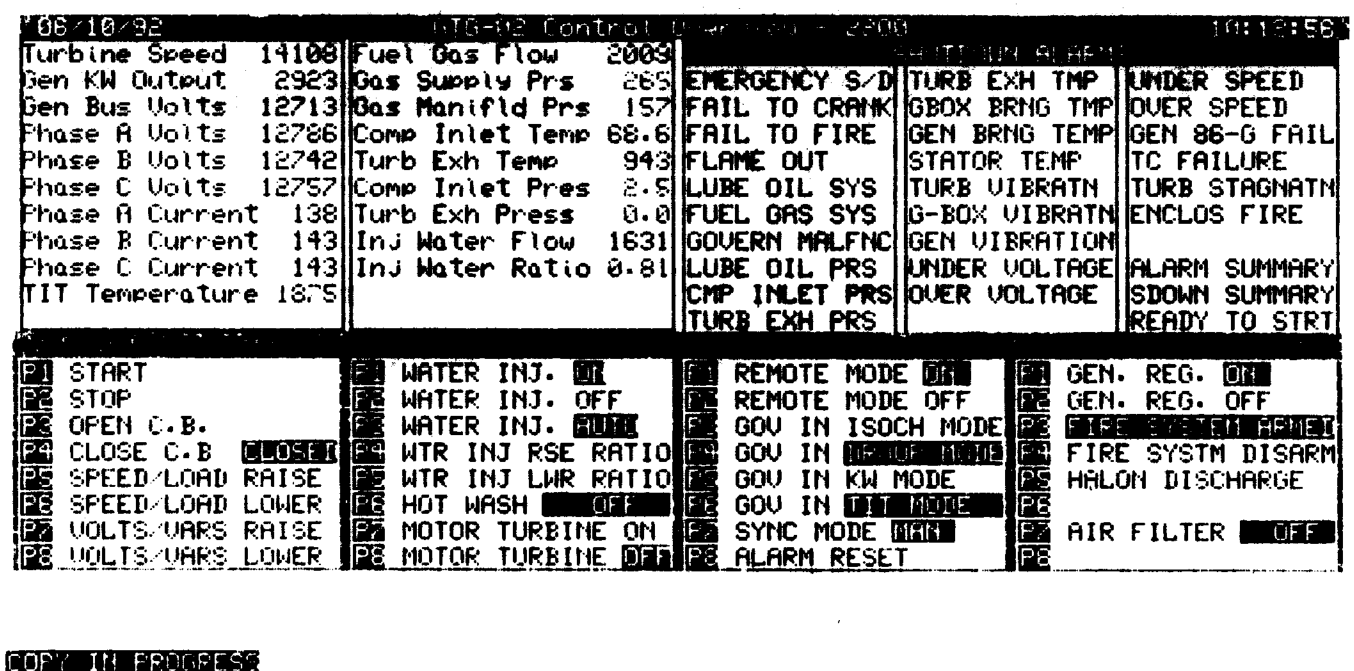

DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 06/10/92 TIME: 10:44:42

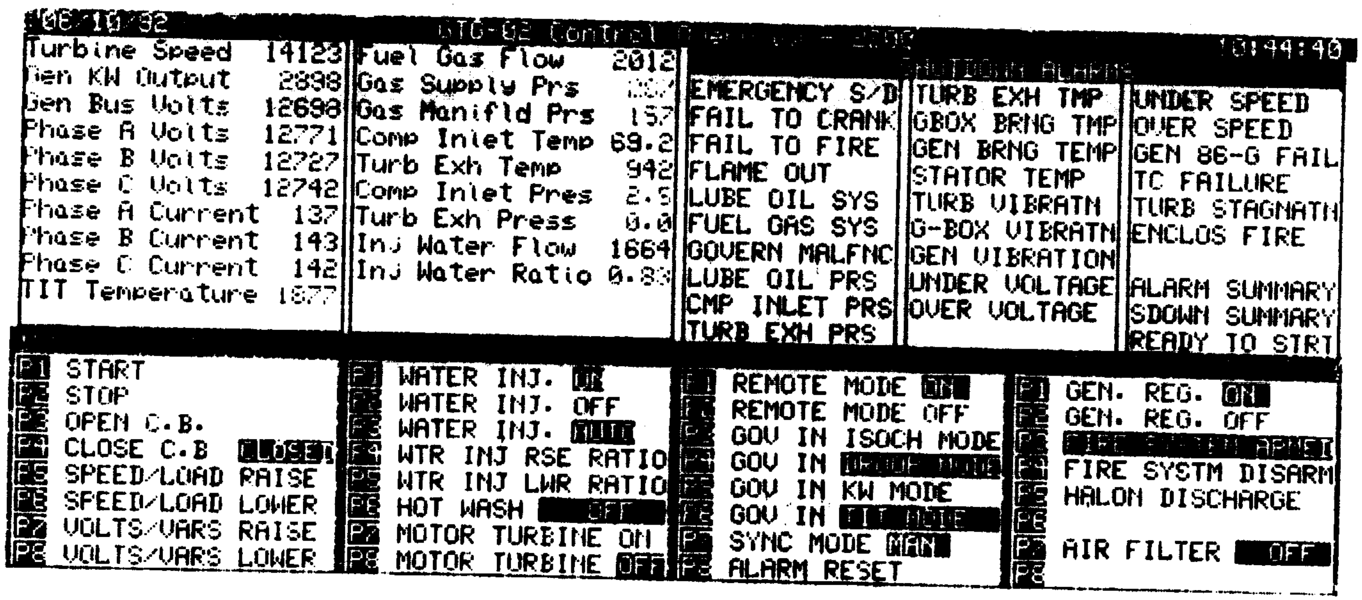

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DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 06/10/92 TIME: 10:57:37

06/10/92 [illegible] 10:57:34

Turbine Speed	14108	Fuel Gas Flow	1991	EMERGENCY S/D	TURB EXH TMP	UNDER SPEED
Gen KW Output	2869	Gas Supply Prs	264	FAIL TO CRANK	GBOX BRNG TMP	OVER SPEED
Gen Bus Volts	12698	Gas Manifld Prs	156	FAIL TO FIRE	GEN BRNG TEMP	GEN 86-G FAIL
Phase A Volts	12771	Comp Inlet Temp	70.1	FLAME OUT	STATOR TEMP	TC FAILURE
Phase B Volts	12742	Turb Exh Temp	942	LUBE OIL SYS	TURB VIBRATN	TURB STAGNATN
Phase C Volts	12727	Comp Inlet Pres	2.5	FUEL GAS SYS	G-BOX VIBRATN	ENCLOS FIRE
Phase A Current	135	Turb Exh Press	0.0	GOVERN MALFNC	GEN VIBRATION	
Phase B Current	141	Inj Water Flow	1667	LUBE OIL PRS	UNDER VOLTAGE	ALARM SUMMARY
Phase C Current	140	Inj Water Ratio	0.84	CMP INLET PRS	OVER VOLTAGE	SDOWN SUMMARY
TIT Temperature	1871			TURB EXH PRS		READY TO STRT

F1 START	F1 WATER INJ. ON	F1 REMOTE MODE ON	F1 GEN. REG. ON
F2 STOP	F2 WATER INJ. OFF	F2 REMOTE MODE OFF	F2 GEN. REG. OFF
F3 OPEN C.B.	F3 WATER INJ. [illegible]	F3 GOV IN ISOCH MODE	F3 [illegible]
F4 CLOSE C.B CLOSED	F4 WTR INJ RSE RATIO	F4 GOV IN [illegible]	F4 FIRE SYSTM DISARM
F5 SPEED/LOAD RAISE	F5 WTR INJ LWR RATIO	F5 GOV IN KW MODE	F5 HALON DISCHARGE
F6 SPEED/LOAD LOWER	F6 HOT WASH OFF	F6 GOV IN TIT MODE	F6
F7 VOLTS/VARS RAISE	F7 MOTOR TURBINE ON	F7 SYNC MODE MAN	F7 AIR FILTER OFF
F8 VOLTS/VARS LOWER	F8 MOTOR TURBINE OFF	F8 ALARM RESET	F8

COPY IN PROGRESS

DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 06/10/92 TIME: 11:12:38

06/10/92 GTG-02 Control ... 2200 11:12:34

Turbine Speed	14108	Fuel Gas Flow	1999
Gen KW Output	2879	Gas Supply Prs	[illegible]
Gen Bus Volts	12698	Gas Manifld Prs	156
Phase A Volts	12771	Comp Inlet Temp	69.5
Phase B Volts	12742	Turb Exh Temp	943
Phase C Volts	12742	Comp Inlet Pres	[illegible]
Phase A Current	136	Turb Exh Press	0.0
Phase B Current	142	Inj Water Flow	1634
Phase C Current	141	Inj Water Ratio	0.82
TIT Temperature	1873		

SHUTDOWN ALARM

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

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: 2200 VERSION: 4

DATE: 06/10/92 TIME: 11:27:20

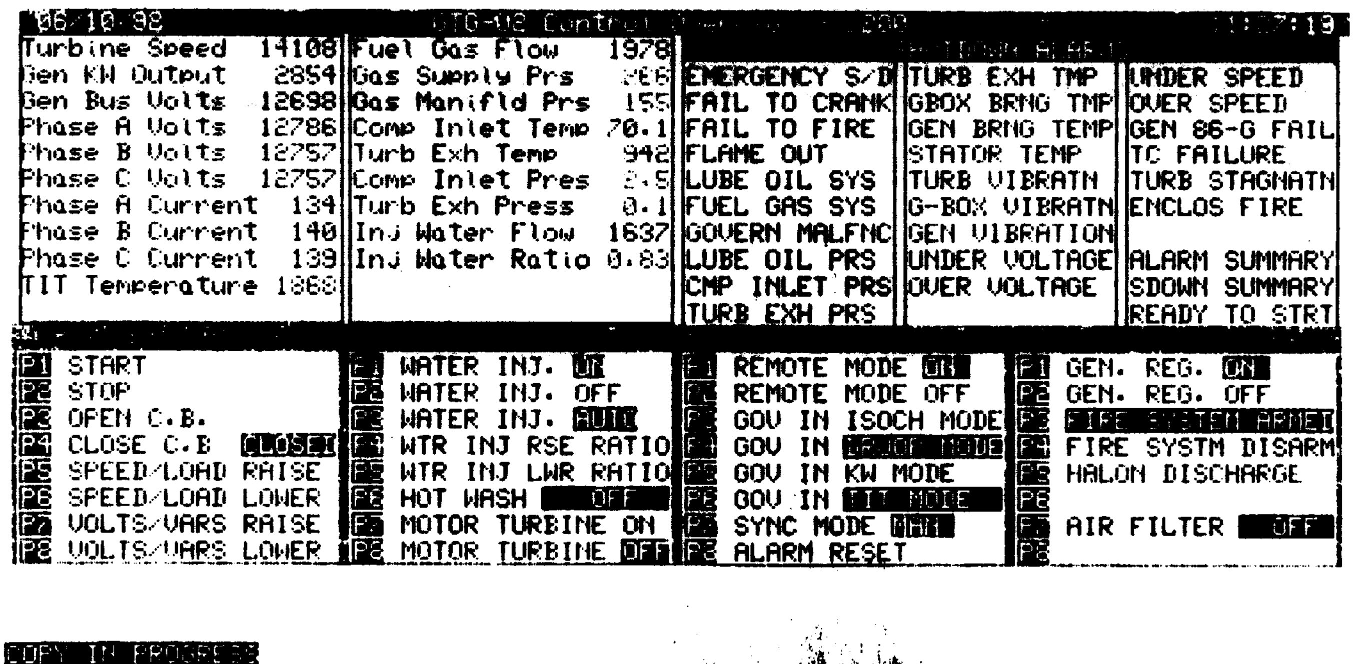

DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 06/10/92 TIME: 11:43:20

Turbine Speed	14108	Fuel Gas Flow	2001
Gen KW Output	2879	Gas Supply Prs	268
Gen Bus Volts	12898	Gas Manifld Prs	156
Phase A Volts	12786	Comp Inlet Temp	70.4
Phase B Volts	12757	Turb Exh Temp	941
Phase C Volts	12742	Comp Inlet Pres	2.5
Phase A Current	135	Turb Exh Press	0.3
Phase B Current	141	Inj Water Flow	1658
Phase C Current	140	Inj Water Ratio	0.83
TIT Temperature	1875		

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

P1 START	F1 WATER INJ.	REMOTE MODE	GEN. REG.
P2 STOP	F2 WATER INJ. OFF	REMOTE MODE OFF	GEN. REG. OFF
P3 OPEN C.B.	F3 WATER INJ.	GOV IN ISOCH MODE	
P4 CLOSE C.B	F4 WTR INJ RSE RATIO	GOV IN	FIRE SYSTM DISARM
P5 SPEED/LOAD RAISE	F5 WTR INJ LWR RATIO	GOV IN KW MODE	HALON DISCHARGE
P6 SPEED/LOAD LOWER	F6 HOT WASH	GOV IN	
P7 VOLTS/VARS RAISE	F7 MOTOR TURBINE ON	SYNC MODE	AIR FILTER
P8 VOLTS/VARS LOWER	F8 MOTOR TURBINE	ALARM RESET	

DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 06/10/92 TIME: 12:13:04

06/10/92

Turbine Speed	14108	Fuel Gas Flow	1966
Gen KW Output	2801	Gas Supply Prs	267
Gen Bus Volts	12727	Gas Manifld Prs	154
Phase A Volts	12801	Comp Inlet Temp	71.0
Phase B Volts	12771	Turb Exh Temp	940
Phase C Volts	12771	Comp Inlet Pres	2.5
Phase A Current	132	Turb Exh Press	0.0
Phase B Current	138	Inj Water Flow	1623
Phase C Current	137	Inj Water Ratio	0.83
TIT Temperature	1866		

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

F1 START	F1 WATER INJ. ON	F1 REMOTE MODE ON	F1 GEN. REG. ON
F2 STOP	F2 WATER INJ. OFF	F2 REMOTE MODE OFF	F2 GEN. REG. OFF
F3 OPEN C.B.	F3 WATER INJ. AUTO	F3 GOV IN ISOCH MODE	F3 [illegible]
F4 CLOSE C.B CLOSED	F4 WTR INJ RSE RATIO	F4 GOV IN [illegible]	F4 FIRE SYSTM DISARM
F5 SPEED/LOAD RAISE	F5 WTR INJ LWR RATIO	F5 GOV IN KW MODE	F5 HALON DISCHARGE
F6 SPEED/LOAD LOWER	F6 HOT WASH OFF	F6 GOV IN [illegible]	F6
F7 VOLTS/VARS RAISE	F7 MOTOR TURBINE ON	F7 SYNC MODE MAN	F7 AIR FILTER OFF
F8 VOLTS/VARS LOWER	F8 MOTOR TURBINE OFF	F8 ALARM RESET	F8

COPY IN PROGRESS

DIAGRAM NUMBER: 2200 VERSION: 4

DATE: 06/10/92 TIME: 12:27:24

06/10/92 · [illegible] Control

Turbine Speed	14108	Fuel Gas Flow	1975
Gen KW Output	2830	Gas Supply Prs	267
Gen Bus Volts	12727	Gas Manifld Prs	155
Phase A Volts	12830	Comp Inlet Temp	70.7
Phase B Volts	12786	Turb Exh Temp	941
Phase C Volts	12786	Comp Inlet Pres	2.6
Phase A Current	132	Turb Exh Press	0.4
Phase B Current	138	Inj Water Flow	1664
Phase C Current	137	Inj Water Ratio	0.84
TIT Temperature	1366		

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

F1 START	F1 WATER INJ. ON	F1 REMOTE MODE ON	F1 GEN. REG. ON
F2 STOP	F2 WATER INJ. OFF	F2 REMOTE MODE OFF	F2 GEN. REG. OFF
F3 OPEN C.B.	F3 WATER INJ. AUTO	F3 GOV IN ISOCH MODE	F3 [illegible]
F4 CLOSE C.B CLOSED	F4 WTR INJ RSE RATIO	F4 GOV. IN [illegible]	F4 FIRE SYSTM DISARM
F5 SPEED/LOAD RAISE	F5 WTR INJ LWR RATIO	F5 GOV IN KW MODE	F5 HALON DISCHARGE
F6 SPEED/LOAD LOWER	F6 HOT WASH OFF	F6 GOV IN TIT MODE	F6
F7 VOLTS/VARS RAISE	F7 MOTOR TURBINE ON	F7 SYNC MODE MAN	F7 AIR FILTER OFF
F8 VOLTS/VARS LOWER	F8 MOTOR TURBINE OFF	F8 ALARM RESET	F8

COPY IN PROGRESS

Environmental log for Wednesday, June 10, 1992

DAILY SUMMARY FOR UNIT 2

NOx gas limit: 8.3 CO gas limit: 5.1

	average		mmbtu	----total mmbtu---			total	total	total	---------- averages ----------						
											------CO------		-----NOx-----			water
day	gas	oil	comb	gas	oil	comb	CO lbs	NOx lbs	water lbs	O2 pct	lbs/hr	lbs/ mmbtu	lbs/hr	lbs/ mmbtu	water lbs/hr	injection ratio
10	45.4	0.0	45.4	1089.0	0.0	1089.0	10.0	109.3	39533.3	15.0	0.42	0.01	4.56	0.10	1647.2	0.8
MTD	45.6	0.0	45.6	10950.5	0:0	10950.5	104.0	1084.6	397468.1							

Emissions and Performance

TIME		---------- CO ----------						---------- NOx ----------					mmbtu/hr			
		---- ppm ---		lbs/	-- lb/hr--		O2	---- ppm----		---lb/hr---		lb/	turbine		water	injection
HH:MM	unit	uncorr	corr	mmbtu	1-hr	2-hr	pct	uncorr	corr	1-hr	2-hr	mmbtu	gas	oil	#/hr	ratio
1:00	2	4	4	0.01	0.41	0.41	15.0	27	27	4.50	4.46	0.10	45.25	0.0	1642.5	0.83
2:00	2	4	4	0.01	0.41	0.41	15.0	28	28	4.62	4.56	0.10	45.41	0.0	1648.0	0.83
3:00	2	4	4	0.01	0.41	0.41	15.0	28	28	4.62	4.62	0.10	45.43	0.0	1649.7	0.83
4:00	2	4	4	0.01	0.41	0.41	15.0	28	28	4.69	4.65	0.10	45.62	0.0	1655.4	0.83
5:00	2	4	4	0.01	0.42	0.42	15.0	28	28	4.68	4.68	0.10	45.69	0.0	1657.2	0.83
6:00	2	4	4	0.01	0.43	0.43	15.1	28	28	4.76	4.72	0.10	45.79	0.0	1662.3	0.83
7:00	2	4	4	0.01	0.42	0.42	15.0	28	28	4.67	4.72	0.10	45.65	0.0	1656.7	0.83
8:00	2	4	4	0.01	0.42	0.42	15.0	28	28	4.62	4.64	0.10	45.42	0.0	1647.2	0.83
9:00	2	4	4	0.01	0.42	0.42	15.0	28	28	4.60	4.61	0.10	45.45	0.0	1649.8	0.83
10:00	2	4	4	0.01	0.42	0.42	15.0	28	28	4.60	4.60	0.10	45.56	0.0	1652.9	0.83
11:00	2	4	4	0.01	0.43	0.42	15.0	27	27	4.49	4.55	0.10	45.48	0.0	1650.7	0.83
12:00	2	4	4	0.01	0.45	0.44	15.0	27	27	4.41	4.45	0.10	45.36	0.0	1647.6	0.83
13:00	2	4	4	0.01	0.43	0.44	15.1	26	27	4.41	4.41	0.10	45.20	0.0	1641.7	0.83
14:00	2	4	4	0.01	0.42	0.43	15.1	27	27	4.45	4.43	0.10	45.20	0.0	1641.3	0.83
15:00	2	4	4	0.01	0.42	0.42	15.1	27	27	4.45	4.45	0.10	45.14	0.0	1639.8	0.83
16:00	2	4	4	0.01	0.42	0.42	15.0	27	27	4.43	4.44	0.10	45.08	0.0	1637.5	0.83
17:00	2	4	4	0.01	0.41	0.42	15.1	27	27	4.45	4.44	0.10	44.96	0.0	1632.7	0.83
18:00	2	4	4	0.01	0.42	0.42	15.1	27	27	4.41	4.43	0.10	44.89	0.0	1629.6	0.83
19:00	2	4	4	0.01	0.40	0.41	15.1	27	27	4.42	4.42	0.10	44.86	0.0	1629.8	0.83
20:00	2	4	4	0.01	0.40	0.40	15.0	27	27	4.49	4.46	0.10	45.06	0.0	1636.1	0.83
21:00	2	4	4	0.01	0.41	0.40	15.0	27	27	4.52	4.51	0.10	45.36	0.0	1647.5	0.83
22:00	2	4	4	0.01	0.40	0.41	15.0	28	28	4.63	4.58	0.10	45.63	0.0	1657.5	0.83
23:00	2	4	4	0.01	0.41	0.40	15.0	28	28	4.70	4.67	0.10	45.72	0.0	1660.2	0.83
24:00	2	4	4	0.01	0.41	0.41	15.0	28	28	4.69	4.70	0.10	45.73	0.0	1659.8	0.83

Test 4

RADIAN CORPORATION

GENERAL COMPUTATION SHEET

CALCULATION SET		
Prelim.		
Final		
Sheet 1 Of 1		
Charge #		
Rev.	Comp. By	Chk'd By
	LDL	[illegible]
	Date 8/4/92	Date 8/7/92
	Date	Date

CLIENT NAME WSPA / SWEPI (SEKR)

PROJECT NAME WSPA-AB2588

Heat Input Calculation (Example)

Heat Input (mmBTU/hr) = Fuel Gas Flow (lb/hr) x Fuel Gas Heat Content (BT
÷ 10^6 (BTU/mmBTU)

Based on the fuel analysis, the higher heating of the fuel was 22947 BTU/lb. This value was used for all tests.

Test 1 (PAH), the average fuel gas rate was 1984 lb/hr

$$\text{Heat Input (mmBTU/hr)} = 1984 \frac{lb}{hr} \times 22947 \frac{BTU}{lb} \times \frac{mmBTU}{10^6 BTU}$$

$$\boxed{45.5 \text{ mmBTU/hr}}$$

Test 3 (PAH), the average fuel gas rate was 1993 lb/hr

$$= 1993 \frac{lb}{hr} \times 22947 \frac{BTU}{lb} \times \frac{mmBTU}{10^6 BTU} = \boxed{45.7 \frac{mmBTU}{hr}}$$

~~Test 4 (PAH), the average fuel gas rate was 1968 lb/hr~~

$$= \cancel{1968 \frac{lb}{hr} \times 22947 \frac{BTU}{lb} \times \frac{mmBTU}{10^6 BTU} = \boxed{45.0 \frac{mmBTU}{hr}}}$$

1-85-18743

FUEL ANALYSIS DATA

PACIFIC GAS TECHNOLOGY

2122 Q Stre--
Bakersfield, California 933
805/324-13--
Fax: 805/324-2746

GAS ANALYSIS BY CHROMATOGRAPH

STEINER ENVIRONMENTAL, INC
4930 Boylan Street
Bakersfield, CA 93308

Attention: Jim Steiner

RECEIVED
JUN 18 1992
Ans'd............

SAMPLED: JUNE 10, 1992
SUBMITTED: JUNE 11, 1992
REPORTED: JUNE 16, 1992
LAB # 4395

Sample ID : WSPA/RADIAN
SEKR #2
FUEL GAS

STEINER ID # 32835

ANALYZED GAS

	MOLE %	WT %	CHONS WT %	
OXYGEN	0.04	0.07	CARBON	73
NITROGEN	1.16	1.87	HYDROGEN	23
CARBON DIOXIDE	0.53	1.34	OXYGEN	1.0
HYDROGEN	ND	0.00	NITROGEN	1.8
CARBON MONOXIDE	ND	0.00	SULFUR	0.0
HYDROGEN SULFIDE	ND	0.00		
METHANE	92.39	85.40		
ETHANE	4.79	8.30		
PROPANE	0.87	2.21		
iso-BUTANE	0.09	0.30		
n-BUTANE	0.08	0.27		
iso-PENTANE	0.02	0.08		
n-PENTANE	0.01	0.04		
HEXANE +	0.02	0.10		
TOTAL:	100.00			

SPECIFIC GRAVITY * : 0.599

SPECIFIC VOLUME : 21.90 cu ft/lb

HYDROGEN SULFIDE : ppm (GC/FPD)
STEINER ID# :

TOTAL * BTU/cu ft	DRY :	1048		NET * BTU/cu ft	DRY :	94
	WET :	1030			WET :	92
BTU/lb	:	22947		BTU/lb	:	20

* CALCULATED ACCORDING TO : ASTM D-3588

AIR TOXICS LTD.

SAMPLE NAME: S24-A

ID#: 9206067-06A

Natural Gas

Stationary Source Test Method - Low Level BTEX & Propylene

(Modified CARB Method 410A)

Cryofocusing GC FID/PID

File Name: 6061503	Date of Collection: 6/[illegible]/92
Dil. Factor: 1000	Date of Analysis: 6/15/92

Compound	MDL (ppbv)	Amount (ppbv)
Benzene	1000	6300
Toluene	1000	5700
Ethyl Benzene	1000	Not Detected
Total Xylenes	1000	1300
Propylene	1000	Not Detected

Container Type: Tedlar Bag

9206067 Radian/Kern

AIR TOXICS LTD.

SAMPLE NAME: S24-A Duplicate

ID#: 9206067-06B

Natural Gas

Stationary Source Test Method - Low Level BTEX & Propylene

(Modified CARB Method 410A)

Cryofocusing GC FID/PID

File Name: [illegible] **Date of Collection:** 6/[illegible]/92
Dil. Factor: 1000 **Date of Analysis:** 6/18/92

Compound	MDL (ppbv)	Amount (ppbv)
Benzene	1000	6500
Toluene	1000	5500
Ethyl Benzene	1000	Not Detected
Total Xylenes	1000	1300
Propylene	1000	Not Detected

Container Type: Tedlar Bag

APPENDIX B

SUPPORTING CALCULATIONS AND FIELD DATA SHEETS

Nomenclature

Parameter	Definition
DGM	Dry Gas Meter
Y	Dry gas meter calibration factor
Cp	Pitot tube calibration factor
cu ft	Cubic feet
" Hg	Inches of mercury
" H2O	Inches of water
% O2	Oxygen concentration (%)
% CO2	Carbon dioxide concentration (%)
% H2O	Water vapor concentration (%)
Pv	Velocity pressure
Pb	Barometric pressure
Ps	Stack gas pressure (absolute)
Pstat	Stack gas static pressure
Ts	Stack gas temperature
Tm	DGM gas temperature
Pm	DGM gas pressure
Vm	Volume sampled (meter conditions)
Vm,std	Volume sampled (standard conditions)
Dn	Sampling nozzle diameter
An	Sampling nozzle cross-sectional area
Ds	Stack Diameter
As	Stack cross-sectional area
I	Isokinetic percentage (I)
t	Sampling time
Delta H	Pressure drop across the orifice meter
scf	Standard cubic feet (dry basis)
dscm	Standard cubic meters (dry basis)
acfm	Actual cubic feet per minute
dscfm	Standard cubic feet per minute (dry basis)
gm/mole	Grams per gram-mole
ft/sec	Feet per second
F	Fahrenheit
mg	Milligrams
gr	Grains
gr/dscf	Grains per standard cubic feet (dry basis)
lb	Pounds
lb/hr	Pounds per hour
lb/day	Pounds per day
Qnty	Quantity of pollutant collected
C	Concentration of pollutant
MER	Mass emission rate of pollutant

Formulas

$$Ps = Pb + (Pstat / 13.6)$$

$$Vm,std = 17.65 \times Vm \times Y \times ((Pb + (Delta\ H/13.6) / (Tm + 460))$$

$$\%\ H2O = ((0.0471 \times Vw) / [(0.0471 \times Vw) + Vm,std] \times 100$$

$$Vs = 85.49 \times Cp \times SQRT\ [(Pv \times Ts)/(Ps \times Ms)]$$

$$Qact = 60 \times Vs \times As$$

$$Qstd = 17.65 \times Qact \times (1 - (\%H2O/100)) \times (Ps / (Ts + 460))$$

$$C = Qnty / Vm,std$$

$$MER = C \times Qstd$$

$$I = \frac{100 \times Ts\ ((0.00267 \times Vw) + ((Y \times Vm \times Pm) / Tm))}{(Vs \times An \times t \times Ps)}$$

TEXACO HEATER TREATER TEST DATA

(MAY 28-30, 1992)

PAH EMISSION DATA

Table A-1: Polycyclic Aromatic Hydrocarbon (PAH) Emission Data - Texaco (Cymric Field) Heater Treater Exhaust Stack

Run Number Date Time		# 1 05/28/92 1000-2003	# 2 05/29/92 0851-1644	# 4 05/30/92 0824-1500
DGMCF	(---)=	0.993	0.993	0.993
Dry Gas Meter Volume	(cu. ft.)=	77.47	72.58	85.25
PTCF	(---)=	0.84	0.84	0.84
Barometric Pressure	(" Hg)=	29.28	29.31	29.34
Impinger Weight Gain	(grams)=	304.1	262.2	292.0
Percent Oxygen	(% O2)=	1.7	2.5	2.7
Percent Carbon Dioxide	(% CO2)=	12.3	11.8	11.6
Average Delta H	(" H2O)=	0.42	0.36	0.52
Pressure at Meter	(" Hg)=	29.31	29.34	29.38
Pressure in Stack	(" H2O)=	-0.02	-0.02	-0.02
Temp at Meter	(deg F)=	97	96	104
Temp in Stack	(deg F)=	488	466	470
Nozzle Diameter	(inches)=	0.615	0.615	0.626
Total Sampling Time	(minutes)=	215.0	216.0	216.0
Sq Rt Stack Gas Vel Press	((a))=	0.074	0.071	0.080
Standard Temp	(deg F)=	60.0	60.0	60.0
Standard Pressure	(" Hg)=	29.92	29.92	29.92
Diameter of Stack	(feet)=	2.00	2.00	2.00
Heater Heat Input	(MMBtu/h)=	4.3	4.1	4.1
Volume of Gas Sampled	(dscf)=	70.31	66.06	76.70
Moisture Fraction	(% H2O)=	16.7%	15.6%	15.0%
Gas Molecular Weight	(g/mole)=	28.02	28.12	28.16
Stack Gas Velocity	(ft/sec)=	5.7	5.4	6.1
Percent Isokinetic	(%)=	103.6%	98.5%	97.5%
Volumetric Stack Flow	(acfm)=	1,075	1,019	1,149
Volumetric Stack Flow	(dscfm)=	481	473	535

(a) (in.H2O)**0.5

Table A-1: PAH Emission Data - Texaco (Cymric Field) Heater Treater

Run Number Date	# 1 05/28/92	# 2 05/29/92	# 4 05/30/92	Avg. (a)
PAH Compounds (ng/sample)=				
Naphthalene	1,300	1,000	840	--
Acenaphthylene	150.0	12.0	< 5.0	--
Acenaphthene	7.5	5.9	< 5.0	--
Fluorene	27	19	15	--
Phenanthrene	220	140	89	--
Anthracene	8.5	7.8	< 5	--
Fluoranthene	83	45	31.0	--
Pyrene	54	12	10.0	--
Chrysene*	8.5	< 5.0	< 5.0	--
Benz(a)anthracene*	8.8	< 5.0	< 5.0	--
Benzo(b)fluoranthene*	< 5.0	< 5.0	< 5.0	--
Benzo(k)fluoranthene*	< 5.0	< 5.0	< 5.0	--
Benzo(a)pyrene*	< 5.0	< 5.0	< 5.0	--
Indeno(1,2,3-c,d)pyrene*	< 5.0	< 5.0	< 5.0	--
Dibenz(a,h)anthracene*	< 5.0	< 5.0	< 5.0	--
Benzo(g,h,i)perylene	6.6	< 5.0	< 5.0	--
Total (7 Carcinogens (*))	30	18	18	--
Total (excluding napthalene)	583	262	173	
Total (including napthalene)	1886	1260	1013	
PAH Concentration (ng/dscm)=				
Naphthalene	653	534	387	524.7
Acenaphthylene	75.3	6.4	< 2.3	27.63
Acenaphthene	3.8	3.2	< 2.3	2.69
Fluorene	13.6	10.2	6.9	10.21
Phenanthrene	110	75	41.0	75.43
Anthracene	4.3	4.2	< 2.3	3.20
Fluoranthene	41.7	24.1	14.3	26.67
Pyrene	27.1	6.4	4.6	12.71
Chrysene*	4.3	< 2.7	< 2.3	2.25
Benz(a)anthracene*	4.4	< 2.7	< 2.3	2.30
Benzo(b)fluoranthene*	< 2.5	< 2.7	< 2.3	1.25
Benzo(k)fluoranthene*	< 2.5	< 2.7	< 2.3	1.25
Benzo(a)pyrene*	< 2.5	< 2.7	< 2.3	1.25
Indeno(1,2,3-c,d)pyrene*	< 2.5	< 2.7	< 2.3	1.25
Dibenz(a,h)anthracene*	< 2.5	< 2.7	< 2.3	1.25
Benzo(g,h,i)perylene	3.3	< 2.7	< 2.3	1.93
Total (7 Carcinogens (*))	15	9.4	8.1	10.79
Total (excluding napthalene)	293	140	79	170.70
Total (including napthalene)	947	674	466	695.71

Table A-1: PAH Emission Data - Texaco (Cymric Field) Heater Treater

Run Number Date	# 1 05/28/92	# 2 05/29/92	# 4 05/30/92	Avg.
PAH Emission Rate (lb/hr x 10-9)=				
Naphthalene	1,176	947	775	96[illegible]
Acenaphthylene	136	11.4	< 4.6	49.[illegible]
Acenaphthene	6.8	5.6	< 4.6	4.[illegible]
Fluorene	24.4	18.0	13.8	18.[illegible]
Phenanthrene	199	133	82.2	13[illegible]
Anthracene	7.7	7.4	< 4.6	5.[illegible]
Fluoranthene	75.1	42.6	28.6	48.[illegible]
Pyrene	48.8	11.4	9.2	23.[illegible]
Chrysene*	7.7	< 4.7	< 4.6	4.[illegible]
Benz(a)anthracene*	8.0	< 4.7	< 4.6	4.[illegible]
Benzo(b)fluoranthene*	< 4.5	< 4.7	< 4.6	2.[illegible]
Benzo(k)fluoranthene*	< 4.5	< 4.7	< 4.6	2.[illegible]
Benzo(a)pyrene*	< 4.5	< 4.7	< 4.6	2.[illegible]
Indeno(1,2,3-c,d)pyrene*	< 4.5	< 4.7	< 4.6	2.[illegible]
Dibenz(a,h)anthracene*	< 4.5	< 4.7	< 4.6	2.[illegible]
Benzo(g,h,i)perylene	6.0	< 4.7	< 4.6	3.[illegible]
Total (7 Carcinogens (*))	26.9	16.6	16.2	1[illegible]
Total (excluding napthalene)	527	248	159	
Total (including napthalene)	1,706	1,194	935	127[illegible]
PAH Emission Ratio (lb/MMBtu x 10-9)=				
Naphthalene	277	229	188	231.[illegible]
Acenaphthylene	31.9	2.8	< 1.1	11.[illegible]
Acenaphthene	1.6	1.4	< 1.1	1.[illegible]
Fluorene	5.7	4.4	3.4	4.[illegible]
Phenanthrene	46.8	32.1	19.9	32.[illegible]
Anthracene	1.8	1.8	< 1.1	1.[illegible]
Fluoranthene	17.7	10.3	6.9	11.
Pyrene	11.5	2.8	2.2	5.
Chrysene*	1.8	< 1.1	< 1.1	1.
Benz(a)anthracene*	1.9	< 1.1	< 1.1	1.
Benzo(b)fluoranthene*	< 1.1	< 1.1	< 1.1	0.5
Benzo(k)fluoranthene*	< 1.1	< 1.1	< 1.1	0.5
Benzo(a)pyrene*	< 1.1	< 1.1	< 1.1	0.5
Indeno(1,2,3-c,d)pyrene*	< 1.1	< 1.1	< 1.1	0.5
Dibenz(a,h)anthracene*	< 1.1	< 1.1	< 1.1	0.5
Benzo(g,h,i)perylene	1.4	< 1.1	< 1.1	0.8
Total (7 Carcinogens (*))	6.3	4.0	3.9	4.
Total (excluding napthalene)	124	60.0	38.6	74.
Total (including napthalene)	401	289	226	30

* See previous page.

RADIAN CORPORATION

METHOD 5 FIELD DATA

RUN 1
PAGE 1 OF 3

PLANT	Baco	PROBE LENGTH AND TYPE	3' Glass	HEIGHT OF LOCATION (ft)	20'
DATE	5/28/92	NOZZLE I.D. (in)	0.615	DUCT DIMENSIONS	24"
SAMPLING LOCATION	Heat Treater	METER BOX NUMBER	3AC-05	FILTER NUMBER	—
SAMPLE TYPE	PAH	METER Δ H@	1.88	ASSUMED MOISTURE (%)	17.5
RUN NUMBER	#1	Yd	0.993	MOISTURE METHOD	CARB 4
OPERATOR	ML/SF	C FACTOR	See Sol	MOISTURE DATA	
AMBIENT TEMPERATURE	85	PROBE HEATER SETTING	250	O2/CO2 METHOD	
BAROMETRIC PRESSURE	29.28	HEATER BOX SETTING	250	O2	
STATIC PRESSURE (Ps)	-0.021			CO2	
INITIAL LEAKCHECK	0.008 cfm e 11" Hg			FINAL LEAKCHECK	See Pg 3

C	Temp
~~0.024~~ 0.027	500
0.024	400
0.0195	250

READ AND RECORD ALL DATA EVERY ~~4.5~~ 4.5 MINUTES

Notes	Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit / Last	Pump Vacuum (in. Hg)	Probe Temp	C
P start (in. H2O)	start	0	10:00	212.003	0.005	470	0.36	248	95	95	72/49	2	250	0.027
	A-12	4.5	10:04.5	—	0.006	506	0.41	248	95	95	68/47	2	248	
	A-12	9	10:09	215.3	0.005	510	0.36	248	96	95	64/45	2.5	245	
	A-11	13.5	10:13.5	216.4	0.005	511	0.36	247	96	95	65/41	3	248	
Stop @ 1021	-11	18	10:18	218.0/219.0	0.006	515	0.40	253	98	96	64/41	3	248	
Re-start @ 1153	-10	22.5	10:22.5	—	0.006	483	0.40	252	101	100	73/46	3	248	
	-10	27	~~10:27~~ 1159.5	221.2	0.007	499	0.47	248	102	100	65/42	3	247	
	-9	31.5	1204	222.7	0.008	502	0.54	249	102	101	65/40	3.5	249	
Stop @ 1208 Restart 1353	-9	36	1354 ~~1208.5~~	224.7	0.007	481	0.47	249	104	103	72/44	3.5	253	
	-8	40.5	1358.5 ~~1213~~	226.4	0.007	497	0.47	247	104	103	70/44	3.5	253	
	-8	45	1406	228.1	0.008	504	0.55	249	105	103	66/43	3.5	252	
-0.020	-7	49.5	1410.5	230.0	0.007	507	0.47	251	106	104	65/43	3.5	250	
	-7	54	1415	231.6	0.005	325*	0.41	249	106	104	67/43	3.5	249	0.023
	-6	58.5	1419.5	233.4	0.006	350*	0.53	249	107	104	67/44	3.5	254	0.021
	-6	63	1424	235.2	0.005	310*	0.45	250	107	105	66/44	3.5	248	
Stop 1432	-5	67.5	1428.5	237.0	0.005	257*	0.47	246	103	102	76/43	3.5	249	
Restart 1510	-5	72	~~1433~~	—	0.004	225*	0.39	247	103	102	66/43	3	249	24
-0.020	-4	76.5	~~1427.5~~	240.5	0.004	247*	0.39	247	103	102	68/43	3	246	4
	-4	81	1	242.0	0.007	—	0.68	247	103	102	69/43	4	248	15
	-3	85.5												26

COMMENTS: *Void data; *Data suspect; thermocouple problem

5985

3847

Revision: 11/90

RADIAN CORPORATION

METHOD 5
FIELD DATA

RUN #1
PAGE 2 OF 3

PLANT	Texaco-
DATE	5/28/92
SAMPLING LOCATION	Heater Treater
SAMPLE TYPE	PAH
RUN NUMBER	#1
OPERATOR	MK/SF

	Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit / H_2O_2	Pump Vacuum (in. Hg)	
P Start	A-3	90	15:32.5	—	0.007	—	0.68	250	103	102	68/44	4	251
	A-2	94.5	15:37	248.0	0.005	—	0.48	248	103	102	68/45	3.5	243
-0.025	A-2	99	15:41.5	249.6	0.005	—	0.48	251	103	102	71/46	3.5	243
	A-1	103.5	15:46	251.4	0.005	—	0.48	251	103	102	74/44	3.5	249
Stop @	-1	108	15:50.5	253.144	0.005	—	0.48	248	103	102	74/43	3.5	245
				Mid-Trav Lk Rate = 0.016 cfm @ 7"Hg									
				Pre-B-Traverse Leak Rate = 0.010 cfm @ 7"Hg									
Start @			16:47	253.400									
	B-12	112.5	16:51.5	255.0	0.005	482	0.34	254	99	98	76/44	3.5	248
	-1	117	16:56	256.3	0.004	497	0.275	251	99	98	75/45	3.5	250
Stop @ 1700	-11	121.5	~~17:00.5~~ 257.4	—	0.005	482	0.34	250	99	98	73/45	3.5	250
Re-Start 1725	-2	126	17:30	259.6	0.006	487	0.42	246	95	95	75/42	4	245
-0.028	-10	130.5	17:34.5	261.0	0.006	495	0.42	249	96	95	68/40	4	240
	-10	135	17:39	262.8	0.007	503	0.48	252	96	95	66/41	4	251
	-9	139.5	17:43.5	264.4	0.007	506	0.48	248	96	95	65/41	4	241
	-9	144	17:48	266.0	0.006	507	0.42	248	96	95	66/42	4	245
	-8	148.5	17:52.5	267.8	0.006	506	0.42	252	96	95	66/44	4	245
	-8	153	17:57	269.5	0.007	505	0.48	250	96	95	65/44	4	251
Stop @ 18:02	-	157.5	18:01.5	271.2	0.006	508	0.42	247	97	95	65/45	4	245

Revision 1

RADIAN CORPORATION

METHOD 5
FIELD DATA

RUN	#1
PAGE	3 OF 3

PLANT	Texaco	PROBE LENGTH AND TYPE	3'-6/gss	HEIGHT OF LOCATION (ft)	2
DATE	5/28/92	NOZZLE I.D. (in)	0.615	DUCT DIMENSIONS	24"
SAMPLING LOCATION	Heat Treater	METER BOX NUMBER	Sac-05	FILTER NUMBER	-
SAMPLE TYPE	PAH	METER ΔH@	1.88	ASSUMED MOISTURE (%)	17.5
RUN NUMBER	#1	Yd	0.993	MOISTURE METHOD	CARB 4
OPERATOR	MJ	K FACTOR		MOISTURE DATA	
AMBIENT TEMPERATURE	~~78~~ 85	PROBE HEATER SETTING	250	O2/CO2 METHOD	
BAROMETRIC PRESSURE	29.28	HEATER BOX SETTING	250	O2	
STATIC PRESSURE (Ps)				CO2	
INITIAL LEAKCHECK				FINAL LEAKCHECK	0.010cfm@7"Hg

READ AND RECORD ALL DATA EVERY 4.5 MINUTES

	Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit / MM2	Pump Vacuum (in. Hg)	Probe Temp (°F)
		—	—	—									
Start @1834	B-6	162	1840.5	272.7	0.006	486	0.42	244	91	91	72/44	3.5	245
	B-6	166.5	1845	274.4	0.005	474	0.34	246	91	91	62/43	3.5	253
	B-6	171	1849.5	—	0.005	492	0.34	253	92	91	62/43	3	243
(-0.23)	B-5	175.5	1854	277.2	0.004	485	0.275	252	92	92	65/44	3	234
	B-5	180	1858.5	278.7	0.005	492	0.34	250	93	92	67/46	3.5	246
Stop @19:03	B-4	184.5	1903	280.1	0.004	465	0.275	248	93	92	68/48	3	252
	B-4	189	1907.5	281.3	0.003	479	0.205	251	94	93	67/48	3	246
Re-start @1938	B-3	193.5	1912	282.3	0.003	446	0.22	247	89	89	73/53	3	244
	B-3	198	1916.5	—	0.004	435	0.295	245	88	88	72/55	3	248
	B-2	202.5	1921	285.3	0.005	457	0.37	246	88	88	68/56	3	243
	B-2	207	1925.5	286.7	0.005	468	0.37	250	88	88	67/57	3.5	235
Stop	B-1	211.5	1930	288.5	0.006	456	0.45	248	88	88	68/57	3.5	240
@2003	B-1	~~216~~ 215*	1934.5	289.674	0.005	457	0.37	254	88	87	70/58	3.5	251
	Avg	215		77.465	0.0739	488.0	0.416		97.3				

COMMENTS:
*Test stopped 1 minute short of 216 minutes due to curtailment of treater operation
212.000 0.8785 6091 437 2345

Revision: 11/90

RADIAN CORPORATION

METHOD 5 FIELD DATA

RUN 2
PAGE 1 OF 3

PLANT	Texaco	PROBE LENGTH AND TYPE	3' glass	HEIGHT OF LOCATION (ft)	20'
DATE	5/29/92	NOZZLE I.D. (in)		DUCT DIMENSIONS	24"
SAMPLING LOCATION	Heater [illegible]	METER BOX NUMBER	Sac-05	FILTER NUMBER	~
SAMPLE TYPE	PAH	METER Δ H@	1.88	ASSUMED MOISTURE (%)	17.5
RUN NUMBER	2	Yd	0.993	MOISTURE METHOD	C1AB4
OPERATOR	SF	K FACTOR		MOISTURE DATA	
AMBIENT TEMPERATURE	80	PROBE HEATER SETTING	250	O2/CO2 METHOD	
BAROMETRIC PRESSURE	29.31	HEATER BOX SETTING	250	O2	
STATIC PRESSURE (Ps)	~~0 DOWN~~ -0.02			CO2	
INITIAL LEAKCHECK	0.010 @ 10"Hg			FINAL LEAKCHECK	

C = 0.027

READ AND RECORD ALL DATA EVERY 4.5 MINUTES

	Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Dry Gas Meter Inlet (Tm in) (°F)	Dry Gas Meter Outlet (Tm out) (°F)	Impinger Exit / XAD (°F)	Pump Vacuum (in. Hg)	Probe Temp
Start		0	0850	289.865									
	A-12	4.5	0855½	291.20	0.004	472	0.27	248	82	81	71/60	2	250
	A-12	9	0900	292.45	0.004	480	0.27	247	82	81	67/53	2	245
	A-11	13.5	0904½	294.00	0.005	489	0.34	249	84	82	63/52	2	247
	A-11	18	0909	295.35	0.005	490	0.34	248	85	83	61/46	2	246
	A-10	22.5	0913½	296.85	0.005	492	0.34	250	87	84	61/45	3	254
	A-10	27	0918	298.30	0.005	498	0.34	249	88	85	61/46	3	247
-0.0027	A-9	31.5	0922½	300.00	0.006	486	0.41	249	90	87	62/46	3	247
	A-9	36	0927	301.50	0.006	493	0.41	250	91	87	62/48	3	251
	A-8	40.5	0931½	303.20	0.007	491	0.48	249	91	88	63/48	3	246
	A-8	45	0936	304.90	0.006	493	0.41	243	92	89	63/49	3	251
	A-7	49.5	0940½	306.50	0.006	498	0.41	248	94	90	65/50	3	256
	A-7	54	0945	308.20	0.006	504	0.41	249	94	91	64/50	3	252
	A-6	58.5	0949½	309.60	0.005	506	0.34	248	96	93	62/49	3	252
	A-6	63	0954	311.20	0.005	506	0.34	248	97	93	62/49	3	247
	A-5	67.5	0958½	312.75	0.006	498	0.41	249	98	94	62/49	3	247
	A-5	72	1003	314.40	0.006	485	0.41	248	99	95	62/49	3	250
	A-4	76.5	1007½	316.00	0.005	474	0.34	249	99	96	61/49	3	250
	A-4	81	1012	317.50	0.005	479	0.34	249	100	97	63/51	3	251
-0.0025	A	85½	1016½	319.00	0.005	461	[illegible]	248	100	97	63/52		45

Revision: 11/90

RADIAN CORPORATION

METHOD 5
FIELD DATA

RUN 2
PAGE 2 OF 3

PLANT	Texaco
DATE	5/29/92
SAMPLING LOCATION	Heater/Treater
SAMPLE TYPE	PAH
RUN NUMBER	2
OPERATOR	SP

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Temperature (°F) Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit XAD	Pump Vacuum (in. Hg)	Probe Temp
	85½	1016½	319.00									
A-3	90	1021	—	0.005	429	0.34	247	100	97	62/52	3	249
A-2	94½	1025½	322.00	0.004	410	0.31	248	100	98	60/49	3	249 (=0.024 ↓
A-2	99	1030	323.40	0.004	292*	0.31	248	101	98	62/48	3	247
A-1	103½	1034½	324.75	0.004	379	0.31	251	101	98	63/47	3	251
A-1	108	1039½	326.225	0.004	396	0.31	250	101	99	64/49	3	248
			Post A traverse		Leak check		0.005 cfm @ 7" Hg					
			Pre B traverse		Leak check		0.010 cfm @ 8" Hg					
	108	1114	326.370									
B-12	112½	1118½	328.05	0.007	472	0.47	243	98	97	70/51	3	237
B-12	117	1123	330.00	0.007	479	0.47	251	98	97	72/46	3	254
B-11	117.6	[illegible]	330.10	0.								
B-11	121½	1223½	—	0.006	470	0.41	250	100	99	70/50	3	248
B-10	126	1228	333.00	0.006	489	0.41	247	101	99	67/45	3	246
B-10	130½	1232½	334.50	0.005	490	0.34	248	100	99	66/46	3	248
B-10	135	1237	336.00	0.005	494	0.34	248	100	99	65/46	3	248
B-9	139½	1241½	337.65	0.006	501	0.41	247	100	98	66/48	3	248
B-9	144	1246	339.25	0.006	511	0.41	247	100	98	65/49	3	250
B-8	148½	1250½	340.90	0.007	511	0.47	249	100	99	67/51		243

stop 1124 Restart 1220

-0.0025

CO: TS: * Low Temp

775

Revision: 1

RADIAN CORPORATION

METHOD 5
FIELD DATA

RUN 2
PAGE 3 OF 3

PLANT	Texaco	PROBE LENGTH AND TYPE	3' glass	HEIGHT OF LOCATION (ft)	20'
DATE	5/29/92	NOZZLE I.D. (in)	0.615	DUCT DIMENSIONS	24"
SAMPLING LOCATION	[illegible]	METER BOX NUMBER	Sac-05	FILTER NUMBER	-
SAMPLE TYPE	PAH	METER Δ H@	1.88	ASSUMED MOISTURE (%)	17.5
RUN NUMBER	2	Yd		MOISTURE METHOD	CARB 4
OPERATOR	SF	K FACTOR		MOISTURE DATA	
AMBIENT TEMPERATURE	90F	PROBE HEATER SETTING	250	O2/CO2 METHOD	
BAROMETRIC PRESSURE	29.51	HEATER BOX SETTING	250	O2	
STATIC PRESSURE (Ps)				CO2	
INITIAL LEAKCHECK				FINAL LEAKCHECK	0.010 cfm @ 8" Hg

READ AND RECORD ALL DATA EVERY 4.5 MINUTES

	Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Dry Gas Meter Inlet (Tm in) (°F)	Dry Gas Meter Outlet (Tm out) (°F)	Impinger Exit/XAD (°F)	Pump Vacuum (in. Hg)	Probe Temp
stop 1256	B-8	153	1255	342.70	0.007	510	0.47	248	101	99	67/52	3	247
				342.941		504							
				Leak check 0.010 cfm @ 8" Hg									
Restart 1450		153	1450	343.030									
	B-7	157.5	1454	344.40	0.006	457	0.41	251	99	99	75/63	3	247
	B-7	162.0	1458½	345.90	0.006	471	0.41	247	100	99	70/55	3	246
	B-6	166.5	1503	347.40	0.005	459	0.34	249	99	98	67/53	SAF 3	248
	B-6	171	1507½	349.00	0.005	476	0.34	247	99	98	68/53	3	250
	B-5	175.5	1512	350.20	0.003	475	0.20	248	99	98	70/55	3	245
	B-5	180.0	1516½	351.35	0.003	461	0.20	248	100	98	72/52	3	245
	B-4	184.5	1521	352.60	0.004	463	0.27	250	101	99	70/49	3	252
	B-4	189.0	1525½	353.90	0.004	469	0.27	245	102	100	68/48	3	251
	B-3	193.5	1530	355.50	0.008	439	0.34	251	103	101	67/46	3	254
	B-3	198.0	1534½	357.10	0.005	426	0.38	250	103	101	67/48	3	249 C=0.024
stop	B-2	202.5	1539	358.60	0.005	398	0.38	251	104	101	68/48	3	253
	B-2	204	1540	359.[illegible]	0.005	381	0.38	249	104	102	69/50	3	250
	[illegible]	207	1637	360.20	0.005	397	0.[illegible]	249	100	99	71/51	3	250
		211.5	163[illegible]	361.40	0.003	379	0.[illegible]	249	101	99	69/46	3	243

RADIAN CORPORATION

METHOD 5
FIELD DATA

RUN	4
PAGE 1 OF	3

PLANT	Texaco	PROBE LENGTH AND TYPE	3' Glass	HEIGHT OF LOCATION (ft)	20'
DATE	5/30/92	NOZZLE I.D. (in)	0.626	DUCT DIMENSIONS	24"
SAMPLING LOCATION	Heater/Inlet	METER BOX NUMBER	SAG05	FILTER NUMBER	—
SAMPLE TYPE	PAH	METER Δ H@	1.88	ASSUMED MOISTURE (%)	17
RUN NUMBER	#4	Yd	0.993	MOISTURE METHOD	CARB4
OPERATOR	MJ/GF	K FACTOR	(see side)	MOISTURE DATA	
AMBIENT TEMPERATURE	85	PROBE HEATER SETTING	250	O2/CO2 METHOD	
BAROMETRIC PRESSURE	29.34	HEATER BOX SETTING	260	O2	
STATIC PRESSURE (Ps)	-0.023			CO2	
INITIAL LEAKCHECK	0.009 @ 8"			FINAL LEAKCHECK	

I	C
450	0.023
500	0.0245

READ AND RECORD ALL DATA EVERY 4.5 MINUTES

	Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit / XAD-2	Pump Vacuum (in. Hg)	Probe Temp (°F)
P Start		0	0824	363.073									
	A-12	4.5	0828.5	—	0.006	458	0.495	250	84	83	75/58	2.5	248
	-12	9	0833	366.4	0.006	459	0.495	247	85	83	69/52	2.5	252
	-11	13.5	0837.5	368.3	0.007	462	0.570	248	86	84	66/47	3.5	246
	-11	18	0842	370.3	0.007	468	0.57	249	88	85	62/46	3.5	249
	-10	22.5	0846.5	372.1	0.008	473	0.62	248	89	86	59/43	4	248
-0.025	-10	27	0851	374.0	0.007	474	0.54	249	91	87	58/44	3.5	251
	-9	31.5	0855.5	~~37~~ —	0.008	478	0.62	249	92	88	58/45	4	257
	-9	36	0900	378.0	0.008	479	0.62	249	93	89	58/46	4	253
	-8	40.5	0904.5	379.9	0.008	482	0.62	249	94	90	59/48	4	248
	-8	45	0909	381.5	0.007	483	0.54	248	94	90	60/47	3.5	252
	-7	49.5	0913.5	383.7	0.007	482	0.54	247	95	91	61/49	3.5	256
	-7	54	0918	385.4	0.007	486	0.54	247	95	91	63/53	3.5	247
	-6	58.5	0922.5	—	0.006	496	0.465	250	97	93	65/54	3.5	251
	-6	63	0927	388.7	0.006	443	0.465	250	97	93	66/55	3.5	256
	-5	67.5	0931.5	—	0.006	446	0.465	249	98	95	64/48	3.5	253
-0.027	-5	72	0936	392.0	0.006	433	0.465	249	99	95	64/45	3.5	254
	-4	76.5	0940.5	393.7	0.003	471	0.245	249	100	96	66/47	2.5	248
	-4	81	0945	—	0.004	448	0.325	251	100	97	67/47	3	253
	-3	85.5	0949.5	396.8	0.004	478	0.325	249	102	98	68/48		249

COMMENTS:

Revision: 11/90

349)

RADIAN CORPORATION

METHOD 5 FIELD DATA

RUN 4
PAGE 2 OF 3

PLANT	Tenaco
DATE	5/30/92
SAMPLING LOCATION	Heater Treater
SAMPLE TYPE	D/F
RUN NUMBER	4
OPERATOR	[illegible]

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Dry Gas Meter Inlet (Tm in) (°F)	Dry Gas Meter Outlet (Tm out) (°F)	Impinger Exit/XAD (°F)	Pump Vacuum (in. Hg)	Probe Temp (°F)
A-3	90	0954	398.2	0.005	464	0.38	248	103	99	66/47	3	249
A-2	94.5	0958.5	400.5	0.015	467	1.15	250	105	101	62/45	3	256
A-2	99	1003	402.5	0.011	472	0.83	249	105	101	61/45	4.5	253
A-1	103.5	1007.5	405.0	0.011	444	0.83	247	106	102	63/45	4.5	248
A-1	108	1012	407.764	0.015	462	1.15	249	107	103	63/46	5	257
Mid-test Leak Rate = 0.002 cfm @ 6" Hg												
Pre-B traverse Leak Rate = 0.002 cfm @ 6" Hg												
	108	1130	408.1									
B-12	112.5	1139.5	409.5	0.005	486	0.37	233	106	105	70/57	2.5	248
-12	117	1144	411.1	0.005	491	0.37	245	106	105	73/46	3	255
-4	120.5	1148.5	412.7	0.005	496	0.37	249	107	105	68/42	3	253
-11	126	1153	414.2	0.006	494	0.455	251	109	107	67/44	3.5	252
-10	130.5	1157.5	416.0	0.006	500	0.455	255	110	107	67/45	3.5	252
-10	135	1202	417.6	0.007	502	0.53	250	110	108	67/46	4	250
-9	139.5	1206.5	—	0.005	507	0.37	248	111	108	68/48	3.5	252
-9	144	1211	421.0	0.007	510	0.53	247	111	108	66/45	4	252
-8	148.5	1215.5	423.0	0.007	510	0.53	247	112	109	66/45	4	254
-8	153	1220	424.7	0.006	505	0.455	248	112	109	66/44	3.5	255
-7	157.5	1224.5	426.5	0.007	514	[illegible]3	249	113	110	66/45	3.5	250

Stop @

-0.025

FIELD DATA

PLANT	Texaco	PROBE LENGTH AND TYPE	3' Glass	HEIGHT OF LOCATION (ft)	20'
DATE	5/30/92	NOZZLE I.D. (in)	0.626	DUCT DIMENSIONS	24"
SAMPLING LOCATION	Heater Stack	METER BOX NUMBER	Sac-05	FILTER NUMBER	—
SAMPLE TYPE	PAH	METER Δ H@	1.88	ASSUMED MOISTURE (%)	17
RUN NUMBER	#4	Yd	0.993	MOISTURE METHOD	CARB 4
OPERATOR	[illegible]	K FACTOR		MOISTURE DATA	
AMBIENT TEMPERATURE	85	PROBE HEATER SETTING	250	O2/CO2 METHOD	
BAROMETRIC PRESSURE	29.34	HEATER BOX SETTING	250	O2	
STATIC PRESSURE (Ps)				CO2	
INITIAL LEAKCHECK				FINAL LEAKCHECK	0.006 cfm @ 10" Hg

READ AND RECORD ALL DATA EVERY 4.5 MINUTES

	Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit / XAD-2	Pump Vacuum (in. Hg)	Probe Temp (°F)
Pstat	B-7	162	1229	—	0.007	511	0.53	247	113	110	67/48	4	250
stope	-6	166.5	1233.5	429.8	0.004	453	0.31	248	113	111	64/48	3½	254 C→ OA22
1234	-6	171	~~1238~~ 1415	431.2	0.003	451	0.25	249	111	110	75/48	3	247
Restart	-5	175.5	1420	—	0.005	429	0.405	249	111	110	74/44	3.5	255
1412	-5	180	1424.5	434.4	0.006	423	0.485	249	111	110	68/44	3.5	254
	-4	184.5	1429	436.2	0.006	448	0.485	249	112	111	64/42	3.5	253
-0.02	-4	189	1433.5	437.8	0.005	455	0.405	249	113	111	64/43	3.5	254
	-3	193.5	1438	439.5	0.005	430	0.405	251	113	111	66/44	3.5	247
	-3	198	1442.5	441.0	0.005	441	0.405	249	114	112	67/44	3.5	247
	-2	202.5	1447	442.7	0.005	455	0.400	247	114	112	69/48	3.5	252
	-2	207	1451.5	444.7	0.008	425	0.64	248	114	112	67/45	4	245
	-1	211.5	1456	446.7	0.008	431	0.64	249	115	112	64/43	4.5	260
stop @	-1	216	1504.5	448.658	0.007	448	0.56	251	116	113	65/44	4	256
	Ave	216		85.249	0.080	470.3	0.515			103.5			

COMMENTS:

Revision: 11/90

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IMPINGER SOLUTION RECOVERY FIELD DATA SHEET

Plant	Texaco
Date	5/28/92
Sampling Location	Heater/Treater
Sample Type	PAH
Run Number	#1
Sample Box Number	I
Clean-up Person	ML/SF
Solvent Rinses	Meth/Hex/MC
Sample Identification Code	TI-~~[illegible]~~ E,F SNP
XAD Trap Number	— TI-D

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (g)		
				Final	Initial	Weight Gain
1	–	Knock-out Empty	Knock-out	705.64	423.17	282.47
2	HPLC H_2O	100g.	GS	561.42	557.11	4.31
3	HPLC H_2O	100 gm	Mod-GS	567.31	569.32	-2.01
4	Silica Gel	~250gm	Inverted	787.56	768.24	19.32
5						
6						
7						

TOTAL WEIGHT GAIN (g) 304.09

RADIAN CORPORATION

IMPINGER SOLUTION RECOVERY FIELD DATA SHEET

Plant	Texaco
Date	5/29/92
Sampling Location	Heater Treater
Sample Type	PAH
Run Number	2
Sample Box Number	
Clean-up Person	SF
Solvent Rinses	methanol/Hexane/meth Chloride
Sample Identification Code	T2 - ~~A-E~~ E,F snf
XAD Trap Number	T2 - D

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (g) Final	Initial	Weight Gain
1	Empty	—	knock-out	669.32	428.41	240.91
2	HPLC H_2O	100g	GS	581.26	577.86	3.4
3	HPLC H_2O	100g	MGS.	595.26	594.39	0.87
4	Silica Gel	250g	Inverted	790.84	773.84	17.02
5						
6						
7						

TOTAL WEIGHT GAIN (g) 262.2

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IMPINGER SOLUTION RECOVERY FIELD DATA SHEET

Plant	Texaco
Date	5/30/92
Sampling Location	Heater Transfer
Sample Type	PAH
Run Number	4
Sample Box Number	
Clean-up Person	SF/mL
Solvent Rinses	
Sample Identification Code	T4-E,F
XAD Trap Number	T4-D

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (g) Final	Initial	Weight Gain
1	Empty	—	Knock-out	698.03	429.36	268.67
2	HPLC H_2O	100g	GS	582.31	576.46	5.85
3	HPLC H_2O	100g	MGS	590.12	589.39	0.73
4	Silica Gel	250g	Inverted	784.56	767.86	16.7
5						
6						
7						

TOTAL WEIGHT GAIN (g) 291.95

ALDEHYDE EMISSION DATA

RADIAN CORPORATION

Table B-2: Aldehyde Emission Data - Texaco (Cymric Field)
Heater Treater Exhaust

Run Number / Date / Time		# 1A 05/28/92 1000-1550	#1B 05/28/92 1653-2003	#2 05/29/92 0851-1039	AVG (a)
DGMCF	(---)=	1.010	1.010	1.010	--
Dry Gas Meter Volume	(liters)=	52.98	50.05	51.80	--
Barometric Pressure	(" Hg)=	29.28	29.28	29.31	--
Meter Back-Pressure	(" H2O)=	1.0	1.0	1.0	--
Meter Pressure, Absolute	(" Hg)=	29.35	29.35	29.38	--
Meter Temperature	(deg F)=	101	94	95	--
Stack Gas Flow Rate (b)	(dscfm)=	481	481	473	--
Standard Temperature	(deg F)=	60.0	60.0	60.0	--
Standard Pressure	(" Hg)=	29.92	29.92	29.92	--
Heat Input	(MMBTU/h)=	4.4	4.1	4.1	--
Aldehyde Qty Collected	(ug)=				--
Formaldehyde		< 0.50	0.55	< 0.50	
Acetaldehyde		0.51	< 0.50	< 0.50	
Acrolein		< 0.50	< 0.50	< 0.50	
Volume of Gas Sampled	(dscm)=	0.0486	0.0465	0.0481	--
Aldehyde Concentration	(ug/dscm)=				
Formaldehyde		< 10.3	11.8	< 10.4	7.4
Acetaldehyde		10.5	< 10.7	< 10.4	7.0
Acrolein		< 10.3	< 10.3	< 10.3	5.1
Aldehyde Concentration	(ppbv)=				
Formaldehyde		< 8.1	9.3	< 8.2	5.8
Acetaldehyde		5.6	< 5.8	< 5.6	3.8
Acrolein		< 4.3	< 4.3	< 4.3	2.2
Aldehyde Emission Rate	(lb/hr x 10-3)=				
Formaldehyde		< 0.019	0.021	< 0.018	0.013
Acetaldehyde		0.019	< 0.019	< 0.018	0.013
Acrolein		< 0.019	< 0.019	< 0.018	0.009
Aldehyde Emission Ratio	(lb/MMBTU x 10-6)=				
Formaldehyde		< 4.2	5.2	< 4.5	3.2
Acetaldehyde		4.3	< 4.7	< 4.5	3.0
Acrolein		< 4.2	< 4.5	< 4.4	2.2

(a) Average values were computed assuming that compounds that were below the detection limit were present at one-half of the detection limit.
(b) Based on flow rate data collected during the PAH testing (refer to Table B-1).

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Formaldehyde Field Data Sheet

Plant: Texaco
Date: 5/28/92
Location: Heater Treater
Console #: SAC-V02
DGMCF: 1.01

Test ID: Run 1A
Leak Rate (L/min): 0.000 lpm @ 7" Hg / 0.000 lpm @ 6.5" Hg
Barometric Pressure (in Hg): 29.28
Sampling Duration (min): 108
Operator: [illegible]

Time	DGM Reading (L)	Rotometer (L/min)	Meter Temp. (°C) Inlet	~~Outlet~~	Meter Pressure (in H2O)	Pump Vacuum (in Hg)
Start @ 10:00	728.020					
10:05	731.00	0.5	35	—	1.0	<2
10:16	735.5	0.5	36	—	1.0	<2
1159	740.0	0.5	38	—	1.0	<2
1357	745.0	0.5	39	—	1.0	<2
1413	753.0	0.5	41	—	1.0	<2
1424	758.0	0.5	42	—	1.0	<2
1514	763.0	0.5	38	—	1.0	<2
1531	771.0	0.5	38	—	1.0	<2
1544	777.5	0.5	39	—	1.0	<2
Stop @ 1550	781.000					
Δ = 108 minutes						
Avg.	52.980	0.5	38.4 (101.2°F)	—	1.0	<2

10:21 stop @ ... start 1159; stop @ 1208 start 1355; stop @ 1430 ... restart

RADIAN CORPORATION

Formaldehyde Field Data Sheet

Plant: Texaco
Date: 5/28/92
Location: Heater Treater
Console #: SAC-V02
DGMCF: 1.01

Test ID: Run 1B
Leak Rate (L/min): 0.000 lpm @ 7" Hg / 0.000 lpm @ 6.5" Hg
Barometric Pressure (in Hg): 29.28
Sampling Duration (min): 99.8
Operator: [illegible]

	Time	DGM Reading (L)	Rotameter (L/min)	Meter Temp. (°C) Inlet	~~Outlet~~	Meter Pressure (in H2O)	Pump Vacuum (in Hg)
Start @	16:53	781.500					
	~~16:53~~	—	0.5	35	—	1.0	<2
Stop @ 1700 → Restart @ 1725	16	790.0	0.5	35	—	1.0	<2
	24	793.5	0.5	36	—	1.0	<2
	36	799.5	0.5	36	—	1.0	<2
Stop @ 18:02 → Restart @ 18[illegible]	46	804.5	0.5	34	—	1.0	<2
	58	811.0	0.5	34	—	1.0	<2
Stop @ 1905 → Restart @ 1935	71	816.5	0.5	35	—	1.0	<2
	81	822.0	0.5	33	—	1.0	<2
	90	—	0.5	33	—	1.0	<2
Stop @ 2003	99.8	831.55					
	Avg.	50.050	0.5	34.6		1.0	<2

(94.2)

99.8
-23
38
38
5.8 min

RADIAN CORPORATION

Formaldehyde Field Data Sheet

Plant: Texaco

Date: 5/29/92

Location: Heater Treater

Console #: Sac - VØ2

DGMCF: 1.01

Test ID: 2 ~~A~~

Leak Rate (L/min): Pre-Test 0.000lpm @ 7" Hg / Post-Test 0.000lpm @ 7" Hg

Barometric Pressure (in Hg): 29.31

Sampling Duration (min): 108

Operator: SF

	Time	DGM Reading (L) 831.74	Rotometer (L/min)	Meter Temp. (°C) Inlet	Outlet	Meter Pressure (in H2O)	Pump Vacuum (in Hg)
Start	085Ø		0.5	29		1.0	<2
	0902	837.10	0.5	31		1.0	<2
	0920	845.52	0.5	34		1.0	<2
	0937	853.70	0.5	36		1.0	<2
	0956	856.25	0.5	38		1.0	<2
	1020	874.30	0.5	38		1.0	<2
	1032	880.35	0.5	37		1.0	<2
Stop	1039	883.54					
		Leak check		0.000lpm @ 7" Hg			
	Avg.	51.800	0.5	35 (95)	—	1.0	<2

BTEX, PROPYLENE, AND THC EMISSION DATA

Table B-3: BTEX, Propylene, and Total Hydrocarbon Emission Data - Texaco (Cymric Field) Heater Treater Exhaust

Run Number	# 4A	# 4B	# 4C (a)	AVG (b)
Date	05/30/92	05/30/92	05/30/92	
Time	0824-0854	0902-0932	0943-1013	
Barometric Pressure (" Hg)=	29.34	29.34	29.34	--
Stack Gas Flow Rate(c) (dscfm)=	535	535	535	--
Standard Temperature (deg F)=	60.0	60.0	60.0	--
Standard Pressure (" Hg)=	29.92	29.92	29.92	--
Heat Input (MMBtu/h)=	4.1	4.1	4.1	--
VOC Concentration (ppbv)=				
Benzene	< 1.0	< 1.0	2.3	1.1
Toluene	7.0	38.0	4.3	16.4
Ethylbenzene	< 1.0	< 1.0	< 1.0	0.50
Xylenes	9.0	13.0	2.5	8.2
Propylene	360	700	515	525
Total Hydrocarbons (d)	6,300	6,300	6,300	6,300
VOC Concentration (ug/dscm)=				
Benzene	< 3.3	< 3.3	7.4	3.6
Toluene	27.5	149	16.7	64.5
Ethylbenzene	< 4.5	< 4.5	< 4.5	2.3
Xylenes	41.0	59.3	11.4	37.2
Propylene	639	1,223	913	925
Total Hydrocarbons	4,257	4,257	4,257	4,257
Emission Rate (lb/hr x 10-6)=				
Benzene	< 6.6	< 6.6	14.9	7.2
Toluene	55.1	299	33.5	129
Ethylbenzene	< 9.1	< 9.1	< 9.1	4.5
Xylenes	82.3	119	22.9	74.6
Propylene	1,280	2,451	1,831	1,854
Total Hydrocarbons	8,531	8,531	8,531	8,531
Emission Ratio (lb/MMBtu x 10-6)=				
Benzene	< 1.6	< 1.6	3.6	1.7
Toluene	13.3	72.4	8.1	31.3
Ethylbenzene	< 2.2	< 2.2	< 2.2	1.1
Xylenes	19.9	28.8	5.5	18.1
Propylene	310	593	443	449
Total Hydrocarbons	2,066	2,066	2,066	2,066

(a) Duplicate samples were collected during Test 4C; data represent the averages of the two analyses (refer to Appendix C).
(b) Average values are computed assuming that compounds which are below the detection limit, are present at one-half of the detection limit.
(c) Based on data collected during the PAH emission testing (refer to Table B-1).
(d) Quantified as methane.

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VOCs Field Data Sheet

Plant Texaco

Date 5/30/92

Location Heater Treater

Console #

DGMCF

Bag ID T20-A

Leak Rate (L/min)

Barometric Pressure (in Hg)

Sampling Duration (min) 30 min

Operator SF

Test 4A

	Time	Rotameter (L/min) cc	Pump Vacuum (in Hg)
Start@	0824	10	
	0836	10	
	0845	10	
	0851	10	
Stop@	0854	10	
	Avg.		

RADIAN CORPORATION

VOCs Field Data Sheet

Plant Texaco

Date 5/3/92

Location Heater Treater Exhaust

Console #

DGMCF

Bag ID T21-A

Leak Rate (L/min)

Barometric Pressure (in Hg)

Sampling Duration (min) 30 min

Operator SF

Test 4B

	Time	Rotometer (L/min)	Pump Vacuum (in Hg)
Start @	0902	10	
	0909	10	
	0920	10	
	0925	10	
Stop @	0932	10	
	Avg.		

RADIAN
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VOCs Field Data Sheet

Plant Texaco
Date 5/30/92
Location Heater treater Exhaust
Console #
DGMCF

Bag ID T22-A, T22-B
Leak Rate (L/min)
Barometric Pressure (in Hg)
Sampling Duration (min) 30 min
Operator SF

Test 4C

	Time	Rotameter (L/min)	Pump Vacuum (in Hg)
start	0943	10	
	0952	10	
	1060	10	
	1006	10	
stop	1013	10	
	Avg.		

NO_X, CO, O_2, AND CO_2 EMISSION DATA

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Table B-4: NOx and CO Emission Data - Texaco (Cymric Field) Heater Treater Exhaust Stack

Run Number Date Time (a)	# 1 5/28/92 1000-2004	# 2 5/29/92 0850-1644	# 4 5/30/92 0824-1457	Average
Barometric Pressure (" Hg)=	29.28	29.31	29.34	--
Oxygen Concentration (% O2)=	1.7	2.5	2.7	--
CO2 Concentration (% CO2)=	12.3	11.8	11.6	--
Stack Gas Flow Rate (b) (dscfm)=	481	473	535	--
Standard Temperature (deg F)=	60.0	60.0	60.0	--
Standard Pressure (" Hg)=	29.92	29.92	29.92	--
Heat Input (MMBTU/h)=	4.25	4.1	4.1	
Concentration (ppmv)=				
NOx	55.3	54.8	56.7	55.6
CO	6.6	0.3	0.7	2.5
Concentration (mg/dscm)=				
NOx	107.3	106.4	110.0	107.9
CO	7.8	0.3	0.8	3.0
Emission Rate (lb/hr)=				
NOx	0.19	0.19	0.22	0.20
CO	0.014	0.001	0.002	0.005
Emission Ratio (lb/MMBTU x 10-3)=				
NOx	45.5	45.6	53.4	48.2
CO	3.3	0.1	0.4	1.3

(a) Tests 1 and 2 CO levels were sporadic, with several peaks above the upper limit of the analyzer (i.e., 10,000 ppm). The data presented above represent average CO levels during intervals in which CO levels were relatively stable; In particular, Test 1 - 1000-1300; 1836-2004. Test 2 - 0850-1038. The data are presented in further detail in the attached field records.

(b) Based on flow rate data collected during the PAH testing (refer to Table B-1).

SUMMARY OF TEST RESULTS

Date	Test Location	Test No.	Test Time	NO_x (ppm)	CO (ppm)	CO_2 (%)	O_2 (%)
5/28/92	Fitzgerald Lease Heater Treater	1A	10:00 am - 1:00 pm	54.67	4.55	11.97	2.18
		1B	1:56 pm - 3:52 pm	54.03	>5749.94	12.33	1.38
		1C	4:47 pm - 6:04 pm	56.65	>9934.61	12.55	1.62
		1D	6:36 pm - 8:04 pm	55.94	7.59	12.09	1.88
5/29/92	Fitzgerald Lease Heater Treater	2A	8:50 am - 10:38 am	53.51	0.28	11.64	2.64
		2B	11:14 am - 12:56 pm	55.66	>1996.75	11.88	2.53
		2C	2:50 pm - 4:42 pm	56.31	>2020.11	11.98	2.17
5/30/92	Fitzgerald Lease Heater Treater	4A	8:24 am - 10:12 am	55.39	0.37	11.45	2.85
		4B	11:35 am - 12:33 pm	57.57	0.93	11.60	2.47
		4C	2:12 pm - 2:57 pm	58.30	1.20	11.81	2.51

> indicates CO emissions were off-scale during a portion of the test period.

Steiner Environmental, Inc.

1/6

CONTINUOUS MONITOR DATA SHEET

Plant: Texaco, Cymric Field (WSPA)
Date: 5/28/92 Run No. 1
Test Location: Heater Treater (Fritzgerald Lease)
Operator: VVM
Fuel Type: Natural Gas Trailer No. 2

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

Time	Sample Point	O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
		7.88	14.46	37.9			77.4	Span Gases
								Calibration
		0	0	0.			0	Zero
		7.88	14.46	37.9			77.4	Span
		7.96	14.30	38.5			76.6	Bias / Span
								Zero
		0.08						QA / Leak ✓ OK
1000		2.30	11.60	3.40			54.0	Run 1A
10								Stop: Low Flow,
20								Repair Hankinson
1156		2.15	12.00	2.00			56.0	Unit Down @ 1020
1206		2.15	12.20	6.50			56.0	
1210								Stop: Unit Down
								@ 1210
1300		0.05	0.10	0.10			0.2	Zero ✓
		7.86	14.46	38.4			79.2	Span ✓
								Reset
1356		1.70	12.15	7.50			55.2	Run 1B (cont)
1406		1.90	12.05	7.00			56.0	
16		1.05	12.10	7.50			56.0	Stop @ 1430
26								Unit Down
1512		1.20	12.30	*			54.0	*CO very Erratic
22		1.00	12.40				49.0	0 - 12500 ppm
32		0.80	12.30				53.[illegible]	Anarad CO not
[illegible]2		1.40	12.40				56[illegible]	working -

Dry Uncorrected: columns O_2 through NO_x

Miscellaneous Information

CALIBRATION GASES
NO_x: CC12545
SO_2:
CO:
$CO/CO_2/O_2$: CC83869 ; CC60303

Wet Bulb: Dry Bulb:
Barometric Press:

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

PROCESS DATA
Fuel Flow:
Steam Flow:
Rating:

CONVERTER GAS

	Cal Gas Values	Actual Values
NO		
NO_2		

Conv. Efficiency:

Steiner Environmental, Inc.

2|6

CONTINUOUS MONITOR DATA SHEET

Plant: Texaco, Cymric Field (WSPA)
Date: 5/20/92 Run No. 1
Test Location: Heater Treator (Fritzgerald lease)
Operator: VVM
Fuel Type: Natural Gas Trailer No. 2

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

Dry Uncorrected

Time	Sample Point	O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
		0.0	0.0	0.8			0.2	Zero ✓
		7.92	14.4	37.6			77.5	Span ✓
								Reset, Unit Down
1647		1.80	12.35	*			56.0	Run 1C (cont)
51								* See page 1
1703								Unit Down
25		1.70	12.60	*			57.0	
35		1.60	12.60				57.0	
45		1.40	12.70				57.0	
55		1.60	12.90				57.5	
1804		0.0	0.0	0.0			0.5	Zero ✓
		7.85	14.60	38.4			77.8	Span ✓
								Reset
1836		1.80	12.20	3.0			56.0	Run 1D (cont)
46		1.80	12.20	8.0			56.2	
56		1.75	12.20	12.5			56.5	
1900								Unit Down
1935		2.10	12.00	4.0			56.0	
45		1.90	12.10	8.5			54.2	
55		1.90	12.10	9.0			55.4	
2004		0.0	-0.12	-0.40			-0.6	Zero ✓
		7.86	14.60	38.5			77.0	Span ✓
		7.92	14.50	38.0			78.0	Bias ✓ Span
		0.06	-0.1	0.0			0.0	Zero
		0.10						calibration

Miscellaneous Information

CALIBRATION GASES

NO_x ___
SO_2 ___
CO ___
$CO/CO_2/O_2$ ___

Wet Bulb: ___ Dry Bulb: ___
Barometric Press: ___

RESPONSE TIME

Upscale: ___ Downscale: ___
Upscale: ___ Downscale: ___
Upscale: ___ Downscale: ___

PROCESS DATA

Fuel Flow: ___
Steam Flow: ___
Rating: ___

CONVERTER GAS

	Cal Gas Values	Actual Values
NO		
NO_2		

Conv. Efficiency: ___

Steiner Environmental, Inc.

3|6

CONTINUOUS MONITOR DATA SHEET

Plant Texaco - Cymric Field (WSDA)
Date 5/29/92 Run No. 2
Test Location Heater Treater (Fritzgerald Lease)
Operator VVn
Fuel Type Natural Gas Trailer No. 2

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

Time	Sample Point	Dry Uncorrected O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
		7.88	14.46	37.9			77.4	Span Gases
								Calibration
		0	0	0			0	Zero
		3.76	14.46	37.9			77.4	Span
		3.80	14.35	37.6			77.0	Bias ✓ Span
		0.09	0.0	0.0			0.0	Zero
		0.03						QA/Leak ✓ ok
		7.88						Cal Adjust - ΔO_2
0850		2.75	11.60	0.50			52.6	Run 2A
0900		2.70	11.65	0.50			53.0	
10		2.50	11.70	0.40			53.2	32766
20		2.50	11.70	1.00			54.5	75
30		2.60	11.60	0.50			56.0	
40		2.70	11.50	0.40			54.0	
50		2.70	11.60	0.40			56.0	
1000		2.60	11.50	0.30			54.5	
10		2.74	11.50	0.20			54.0	
20		2.65	11.60	0.00			56.0	
30		2.60	11.56	0.20			54.6	
1038		0.02	-0.1	0.26			0.4	Zero ✓
		7.86	14.35	37.5			77.8	Span ✓
								Reset

Miscellaneous Information

CALIBRATION GASES

NO_x CC12545
SO_2
CO
$CO/CO_2/O_2$ CC83869; CC60303

Wet Bulb: Dry Bulb:
Barometric Press:

RESPONSE TIME

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

PROCESS DATA

Fuel Flow:
Steam Flow:
Rating:

CONVERTER GAS

	Cal Gas Values	Actual Values
NO		
NO_2		

Conv. Efficiency:

Ste Environmental, Inc.

4|6

CONTINUOUS MONITOR DATA SHEET

Plant Texaco, Cymric Field (WGPA)
Date 5/21/92 Run No. 2B / 2C
Test Location Heater Treater ~~(Fitzgerald Lease)~~
Operator WM
Fuel Type Natural Gas Trailer No. 2

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

Time	Sample Point	O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
			Dry Uncorrected					
		7.88	14.40	37.4			77.4	Span Gases
1114		2.6	11.60	0.5			55.0	Run 2B
24								Unit Down
1220		2.35	11.80	4.0			56.0	Restart
30		2.20	12.20	>1000	*		55.0	*CO erratic - 0 to 1200
40		2.10	11.70	0.3			56.5	for ~3 min
50		2.00	12.00	12.5			56.5	
								Unit Down
1256		0.0	0.0	0.0			0.0	Zero ✓
		7.86	14.42	38.2			77.8	Span ✓
								Reset
1430		1.60	12.40	25.0			54.2	Run 2C
1500		2.60	11.60	10.0			56.2	
10		2.40	11.80	2.5			56.8	
20		2.30	12.00	–	**		57.0	**offscale
30		2.00	12.00	7.50			56.6	
42								Unit Down
1632		1.60	12.20	–	**		55.0	
42		0.0	0.05	0.1			0.0	Zero ✓
		7.94	14.40	37.7			77.0	Span ✓
		7.98	14.38	38.2			77.4	Bias ✓ Span
		0.04	0.0	0.0			0.0	Zero
		0.04						QA Leak ✓ OK

Miscellaneous Information

CALIBRATION GASES

NO_x
SO_2
CO
$CO/CO_2/O_2$

Wet Bulb: Dry Bulb:
Barometric Press:

RESPONSE TIME

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

PROCESS DATA

Fuel Flow:
Steam Flow:
Rating:

CONVERTER GAS

	Cal Gas Values	Actual Values
NO		
NO_2		

Conv. Efficiency:

Steiner Environmental, Inc.

5|6

CONTINUOUS MONITOR DATA SHEET

Plant Texaco - Cymric Field (Wopa)
Date 5/30/92 Run No. 4*
Test Location Heater Treater (Fritzgerald Lease)
Operator Wrt
Fuel Type Natural Gas Trailer No. 2

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

Time	Sample Point	Dry Uncorrected O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
		7.88	14.46	37.9			77.4	Span Gases
								Calibration
		0	0	0			0	Zero
		7.88	14.46	37.9			77.4	Span
		7.92	14.30	38.1			76.8	Bias ✓ Span
		0.06	0.0	0.0			0.2	Zero
		0.04						QA / Leak ✓ ok
0824		2.30	11.50	1.50			54.0	Run 4A
34		2.50	11.30	0.50			53.2	Note: Run 3 is
44		2.79	11.50	0.40			53.4	Field Blank for PAH
54		2.78	11.50	0.50			56.0	
0904		2.62	11.60	0.40			54.2	
14		2.50	11.45	0.40			56.5	
24		2.85	11.50	0.40			56.5	
34		3.00	11.30	0			57.0	
44		3.20	11.20	0			57.0	
54		3.00	11.30	0			56.0	
1004		3.00	11.30	0			57.0	
1012		0.04	0.0	0.0			-0.8	Zero ✓
		7.94	14.40	37.5			78.6	Span ✓
								Reset

Miscellaneous Information

CALIBRATION GASES

NO_x CC12545
SO_2
CO
$CO/CO_2/O_2$ CC83869 ; CC60303

Wet Bulb: Dry Bulb:
Barometric Press:

RESPONSE TIME

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

PROCESS DATA

Fuel Flow:
Steam Flow:
Rating:

CONVERTER GAS

	Cal Gas Values	Actual Values
NO		
NO_2		

Conv. Efficiency:

616

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CONTINUOUS MONITOR DATA SHEET

Plant: Texaco / Cymric Field (WSDA)
Date: 5/30/92 Run No. 4B & 4C
Test Location: Heater Treater (Fitzgerald Lease)
Operator: Dutt
Fuel Type: Natural Gas Trailer No. 2

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

Dry Uncorrected

Time	Sample Point	O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
		7.88	14.46	37.9			77.4	Span Gases
1135		2.80	11.55	0.50			56.5	Run 4B
45		2.40	11.70	0.75			57.0	
55		2.35	11.70	0.75			56.5	
1205		2.50	11.70	0.50			58.0	
16		2.40	11.60	2.00			58.0	
25		2.48	11.70	1.00			58.5	
								Unit Down
1233		0.04	0.0	0.0			0.0	Zero ✓
		7.88	14.60	37.1			77.0	Span ✓
								Restart
1412		2.60	11.80	2.00			57.8	Run 4C
22		2.40	11.80	1.00			58.[illegible]	
32		2.50	11.80	2.00			59.0	
42		2.55	11.80	0.50			58.8	
52		2.60	11.65	0.50			59.0	
1457		0.0	0.05	0.0			0.6	Zero ✓
		7.98	14.40	37.6			77.8	Span ✓
		7.96	14.40	38.1			77.2	Bias ✓ Span
		0.04	0.0	0.0			0.6	Zero
		0.04						QA/Leak ✓ ok

Miscellaneous Information

CALIBRATION GASES

NO_x: CC12545
SO_2: ______
CO: ______
$CO/CO_2/O_2$: CC83869 ; CC60303

Wet Bulb: ______ Dry Bulb: ______
Barometric Press: ______

RESPONSE TIME

Upscale: ______ Downscale: ______
Upscale: ______ Downscale: ______
Upscale: ______ Downscale: ______

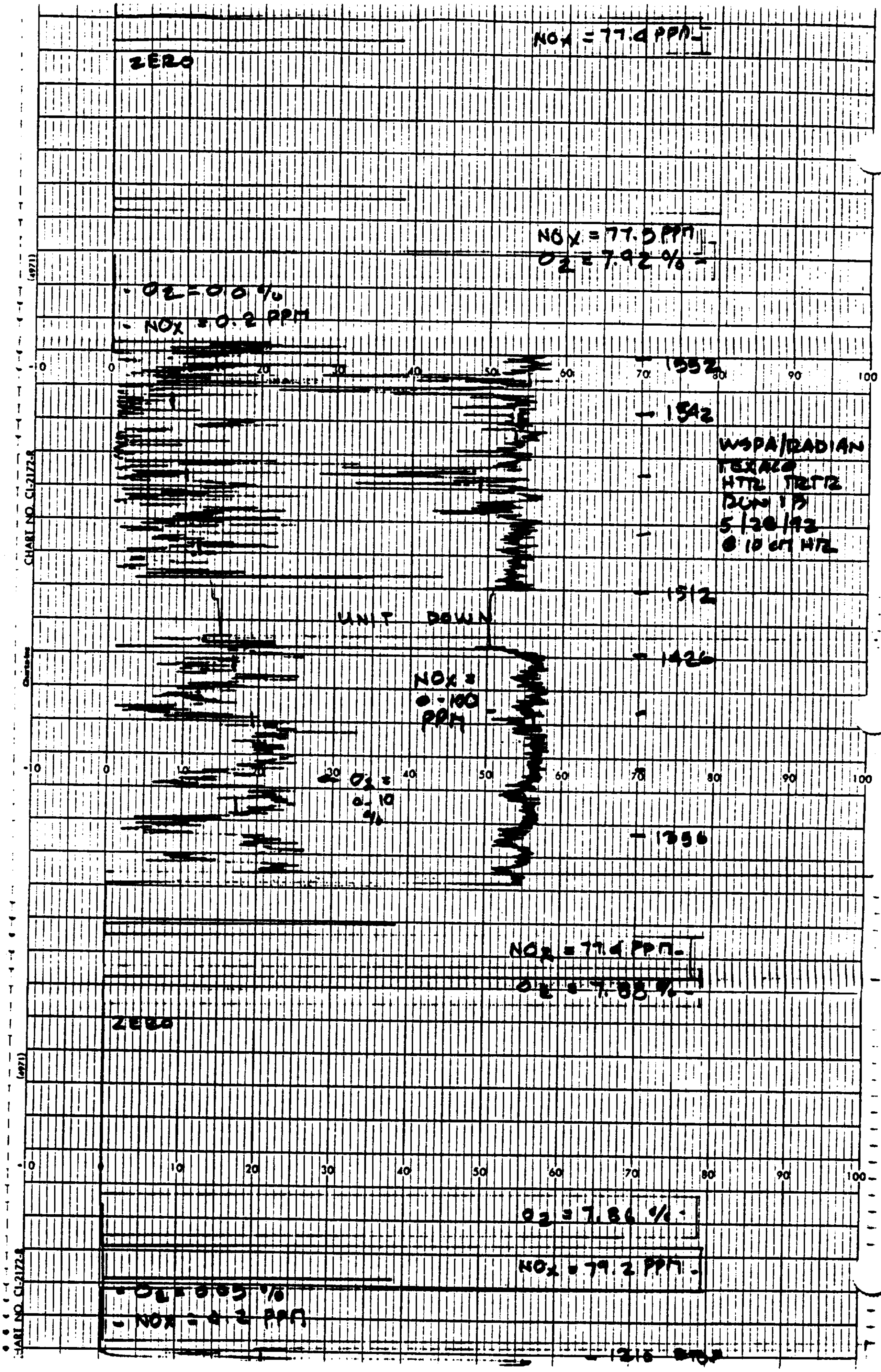
PROCESS DATA

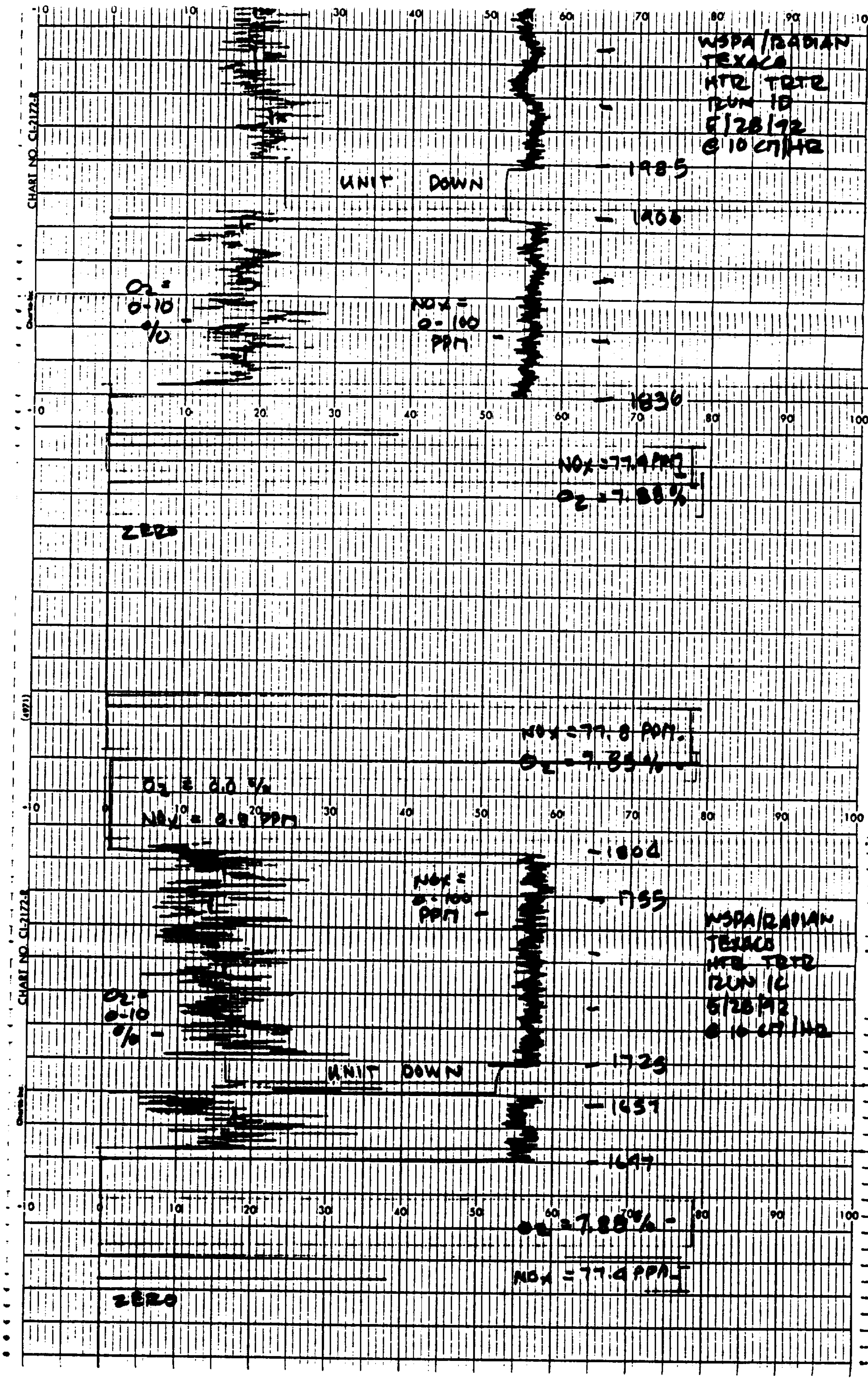
Fuel Flow: ______
Steam Flow: ______
Rating: ______

CONVERTER GAS

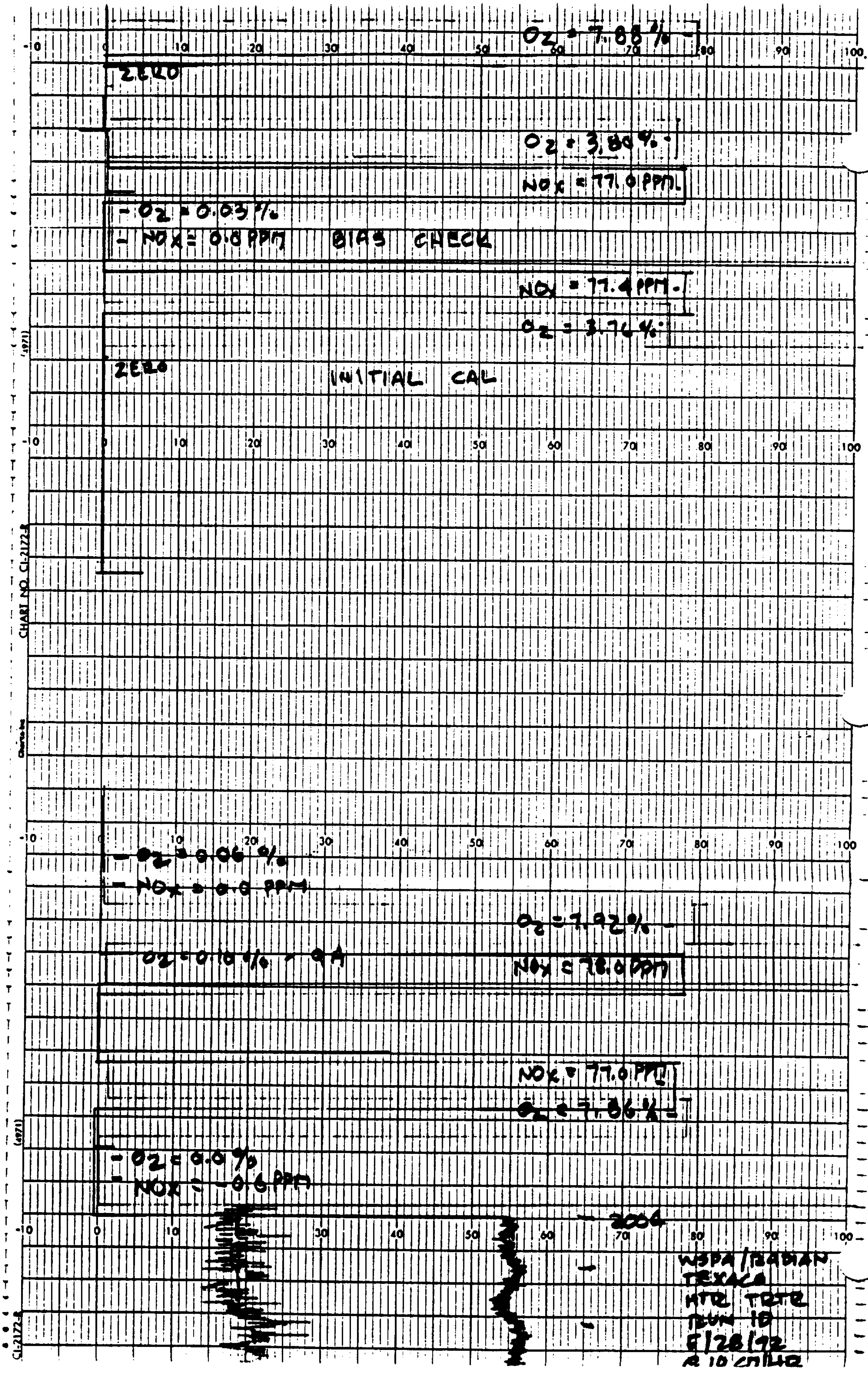
	Cal Gas Values	Actual Values
NO	______	______
NO_2	______	______

Conv. Efficiency: ______


NOx = 77.4 PPM
ZERO
NOx = 77.5 PPM
O2 = 7.92 %
O2 = 0.0 %
NOx = 0.2 PPM
1552
1542
WSPA/RADIAN
TEXACO
5/28/92
1512
UNIT DOWN
1426
NOx = 0-100 PPM
O2 = 0-10 %
1356
NOx = 77.4 PPM
O2 = 7.88 %
ZERO
O2 = 7.86 %
NOx = 79.2 PPM
NOx = 0.2 PPM



WSPA/RADIAN
TEXACO
HTR TRTR
RUN 1B
5/28/92
@ 10 CM/HR
1985
UNIT DOWN
1906
O_2 = 0-10 %
NOx = 0-100 PPM
1836
NOx = 77.4 PPM
O_2 = 7.88%
ZERO
NOx = 77.8 PPM
O_2 = 7.85%
O_2 = 0.0 %
NOx = 0.0 PPM
1804
1755
NOx = 0-100 PPM
WSPA/RADIAN
TEXACO
HTR TRTR
RUN 1C
5/28/92
@ 10 CM/HR
O_2 = 0-10 %
1725
UNIT DOWN
1657
1647
O_2 = 7.88%
NOx = 77.4 PPM
ZERO
CHART NO CL-2172-B


O2 = 7.88%
ZERO
O2 = 3.80%
NOx = 77.0 PPM
- O2 = 0.03%
- NOx = 0.8 PPM BIAS CHECK
NOx = 77.4 PPM
O2 = 3.76%
ZERO
INITIAL CAL
- O2 = 0.06 %
- NOx = 0.0 PPM
O2 = 7.92%
- O2 = 0.10% - QA
NOx = 78.0 PPM
NOx = 77.0 PPM
O2 = 7.86%
- O2 = 0.0%
- NOx = -0.6 PPM
- 2006
WSPA/RADIAN
TEXACO
HTR TEST
RUN 1D
5/28/92
@ 10 cm/HR
CHART NO CL-2172-8

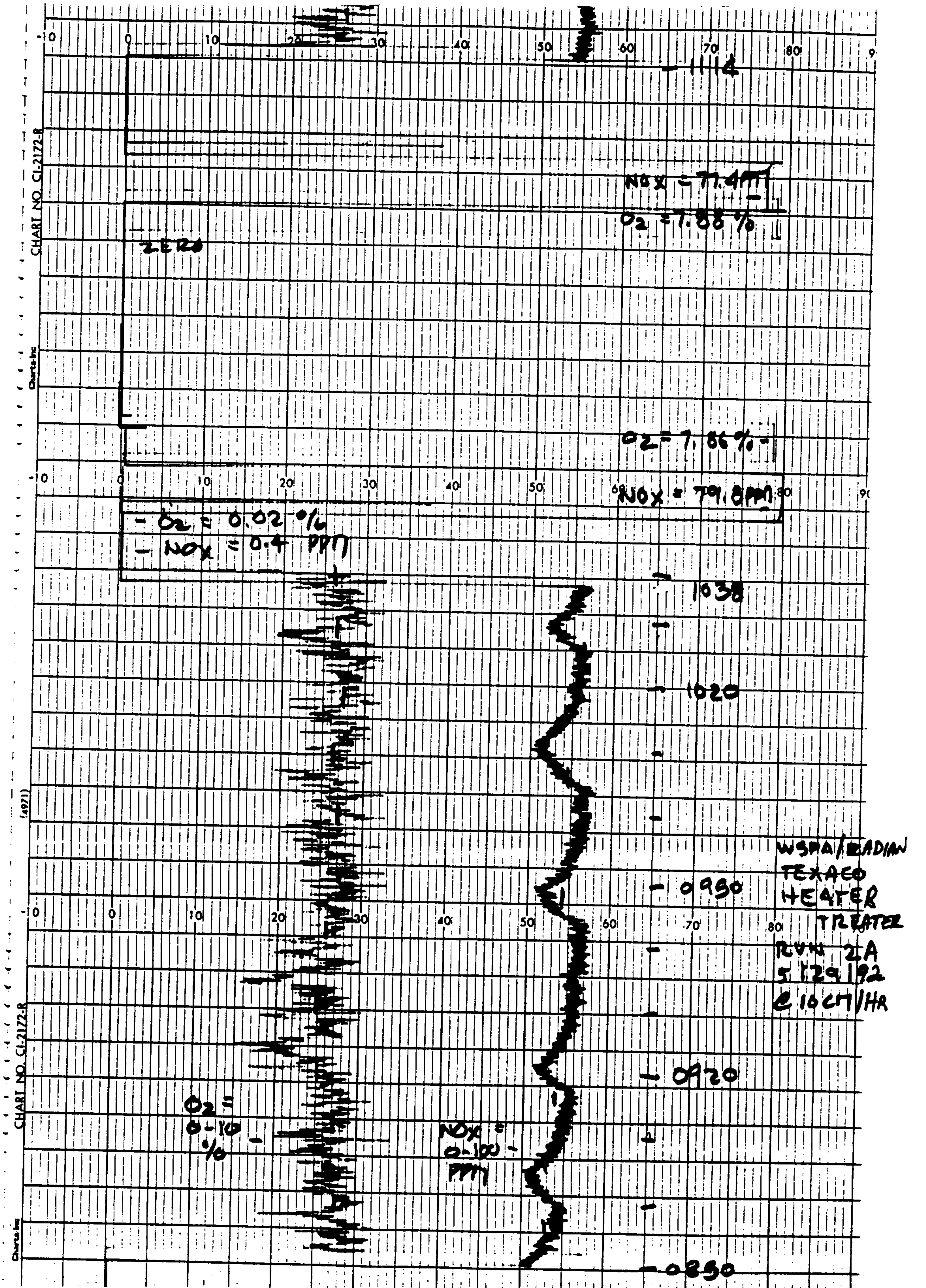
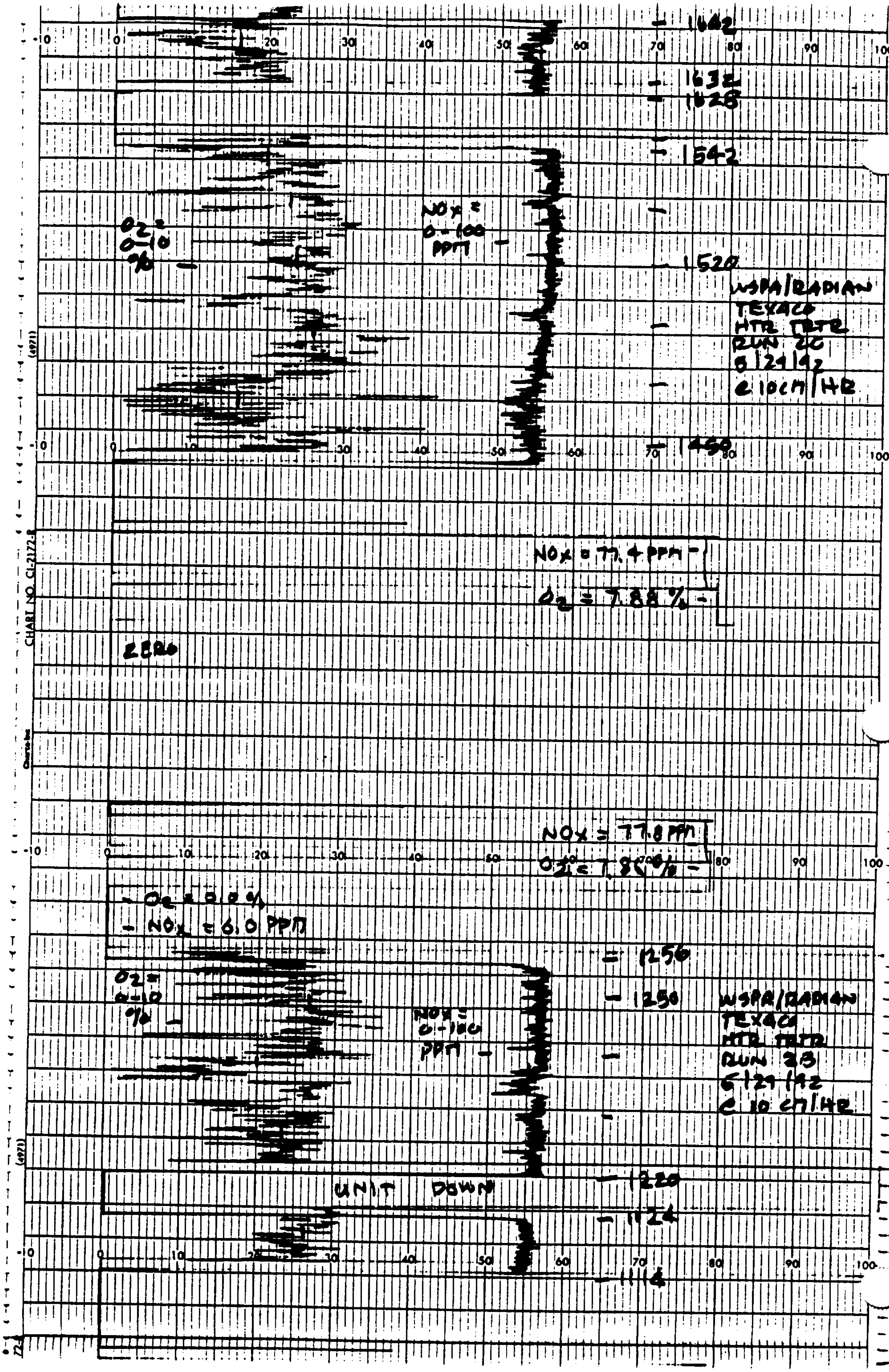
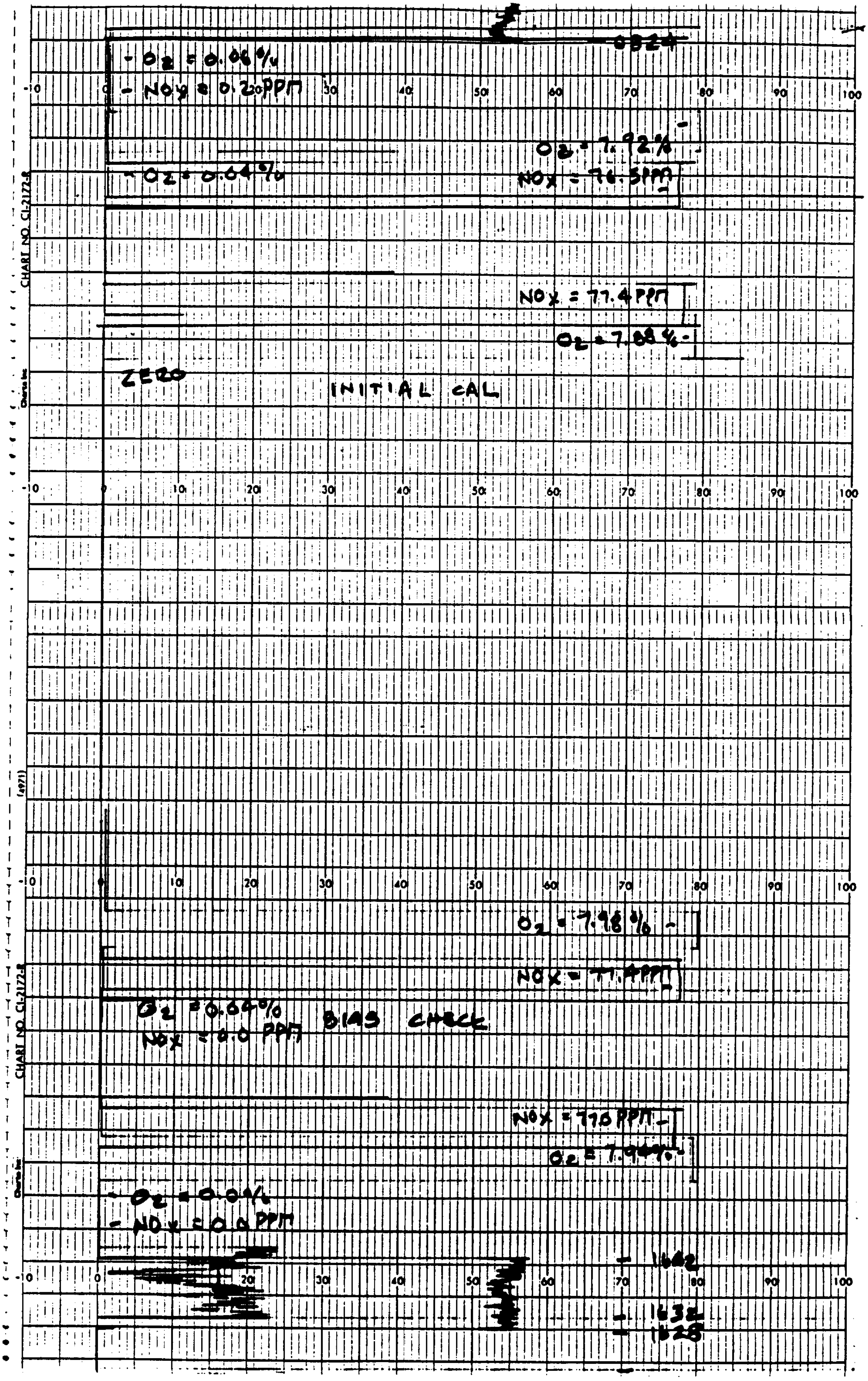
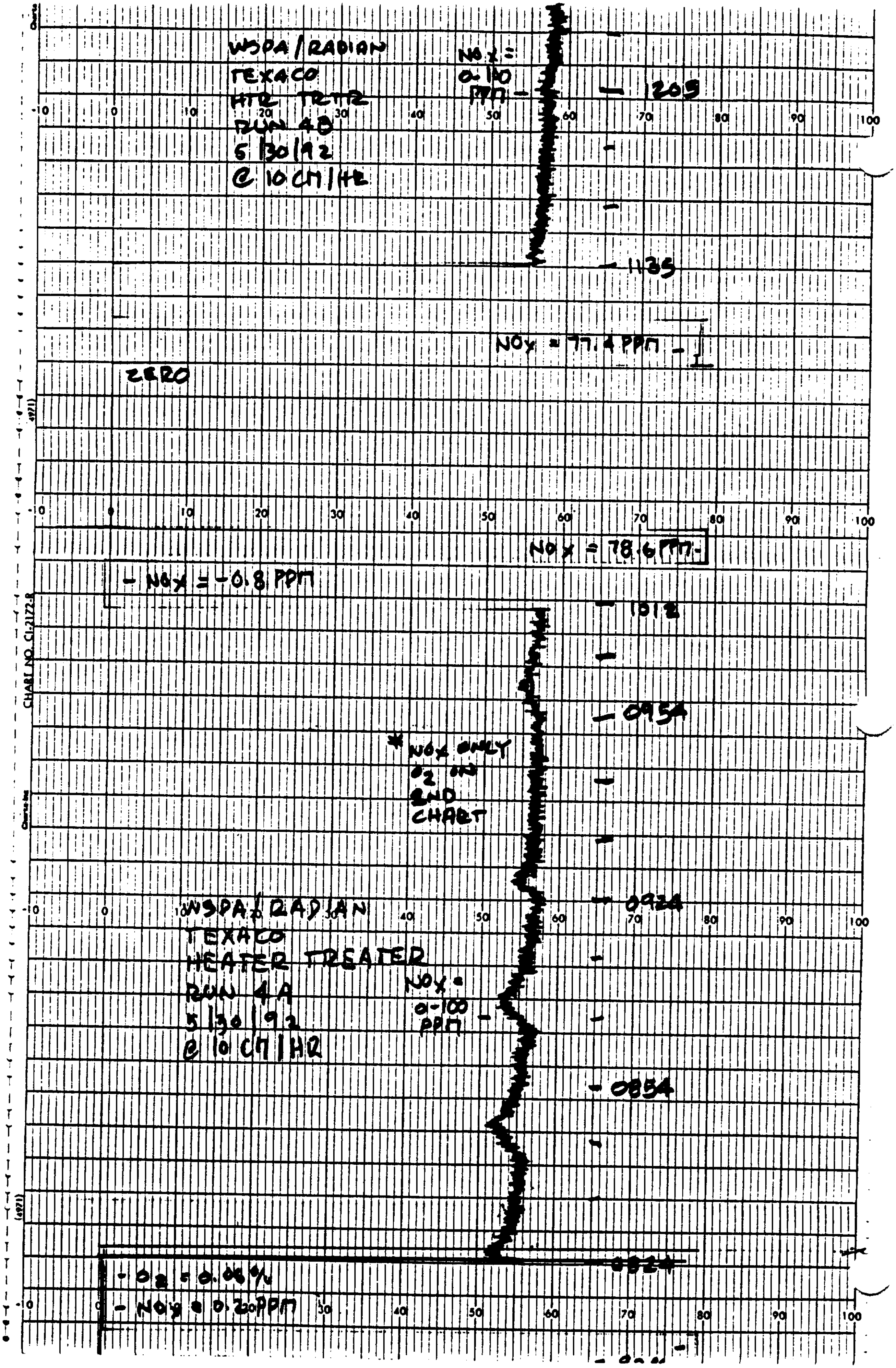


CHART NO. CL-2172-R
1114
O2 = 7.88 %
ZERO
O2 = 7.86 %
NOX = 79.8 PPM
O2 = 0.02 %
NOX = 0.4 PPM
1038
1020
0950
WSPA/RADIAN
TEXACO
HEATER
TREATER
RUN 2A
5/29/92
@ 10CM/HR
0920
O2 = 0-10 %
NOX = 0-100 PPM
0850

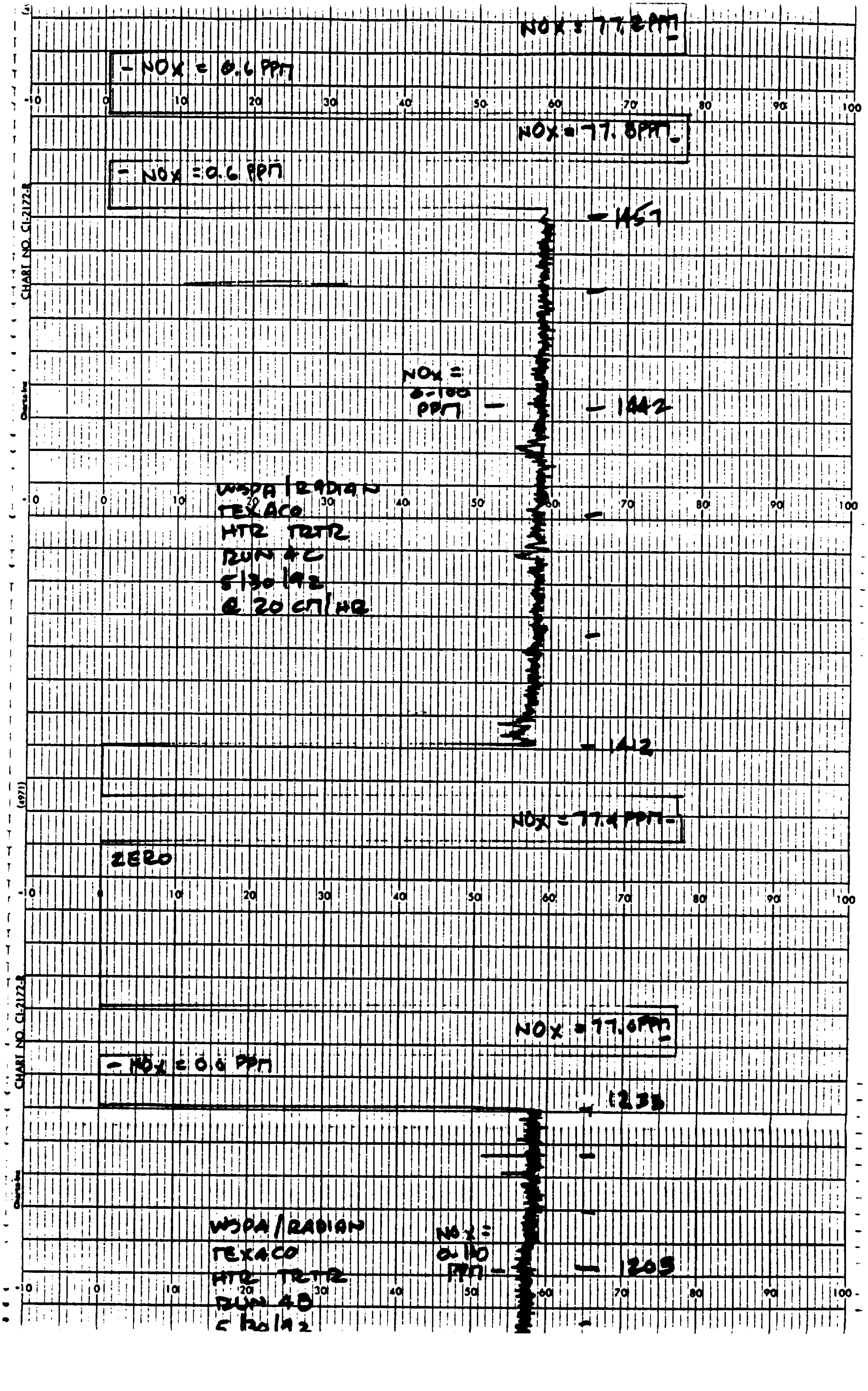

1642
1632
1628
1542
O2 = 0-10 %
NOx = 0-100 PPM
1520
WSPA/RADIAN
TEXACO
HTR TSTR
RUN 2C
5/29/92
@ 10CM/HR
1450
NOx = 77.4 PPM
O2 = 7.88 %
ZERO
CHART NO. CL-2172-B
NOx = 77.8 PPM
O2 = 7.86 %
O2 = 0.0 %
NOx = 6.0 PPM
1256
1250
O2 = 0-10 %
NOx = 0-100 PPM
WSPA/RADIAN
TEXACO
HTR TSTR
RUN 2B
5/29/92
@ 10 CM/HR
1220
UNIT DOWN
1124
1114

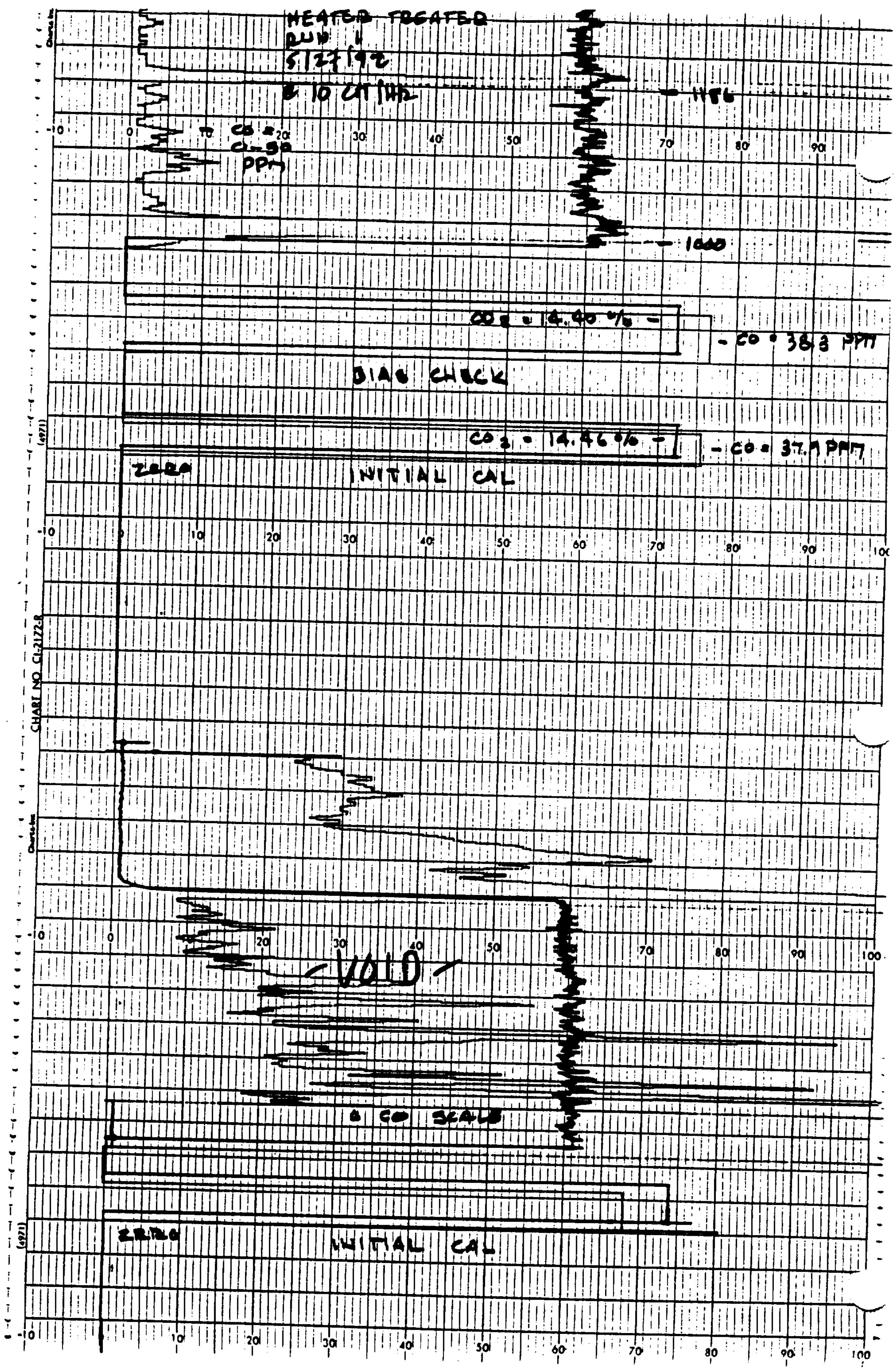


0824
- O2 = 0.06%
- NOx = 0.2 PPM
O2 = 7.92%
NOx = 76.5 PPM
- O2 = 0.04%
NOx = 77.4 PPM
O2 = 7.88%
ZERO
INITIAL CAL
O2 = 7.98%
NOx = 77.4 PPM
O2 = 0.04%
NOx = 0.0 PPM
BIAS CHECK
NOx = 77.0 PPM
O2 = 7.94%
- O2 = 0.0%
- NOx = 0.0 PPM
1642
1632
1628
CHART NO. CL-2172-8
-10
0
10
20
30
40
50
60
70
80
90
100



WSPA / RADIAN
TEXACO
HTR TRTR
RUN 4B
5/30/92
@ 10 CM/HR
NOx = 0-100 PPM
1205
1135
NOx = 77.4 PPM
ZERO
NOx = 78.6 PPM
NOx = -0.8 PPM
1012
0954
* NOx ONLY
O2 ON
2ND
CHART
0924
WSPA/RADIAN
TEXACO
HEATER TREATER
RUN 4A
5/30/92
@ 10 CM/HR
NOx = 0-100 PPM
0854
0824
O2 = 0.06%
NOx = 0.2 PPM
CHART NO. CL-2172-R


NOX = 77.2 PPM
- NOX = 0.6 PPM
NOX = 77.8 PPM
- NOX = 0.6 PPM
1457
CHART NO. CL-2172-B
NOx = 0-100 PPM
1442
WSPA/RADIAN
TEXACO
HTR TRTR
RUN 4C
5/30/92
@ 20 CM/HR
1412
(4971)
NOx = 77.4 PPM
ZERO
NOX = 77.6 PPM
- NOX = 0.6 PPM
CHART NO. CL-2172-B
1235
WSPA/RADIAN
TEXACO
HTR TRTR
RUN 4B
5/30/92
NOx = 0-100 PPM
1205


HEATER TREATER
RUN 1
5/27/92
@ 10 CM/HR
CO = 0-50 PPM
CO2 = 14.40 %
- CO = 38.3 PPM
BIAS CHECK
CO2 = 14.46 %
- CO = 37.7 PPM
ZERO
INITIAL CAL
VOID
@ CO SCALE
ZERO
INITIAL CAL
CHART NO. CL-2172-R

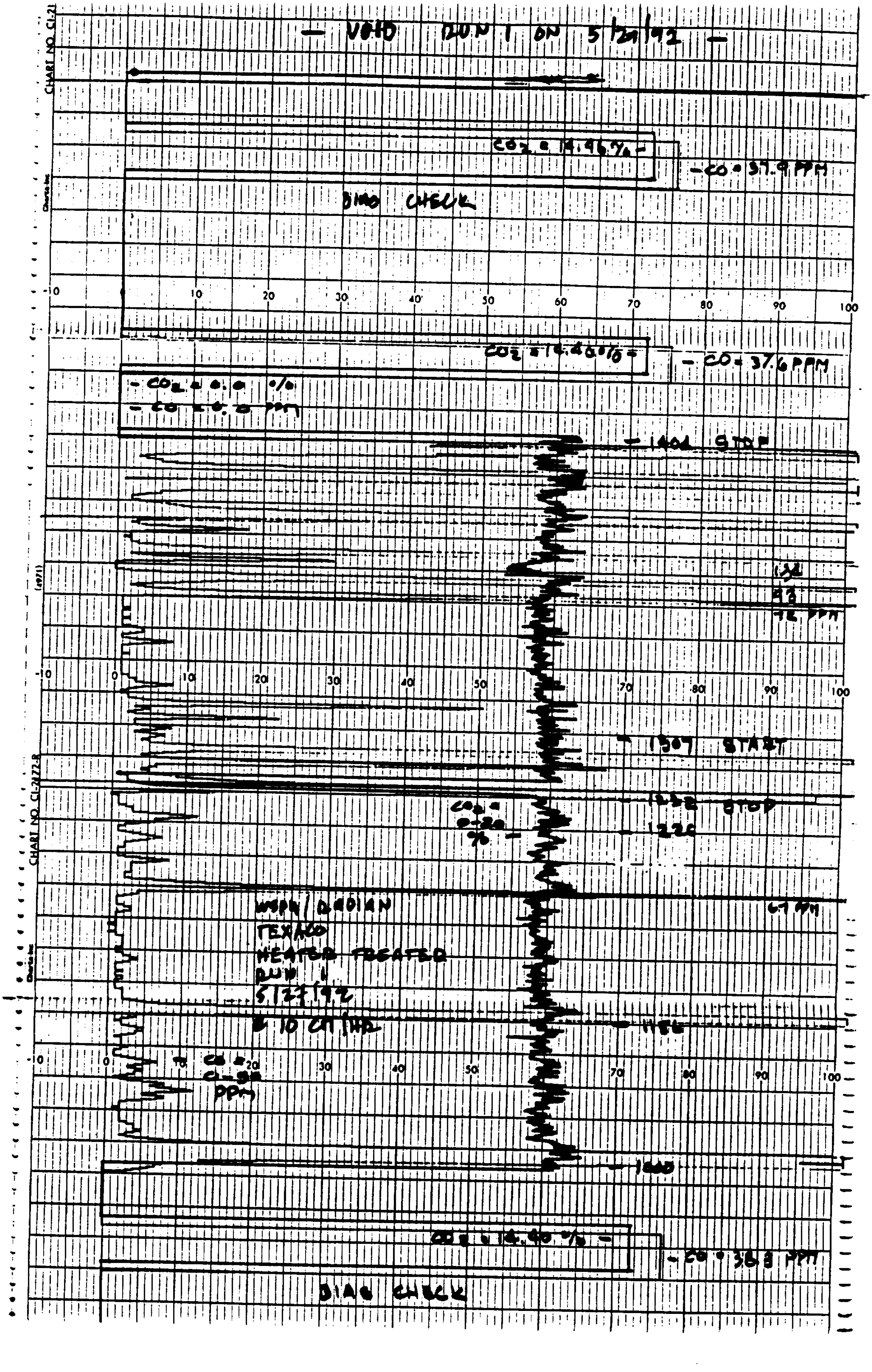
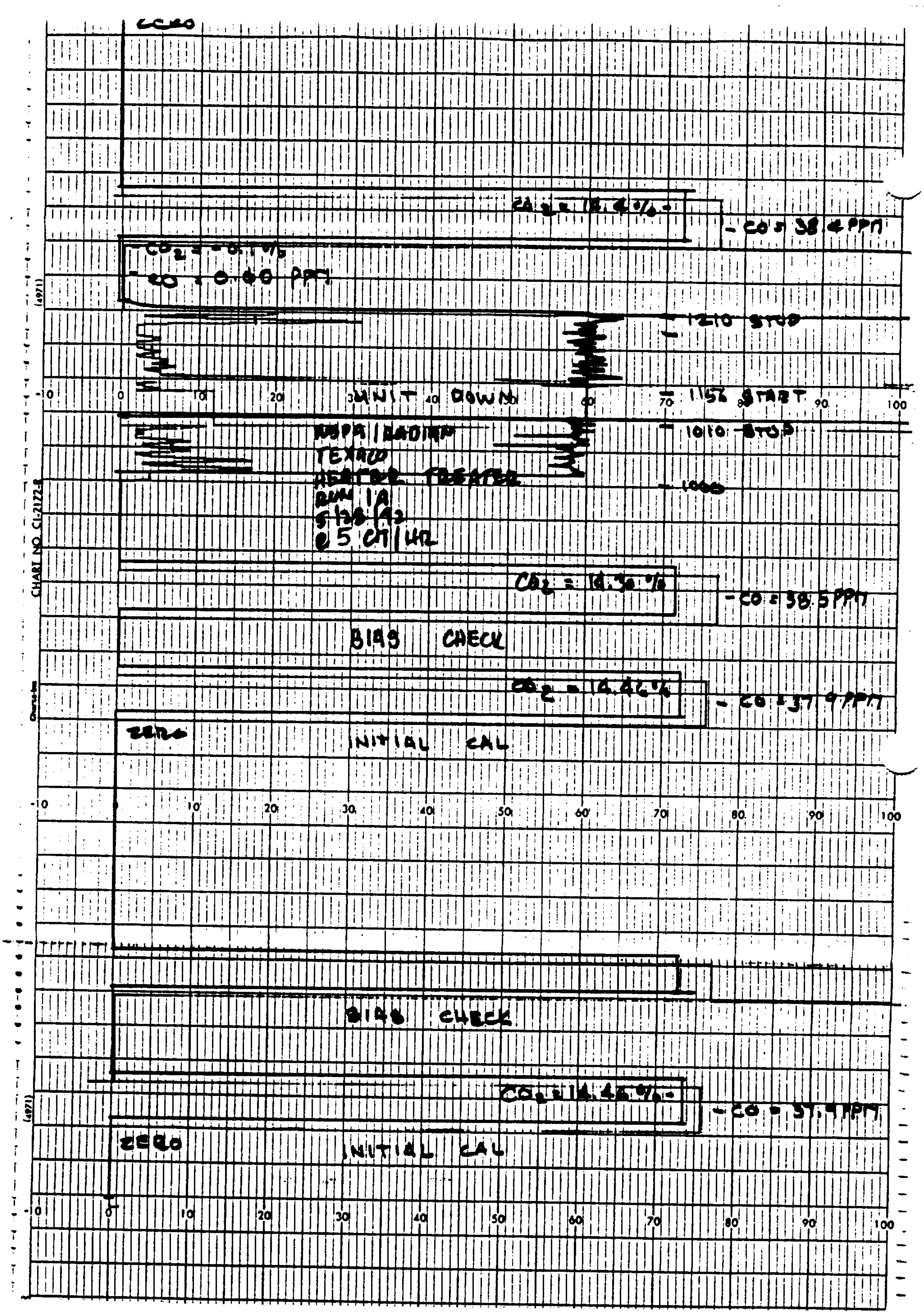


CHART NO. CL-21
— VOID RUN 1 ON 5/27/92 —
CO2 = 14.46% —
— CO = 37.9 PPM
DIAG CHECK
CO2 = 14.40% —
— CO = 37.6 PPM
— CO2 = 0.0 %
— CO = 0.0 PPM
— 1406 STOP
— 1307 START
— 1232 STOP
— 1220
CHART NO. CL-2172-B
TEXACO
HEATER TREATER
RUN 1
5/27/92
10 CM/HR
— 1156
CO2 = 14.40 % —
DIAG CHECK


CO2 = 13.4%
CO = 38.4 PPM
CO2 = 0.1%
CO = 0.00 PPM
1210 STOP
UNIT DOWN
1156 START
1010 STOP
1000
TEXACO
HEATER TREATER
RUN 1A
@ 5 CM/HR
CO2 = 14.30%
CO = 38.5 PPM
BIAS CHECK
CO2 = 14.46%
CO = 37.9 PPM
ZERO
INITIAL CAL
BIAS CHECK
CO2 = 14.46%
CO = 37.9 PPM
ZERO
INITIAL CAL
CHART NO CL-2172-8

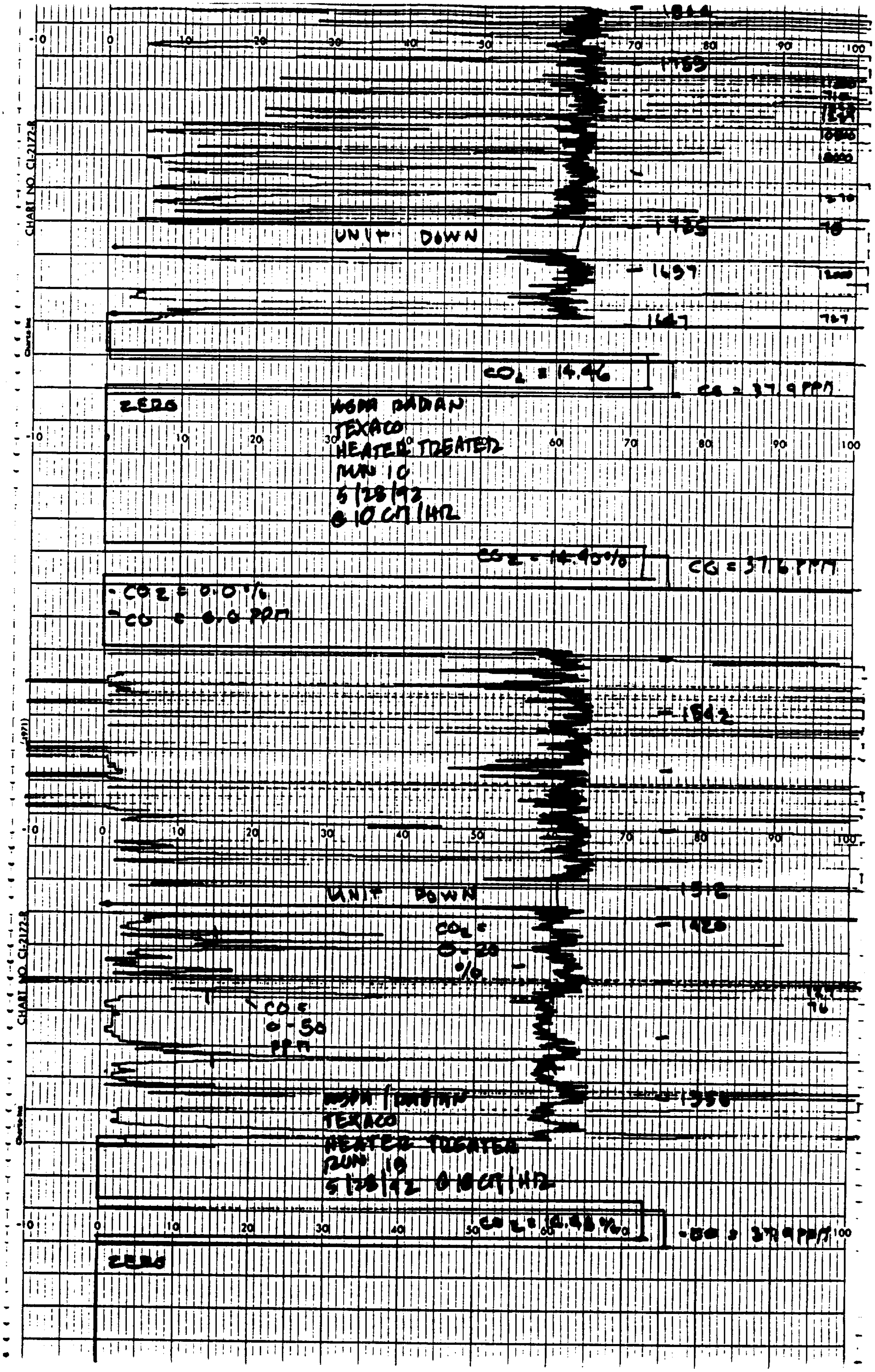
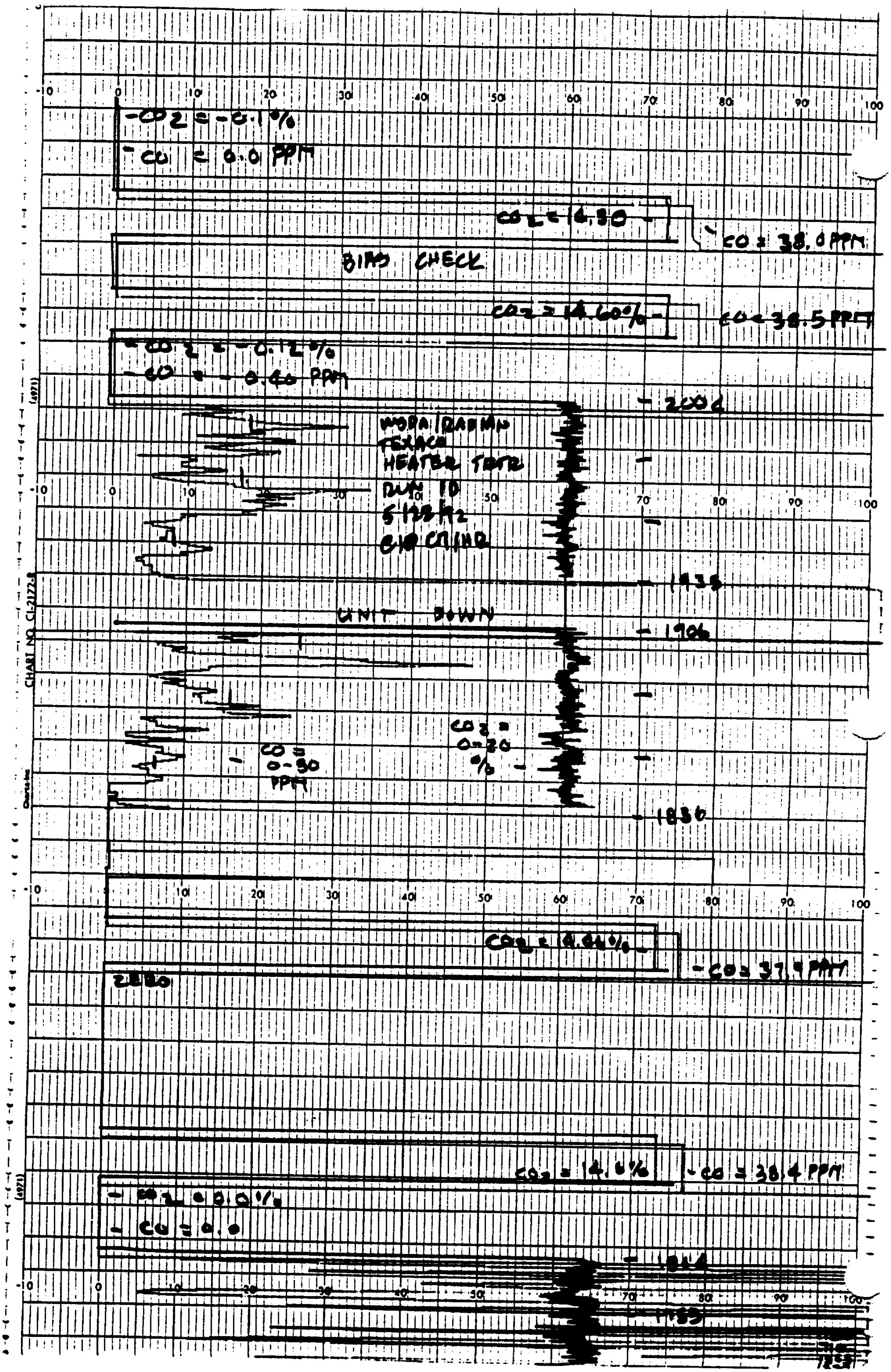


CHART NO. CL-2172-8
UNIT DOWN
CO_2 = 14.46
ZERO
TEXACO
HEATER TREATER
RUN 10
5/28/92
@ 10 CM/HR
CO = 37.6 PPM
CO_2 = 0.0 %
CO = 0.0 PPM
UNIT DOWN
CO_2 =
0 - 20
%
CO =
0 - 50
PPM
TEXACO
5/28/92 @ 10 CM/HR
ZERO



CO = 38.0 PPM
BIAS CHECK
CO2 = 14.60%
UNIT DOWN
CO2 = 0-20 %
CO = 0-30 PPM
1830
CO = 37.9 PPM
ZERO
CO = 38.4 PPM
CHART NO. CL-2172-8

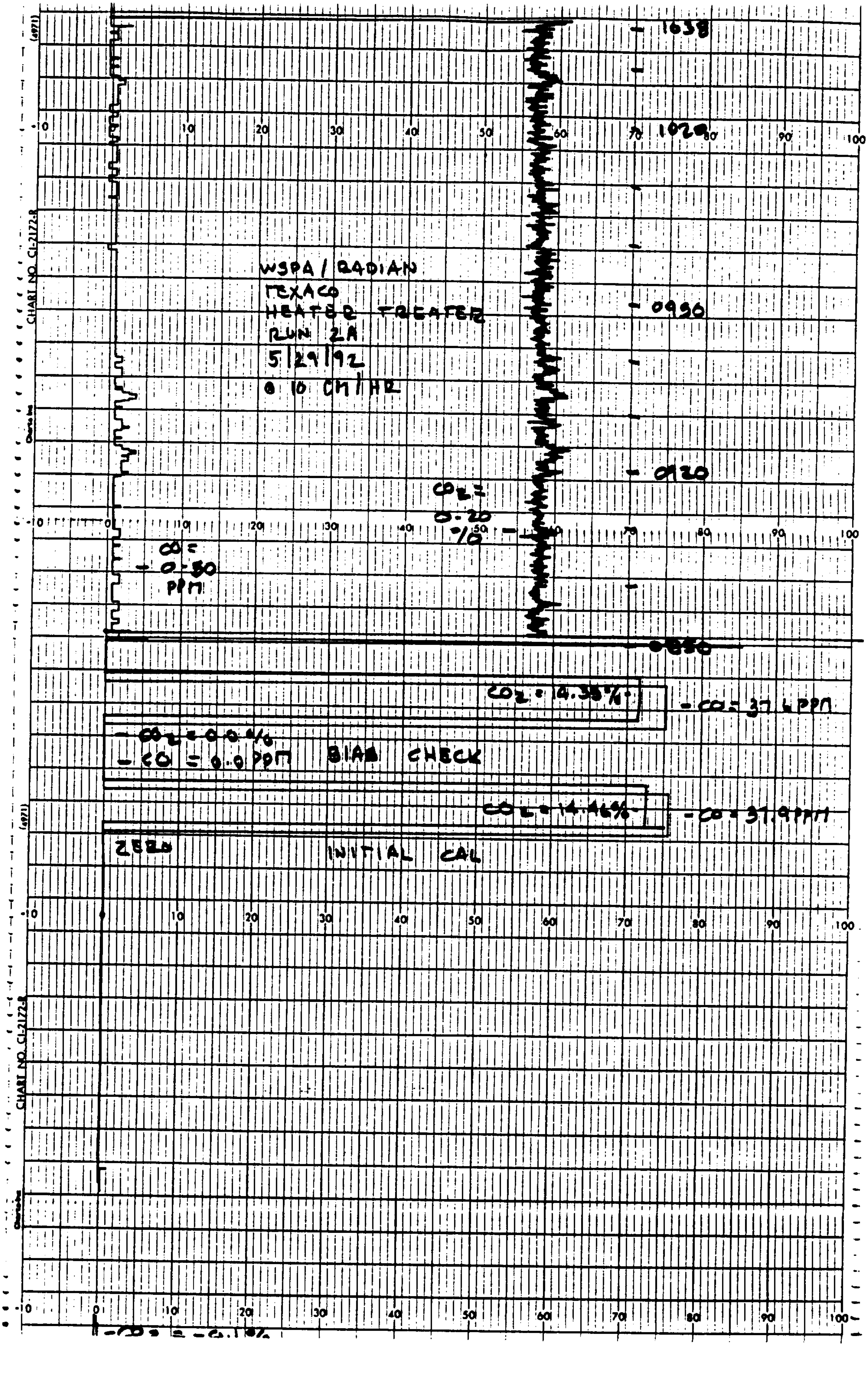


CHART NO. CL-2172-R
1638
1020
WSPA / RADIAN
TEXACO
HEATER TREATER
RUN 2A
5/29/92
@ 10 CM/HR
0950
0920
CO2 = 0-20 %
CO = 0-50 PPM
0850
CO2 = 14.35%
CO = 37.6 PPM
CO2 = 0.0 %
CO = 0.0 PPM
BIAS CHECK
CO2 = 14.46%
CO = 37.9 PPM
ZERO
INITIAL CAL
CO2 = -0.1%

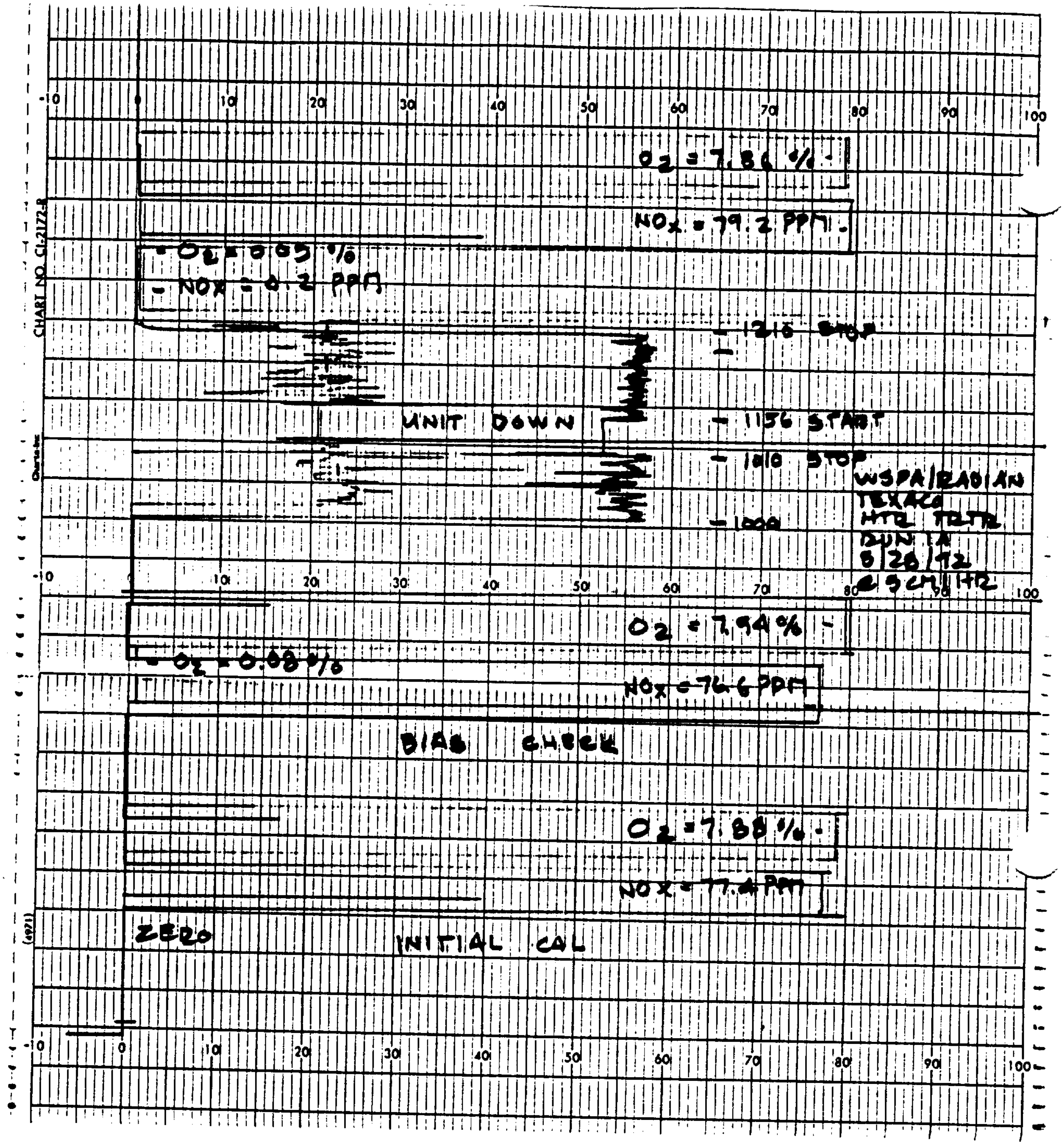
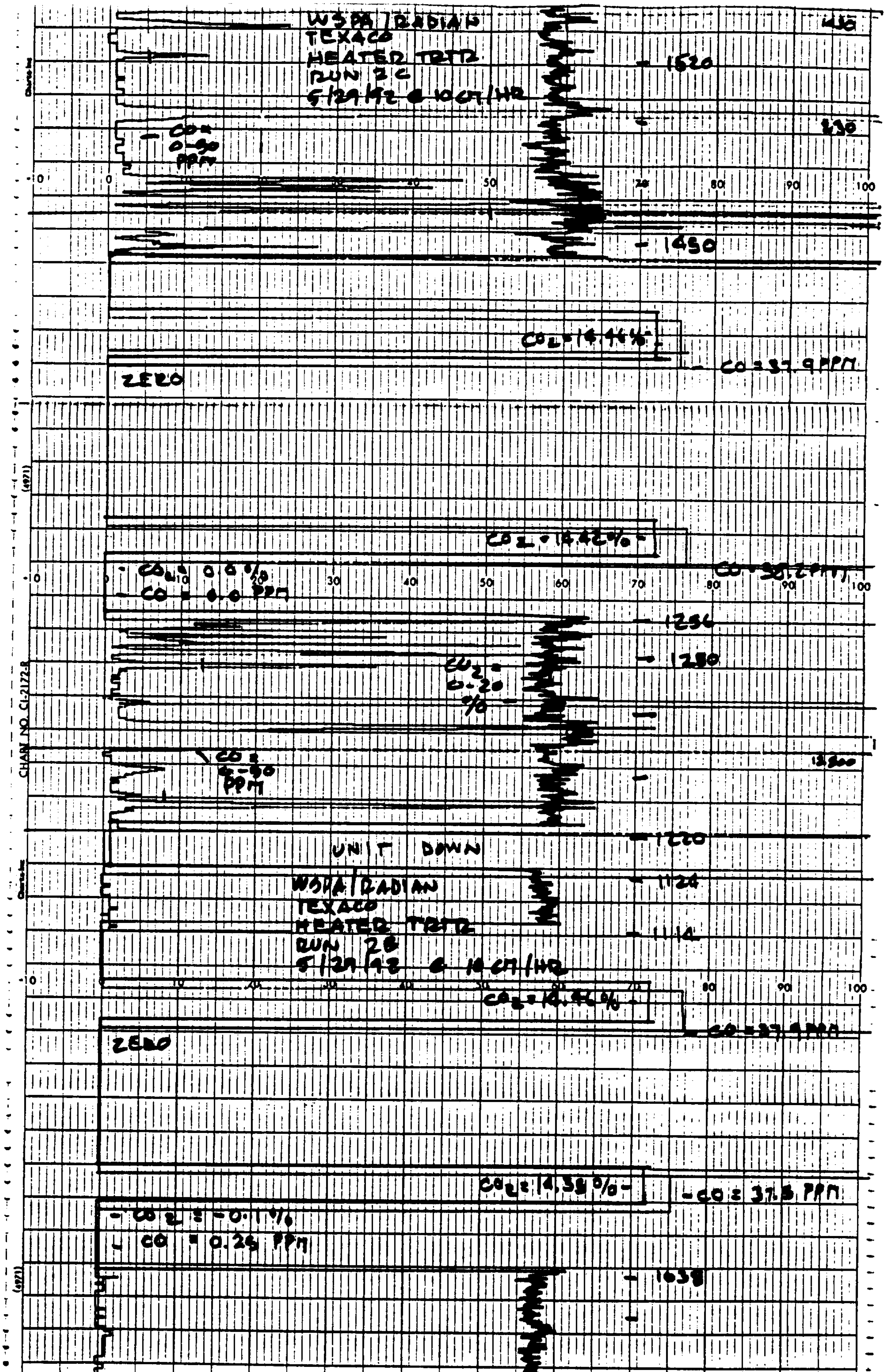
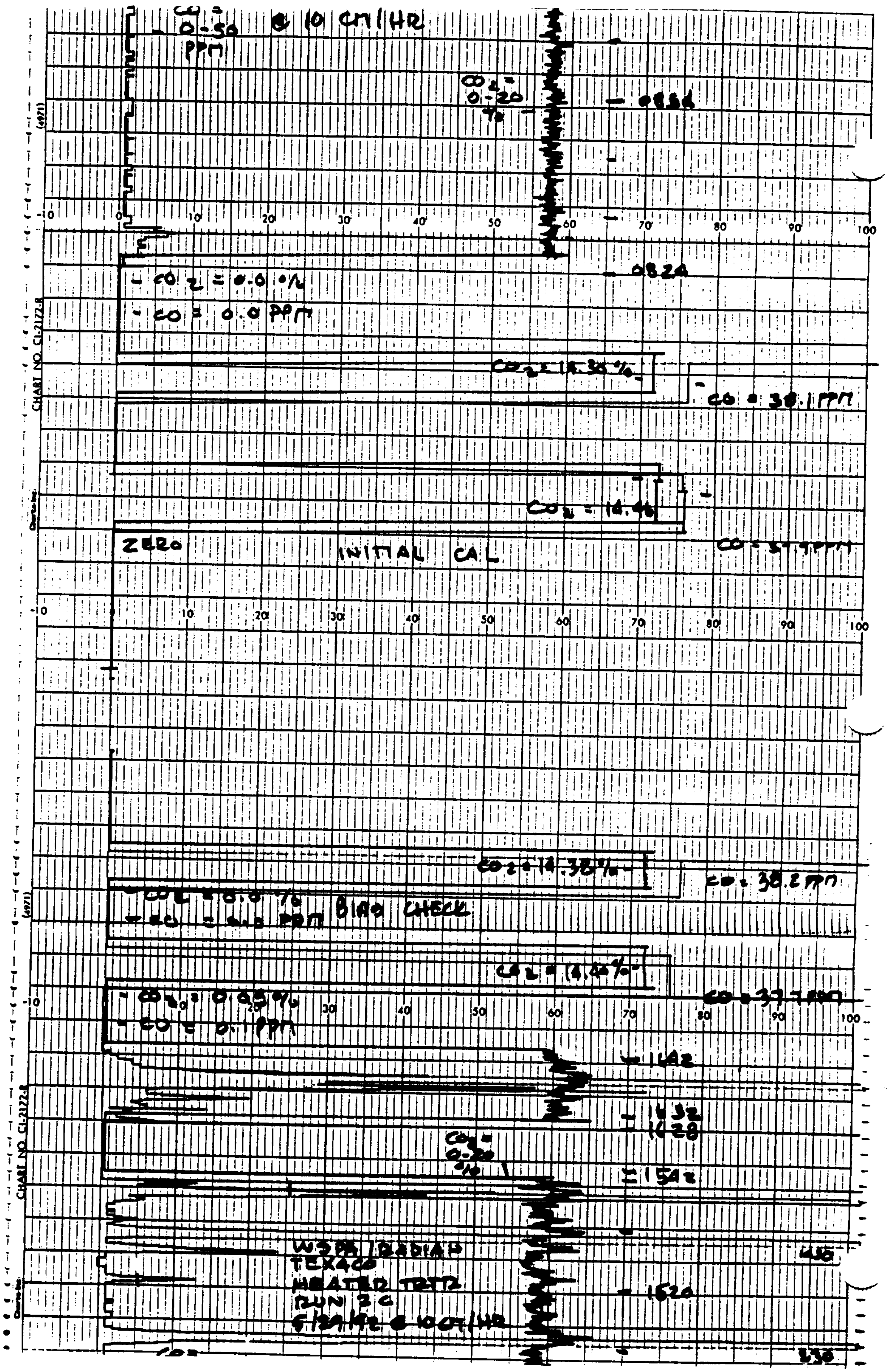
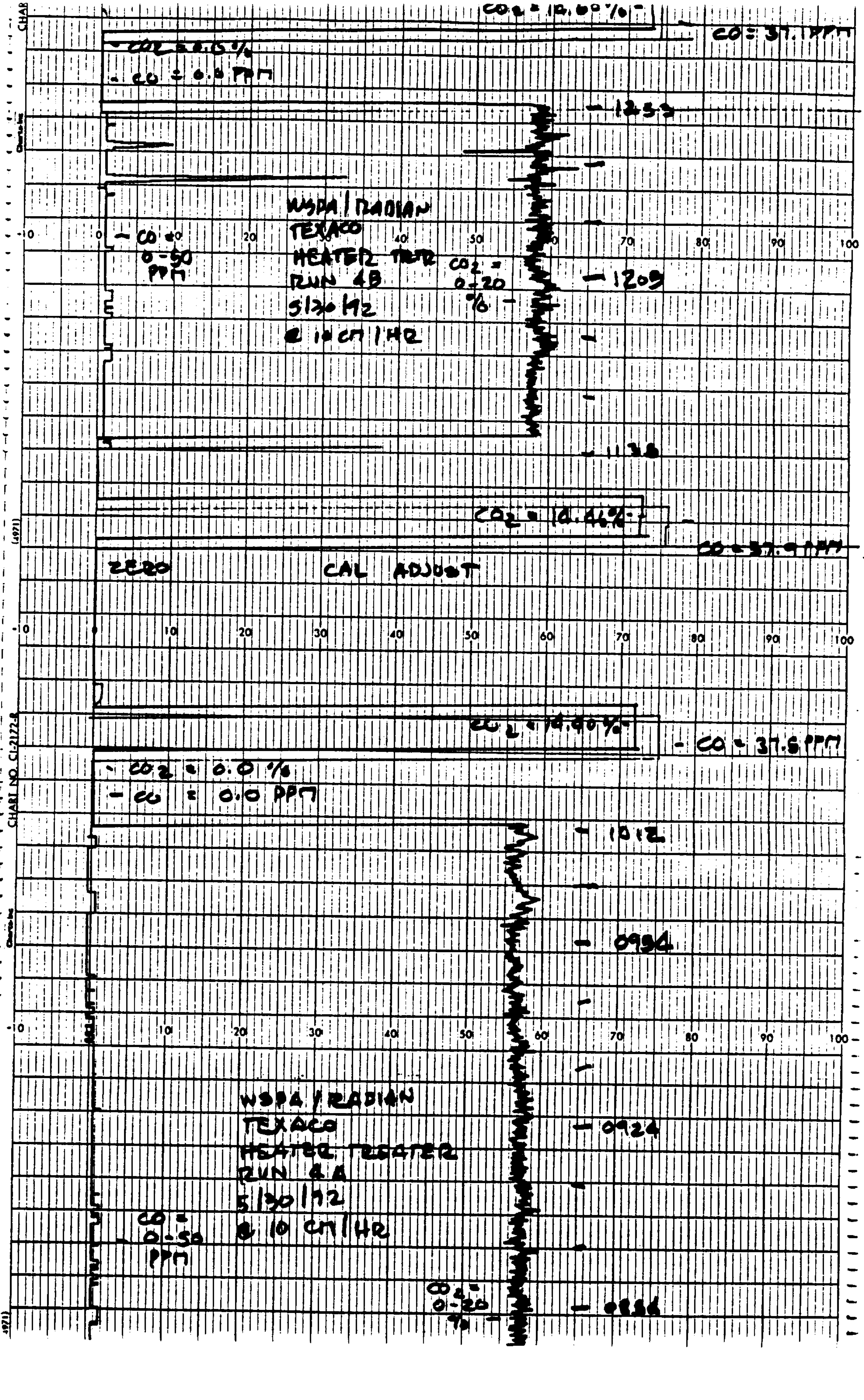


CHART NO. CL-2172-B
O_2 = 7.86 %
NO_x = 79.2 PPM
O_2 = 0.05 %
NOX = 0.2 PPM
1216 STOP
UNIT DOWN
1136 START
1010 STOP
1000
WSPA/RADIAN
TEXACO
HTR TRTR
RUN 1A
8/26/92
@ 5CM/HR
O_2 = 7.94 %
O_2 = 0.08 %
NO_x = 76.6 PPM
BIAS CHECK
O_2 = 7.88 %
NO_x = 77.4 PPM
ZERO
INITIAL CAL

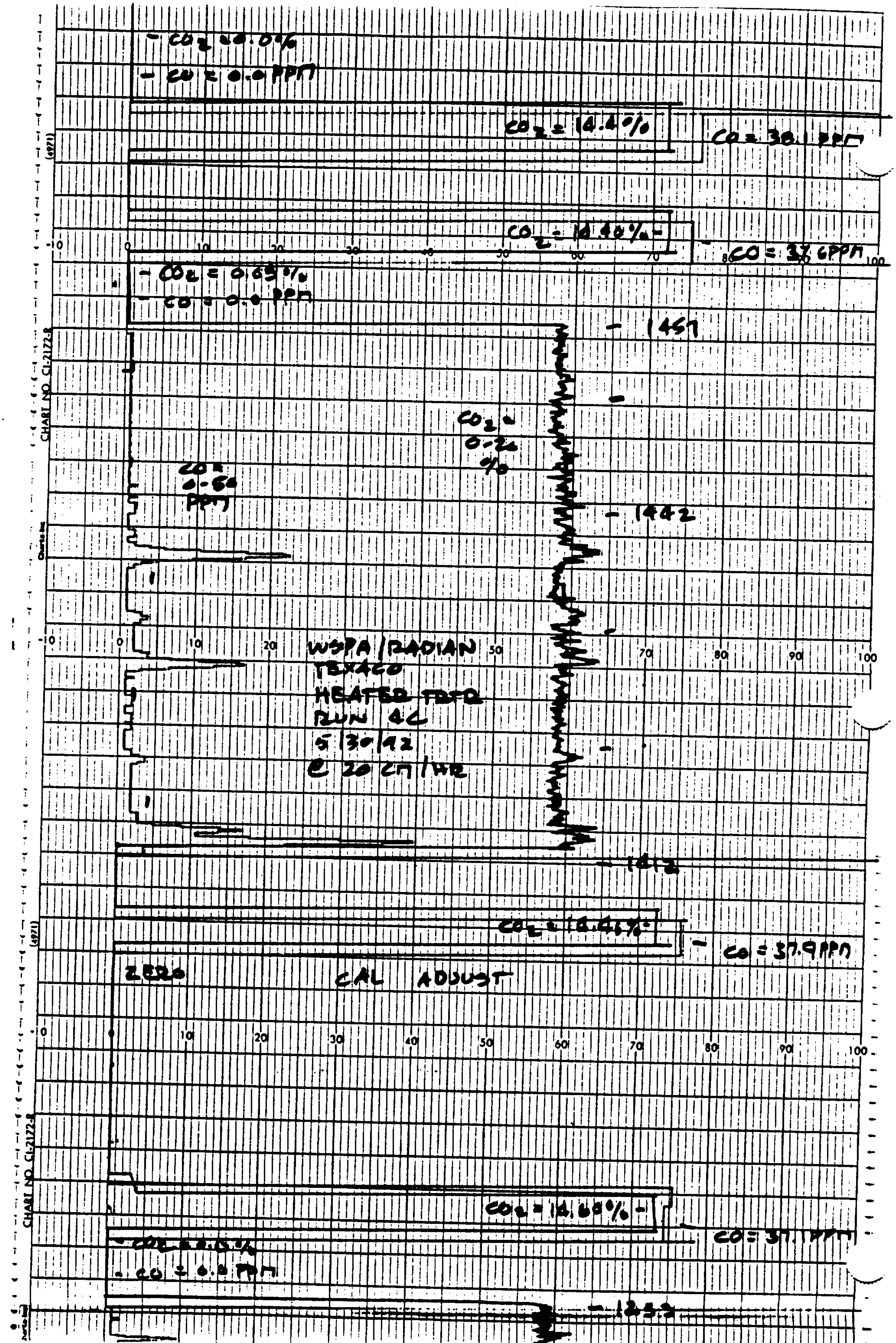

WSPA/RADIAN
TEXACO
HEATER TRTR
RUN 3C
5/29/92 @ 10 CM/HR
1520
CO = 0-50 PPM
1450
CO_2 = 14.44%
CO = 37.9 PPM
ZERO
CO_2 = 14.42%
CO_2 = 0.0%
CO = 0.0 PPM
1256
1250
CO_2 = 0-20 %
CO = 0-50 PPM
CHART NO. CL-2172-8
UNIT DOWN
1220
1126
WSPA/RADIAN
TEXACO
HEATER TRTR
RUN 2B
5/29/92 @ 10 CM/HR
1114
ZERO
CO_2 = 14.38%
CO = 37.5 PPM
CO_2 = -0.1%
CO = 0.26 PPM
1638



CO = 0-50 PPM
@ 10 CM/HR
CO2 = 0-20 %
0836
0824
- CO2 = 0.0 %
- CO = 0.0 PPM
CO2 = 18.30 %
CO = 38.1 PPM
CO2 = 14.46
ZERO
INITIAL CAL
CO2 = 18.38 %
CO = 38.2 PPM
BIAS CHECK
CO2 = 18.40 %
CO = 37.7 PPM
- CO2 = 0.05 %
- CO = 0.1 PPM
1642
1632
1628
CO2 = 0-20 %
1542
WSPB / RADIAN
TEXACO
HEATER TRTR
RUN 2C
5/29/92 @ 10 CM/HR
1520
CHART NO. CL-2172-B



CO = 37.1 PPM
CO = 0.0 PPM
1253
WSPA / RADIAN
TEXACO
RUN 4B
5/30/92
@ 10 CM / HR
CO = 0-50 PPM
CO2 = 0-20 %
1209
1138
CO2 = 10.46%
CO = 37.9 PPM
ZERO
CAL ADJUST
CO2 = 10.40 %
CO = 37.5 PPM
CO2 = 0.0 %
CO = 0.0 PPM
1012
0954
WSPA / RADIAN
TEXACO
HEATER TREATER
RUN 4A
5/30/92
@ 10 CM/HR
CO = 0-50 PPM
0924
CO2 = 0-20 %
0856
CHART NO. CL-2172-8
0
10
20
30
40
50
60
70
80
90
100



CO2 = 0.0%
CO = 0.0 PPM
CO2 = 14.4%
CO = 38.1 PPM
CO2 = 14.40%
CO = 37.6 PPM
CO2 = 0.65%
CO = 0.0 PPM
1457
CO2 = 0.26 %
CO = 0-50 PPM
1442
WSPA/RADIAN
TEXACO
HEATER
RUN 4C
5/30/92
@ 20 CM/HR
1412
CO2 = 14.46%
CO = 37.9 PPM
ZERO
CAL ADJUST
CO2 = 14.60%
CO = 37.1 PPM
CO2 = 0.15%
CO = 0.3 PPM
CHART NO CL-2172-8

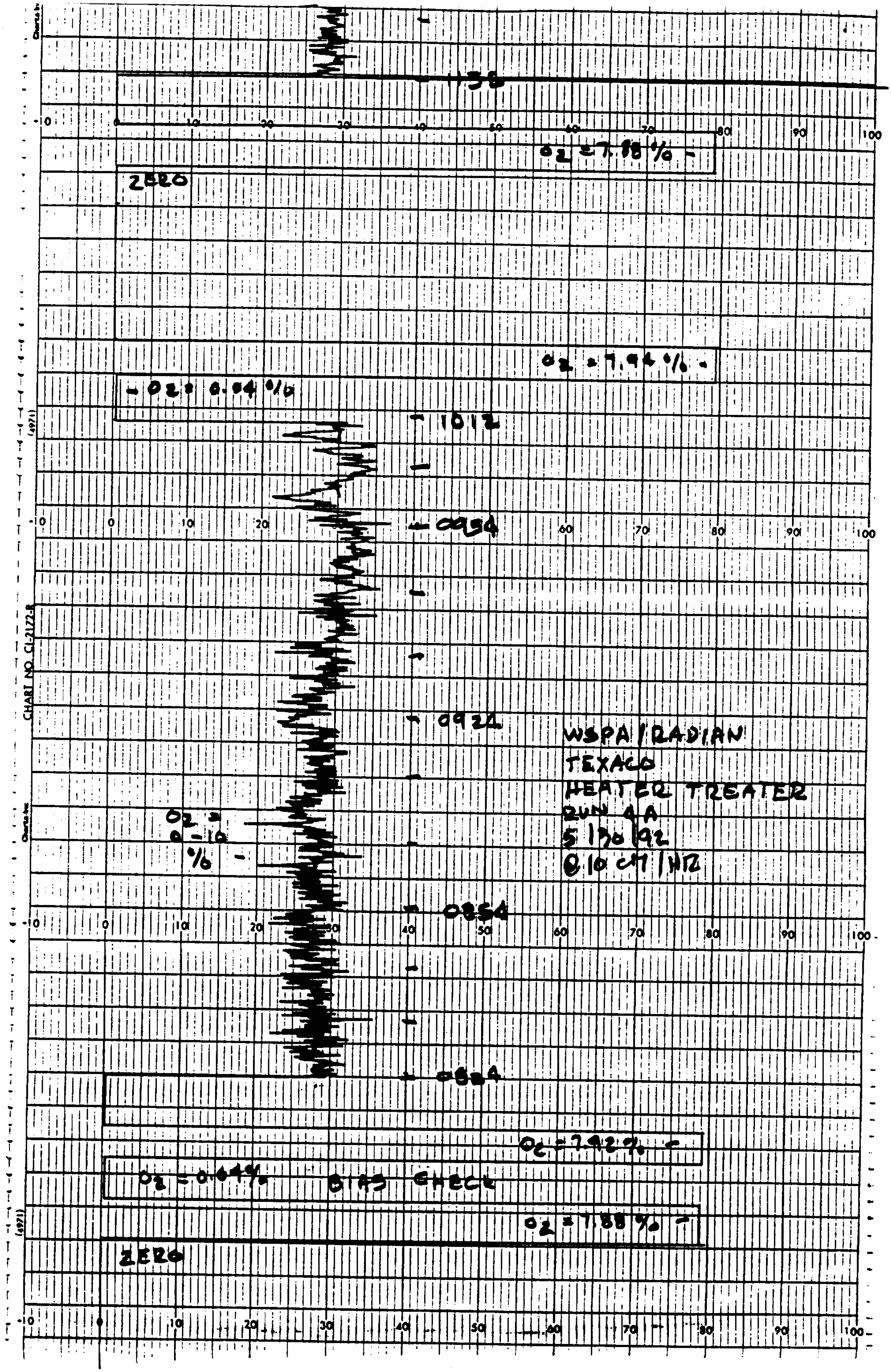


CHART NO. CL-2172-B
ZERO
O2 = 7.98 %
O2 = 7.94 %
O2 = 0.04 %
1012
0954
0922
WSPA / RADIAN
TEXACO
HEATER TREATER
RUN 4A
5/30/92
@10 CM/HR
O2 = 0-10 %
0854
0824
O2 = 7.92 %
O2 = 0.04 % BIAS CHECK
O2 = 7.88 %
ZERO

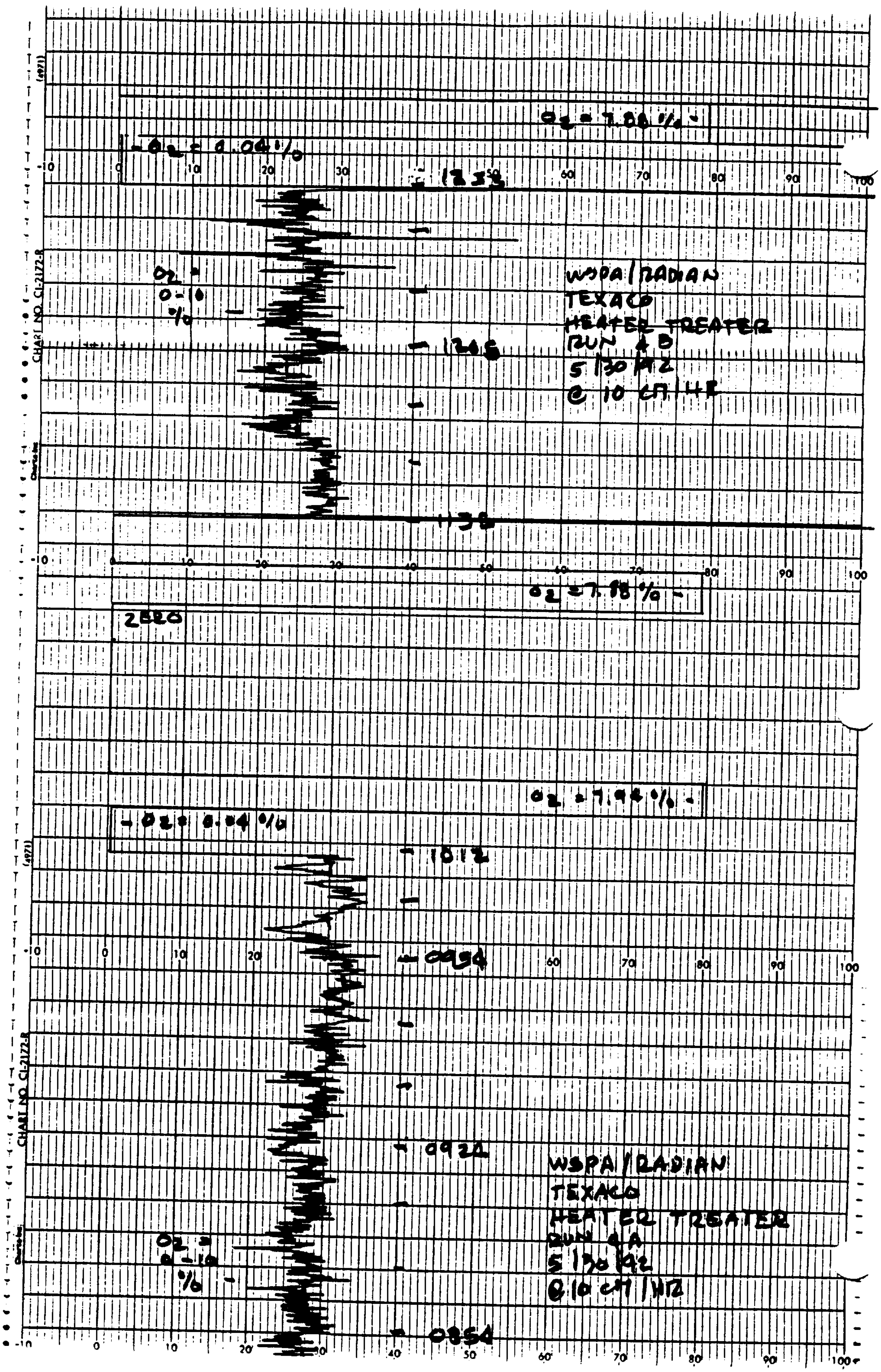


CHART NO. CI-2172-R
WSPA/RADIAN
TEXACO
HEATER TREATER
RUN 4B
5/30/92
@ 10 CM/HR
ZERO
WSPA/RADIAN
TEXACO
HEATER TREATER
RUN 4A
5/30/92
@10 CM/HR
0954
0921
0854

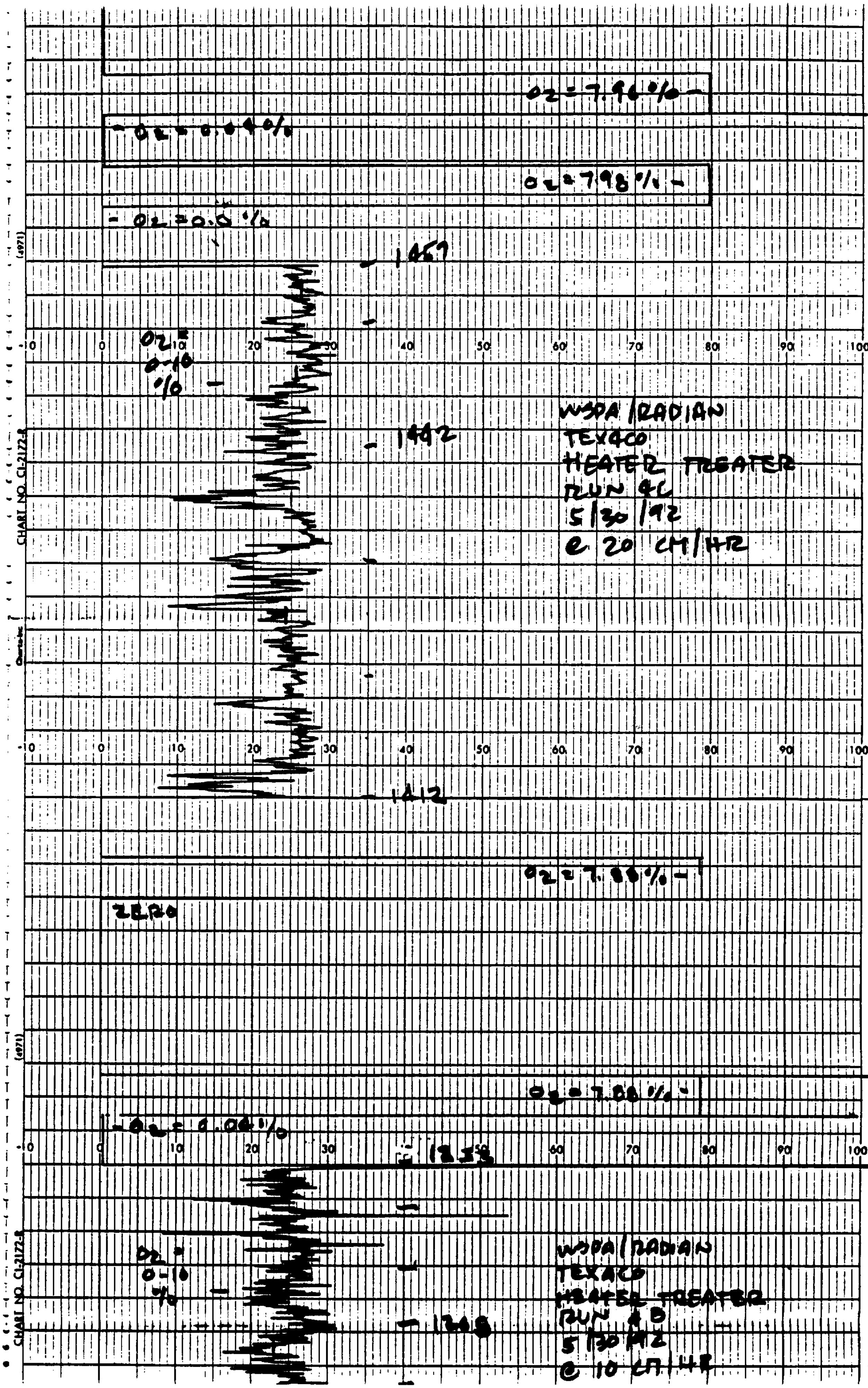


CHART NO. CI-2172-B
O2 = 7.98 %
O2 = 0-10 %
1442
WSPA/RADIAN
TEXACO
HEATER TREATER
5/30/92
@ 20 CM/HR
ZERO
WSPA/RADIAN
TEXACO
HEATER TREATER
5/30/92
@ 10 CM/HR
0
10
20
30
40
50
60
70
80
90
100

MOBIL STEAM GENERATOR TEST DATA

(JUNE 2-4, 1992)

PAH EMISSION DATA

Table B-5.: PAH Emission Data - Mobil (Lost Hills, CA)
Steam Generator #401A Exhaust

Run Number		# 1	# 2	# 3
Date		06/02/92	06/03/92	06/03/92
Time		1336-1830	0821-1303	1407-1904
DGMCF	(---)=	0.993	0.993	0.993
Dry Gas Meter Volume	(cu. ft.)=	171.13	171.38	174.56
PTCF	(---)=	0.84	0.84	0.84
Barometric Pressure	(" Hg)=	29.36	29.49	29.28
Impinger Weight Gain	(grams)=	630.9	632.0	637.4
Percent Oxygen	(% O2)=	1.8	2.3	2.3
Percent Carbon Dioxide	(% CO2)=	13.9	13.8	13.2
Average Delta H	(" H2O)=	1.73	1.76	1.80
Pressure at Meter	(" Hg)=	29.49	29.62	29.41
Pressure in Stack	(" H2O)=	-0.06	-0.05	-0.07
Temp at Meter	(deg F)=	121	112	119
Temp in Stack	(deg F)=	278	279	279
Nozzle Diameter	(inches)=	0.316	0.316	0.316
Total Sampling Time	(minutes)=	240.0	240.0	240.0
Sq Rt Stack Gas Vel Press	((a))=	0.510	0.516	0.523
Standard Temp	(deg F)=	60.0	60.0	60.0
Standard Pressure	(" Hg)=	29.92	29.92	29.92
Diameter of Stack	(feet)=	2.92	2.92	2.92
Heat Input	(MMBtu/h)=	49.5	49.6	50.0
Volume of Gas Sampled	(dscf)=	150.02	153.13	153.03
Moisture Fraction	(% H2O)=	16.3%	16.1%	16.2%
Gas Molecular Weight	(g/mole)=	28.29	28.32	28.23
Stack Gas Velocity	(ft/sec)=	34.5	34.8	35.5
Percent Isokinetic	(%)=	95.8%	96.2%	95.2%
Volumetric Stack Flow	(acfm)=	13,871	14,001	14,267
Volumetric Stack Flow	(dscfm)=	8,025	8,153	8,236

(a) (in.H2O)**0.5

Table B-5 : PAH Emission Data - Mobil (Lost Hills) Steam Generator 401

Run Number / Date		# 1 06/02/92		# 2 06/03/92		# 3 06/03/92	Avg. (
PAH Compounds (ng/sample)=							
Naphthalene		1,300		1,400		1,100	--
Acenaphthylene	<	5.0	<	5.0	<	5.0	--
Acenaphthene	<	5.0		6.0	<	5.0	--
Fluorene		15		22		13	--
Phenanthrene		68		120		66	--
Anthracene		13		30		6.6	--
Fluoranthene		14		7.9		7.5	--
Pyrene		13		23		6.0	--
Chrysene*		7.0		17	<	5.0	--
Benz(a)anthracene*		8.5		17	<	5.0	--
Benzo(b)fluoranthene*	<	5.0	<	5.0	<	5.0	--
Benzo(k)fluoranthene*	<	5.0	<	5.0	<	5.0	--
Benzo(a)pyrene*	<	5.0	<	5.0	<	5.0	--
Indeno(1,2,3-c,d)pyrene*	<	5.0	<	5.0	<	5.0	--
Dibenz(a,h)anthracene*	<	5.0	<	5.0	<	5.0	--
Benzo(g,h,i)perylene	<	5.0	<	5.0	<	5.0	--
Total (7 Carcinogens (*))		28		47		18	[illegible]
Total (excluding naphthalene)		159		260		124	--
Total (including naphthalene)		1,459		1,660		1,224	--

Run Number / Date		# 1 06/02/92		# 2 06/03/92		# 3 06/03/92	Avg. (
PAH Concentration (ng/dscm)=							
Naphthalene		306		323		254	29
Acenaphthylene	<	1.2	<	1.2	<	1.2	0.5
Acenaphthene	<	1.2		1.4	<	1.2	0.8
Fluorene		3.5		5.1		3.0	3.
Phenanthrene		16		28		15	2
Anthracene		3.1		6.9		1.5	3.
Fluoranthene		3.3		1.8		1.7	2.
Pyrene		3.1		5.3		1.4	3.
Chrysene*		1.6		3.9	<	1.2	2.
Benz(a)anthracene*		2.0		3.9	<	1.2	2.
Benzo(b)fluoranthene*	<	1.2	<	1.2	<	1.2	0.5
Benzo(k)fluoranthene*	<	1.2	<	1.2	<	1.2	0.5
Benzo(a)pyrene*	<	1.2	<	1.2	<	1.2	0.5
Indeno(1,2,3-c,d)pyrene*	<	1.2	<	1.2	<	1.2	0.5
Dibenz(a,h)anthracene*	<	1.2	<	1.2	<	1.2	0.5
Benzo(g,h,i)perylene	<	1.2	<	1.2	<	1.2	0.5
Total (7 Carcinogens (*))		6.6		10.7		4.0	7.
Total (excluding naphthalene)		37		60		29	4
Total (including naphthalene)		343		383		282	[illegible]

Table B-5 : PAH Emission Data - Mobil (Lost Hills) Steam Generator 401A

Run Number Date	# 1 06/02/92	# 2 06/03/92	# 3 06/03/92	Avg.
PAH Emission Rate (lb/hr x 10-9)=				
Naphthalene	9,199	9,860	7,831	8,963
Acenaphthylene	< 35	< 35	< 36	18
Acenaphthene	< 35	42	< 36	26
Fluorene	106	155	93	118
Phenanthrene	481	845	470	599
Anthracene	92	211	47	117
Fluoranthene	99	56	53	69
Pyrene	92	162	43	99
Chrysene*	50	120	< 36	62
Benz(a)anthracene*	60	120	< 36	66
Benzo(b)fluoranthene*	< 35	< 35	< 36	18
Benzo(k)fluoranthene*	< 35	< 35	< 36	18
Benzo(a)pyrene*	< 35	< 35	< 36	18
Indeno(1,2,3-c,d)pyrene*	< 35	< 35	< 36	18
Dibenz(a,h)anthracene*	< 35	< 35	< 36	18
Benzo(g,h,i)perylene	< 35	< 35	< 36	18
Total (7 Carcinogens (*))	198	328	125	217
Total (excluding naphthalene)	1,122	1,834	883	1,280
Total (including naphthalene)	10,321	11,694	8,714	10,243
PAH Emission Ratio (lb/MMBtu x 10-9)=				
Naphthalene	186	199	157	180
Acenaphthylene	< 0.71	< 0.71	< 0.71	0.36
Acenaphthene	< 0.71	0.85	< 0.71	0.52
Fluorene	2.1	3.1	1.9	2.4
Phenanthrene	9.7	17.0	9.4	12.1
Anthracene	1.9	4.3	0.9	2.4
Fluoranthene	2.0	1.1	1.1	1.4
Pyrene	1.9	3.3	0.9	2.0
Chrysene*	1.0	2.4	< 0.7	1.3
Benz(a)anthracene*	1.2	2.4	< 0.7	1.3
Benzo(b)fluoranthene*	< 0.71	< 0.71	< 0.71	0.36
Benzo(k)fluoranthene*	< 0.71	< 0.71	< 0.71	0.36
Benzo(a)pyrene*	< 0.71	< 0.71	< 0.71	0.36
Indeno(1,2,3-c,d)pyrene*	< 0.71	< 0.71	< 0.71	0.36
Dibenz(a,h)anthracene*	< 0.71	< 0.71	< 0.71	0.36
Benzo(g,h,i)perylene	< 0.71	< 0.71	< 0.71	0.36
Total (7 Carcinogens (*))	4.0	6.6	2.5	4.4
Total (excluding naphthalene)	23	37	18	26
Total (including naphthalene)	208	236	174	206

RADIAN CORPORATION

METHOD 5
FIELD DATA

RUN 1
PAGE 1 OF 3

PLANT	Mobil	PROBE LENGTH AND TYPE	3' glass	HEIGHT OF LOCATION (ft)	45'
DATE	6/2/92	NOZZLE I.D. (in)	Ext 0.316	DUCT DIMENSIONS	35"
SAMPLING LOCATION	Stm Gen 4018	METER BOX NUMBER	Sac-05	FILTER NUMBER	
SAMPLE TYPE	PAH	METER Δ H@	1.88	ASSUMED MOISTURE (%)	15
RUN NUMBER	1	Yd	0.993	MOISTURE METHOD	Calc 64
OPERATOR	SF/RH	K FACTOR		MOISTURE DATA	630.92
AMBIENT TEMPERATURE	~~85~~ 95	PROBE HEATER SETTING	250	O2/CO2 METHOD	
BAROMETRIC PRESSURE	29.36	HEATER BOX SETTING	250	O2	
STATIC PRESSURE (Ps)	~~-0.14~~ -0.064	-0.064	C = 0.28	CO2	
INITIAL LEAKCHECK	0.01 cfm @ 7" Hg			FINAL LEAKCHECK	

READ AND RECORD ALL DATA EVERY 6 MINUTES

	Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft 468.643	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit	Pump Vacuum (in. Hg)	Probe Temp
Pitot		0	1336	~~[illegible]~~									
	A-10	6	1342	472.70	0.25	276	1.65	240	109	107	89/55	6	256
	A-9	12	1348	477.00	0.26	278	1.70	252	111	110	67/45	7	257
-0.13	A-8	18	1354	481.20	0.27	279	1.80	255	112	110	65/43	8	248
	A-7	24	1400	485.45	0.27	280	1.80	257	116	112	67/41	8	256
	A-6	30	1406	489.80	0.27	283	1.80	250	117	112	68/46	8	250
	A-5	36	1412	494.20	0.27	285	1.80	250	119	113	68/45	8	250
	A-4	42	1418	498.55	0.27	282	1.80	251	119	114	67/42	8	252
	A-3	48	1424	503.00	0.27	281	1.80	250	121	115	67/43	8	254
	A-2	54	1430	507.15	0.26	280	1.90	253	123	117	68/43	8	244
	A-1	60	1436	511.00	0.21	269	1.40	251	123	117	69/46	8	252
	A-1	66	1442	515.00	0.23	274	1.50	248	122	117	68/46	~~8~~ 7	251
	A-2	72	1448	519.15	0.26	279	1.70	248	122	116	69/46	7	250
-0.17	A-3	78	1454	523.50	0.27	281	1.80	248	121	117	70/44	8	245
	A-4	84	1500	527.85	0.27	281	1.80	250	120	117	69/45	8	253
50 leak stop	A-5	90	1506 leak	532.20	0.27	282	1.80	251	122	117	70/47	8	249
1509 start	A-6	96	1513	536.60	0.27	281	1.80	245	121	118	71/47	8	244
	A-7	102	1519	540.90	0.27	279	1.80	246	121	117	70/43	8	235
	A-[illegible]	108	1525	545.80	0.27	279	1.80	251	122	118	69/41	8	246
	A-[illegible]	114	1531	—	0.28	278	1[illegible]	252	123	118	69/44	8	

RADIAN CORPORATION

METHOD 5 FIELD DATA

RUN 1
PAGE 2 OF 3

PLANT	Mobil
DATE	6/2/92
SAMPLING LOCATION	Stn Bay 401-A
SAMPLE TYPE	PAH
RUN NUMBER	1
OPERATOR	SF/RH

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit / NH2	Pump Vacuum (in. Hg)	Probe Temp
	114	1531	—									
A-10	120	1537	553.808	0.25	277	1.65	249	123	119	71/45	8	253
	Post A traverse leak rate							0.01 cfm @ 0" Hg				
	B-Start Leak Check						0.006 cfm @ 9 Hg					
	120	1629	554.319									
B-10	126	1635	558.4	0.25	278	1.65	228	117	118	76/55	8	253
B-9	132	1641	562.6	0.26	278	1.70	246	117	117	70/51	8	253
B-8	138	1647	566.9	0.27	278	1.80	252	118	118	70/51	8	247
B-7	144	1653	571.3	0.28	279	1.85	244	120	119	73/58	8	247
B-6	150	1659	575.8	0.28	278	1.85	243	122	119	76/54	8	250
B-5	156	1705	580.2	0.27	275	1.80	254	123	120	77/52	8	251
B-4	162	1711	583.1	0.27	240 (a)	1.80	251	124	121	74/53	8	251
B-3	168	1717	588.8	0.25	246 (a)	1.65	244	126	122	76/56	8	247
B-2	174	1723	592.7	0.23	212 (a)	1.50	251	127	123	76/58	8	251
B-1	180	1729	596.6	0.19	190 (a)	1.35	240	128	124	79/61 *	8	252
B-1	186	1735	600.4	0.19	195 (a)	1.35	248	128	125	79/75	7	248
B-2	192	1741	604.7	0.26	257 (a)	1.70	247	129	125	80/51	8	254
B-3	198	1748		0.28	276	1.85	242	129	125	80/50	8	252

static → 0.155 (at B-5)

static → 0.120 (at B-1)

COMMENTS: (a) Data suspect - thermocouple not.

* plug fell out (50°)

Revision: 1

RADIAN CORPORATION

METHOD 5 FIELD DATA

RUN 1
PAGE 3 OF 3

PLANT	mobil	PROBE LENGTH AND TYPE		HEIGHT OF LOCATION (ft)	45'
DATE	6-2-92	NOZZLE I.D. (in)	0.316	DUCT DIMENSIONS	35"
SAMPLING LOCATION	St Gen 401A	METER BOX NUMBER	Sac-05	FILTER NUMBER	
SAMPLE TYPE	PAH	METER Δ H@	1.88	ASSUMED MOISTURE (%)	15
RUN NUMBER	1	Yd	.993	MOISTURE METHOD	Carb 4
OPERATOR	AAH/SAF	K FACTOR		MOISTURE DATA	630.92 mls
AMBIENT TEMPERATURE	95	PROBE HEATER SETTING	250	O2/CO2 METHOD	
BAROMETRIC PRESSURE	29.36	HEATER BOX SETTING	250	O2	
STATIC PRESSURE (Ps)				CO2	
INITIAL LEAKCHECK				FINAL LEAKCHECK	0.012 cfm 8"Hg

C = 0.28

READ AND RECORD ALL DATA EVERY ____ MINUTES

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Dry Gas Meter Inlet (Tm in) (°F)	Dry Gas Meter Outlet (Tm out) (°F)	Impinger Exit (°F) x/10	Pump Vacuum (in. Hg)	
	198	1748	609.2									
B-4	204	1754	613.6	0.26	276	1.70	218	129	126	80/52	8	254
B-5	210	1800	617.8	0.27	276	1.80	238	129	126	81/51	8	249
B-6	216	1806	622.4	0.28	275	1.85	236	128	125	82/54	8	253
B-7	222	1812	626.9	0.28	274	1.85	243	127	125	85/54	8	251
B-8	228	1818	631.4	0.28	274	1.85	239	127	125	87/54	9	251
B-9	234	1824	635.8	0.27	273	1.80	242	127	124	82/50	9	248
B-10	240	1830	640.284	0.26	272	1.70	235	127	124	81/51	9	247
				LDL	LDL							
Ave	240		171.13	~~0.509~~ 0.510	~~269.5~~ 277.8	~~0.901~~ 1.73			120.5			

Averages checked by KDLaFe

Stratle → 0.10

RADIAN CORPORATION

METHOD 5 FIELD DATA

RUN 2
PAGE 1 OF 3

PLANT	Mobil	PROBE LENGTH AND TYPE	3' Glass	HEIGHT OF LOCATION (ft)	30'
DATE	6-3-92	NOZZLE I.D. (in)	0.316	DUCT DIMENSIONS	35"
SAMPLING LOCATION	St. Gen	METER BOX NUMBER	Sec-05	FILTER NUMBER	—
SAMPLE TYPE	PAH	METER Δ H@	1.88	ASSUMED MOISTURE (%)	~16
RUN NUMBER	2	Yd	0.993	MOISTURE METHOD	CARB4
OPERATOR	SAF/AAH	K FACTOR	0.28	MOISTURE DATA	
AMBIENT TEMPERATURE	90	PROBE HEATER SETTING	250	O2/CO2 METHOD	
BAROMETRIC PRESSURE	29.~~[illegible]~~	HEATER BOX SETTING	250	O2	
STATIC PRESSURE (Ps)	~~-0.12~~ -0.045			CO2	
INITIAL LEAKCHECK	0.008 cfm @ 9" Hg.			FINAL LEAKCHECK	

READ AND RECORD ALL DATA EVERY 6 MINUTES

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit XAD	Pump Vacuum (in. Hg)	
	0	0821	640.495									
A-10	6	0827	644.5	0.28	278	1.85	253	100	96	80/54	6	251
A-9	12	0833	648.8	0.28	278	1.85	251	102	97	67/38	7	249
A-8	18	0839	653.2	0.29	279	1.90	251	105	97	67/39	7	248
Static 0.13 → A-7	24	0845	657.7	0.29	281	1.90	250	108	100	67/40	7	255
A-6	30	0851	662.2	0.30	281	2.00	250	112	103	66/42	7	252
A-5	36	0857	—	0.29	278	1.90	249	114	105	66/43	7	253
A-4	42	0903	671.1	0.28	240	1.85	247	115	106	66/42	7	247
A-3	48	0909	675.5	0.29	276	1.90	249	115	107	66/41	7	253
A-2	54	0915	—	0.26	~~228~~ *	1.70	249	116	108	66/41	7	251
A-1	60	0921	683.7	0.20	~~212~~ *	1.30	249	117	109	66/42	6	252
A-1	66	0927	687.6	0.20	~~207~~ 202*	1.30	250	117	110	66/40	6	249
Static 0.08 → A-2	72	0933	691.3	0.19	~~246~~ 274	1.25	247	117	111	68/41	6	247
A-3	78	0939	694.9	0.27	273	1.80	245	116	111	69/43	6	244
A-4	84	0945	699.2	0.27	280	1.80	247	116	112	69/42	6	246
A-5	90	0951	703.5	0.27	281	1.70	247	117	112	70/44	6	250
A-6	96	0957	707.8	0.27	281	1.60	248	118	113	72/46	6	250
A-7	102	1003	712.2	0.27	279	1.80	247	117	113	75/48	6	246
A-8	108	1009	716.6	0.28	283	1.85	249	118	113	73/44	7	247
A-9	114	1015		0.26	278	1.70	248	117	113	71/44	7	245

Revision: 11/90

COMMENTS:

* data suspect - thermo not working.

RADIAN CORPORATION

METHOD 5
FIELD DATA

RUN 2
PAGE 2 OF 3

PLANT	Mobil
DATE	6-3-92
SAMPLING LOCATION	St. Gen 401A
SAMPLE TYPE	PAH
RUN NUMBER	2
OPERATOR	SAF / BAH.

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Temperature (°F) Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit	Pump Vacuum (in. Hg)	
	114	1015	720.9									
A-10	120	1021	725.219	0.27	284	1.80	249	119	114	71 / 44	6	250
			Post	Leak check		0.005	CFM	7" Hg.				
			Start	Leak check		0.006	CFM	7" Hg				
	120	1103	725.480									
B-10	126	1109	—	0.27	280	1.80	252	110	110	76/47	7	190
A-9	132	1115	—	0.27	288	1.80	249	112	111	65/41	7	174
B-8	138	1121	738.5	0.29	282	1.90	248	112	110	70/42	7	240
B-7	144	1127	743.1	0.29	283	1.90	249	113	110	70/41	7	249
A-6	150	1133	747.5	0.29	283	1.70	250	115	111	69/42	7	248
B-5	156	1139	752.0	0.28	282	1.85	250	117	111	68/41	7	253
B-4	162	1145	—	0.29	~~285~~ 281	1.90	250	118	112	67/43	7	256
B-3	168	1151	761.0	0.29	280	1.90	251	120	114	72/47	7	255
B-2	174	1157	—	0.24	271	1.55	248	117	113	69/43	6	248
B-1	180	1203	768.8	0.18	268	1.20	250	117	113	71/45	6	248
B-1	186	1209	772.6	0.18	271	1.2[illegible]	249	117	114	75/48	5	253
B-2	92	1215		0.25	275	1.[illegible]	251	115	113	73/47		48

Static 0.12

RADIAN CORPORATION

METHOD 5
FIELD DATA

RUN 2
PAGE 3 OF 3

PLANT	Mobil	PROBE LENGTH AND TYPE	3' Glass	HEIGHT OF LOCATION (ft)	30'
DATE	6-3-92	NOZZLE I.D. (in)	0.316	DUCT DIMENSIONS	35"
SAMPLING LOCATION	St Gen 401A	METER BOX NUMBER	Sac-05	FILTER NUMBER	—
SAMPLE TYPE	PAH	METER ΔH@	1.88	ASSUMED MOISTURE (%)	16
RUN NUMBER	2	Yd	0.993	MOISTURE METHOD	CARB
OPERATOR	SAE/AAH	K FACTOR	0.28	MOISTURE DATA	
AMBIENT TEMPERATURE	95°	PROBE HEATER SETTING	250	O2/CO2 METHOD	
BAROMETRIC PRESSURE	29.49	HEATER BOX SETTING	250	O2	
STATIC PRESSURE (Ps)				CO2	
INITIAL LEAKCHECK				FINAL LEAKCHECK	0.002 CFM @ 8" Hg

READ AND RECORD ALL DATA EVERY ____ MINUTES

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Temperature (°F) Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit/XAD	Pump Vacuum (in. Hg)	
	192	1215	—									
B-3	198	1221	781.0	0.28	278	1.85	250	116	113	73/45	7	252
B-4	204	1227	785.5	0.28	282	1.85	249	115	112	72/42	7	245
B-5	210	1233	789.9	0.28	282	1.85	249	115	112	72/44	7	247
B-6	216	1239	794.4	0.29	279	1.90	250	115	111	72/44	7	253
B-7	222	1245	798.8	0.29	285	1.90	249	115	111	70/46	8	251
B-8	228	1251	803.3	0.29	285	1.90	246	115	111	70/47	8	248
B-9	234	1257	807.8	0.29	285	1.90	250	115	111	71/48	8	255
B-10	240	1303	812.135	0.27	284	1.80	250	116	111	72/46	8	249
			AH	AH	LDL							
Ave	240		~~171.39~~ 171.379	~~1.052~~ 0.516	~~275.8~~ 278.6	1.76			112.1			

Static 0.14

averages checked by LDBate

JV

COMMENTS:

Revision: 11/90

RADIAN CORPORATION

METHOD 5 FIELD DATA

RUN 3
PAGE 1 OF 3

PLANT	Mobil	PROBE LENGTH AND TYPE	3' Glass	HEIGHT OF LOCATION (ft)	30'
DATE	6/3/92	NOZZLE I.D. (in)	0.316	DUCT DIMENSIONS	35"
SAMPLING LOCATION	SIG 401A	METER BOX NUMBER	SAG05	FILTER NUMBER	—
SAMPLE TYPE	PAH	METER Δ H@	1.88	ASSUMED MOISTURE (%)	16
RUN NUMBER	#3	Yd	0.993	MOISTURE METHOD	CARB
OPERATOR	MK/RM	K FACTOR	0.28	MOISTURE DATA	
AMBIENT TEMPERATURE	~~70~~ 80	PROBE HEATER SETTING	250	O2/CO2 METHOD	
BAROMETRIC PRESSURE	29.28	HEATER BOX SETTING	250	O2	
STATIC PRESSURE (Ps)	~~-0.15~~ -0.072			CO2	
INITIAL LEAKCHECK	0.012 cfm @ 14" Hg			FINAL LEAKCHECK	

READ AND RECORD ALL DATA EVERY 6 MINUTES

	Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Dry Gas Meter Inlet (Tm in) (°F)	Dry Gas Meter Outlet (Tm out) (°F)	Impinger Exit / AMD-1 (°F)	Pump Vacuum (in. Hg)	Probe Temp (GP)
Pstat		0	14:07	812.500									
	B-10	6	14:13	816.6	0.27	284	1.85	243	108	108	79/60	7	253
	B-9	12	14:19	—	0.27	284	1.80	252	109	108	76/48	7.5	248
	B-8	18	14:25	825.1	~~0.29~~	285	1.90	246	112	109	70/46	8.8	249
-0.16	B-7	24	14:31	829.6	0.29	284	1.90	249	114	110	66/45	8.5	248
	B-6	30	14:37	—	0.29	284	1.90	252	115	110	65/45	8.5	254
	B-5	36	14:43	838.4	0.28	281	1.85	251	116	111	61/44	8.5	256
	B-4	42	14:49	842.8	0.28	279	1.85	256	118	112	61/46	8.5	238
	-3	48	14:55	847.4	0.29	280	1.90	250	120	113	63/49	8.5	249
	-2	54	15:01	851.6	0.26	265	1.70	247	119	114	62/47	8	249
-0.11	-1	60	15:07	—	0.22	—	1.45	254	120	114	62/46	7.5	252
	-1	66	15:13	859.9	0.26	239	1.70	251	120	115	63/46	8	249
	-2	72	15:19	864.3	0.28	273	1.85	250	120	116	65/48	8	250
	-3	78	15:25	868.8	0.30	279	1.95	248	120	116	67/49	8.5	249
	-4	84	15:31	—	0.29	282	1.85	247	121	117	67/48	8.5	251
	-5	90	15:37	877.9	0.29	283	1.90	247	121	117	69/47	9	250
	-6	96	15:43	882.4	0.30	279	1.95	249	122	118	64/50	9	253
	-7	102	15:49	887.1	0.29	283	1.90	253	123	118	57/51	8.5	253
	-8	108	15:55	891.45	0.28	292	1.86	251	123	118	65/46	8.5	254
	-9	114	16:01		0.28	282		244	124	120	66/49		55

Revision: 11/90

RADIAN CORPORATION

METHOD 5
FIELD DATA

RUN 3
PAGE 2 OF 3

PLANT	Mobil
DATE	6/3/92
SAMPLING LOCATION	Stm Gen 401-A
SAMPLE TYPE	PAH
RUN NUMBER	3
OPERATOR	SF/ML/RH

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Temperature (°F) Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit	Pump Vacuum (in. Hg)	Probe Temp
	114	1601	896.60									
B-10	120	1607	900.173	0.25	281	1.65	251	123	120	68/49	8.5	252
			Post B traverse Leak Rate				0.015 cfm @10"Hg					
			Pre A traverse Leak Rate				0.018 cfm @9"Hg					
	120	1704	901.063									250
A-10	126	1710	905.25	0.27	278	1.80	253	122	120	69/56	8.5	249
A-9	132	1716	909.70	0.27	280	1.80	250	121	120	65/55	8.5	252
A-8	138	1722	914.30	0.28	280	1.85	250	122	122	65/56	8.5	253
-0.14 A-7	144	1728	918.70	0.28	280	1.85	252	123	122	69/56	8.5	255
A-6	150	1734	923.10	0.29	281	1.90	251	124	122	68/57	8.5	253
A-5	156	1740	927.50	0.28	280	1.85	248	124	121	68/57	8.8	253
A-4	162	1746	932.00	0.28	280	1.85	250	123	121	63/55	8.6	252
A-3	168	1752	936.30	0.27	279	1.80	248	123	121	65/56	8.0	253
A-2	174	1758	940.90	0.25	278	1.65	252	123	121	66/57	8.0	254
A-1	180	1804		0.20	275	1.30	251	123	121	69/58	7.0	251
A-1	186	1810	948.20	0.20	276	1.30	250	123	121	70/59	7.0	250
A-2	192	1816	952.30	0.26	277	1.70	251	123	121	68/55	7.0	253
-0.14 A-3	198	1822	956.50	0.28	278	1.85	248	123	121	63/57	8.0	256
A-4	204	1828	961.20	0.29	279	1.90	251	122	120	62/58	8.0	

COMMENTS:

3656

Revision: 1

RADIAN CORPORATION

METHOD 5
FIELD DATA

RUN 3
PAGE 3 OF 3

PLANT	Imobil	PROBE LENGTH AND TYPE	3' glass	HEIGHT OF LOCATION (ft)	40
DATE	6/3/92	NOZZLE I.D. (in)	0.316	DUCT DIMENSIONS	35
SAMPLING LOCATION	Stn [illegible]	METER BOX NUMBER	Sae-05	FILTER NUMBER	
SAMPLE TYPE	PAH	METER Δ H@	1.88	ASSUMED MOISTURE (%)	15
RUN NUMBER	3	Yd	0.993	MOISTURE METHOD	Carb
OPERATOR	SP/RH	K FACTOR C =	0.28	MOISTURE DATA	
AMBIENT TEMPERATURE	90	PROBE HEATER SETTING	250	O2/CO2 METHOD	
BAROMETRIC PRESSURE	29.28	HEATER BOX SETTING	250	O2	
STATIC PRESSURE (Ps)				CO2	
INITIAL LEAKCHECK				FINAL LEAKCHECK	0.014 cfm @ 9" Hg

READ AND RECORD ALL DATA EVERY ____ MINUTES

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit (°F)	Pump Vacuum (in. Hg)	Probe Temp
	204	1828	961.20									
A-5	210	1834	965.70	0.29	280	1.90	251	123	121	66/58	8.0	248
A-6	216	1840	970.30	0.29	280	1.90	248	123	121	68/57	8.0	247
A-7	222	1846	974.75	0.29	280	1.90	250	124	121	70/60	8.5	254
A-8	228	1852	979.30	0.28	281	1.85	246	123	121	68/57	8.5	251
A-9	234	1858	983.60	0.27	279	1.80	247	122	121	68/56	8.5	253
A-10	240	1904	987.75	20.27	278	1.80	250	122	119	68/60	8.5	253
Ave	240		174.558	0.523	278.66	1.80			119			

Averages checked by Lisa Lake

Revision: 11/90

RADIAN

IMPINGER SOLUTION RECOVERY FIELD DATA SHEET

Plant	Mobil - Lost Hills
Date	6/1/92
Sampling Location	Stm Gen. 401A
Sample Type	PAH
Run Number	#1
Sample Box Number	
Clean-up Person	~~TR~~/KF
Solvent Rinses	
Sample Identification Code	M1-C,E,F
XAD Trap Number	

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (g) Final	Initial	Weight Gain
1	empty	—	Knock-out	1012.46	422.46	590.0
2	DI H_2O	~100	GS	638.12	589.17	48.95
3	DI H_2O	~100	Mod. GS	536.56	587.98	-51.42
4	Silica Gel	~300	Inverted	853.94	810.55	43.39
5						
6						
7						

TOTAL WEIGHT GAIN (g) 630.92

RADIAN CORPORATION

IMPINGER SOLUTION RECOVERY FIELD DATA SHEET

Plant	Mobil - Lost Hills
Date	6/2/92
Sampling Location	Stm. Generator 401A
Sample Type	PAH
Run Number	#2
Sample Box Number	—
Clean-up Person	[illegible]
Solvent Rinses	Meth, Hex, MC
Sample Identification Code	M2-C, E, F
XAD Trap Number	—

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (g)		
				Final	Initial	Weight Gain
1	Empty	—	knock-out	991.21	428.53	562.68
2	HPLC H_2O	~100g	GS	598.63	571.77	26.86
3	HPLC H_2O	~100g	MGS.	597.98	596.68	1.30
4	Silica Gel	~300gm	Inverted	833.67	792.54	41.13
5						
6						
7						

TOTAL WEIGHT GAIN (g) 631.97

RADIAN CORPORATION

IMPINGER SOLUTION RECOVERY FIELD DATA SHEET

Plant	Mobil - Lost Hills
Date	6/3/92
Sampling Location	Stm. Gen 401A
Sample Type	PAH
Run Number	#3 -
Sample Box Number	
Clean-up Person	JW/SF
Solvent Rinses	Meth, Hex, MC
Sample Identification Code	M3-C,E,F
XAD Trap Number	—

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (g) Final	Initial	Weight Gain
1	Empty ~~DI H2O~~	~~100~~ —	Knock-Out	1007.57	421.16	586.41
2	DI H_2O	~100	GS	610.35	606.38	3.97
3	DI H_2O	~100	Mod GS	606.16	599.28	6.88
4	Silica Gel	~300	Inverted	872.5	832.34	40.16
5						
6						
7						

TOTAL WEIGHT GAIN (g) 637.42

ALDEHYDE EMISSION DATA

ALDEHYDE EMISSION DATA

RADIAN CORPORATION

IMPINGER SOLUTION RECOVERY FIELD DATA SHEET

Plant	Mobil-Lost Hills
Date	6/3/92
Sampling Location	Stm. Gen 401A
Sample Type	PAH
Run Number	#3-
Sample Box Number	7
Clean-up Person	MC/SF
Solvent Rinses	MeOH, Hex, MC
Sample Identification Code	M3-C,E,F
XAD Trap Number	—

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (g) Final	Initial	Weight Gain
1	Empty ~~DI H2O~~	~~100~~ —	Knock-Out	1007.57	421.16	586.41
2	DI H_2O	~100	GS	610.35	606.38	3.97
3	DI H_2O	~100	Mod GS	606.16	599.28	6.88
4	Silica Gel	~300	Inverted	872.5	832.34	40.16
5						
6						
7						

TOTAL WEIGHT GAIN (g) 637.42

RADIAN
CORPORATION

Formaldehyde Field Data Sheet

Plant mobil
Date 6-3-92
Location 5x Gen 401A
Console # Sac - V02
DGMCF 1.01

Test ID 2B
Leak Rate (L/min) 0.004 ~~cfm~~ lpm @ 5" Hg
Barometric Pressure (in Hg) 29.49
Sampling Duration (min) 116
Operator MAH / SAF

Time	DGM Reading (L)	Rotometer (L/min)	Meter Temp. (°C) Inlet	Meter Temp. (°C) Outlet	Meter Pressure (in H2O)	Pump Vacuum (in Hg)
1108	942.11	—	—	—	—	—
1119	947.9	.5	43		1.0	<2
1129	952.3	.5	43		1.0	<2
1141	958.5	.5	45		1.0	<2
1154	964.0	.5	46		1.0	<2
1205	970.2	.5	47		1.0	<2
1218	976.2	.5	47		1.0	<2
1229	981.2	.5	46		1.0	<2
1240	986.7	.5	46		1.0	<2
1253	992.5	.5	46		1.0	<2
1304	998.09	.5	46		1.0	<2
Avg.	55.980	.5	45.5 (113.9 °F)		1.0	<2

RADIAN CORPORATION

Formaldehyde Field Data Sheet

Plant: Mobil
Date: 6-23-92
Location: Lost Hills / [illegible] Gen
Console #: Sac-V02
DGMCF: 1.01

Test ID: 2A
Leak Rate (L/min): 0.003 ~~cfm~~ lpm @ 5" Hg
Barometric Pressure (in Hg): 27.49
Sampling Duration (min): 121
Operator: BAH / SAF

Time	DGM Reading (L)	Rotometer (L/min)	Meter Temp. (°C) Inlet	Outlet	Meter Pressure (in H2O)	Pump Vacuum (in Hg)
					—	—
start 0824	884.14	-	—	—		
0834	889.70	.5	34	—	1.0	<2
0844	893.55	.5	36	-	1.0	<2
0854	898.50	.5	38		1.0	<2
0904	903.55	.5	39		1.0	<2
0914	908.25	.5	40		1.0	<2
0924	913.10	.5	41		1.0	<2
0935	919.60	.5	42		1.0	<2
0946	924.10	.5	43		1.0	<2
0956	928.40	.5	44		1.0	<2
1006	933.30	.5	44		1.0	<2
1017	938.8	.5	45		1.0	<2
stop 1025	941.850	.5	45		1.0	<2
Avg.	57.710	.5	40.9 (105.6 °F)		1.0	<2

RADIAN CORPORATION

Formaldehyde Field Data Sheet

Plant Mobil

Date 6/2/92

Location Sim Evaporator 401A

Console # SAC-V01

DGMCF 1.01

Test ID 1

Leak Rate (L/min) 0.000 lpm @ 5" Hg

Barometric Pressure (in Hg) 29.36

Sampling Duration (min) 121

Operator MK/RH

Time	DGM Reading (L)	Rotometer (L/min)	Meter Temp. (°C) Inlet	Outlet	Meter Pressure (in H2O)	Pump Vacuum (in Hg)
Start 1629/0	387.60	—	—	—	—	—
1639	392.73	.5	44	—	.7	<2
1649	398.15	.5	45	—	.7	<2
1700	404.15	.5	46	—	.7	<2
1711	409.85	.5	47	—	.7	<2
1720	413.70	.5	48		.7	<2
1730	420.20	.5	49		.7	<2
1740	423.86	.5	49		.7	<2
1750	429.20	.5	49		.7	<2
1800	435.00	.5	49		.7	<2
1810	440.00	.5	49		.7	<2
1820	444.50	.5	49		.7	<2
1830	449.70	.5	49		.7	<2
Avg.	62.100	.5	47.75 (117.9°F)		.7	<2

Table B-6: Aldehyde Emission Data - Mobil (Lost Hills, CA)
Steam Generator #401A Exhaust

Run Number	# 1	#2A	#2B	AVG (a)
Date	06/02/92	06/03/92	06/03/92	
Time	1629-1830	0824-1025	1108-1304	
DGMCF (---)=	1.010	1.010	1.010	--
Dry Gas Meter Volume (liters)=	62.10	57.71	55.98	--
Barometric Pressure (" Hg)=	29.36	29.49	29.49	--
Meter Back-Pressure (" H2O)=	0.70	1.00	1.00	--
Meter Pressure, Absolute(" Hg)=	29.41	29.56	29.56	--
Meter Temperature (deg F)=	118	106	114	--
Stack Gas Flow Rate (b) (dscfm)=	8,025	8,153	8,153	--
Standard Temperature (deg F)=	60.0	60.0	60.0	--
Standard Pressure (" Hg)=	29.92	29.92	29.92	--
Heat Input (MMBTU/h)=	49.5	49.8	49.3	--
Quantity Collected (ug)=				
Formaldehyde	< 0.50	0.50	< 0.50	--
Acetaldehyde	< 0.50	< 0.50	< 0.50	--
Acrolein	< 0.50	< 0.50	< 0.50	--
Volume of Gas Sampled (dscm)=	0.0555	0.0529	0.0506	-- 0.0530
dehyde Concentration (ug/dscm)=				
Formaldehyde	< 9.0	9.4	< 9.9	6.3
Acetaldehyde	< 9.0	< 9.4	< 9.9	4.7
Acrolein	< 9.0	< 9.4	< 9.9	4.7
Aldehyde Concentration (ppbv)=				
Formaldehyde	< 7.1	7.5	< 7.8	5.0
Acetaldehyde	< 4.9	< 5.1	< 5.3	2.5
Acrolein	< 3.8	< 4.0	< 4.2	2.0
Aldehyde Emission Rate (lb/hr x 10-3)=				
Formaldehyde	< 0.27	0.29	< 0.30	0.19
Acetaldehyde	< 0.27	< 0.29	< 0.30	0.14
Acrolein	< 0.27	< 0.29	< 0.30	0.14
Aldehyde Emission Ratio (lb/MMBTU x 10-6)=				
Formaldehyde	< 5.5	5.8	< 6.1	3.9
Acetaldehyde	< 5.5	< 5.8	< 6.1	2.9
Acrolein	< 5.5	< 5.8	< 6.1	2.9

(a) Average values were computed assuming that compounds that were below the detection limit were present at one half of the detection limit.
(b) Based on flow rate data collected during the PAH testing (refer to Table B-5).

RADIAN CORPORATION

Table B-6: Aldehyde Emission Data - Mobil (Lost Hills, CA)
Steam Generator #401A Exhaust

Run Number	# 1	#2A	#2B	AVG (a)
Date	06/02/92	06/03/92	06/03/92	
Time	1629-1830	0824-1025	1108-1304	
DGMCF (---)=	1.010	1.010	1.010	--
Dry Gas Meter Volume (liters)=	62.10	57.71	55.98	--
Barometric Pressure (" Hg)=	29.36	29.49	29.49	--
Meter Back-Pressure (" H2O)=	0.70	1.00	1.00	--
Meter Pressure, Absolute(" Hg)=	29.41	29.56	29.56	--
Meter Temperature (deg F)=	118	106	114	--
Stack Gas Flow Rate (b) (dscfm)=	8,025	8,153	8,153	--
Standard Temperature (deg F)=	60.0	60.0	60.0	--
Standard Pressure (" Hg)=	29.92	29.92	29.92	--
Heat Input (MMBTU/h)=	49.5	49.8	49.3	--
Quantity Collected (ug)=				
Formaldehyde	< 0.50	0.50	< 0.50	--
Acetaldehyde	< 0.50	< 0.50	< 0.50	--
Acrolein	< 0.50	< 0.50	< 0.50	--
Volume of Gas Sampled (dscm)=	0.0555	0.0529	0.0506	-- 0.0530
dehyde Concentration (ug/dscm)=				
Formaldehyde	< 9.0	9.4	< 9.9	6.3
Acetaldehyde	< 9.0	< 9.4	< 9.9	4.7
Acrolein	< 9.0	< 9.4	< 9.9	4.7
Aldehyde Concentration (ppbv)=				
Formaldehyde	< 7.1	7.5	< 7.8	5.0
Acetaldehyde	< 4.9	< 5.1	< 5.3	2.5
Acrolein	< 3.8	< 4.0	< 4.2	2.0
Aldehyde Emission Rate (lb/hr x 10-3)=				
Formaldehyde	< 0.27	0.29	< 0.30	0.19
Acetaldehyde	< 0.27	< 0.29	< 0.30	0.14
Acrolein	< 0.27	< 0.29	< 0.30	0.14
Aldehyde Emission Ratio (lb/MMBTU x 10-6)=				
Formaldehyde	< 5.5	5.8	< 6.1	3.9
Acetaldehyde	< 5.5	< 5.8	< 6.1	2.9
Acrolein	< 5.5	< 5.8	< 6.1	2.9

(a) Average values were computed assuming that compounds that were below the detection limit were present at one half of the detection limit.
(b) Based on flow rate data collected during the PAH testing (refer to Table B-5).

RADIAN
CORPORATION

Formaldehyde Field Data Sheet

Plant Mobil

Date 6/2/92

Location Stm Evaporator 401A

Console # SAC-V01

DGMCF 1.01

Test ID 1

Leak Rate (L/min) 0.000 lpm @ 5" Hg

Barometric Pressure (in Hg) 29.36

Sampling Duration (min) 121

Operator MK/RH

	Time	DGM Reading (L)	Rotometer (L/min)	Meter Temp. (°C) Inlet	Outlet	Meter Pressure (in H2O)	Pump Vacuum (in Hg)
Start	1630	387.60	—	—	—	—	—
	1639	392.93	.5	44	—	.7	<2
	1649	398.15	.5	45	—	.7	<2
	1700	404.15	.5	46	—	.7	<2
	1711	409.85	.5	47	—	.7	<2
	1720	413.70	.5	48		.7	<2
	1730	420.20	.5	49		.7	<2
	1740	423.86	.5	49		.7	<2
	1750	429.20	.5	49		.7	<2
	1800	435.00	.5	49		.7	<2
	1810	440.00	.5	49		.7	<2
	1820	444.50	.5	49		.7	<2
	1830	449.70	.5	49		.7	<2
	Avg.	62.100	.5	47.75		.7	<2

(117.9°F)

RADIAN CORPORATION

Formaldehyde Field Data Sheet

Plant: Mobil
Date: 6-23-92
Location: Lost Hills / Co. Gen
Console #: Sac-V02
DGMCF: 1.01

Test ID: 2A
Leak Rate (L/min): 0.003 ~~cfm~~ lpm @ 5" Hg
Barometric Pressure (in Hg): 29.49
Sampling Duration (min): 121
Operator: BAH / SAF

	Time	DGM Reading (L)	Rotometer (L/min)	Meter Temp. (°C) Inlet	Meter Temp. (°C) Outlet	Meter Pressure (in H2O)	Pump Vacuum (in Hg)
start	0824	884.14	-	—	—	—	—
	0834	889.70	.5	34	—	1.0	<2
	0844	893.55	.5	36	-	1.0	<2
	0854	898.50	.5	38		1.0	<2
	0904	903.55	.5	39		1.0	<2
	0914	908.25	.5	40		1.0	<2
	0924	913.10	.5	41		1.0	<2
	0935	919.60	.5	42		1.0	<2
	0946	924.10	.5	43		1.0	<2
	0956	928.40	.5	44		1.0	<2
	1006	933.30	.5	44		1.0	<2
	1017	938.8	.5	45		1.0	<2
stop	1025	941.850	.5	45		1.0	<2
	Avg.	57.710	.5	40.9		1.0	<2

(105.6 °F)

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CORPORATION

Formaldehyde Field Data Sheet

Plant mobil

Date 6-3-92

Location 5x Gen 401A

Console # Sac - V02

DGMCF 1.01

Test ID 2B

Leak Rate (L/min) 0.004 ~~ℓpm~~ ℓpm@5"Hg

Barometric Pressure (in Hg) 29.49

Sampling Duration (min) 116

Operator MAH / SAF

Time	DGM Reading (L)	Rotometer (L/min)	Meter Temp. (°C) Inlet	Outlet	Meter Pressure (in H2O)	Pump Vacuum (in Hg)
1108	942.11	—	—	—	—	—
1119	947.9	.5	43		1.0	<2
1129	952.3	.5	43		1.0	<2
1141	958.5	.5	45		1.0	<2
1154	964.0	.5	46		1.0	<2
1205	970.2	.5	47		1.0	<2
1218	976.2	.5	47		1.0	<2
1229	981.2	.5	46		1.0	<2
1240	986.7	.5	46		1.0	<2
1253	992.5	.5	46		1.0	<2
1304	998.09	.5	46		1.0	<2
Avg.	55.980	.5	45.5 (113.9 °F)		1.0	<2

BTEX, PROPYLENE, AND THC EMISSION DATA

Table B-7: BTEX, Propylene, and Total Hydrocarbon Emission Data - Mobil (Lost Hills, CA) Steam Generator #401A Exhaust

Run Number		# 4A	# 4B	# 4C (a)	Avg. (b)
Date		06/04/92	06/04/92	06/04/92	
Time		0810-0840	0848-0918	0924-0954	
Barometric Pressure	(" Hg)=	29.53	29.53	29.53	--
Stack Gas Flow Rate (c)	(dscfm)=	8,398	8,398	8,398	--
Standard Temperature	(deg F)=	60.0	60.0	60.0	--
Standard Pressure	(" Hg)=	29.92	29.92	29.92	--
Heat Input	(MMBtu/h)=	50.4	49.9	49.4	--
VOC Concentration (ppbv)=					
Benzene		< 1.4	< 1.4	< 1.4	0.70
Toluene		6.5	6.5	9.9	7.62
Ethylbenzene		4.5	7.1	< 1.4	4.10
Xylenes		16	5.1	4.2	8.4
Propylene		430	610	515	518
Total Hydrocarbons (d)		7,500	9,375	8,125	8,333
VOC Concentration (ug/dscm)=					
Benzene		< 4.6	< 4.6	< 4.6	2.3
Toluene		26	26	39	30
Ethylbenzene		20	32	< 6.3	19
Xylenes		73	23	19	[illegible]
Propylene		763	1,082	913	91[illegible]
Total Hydrocarbons		5,068	6,334	5,490	5,631
Emission Rate (lb/hr x 10-3)=					
Benzene		< 0.15	< 0.15	< 0.15	0.07
Toluene		0.80	0.80	1.22	0.94
Ethylbenzene		0.64	1.01	< 0.20	0.58
Xylenes		2.30	0.73	0.60	1.21
Propylene		24.0	34.0	28.7	28.9
Total Hydrocarbons		159	199	173	177
Emission Ratio (lb/MMBtu x 10-6)=					
Benzene		< 2.9	< 2.9	< 2.9	1.5
Toluene		15.9	16.1	24.6	18.9
Ethylbenzene		12.7	20.2	< 4.0	11.6
Xylenes		45.5	14.7	12.2	24.1
Propylene		476	682	582	580
Total Hydrocarbons		3,163	3,994	3,496	3,551

(a) Duplicate samples were collected during Test #4C; data represents the average results of the two samples analyzed.
(b) Average values are computed assuming that compounds which are below the detection limit, are present at one-half of the detection limit.
(c) Based on velocity traverse data collected during Test 4 (i.e., from 1005 to 1018).
(d) Quantified as methane.

Table B-7 : BTEX, Propylene, and Total Hydrocarbon Emission Data - Mobil (Lost Hills, CA) Steam Generator #401A Exhaust

Run Number	# 4A	# 4B	# 4C (a)	Avg. (b)
Date	06/04/92	06/04/92	06/04/92	
Time	0810-0840	0848-0918	0924-0954	
Barometric Pressure (" Hg)=	29.53	29.53	29.53	--
Stack Gas Flow Rate (c) (dscfm)=	8,398	8,398	8,398	--
Standard Temperature (deg F)=	60.0	60.0	60.0	--
Standard Pressure (" Hg)=	29.92	29.92	29.92	--
Heat Input (MMBtu/h)=	50.4	49.9	49.4	--
VOC Concentration (ppbv)=				
Benzene	< 1.4	< 1.4	< 1.4	0.70
Toluene	6.5	6.5	9.9	7.62
Ethylbenzene	4.5	7.1	< 1.4	4.10
Xylenes	16	5.1	4.2	8.4
Propylene	430	610	515	518
Total Hydrocarbons (d)	7,500	9,375	8,125	8,333
VOC Concentration (ug/dscm)=				
Benzene	< 4.6	< 4.6	< 4.6	2.3
Toluene	26	26	39	30
Ethylbenzene	20	32	< 6.3	19
Xylenes	73	23	19	[illegible]
Propylene	763	1,082	913	91[illegible]
Total Hydrocarbons	5,068	6,334	5,490	5,631
Emission Rate (lb/hr x 10-3)=				
Benzene	< 0.15	< 0.15	< 0.15	0.07
Toluene	0.80	0.80	1.22	0.94
Ethylbenzene	0.64	1.01	< 0.20	0.58
Xylenes	2.30	0.73	0.60	1.21
Propylene	24.0	34.0	28.7	28.9
Total Hydrocarbons	159	199	173	177
Emission Ratio (lb/MMBtu x 10-6)=				
Benzene	< 2.9	< 2.9	< 2.9	1.5
Toluene	15.9	16.1	24.6	18.9
Ethylbenzene	12.7	20.2	< 4.0	11.6
Xylenes	45.5	14.7	12.2	24.1
Propylene	476	682	582	580
Total Hydrocarbons	3,163	3,994	3,496	3,551

(a) Duplicate samples were collected during Test #4C; data represents the average results of the two samples analyzed.
(b) Average values are computed assuming that compounds which are below the detection limit, are present at one-half of the detection limit.
(c) Based on velocity traverse data collected during Test 4 (i.e., from 1005 to 1018).
(d) Quantified as methane.

BTEX, PROPYLENE, AND THC EMISSION DATA

RADIAN CORPORATION

VOCs Field Data Sheet

Plant Mobil - Lost Hills

Date 6/4/92

Location Stm Gen 401-A

Console # Nutech Sep. Pump. Box

DGMCF —

Bag ID M30-C, M30-D

Leak Rate (L/min) —

Barometric Pressure (in Hg) ~~29.37~~ 29.53 "Hg

Sampling Duration (min) 30

Operator SF

Run #4C

	Time	Rotameter (L/min)	Pump Vacuum (in Hg)
Start	0924	10	
	0932	10	
	0941	10	
	0950	10	
Stop	0954	10	
	Avg.		

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VOCs Field Data Sheet

Plant Mobil - Lost Hills
Date 6/4/92
Location Stm Gen - 401-A
Console # Nu-tech Sep. Pump Box
DGMCF

Bag ID M-30-B
Leak Rate (L/min) -
Barometric Pressure (in Hg) ~~29.51~~ 29.53
Sampling Duration (min) 30
Operator SF

Run #4B

	Time	Rotameter (L/min)	Pump Vacuum (in Hg)
Start @	0848	10	
	0854	10	
	0902	10	
	0910	10	
stop @	0918	10	
	Avg.		

RADIAN CORPORATION

VOCs Field Data Sheet

Plant Mobil

Date 6/4/92

Location Stripper 401A

Console # Nu-tech Sep. Pump Box

DGMCF —

Bag ID M30-A

Leak Rate (L/min) —

Barometric Pressure (in Hg) ~~29.31~~ 29.53

Sampling Duration (min) 30

Operator SF

Run #4A

	Time	Rotometer (L/min)	Pump Vacuum (in Hg)
Start @	0810	10	
	0818	10	
	0827	10	
	0835	10	
Stop @	0840	10	
	Avg.		

RADIAN CORPORATION

Table B-8 : Volumetric Flow Rate Data - Mobil Steam Generator #401A Exhaust

Run Number		#4
Date		6/4/92
Time		1005-1018
PTCF	(---)=	0.84
Barometric Pressure	(" Hg)=	29.53
Percent Oxygen	(% O2)=	2.3
Percent Carbon Dioxide	(% CO2)=	13.5
Stack Gas Static Press.	(" H2O)=	-0.23
Stack Gas Temperature	(deg F)=	285
SQRT-Stack Gas V-Press.	(P*1/2)=	0.535
Stack Gas Moist. Content	(%)=	16.2
Diameter of Stack	(feet)=	2.92
Standard Temp	(deg F)=	60.0
Standard Pressure	(" Hg)=	29.92
Gas Molecular Weight	(g/mole)=	28.27
Stack Gas Velocity	(ft/sec)=	36.3
Volumetric Stack Gas Flow	(acfm)=	14,555
Volumetric Stack Gas Flow	(dscfm)=	8,398

RADIAN
CORPORATION

Table B-8 : Volumetric Flow Rate Data - Mobil Steam Generator #401A Exhaust

Run Number		#4
Date		6/4/92
Time		1005-1018
PTCF	(---)=	0.84
Barometric Pressure	(" Hg)=	29.53
Percent Oxygen	(% O2)=	2.3
Percent Carbon Dioxide	(% CO2)=	13.5
Stack Gas Static Press.	(" H2O)=	-0.23
Stack Gas Temperature	(deg F)=	285
SQRT-Stack Gas V-Press.	(P*1/2)=	0.535
Stack Gas Moist. Content	(%)=	16.2
Diameter of Stack	(feet)=	2.92
Standard Temp	(deg F)=	60.0
Standard Pressure	(" Hg)=	29.92
Gas Molecular Weight	(g/mole)=	28.27
Stack Gas Velocity	(ft/sec)=	36.3
Volumetric Stack Gas Flow	(acfm)=	14,555
Volumetric Stack Gas Flow	(dscfm)=	8,398

RADIAN CORPORATION

VOCs Field Data Sheet

Plant: Mobil

Date: 6/4/92

Location: Stripper 40-A

Console #: Nu-tech Sep. Pump Box

DGMCF: —

Bag ID: M30-A

Leak Rate (L/min): —

Barometric Pressure (in Hg): ~~29.31~~ 29.53

Sampling Duration (min): 30

Operator: SF

Run #4A

	Time	Rotometer (L/min)	Pump Vacuum (in Hg)
Start @	0810	10	
	0818	10	
	0827	10	
	0835	10	
Stop @	0840	10	
	Avg.		

RADIAN CORPORATION

VOCs Field Data Sheet

Plant Mobil-Lost Hills

Date 6/4/92

Location Stm Gen - 401-A

Console # Nu-tech Sep. Pump Box

DGMCF

Bag ID M-30-B

Leak Rate (L/min) —

Barometric Pressure (in Hg) ~~29.54~~ 29.53

Sampling Duration (min) 30

Operator SF

Run #4B

	Time	Rotameter (L/min)	Pump Vacuum (in Hg)
Start @	0848	10	
	0854	10	
	0902	10	
	0910	10	
Stop @	0918	10	
	Avg.		

RADIAN CORPORATION

VOCs Field Data Sheet

Plant mobil - Lost Hills

Date 6/4/92

Location Stm Gen 401-A

Console # Nutech Sep. Pump. Box

DGMCF —

Bag ID M30-C, M30-D

Leak Rate (L/min) —

Barometric Pressure (in Hg) ~~29.37~~ 29.53"Hg

Sampling Duration (min) 30

Operator SF

Run #4C

	Time	Rotameter (L/min)	Pump Vacuum (in Hg)
Start @	0924	10	
	0932	10	
	0941	10	
	0950	10	
Stop @	0954	10	
	Avg.		

RADIAN CORPORATION

Velocity Traverse Data Sheet

PLANT Mobil - Stm. Generator
DATE 6/4/93
LOCATION 401 A Exhaust
STACK I.D. 35"
BAROMETRIC PRESSURE in. Hg 29.53
STACK GAUGE PRESSURE in. H_2O -0.23
OPERATORS MJ/SF

Test 4 (H_2S, BTEX)

SCHEMATIC OF TRAVERSE POINT LAYOUT

Start 10:05

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
A1	0.23	285
2	0.26	285
3	0.28	285
4	0.30	285
5	0.30	285
6	0.29	285
7	0.29	285
8	0.29	285
9	0.28	285
10	0.28	285
AVERAGE		

Stop @ 1018

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
B1	0.25	285
2	0.28	285
3	0.30	285
4	0.31	285
5	0.30	285
6	0.30	285
7	0.30	285
8	0.30	285
9	0.30	285
10	0.29	285
AVERAGE	$\sqrt{\Delta P}$ = 0.5349	285.0

HYDROGEN SULFIDE EMISSION DATA

RADIAN CORPORATION

ɔle B-9 : H2S Emission Data - Mobil (Lost Hills, CA)
Steam Generator #401A Exhaust

Run Number Date Time	# 2 06/03/92 0846-1205	#3 06/03/92 1419-1815	#4 06/04/92 0800-1040	Average
DGMCF (---)=	1.010	1.010	1.010	--
Dry Gas Meter Volume (liters)=	192.50	183.45	176.49	--
Barometric Pressure (" Hg)=	29.49	29.28	29.53	--
Meter Back-Pressure (" H2O)=	1.20	1.20	1.50	--
Meter Pressure, Absolute(" Hg)=	29.58	29.37	29.64	--
Meter Temperature (deg F)=	109	118	110	--
Stack Gas Flow Rate (a) (dscfm)=	8,153	8,235	8,398	--
Standard Temperature (deg F)=	60.0	60.0	60.0	--
Standard Pressure (" Hg)=	29.92	29.92	29.92	--
Heat Input (MMBTU/h)=	49.5	49.9	49.9	--
H2S Quantity Collected (mg)=	0.0459	0.0629	0.0204	--
Volume of Gas Sampled (dscm)=	0.1758	0.1636	0.1611	--
Concentration (mg/dscm)=	0.261	0.385	0.127	0.257
Concentration (ppmv)=	0.182	0.268	0.088	0.179
Emission Rate (lb/hr x 10-3)=	7.98	11.86	3.98	7.94
Emission Ratio (lb/MMBTU x 10-3)=	0.161	0.238	0.080	0.160

(a) Based on flow rate data collected during the PAH testing (Tests 2 and 3); the Test 4 flow rate is based on the velocity traverse conducted during Test 4.

RADIAN CORPORATION

H_2S ~~Formaldehyde~~ Field Data Sheet

Plant: Mobil

Date: 6/3/92

Location: Stn. Generator-401A

Console #: SAC-V01

DGMCF: 1.01

Test ID: Run #2

Leak Rate (L/min): 0.000 lpm @ 5" Hg (Pre-Test)

Barometric Pressure (in Hg): 29.49

Sampling Duration (min): 160

Operator: SF/RH

Time	DGM Reading (L)	Rotameter (L/min)	Meter Temp. (°C) Inlet	Outlet	Meter Pressure (in H2O)	Pump Vacuum (in Hg)
Start @ 0846	461.5					
0856	474.1	1.1	40	—	1.2	1
0906	486.3	1.1	41	—	1.2	1
0916	509.6	1.1	41		1.2	1
0930	514.3	1.1	42		1.2	1
0941	528.4	1.1	42		1.2	1
0952	541.5	1.1	42		1.2	1
1002	553.9	1.1	43		1.2	1
1013	565.1	1.1	43		1.2	1
1026	582.4	1.1	44		1.2	1
Stop - 1034	590.44	1.1	44		1.2	1
Start ~~1113~~	590.44					
1113	590.60					
1123	602.60	1.1	42		1.2	1
1135	617.65	1.1	43		1.2	1
Avg.						

108

HYDROGEN SULFIDE EMISSION DATA

RADIAN
CORPORATION

Velocity Traverse Data Sheet

PLANT Mobil-Stm. Generator
DATE 6/4/92
LOCATION 401A Exhaust
STACK I.D. 35"
BAROMETRIC PRESSURE in. Hg 29.53
STACK GAUGE PRESSURE in. H_2O -0.23
OPERATORS MJ/SF

Test 4 (H_2S, BTEX)

SCHEMATIC OF TRAVERSE POINT LAYOUT

Start 10:05

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
A1	0.23	285
2	0.26	285
3	0.28	285
4	0.30	285
5	0.30	285
6	0.29	285
7	0.29	285
8	0.29	285
9	0.28	285
10	0.28	285
AVERAGE		

Stop @ 1018

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
B1	0.25	~~284~~ 285
2	0.28	285
3	0.30	285
4	0.31	285
5	0.30	285
6	0.30	285
7	0.30	285
8	0.30	285
9	0.30	285
10	0.29	285
AVERAGE	$\sqrt{\Delta P}$ 0.5349	285.0

RADIAN CORPORATION

H_2S ~~Formaldehyde~~ Field Data Sheet

Plant: Mobil

Date: 6/3/92

Location: Stn. Generator-401A

Console #: SAC-V01

DGMCF: 1.01

Test ID: Run #2

Leak Rate (L/min): 0.000 lpm @ 5" Hg (Pre-Test)

Barometric Pressure (in Hg): 29.49

Sampling Duration (min): 160

Operator: SF/RH

Time	DGM Reading (L)	Rotometer (L/min)	Meter Temp. (°C) Inlet	Outlet	Meter Pressure (in H2O)	Pump Vacuum (in Hg)
Start @ 0846	461.5					
0856	474.1	1.1	40	—	1.2	1
0906	486.3	1.1	41	—	1.2	1
0916	509.6	1.1	41		1.2	1
0930	514.3	1.1	42		1.2	1
0941	528.4	1.1	42		1.2	1
0952	541.5	1.1	42		1.2	1
1002	553.9	1.1	43		1.2	1
1013	565.1	1.1	43		1.2	1
1026	582.4	1.1	44		1.2	1
Stop - 1034	590.44	1.1	44		1.2	1
Start [illegible]	590.44					
2 → 1113	590.60					
1123	602.60	1.1	42		1.2	1
1135	617.65	1.1	43		1.2	1
Avg.						

108

RADIAN CORPORATION

ɔle B-9 : H2S Emission Data - Mobil (Lost Hills, CA)
Steam Generator #401A Exhaust

Run Number / Date / Time	# 2 06/03/92 0846-1205	#3 06/03/92 1419-1815	#4 06/04/92 0800-1040	Average
DGMCF (---)=	1.010	1.010	1.010	--
Dry Gas Meter Volume (liters)=	192.50	183.45	176.49	--
Barometric Pressure (" Hg)=	29.49	29.28	29.53	--
Meter Back-Pressure (" H2O)=	1.20	1.20	1.50	--
Meter Pressure, Absolute(" Hg)=	29.58	29.37	29.64	--
Meter Temperature (deg F)=	109	118	110	--
Stack Gas Flow Rate (a) (dscfm)=	8,153	8,235	8,398	--
Standard Temperature (deg F)=	60.0	60.0	60.0	--
Standard Pressure (" Hg)=	29.92	29.92	29.92	--
Heat Input (MMBTU/h)=	49.5	49.9	49.9	--
H2S Quantity Collected (mg)=	0.0459	0.0629	0.0204	--
Volume of Gas Sampled (dscm)=	0.1758	0.1636	0.1611	--
Concentration (mg/dscm)=	0.261	0.385	0.127	0.257
Concentration (ppmv)=	0.182	0.268	0.088	0.179
Emission Rate (lb/hr x 10-3)=	7.98	11.86	3.98	7.94
Emission Ratio (lb/MMBTU x 10-3)=	0.161	0.238	0.080	0.160

(a) Based on flow rate data collected during the PAH testing (Tests 2 and 3); the Test 4 flow rate is based on the velocity traverse conducted during Test 4.

RADIAN
CORPORATION

~~Formaldehyde~~ H_2S Field Data Sheet
Cont.

Plant Mobil

Date 6-3-92

Location Stm Gen 401A

Console # SAC-V01

DGMCF 1.01

Test ID #2 (cont)

Leak Rate (L/min) 0.000 lpm @ 5" Hg (Post-Test)

Barometric Pressure (in Hg) 29.49

Sampling Duration (min)

Operator SR/BH

Time	DGM Reading (L)	Rotometer (L/min)	Meter Temp. (°C) Inlet	Meter Temp. (°C) Outlet	Meter Pressure (in H_2O)	Pump Vacuum (in Hg)
1145	629.5	1.1	44		1.2	1
1155	641.0	1.1	44		1.2	1
stop 1205	654.000	1.1	45		1.2	1
	Start Purge @ 1220 @ 1 lpm					
Avg.	192.500	1.1	42.6		1.2	1

(108.6 °F)

RADIAN
CORPORATION

H_2S ~~Formalde~~hyde Field Data Sheet

Plant: Mobil - Lost Hills
Test ID: 3
Date: 6/3/92
Leak Rate (L/min): 0.000 lpm @ 5"Hg
Location: Stm. Gen. (401A)
Barometric Pressure (in Hg): 29.28
Console #: SAC-V01
Sampling Duration (min): 160
DGMCF: 1.01
Operator: PMK

	Time	DGM Reading (L)	Rotometer (L/min)	Meter Temp. (°C) Inlet	Outlet	Meter Pressure (in H_2O)	Pump Vacuum (in Hg)
Start	1419/0	673.800					
	9	683.0	1.1	43	—	1.2	2
	21	698.0	1.1	45	—	1.2	2
	33	711.5	1.1	46	—	1.2	2
	47	728.0	1.1	47	—	1.2	2
	63	746.0	1.1	48	—	1.2	2
	75	760.0	1.1	48	—	1.2	2
	86	772.5	1.1	49	—	1.2	2
	98	786.5	1.1	50	—	1.2	2
	110	799.94	1.1	50		1.2	2
		Leak check 0.000 lpm @ 4"Hg					
Start 1807	110	800.29					
	124	817.35	1.1	48	—	1.2	2
	134	828.25	1.1	49	—	1.2	2
	145	840.75	1.1	50	—	1.2	2
Stop @ 1757	~~Ave~~ 160	857.60	1.1	50	—	1.2	2
	Ave	183.45	1.1	47.9		1.2	2

(118.2%)

1800 15 min ambient air purge @ 1.1 lpm

1815 Purge complete

RADIAN
CORPORATION

H_2S ~~Formaldehyde~~ Field Data Sheet

Plant: Mobil

Date: 6/4/92

Location: Stm Generator - 406A

Console #: SAC-102

DGMCF: 1.01

Test ID: # 4

Leak Rate (L/min): 0.000 lpm @ 5" Hg (Pre-Test) / 0.000 lpm @ 5" Hg (Post-Test)

Barometric Pressure (in Hg): 29.53

Sampling Duration (min): 160

Operator: [illegible]/SF

Time	DGM Reading (L)	Rotometer (L/min)	Meter Temp. (°C) Inlet	~~Outlet~~	Meter Pressure (in H2O)	Pump Vacuum (in Hg)
Start 0800/0	999.00					
~~0805~~ 10	1009.00	1.1	34	–	1.5	<2
21	1022.00	1.1	37	–	1.5	<2
33	1035.00	1.1	40	–	1.5	<2
45	1048.00	1.1	42	–	1.5	<2
55	1059.5	1.1	43	–	1.5	<2
67	1072.0	1.1	44	–	1.5	<2
78	1084.5	1.1	45	–	1.5	<2
94	1102.0	1.1	45	–	1.5	<2
107	1116.5	1.1	46	–	1.5	<2
119	1130.0	1.1	46	–	1.5	<2
132	1144.5	1.1	47	–	1.5	<2
143	–	1.1	47	–	1.5	<2
155	1170.0	1.1	48	–	1.5	<2
Stop @ 1040 160	1175.49					
Avg.	176.49	1.1	43.3 (109.9 °F)		1.5	<2

H2S CALCULATIONS - Casing Gas

COMPANY NAME : MOBIL OIL
SOURCE : STEAM GENERATOR 401A
DATE : JUNE 3,1992

TEMP.STD. : 60 dF

	Run 1
Tm, dF	110.50
Y, meter fac..	0.9980
Vm, cu.ft.....	0.446
Pb, in.Hg.....	29.62
dH, in.H2O....	0.01

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

	Run 1	
Vm(std)	0.4016	dscf

LABORATORY ANALYSIS :

	Run 1
Normality of Na2S2O3	0.01
Normality of Iodine	0.00982
ml of Iodine Added Sample	120.00
ml of Iodine Added Blank	10.00
ml of Na2S2O3 for Sample	20.10
ml of Na2S2O3 for Blank	9.45

EMISSION CALCULATIONS :

Blank CdSO4 = [NI2 x (mls I2) - NNa2S2O3 x (mls Na2S2O3)]

ppm H2S = (0.8039 x (St + 460) x ([NI2 x (mls I2) - (NNa2S2O3) x (mls Na2S2O3)] - Blank)) / Vm,std

	Run 1
ppm H2S	1013

H2S CALCULATIONS - Casing Gas

COMPANY NAME : MOBIL OIL LOST HILLS
SOURCE : STEAM GENERATOR 401A
DATE : JUNE 3,4,1992

TEMP.STD. : 60 dF

	Run 2	Run 3
Tm, dF	134.25	103.00
Y, meter fac..	0.9980	0.9980
Vm, cu.ft.....	0.462	0.446
Pb, in.Hg.....	29.45	29.60
dH, in.H2O....	0.01	0.01

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

	Run 2	Run 3	
Vm(std)	0.3971	0.4067	dscf

LABORATORY ANALYSIS :

	Run 2	Run 3
Normality of Na2S2O3	0.01	0.01
Normality of Iodine	0.09200	0.09200
ml of Iodine Added Sample	20.00	20.00
ml of Iodine Added Blank	10.00	10.00
ml of Na2S2O3 for Sample	9.00	7.00
ml of Na2S2O3 for Blank	8.80	8.80

EMISSION CALCULATIONS :

Blank CdSO4 = [NI2 x (mls I2) - NNa2S2O3 x (mls Na2S2O3)]

ppm H2S = (0.8039 x (St + 460) x ([NI2 x (mls I2) - (NNa2S2O3)
x (mls Na2S2O3)] - Blank)) / Vm,std

	Run 2	Run 3
ppm H2S	966.29	964.07

Steiner Environmental, Inc.

PLANT Mobil - Lost Hills (WSPA) TEST TYPE H_2S (M-11) FIELD TEST DATA SHEET (Page 1 of 1)

Date 6/3/92
Test Location SG 401 A Fuel Line
Run Number 2
Stack Diameter 2"
Operator VVM
Filter No. NA

Barometric Pressure 29.62
Static in.wg. NA
Probe Type/Length 6' / TFE
Pitot Coefficient NA
Meter Box No./Y 16289 / 0.9980
Nozzle No./Size NA

IMPINGER VOLUMES/WEIGHTS			
Contents	Final	Initial	Net
3% H_2O_2	110.6	109.2	1.4
Dry	85.2	85.0	0.2
$CdSO_4$	105.1	103.0	2.1
$CdSO_4$	110.6	109.3	1.2
$CdSO_4$	102.0	101.5	0.5
S.G.	91.0	89.2	1.8
		Total	7.2

GAS COMPOSITION			
Time	CO_2	O_2	CO

Leakrate	cfm	"Hg
Initial	0.000	5
Final	0.002	5

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F: Stack	Probe	Oven	Imp.	Gas Meter In	Gas Meter Out	Pump Vacuum in.Hg	$\sqrt{\Delta P}$	Comments
	1012												
	17			567.682				64	110	110	<2		Bright yellow
	22			567.900				62	112	110	<2		Color change
	1027			568.128									@ 12-13 min
	TA			0.446				63	110.	50	<2		32767

Steiner Environmental, Inc.

PLANT Mobil - Lost Hills (WSPA) TEST TYPE H_2O (M-4) FIELD TEST DATA SHEET (Page 1 of 1)

Date 6/17/92
Test Location SG 401A Fuel Line
Run Number 3 ~~2 mg~~
Stack Diameter 2"
Operator VVIT
Filter No. NA

Barometric Pressure 29.45
Static in.wg. NA
Probe Type/Length TFE / 6'
Pitot Coefficient NA
Meter Box No./γ 16289 / 0.9980
Nozzle No./Size NA

IMPINGER Contents	VOLUMES/WEIGHTS Final	Initial	Net
3% H_2O_2	110.6	109.0	1.6
Dry	85.4	84.9	0.5
$CdSO_4$	104.0	102.8	1.2
$CdSO_4$	111.0	109.7	1.3
$CdSO_4$ S.G.	102.0	101.5	0.5
S.G.	93.0	91.3	1.7
		Total	6.8

GAS COMPOSITION Time	CO_2	O_2	CO

Leakrate	cfm	"Hg
Initial	0.000	5
Final	0.001	5

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	TEMPERATURE °F Stack	Probe	Oven	Imp.	Gas Meter In	Gas Meter Out	Pump Vacuum in.Hg	√ΔP	Comments
	1530												
	35			563.238				67	134	131	<2		
	40			563.410				69	139	133	<2		32768
	1545			563.700									
				0.462				68	134,	25	<2		

Steiner Environmental, Inc.

PLANT Mobil - Lost Hills (WSPA) TEST TYPE H_2S (M-11) FIELD TEST DATA SHEET (Page 1 of 1)

Date 6/4/92
Test Location SG 4014 ~~Fuel Line~~
Run Number 4 ~~1~~
Stack Diameter 2"
Operator VVM
Filter No. NA

Barometric Pressure 29.60
Static in.wg. NA
Probe Type/Length TFE / 6'
Pitot Coefficient NA
Meter Box No./Y 16289 / 0.9980
Nozzle No./Size NA

IMPINGER Contents	VOLUMES/WEIGHTS Final	Initial	Net
3% H_2O_2	110.8	109.2	1.6
Dry	86.0	85.1	0.9
$CdSO_4$	104.0	103.1	0.9
$CdSO_4$	111.0	109.5	1.5
$CdSO_4$	102.6	101.6	1.0
S.G.	91.2	89.2	2.0
		Total	7.9

GAS COMPOSITION Time	CO_2	O_2	CO

Leakrate	cfm	"Hg
Initial	0.000	5
Final	0.000	5

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	TEMPERATURE °F Stack	Probe	Oven	Imp.	Gas Meter In	Gas Meter Out	Pump Vacuum in.Hg	$\sqrt{\Delta P}$	Comments
	0915												
	20			568.968				68	102	99	< 2		
	25			569.191				68	108	103	< 2		32769 H_2S 3
	0930			569.414									
													32770 H_2S blk
	TA			0.446				68	103.00				

NO_X, CO, O_2, AND CO_2 EMISSION DATA

B-10 NOx and CO Emission Data - Mobil Steam Generator #401 Exhaust

Run Number	# 1	# 2	# 3	# 4	Average
Date	6/2/92	6/3/92	6/3/92	6/4/92	
Time	1336-1830	0821-1303	1407-1904	0800-1004	
Barometric Pressure (" Hg)=	29.36	29.49	29.28	29.53	--
Oxygen Concentration (% O2)=	1.8	2.3	2.6	2.3	--
CO2 Concentration (% CO2)=	13.9	13.8	13.2	13.7	--
Stack Gas Flow Rate (dscfm)=	8,025	8,153	8,235	8,398	--
Standard Temperature (deg F)=	60.0	60.0	60.0	60.0	--
Standard Pressure (" Hg)=	29.92	29.92	29.92	29.92	--
Heat Input (MMBTU/h)=	49.5	49.6	50.0	49.9	
Concentration (ppmv)=					
NOx	30.0	34.5	34.8	34.0	33.3
CO	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Concentration (mg/dscm)=					
NOx	58.3	67.0	67.6	66.0	64.7
CO	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Emission Rate (lb/hr)=					
NOx	1.75	2.05	2.09	2.08	1.99
CO	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Emission Ratio (lb/MMBTU x 10-3)=					
NOx	35.4	41.3	41.7	41.6	40.0
CO	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4

SUMMARY OF TEST RESULTS

Date	Location	Test No.	Test Time	NO_x (ppm)	CO (ppm)	CO_2 (%)	O_2 (%)
6/2/92	Steam Generator 401A	1A	1:00 pm - 2:36 pm	31.59	0.00	14.04	1.81
		1B	3:00 pm - 4:00 pm	*	0.00	14.61	1.77
		1C	4:30 pm - 5:30 pm	29.67	0.00	13.30	1.79
		1D	5:40 pm - 6:40 pm	28.79	0.00	13.66	1.77
6/3/92	Steam Generator 401A	2A	8:22 am - 9:22 am	34.10	0.00	14.06	2.31
		2B	9:35 am - 10:35 am	34.35	0.00	14.14	2.28
		2C	11:03 am - 12:03 pm	35.15	0.00	13.46	2.31
		2D	12:10 pm - 1:10 pm	34.40	0.00	13.55	2.27
		3A	2:07 pm - 3:07 pm	34.31	0.00	13.43	2.30
		3B	3:18 pm - 4:18 pm	35.03	0.00	13.27	2.37
		3C	5:04 pm - 6:04 pm	35.57	0.00	13.11	2.36
		3D	6:15 pm - 7:15 pm	34.10	0.00	12.96	2.32
6/4/92	Steam Generator 401A	4A	8:00 am - 9:00 am	34.13	0.00	12.90	2.29
		4B	9:10 am - 10:40 am	33.92	0.00	13.49	2.26

* No NO_x data due to excessive heat in trailer

Steiner Environmental, Inc.

CONTINUOUS MONITOR DATA SHEET

Plant Mobil, Lost Hills (WSPA)
Date 6/2/92 Run No. 1A
Test Location Steam Generator 401 A
Operator VVM
Fuel Type Nat./Casing Gas Trailer No. 3

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

Time	Sample Point	O_2 % (Dry Uncorrected)	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
		7.82	16.13	16.01			82.9	Span Gases
								Calibration
		0	0	0			0	Zero
		7.82	16.13	16.01			82.9	Span
		7.85	16.0	16.0			82.8	Bias ✓ Span
		0.04	0.0	0.0			0.0	Zero
		0.04						QA/Leak ✓ ok
1300		7.82	16.13	16.01			82.9	Reset
1336		1.80	14.00	-0.40			33.0	Run 1A
46		1.90	13.95	-0.40			34.6	AC power on/off
56		1.76	14.00	-0.40			35.0	throughout Run 1A
1406		1.90	13.95	-0.40			36.6	
16		1.75	13.90	-0.40			37.0	AC not working,
26		1.80	14.10	-0.40			38.2	loss power
1436		0.02	0.05	-0.12			7.2	Zero ✓
		7.82	16.0	15.75			93.0	Span ✓
								Reset

Miscellaneous Information

CALIBRATION GASES

NO_x CC 98103
SO_2
CO
$CO/CO_2/O_2$ CC 73017; CC 12974

Wet Bulb: ______ Dry Bulb: ______
Barometric Press: ______

RESPONSE TIME

Upscale: ______ Downscale: ______
Upscale: ______ Downscale: ______
Upscale: ______ Downscale: ______

PROCESS DATA

Fuel Flow:
Steam Flow:
Rating:

CONVERTER GAS

	Cal Gas Values	Actual Values
NO		
NO_2		

Conv. Efficiency:

2/10

Steiner Environmental, Inc.

CONTINUOUS MONITOR DATA SHEET

Plant Mobil - Lost Hills (WSPA)
Date 6/2/92 Run No. 1B & 1C
Test Location Steam Generator 401A
Operator VVT
Fuel Type Nat/Casing Gas Trailer No. 3

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

Time	Sample Point	O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
				Dry Uncorrected				
		7.82	16.13	16.01			82.9	Span Gases
1500		1.70	14.60	-0.40				Run 1B
10		1.80	14.75	-0.40				AC loss power
20		1.80	15.00	-0.40				NOx unstable,
30		1.85	15.10	-0.40				* Did not run NOx
40		1.80	14.60	-0.40				Ambient temp 110°F
50		1.75	14.20	-0.40				Inside T-3 99°F
1600		0.02	0.0	0.0				Zero ✓
		7.90	16.50	16.02				Span ✓
								Reset : AC power on
1630		1.80	13.35	-0.50			29.0	Run 1C
40		1.80	13.40	-0.50			28.2	
50		1.80	13.40	-0.50			28.8	
1700		1.80	13.40	-0.50			28.0	
10		1.80	13.40	-0.50			29.0	
20		1.80	13.40	-0.50			29.0	
1730		0.0	0.0	0.0			-2.4	Zero ✓
		7.90	16.35	16.35	✓ok		81.6	Span ✓
								Reset

Miscellaneous Information

CALIBRATION GASES

NO_x
SO_2
CO
$CO/CO_2/O_2$

Wet Bulb: Dry Bulb:
Barometric Press:

RESPONSE TIME

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

PROCESS DATA

Fuel Flow:
Steam Flow:
Rating:

CONVERTER GAS

Cal Gas Values		Actual Values
NO		
NO_2		

Conv. Efficiency:

Steiner Environmental, Inc.

3/10

CONTINUOUS MONITOR DATA SHEET

Plant Mobil, Lost Hills (WSPA)
Date 6/2/92 Run No. 1D
Test Location Steam Generator 401A
Operator WM
Fuel Type Natural/Casing Gas Trailer No. 3

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

Time	Sample Point	O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
				Dry Uncorrected				
		7.82	16.13	16.01			82.9	Span Gases
1740		1.78	13.70	-0.50			29.0	Run 1D
50		1.80	13.75	-0.50			30.0	Inside T's 900F
1800		1.78	13.80	-0.50			29.0	
10		1.80	13.80	-0.50			29.6	
20		1.79	13.80	-0.50			29.0	
30		1.75	13.80	-0.50			28.6	
1840		0.0	0.0	-0.05			0.2	Zero ✓
		7.88	16.4	16.2			84.9	Span ✓
		0.08	0.0	0.0			0.0	Bias ✓ Zero
		7.90	16.18	16.2			85.0	Span
		0.08						QA/Leak ✓ OK

Miscellaneous Information

CALIBRATION GASES

NO_x
SO_2
CO
$CO/CO_2/O_2$

Wet Bulb: Dry Bulb:
Barometric Press:

RESPONSE TIME

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

PROCESS DATA

Fuel Flow:
Steam Flow:
Rating:

CONVERTER GAS

Cal Gas Values		Actual Values
NO		
NO_2		

Conv. Efficiency:

Steiner Environmental, Inc.

CONTINUOUS MONITOR DATA SHEET

Plant: Mobil - Lost Hills (WSPA)
Date: 6/3/92 Run No. 2A
Test Location: Steam Generator 401A
Operator: VVM
Fuel Type: Nat Casing Gas Trailer No. 3

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

Time	Sample Point	O_2 % (Dry Uncorrected)	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
		7.82	16.13	16.01			82.9	Span Gases
								Calibration
		0	0	0			0	Zero
		7.82	16.13	16.01			82.9	Span
		0.08	0.0	0.0			0.0	Bias ✓ Zero
		7.86	16.10	16.05			82.6	Span ✓
		0.08						QA / Leak
		7.82	16.13	16.01			82.9	Reset
0822		2.35	14.10	-0.50			34.0	Run 2A
32		2.30	14.05	-0.50			34.0	T3 71°F
42		2.30	14.00	-0.50			34.5	
52		2.30	13.90	-0.50			35.0	
0902		2.30	13.80	-0.50			35.0	
12		2.30	13.60	-0.50			35.0	
0922		0.0	0.0	0.0			0.60	Zero ✓
		7.80	15.78	16.00			84.4	Span ✓
								Reset

Miscellaneous Information

CALIBRATION GASES

NO_x: CC98703
SO_2:
CO:
$CO/CO_2/O_2$: CC13017; CC12914

Wet Bulb: ______ Dry Bulb: ______
Barometric Press: ______

RESPONSE TIME

Upscale: ______ Downscale: ______
Upscale: ______ Downscale: ______
Upscale: ______ Downscale: ______

PROCESS DATA

Fuel Flow:
Steam Flow:
Rating:

CONVERTER GAS

	Cal Gas Values	Actual Values
NO		
NO_2		

Conv. Efficiency:

Steiner Environmental, Inc.

5|10

CONTINUOUS MONITOR DATA SHEET

Plant Mobil - Lost Hills (WSDA)
Date 6|2|92 Run No. 2B & 2C
Test Location Steam Generator 401A
Operator VVM
Fuel Type Nat/Casing Gas Trailer No. 3

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

Time	Sample Point	O_2 % (Dry Uncorrected)	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
		7.82	16.13	16.01			82.9	Span Gases
0935		2.20	14.10	-0.50			34.5	Run 2B
45		2.25	14.15	-0.50			35.0	
55		2.30	14.20	-0.50			35.0	
1005		2.30	14.20	-0.50			36.0	
15		2.30	14.20	-0.50			35.0	
25		2.30	14.20	-0.50			36.9	
1035		0.02	0.0	-0.05			1.6	Zero ✓
		7.80	16.20	15.95			84.6	Span ✓
								Reset
1103		2.30	13.60	-0.50			35.0	Run 2C
13		2.30	13.50	-0.50			35.0	
23		2.30	13.40	-0.50			36.0	
33		2.35	13.30	-0.50			36.0	32771 FS CO
43		2.35	13.20	-0.50			36.0	
53		2.35	13.20	-0.50			36.0	32772 FS NG
1203		0.05	0.0	0.05			-0.2	Zero ✓
		7.50	15.90	15.95			55.6	Span ✓
								Reset

Miscellaneous Information

CALIBRATION GASES

NO_x
SO_2
CO
$CO/CO_2/O_2$

Wet Bulb: Dry Bulb:
Barometric Press:

RESPONSE TIME

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

PROCESS DATA

Fuel Flow:
Steam Flow:
Rating:

CONVERTER GAS

	Cal Gas Values	Actual Values
NO		
NO_2		

6/10

Steiner Environmental, Inc.

CONTINUOUS MONITOR DATA SHEET

Plant: Mobil, Lost Hills (WSPA)
Date: 6/3/92 Run No. 2D & 3A
Test Location: Steam Generator 401A
Operator: VVM
Fuel Type: Nat Casing Gas Trailer No. 3

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

Time	Sample Point	O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
		Dry Uncorrected						
		7.82	16.13	16.01			82.9	Span Gases
1210		2.30	13.60	-0.50			34.0	Run 2D
20		2.30	13.60	-0.50			34.5	
30		2.25	13.60	-0.50			35.0	
40		2.30	13.50	-0.50			35.0	
50		2.30	13.40	-0.30			35.5	
1300		2.25	13.38	-0.50			35.5	
1310		0.04	0.0	0.02			-1.0	Zero ✓
		7.84	16.05	16.0			83.6	Span ✓
								Reset
1407		2.30	13.40	-0.50			35.0	Run 3A
17		2.30	13.40	-0.50			34.0	
27		2.30	13.40	-0.50			35.0	
37		2.30	13.40	-0.50			35.0	
47		2.30	13.40	-0.60			35.0	
57		2.30	13.40	-0.50			35.0	
1507		0.02	0.0	0.0			1.0	Zero ✓
		7.84	16.05	16.00			84.0	Span ✓
								Reset

Miscellaneous Information

CALIBRATION GASES

NO_x ______
SO_2 ______
CO ______
$CO/CO_2/O_2$ ______

Wet Bulb: ______ Dry Bulb: ______
Barometric Press: ______

RESPONSE TIME

Upscale: ______ Downscale: ______
Upscale: ______ Downscale: ______
Upscale: ______ Downscale: ______

PROCESS DATA

Fuel Flow: ______
Steam Flow: ______
Rating: ______

CONVERTER GAS

	Cal Gas Values	Actual Values
NO		
NO_2		

Conv. Efficiency: ______

Steiner Environmental, Inc.

7/10

CONTINUOUS MONITOR DATA SHEET

Plant Mobil - Lost Hills (WSPA)
Date 6/10/92 Run No. 3B
Test Location Steam Generator 401A
Operator VVTT
Fuel Type Nat/Casing Gas Trailer No. 3

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

Time	Sample Point	O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
		Dry Uncorrected						
		7.82	16.13	16.01			82.4	Span Gases
1518		2.40	13.35	-0.50			34.5	Run 3B
28		2.40	13.35	-0.50			35.0	
38		2.40	13.35	-0.50			35.5	
48		2.40	13.35	-0.50			35.8	
58		2.40	13.40	-0.50			36.5	
1608		2.35	12.65	-0.50			35.5	
1618		0.05	0.0	0.0			0.8	Zero ✓
		7.88	16.15	16.15			85.8	Span ✓
								Reset
1704		2.42	13.00	-0.50			36.5	Run 3C
14		2.40	13.00	-0.50			36.9	T/S 91°F
24		2.40	13.10	-0.50			36.0	
34		2.38	13.20	-0.50			36.0	
44		2.38	13.20	-0.50			36.0	
54		2.30	13.20	-0.50			35.0	
1804		0.05	0.0	0.0			0.7	Zero ✓
		7.84	16.15	16.10			84.0	Span ✓
								Reset

Miscellaneous Information

CALIBRATION GASES

NO_x
SO_2
CO
$CO/CO_2/O_2$

Wet Bulb: Dry Bulb:
Barometric Press:

RESPONSE TIME

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

PROCESS DATA

Fuel Flow:
Steam Flow:
Rating:

CONVERTER GAS

	Cal Gas Values	Actual Values
NO		
NO_2		

Conv. Effi.:

Steiner Environmental, Inc.

8|10

CONTINUOUS MONITOR DATA SHEET

Plant Mobil - Lost Hills (WSPA)
Date 6/8/92 Run No. 3D
Test Location Steam Generator 40A
Operator VTT
Fuel Type Nat Gas | Casing Trailer No. 3

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

0.04

Time	Sample Point	O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
		Dry Uncorrected						
		7.82	16.13	16.01			82.9	Span Gases
1815		2.35	13.00	-0.50			34.0	Run 3D
25		2.35	13.00				33.0	
35		2.35	12.90				32.5	
45		2.35	12.90				32.5	
55		2.35	13.00				32.0	
1905		2.35	13.00				31.0	
1915		0.04	0.0	0.0			-3.40	zero ✓
		7.92	16.15	16.05			80.0	span ✓
		0.08	0.0	0.0			-4.00	Bias ✓ zero
		7.92	15.90	16.10		*84.9	79.2	span
		0.08						QA/Leak ✓ OK
								* ✓ Bias Span after zero adj

Miscellaneous Information

CALIBRATION GASES

NO_x ______
SO_2 ______
CO ______
$CO/CO_2/O_2$ ______

Wet Bulb: ______ Dry Bulb: ______
Barometric Press: ______

RESPONSE TIME

Upscale: ______ Downscale: ______
Upscale: ______ Downscale: ______
Upscale: ______ Downscale: ______

PROCESS DATA

Fuel Flow: ______
Steam Flow: ______
Rating: ______

CONVERTER GAS

	Cal Gas Values	Actual Values
NO		
NO_2		

Conv. Efficiency: ______

9|10

Steiner Environmental, Inc.

CONTINUOUS MONITOR DATA SHEET

Plant Mobil - Lost Hills (WSPA)
Date 6/4/92 Run No. 4A
Test Location Steam Generator 401A
Operator VVM
Fuel Type Nat/Casing Gas Trailer No. 3

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

Time	Sample Point	O_2 % (Dry Uncorrected)	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
		7.82	16.13	16.01			82.9	Cal Gases
								Calibration
		0	0	0			0	Zero
		7.82	16.13	16.01			82.9	Span
		0.06	0.0	0.0			0.0	Bias ✓ Zero
		7.90	15.9	16.0			82.8	Span
		0.06						QA/Leak ✓ OK
0800		2.30	13.00	-0.50			34.0	Run 4A, 2½ hrs
10		2.30	12.90	-0.50			34.5	test for H_2S @
20		2.30	12.80	-0.50			34.0	stack ✓
30		2.30	12.80	-0.50			34.5	
40		2.30	12.80	-0.50			34.5	
50		2.30	12.80	-0.50			34.5	
0900		0.04	0.0	0.0			0.2	Zero ✓
		7.80	16.0	16.0			83.6	Span ✓
								Reset

Miscellaneous Information

CALIBRATION GASES

NO_x CC98105
SO_2
CO
$CO/CO_2/O_2$ CC73017; CC12974

Wet Bulb: Dry Bulb:
Barometric Press:

RESPONSE TIME

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

PROCESS DATA

Fuel Flow:
Steam Flow:
Rating:

CONVERTER GAS

	Cal Gas Values	Actual Values
NO		
NO_2		

Conv. Efficiency:

Steiner Environmental, Inc.

10|10

CONTINUOUS MONITOR DATA SHEET

Plant: Mobil, Lost Hills (WSPA)
Date: 6/4/92 Run No. Run 4B
Test Location: Steam Generator 401 A
Operator: VVT
Fuel Type: Nat/Casing Gas Trailer No. 3

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

Time	Sample Point	O_2 % (Dry Uncorrected)	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
		7.82	16.13	16.01			82.9	Span Gases
0910		2.25	13.45	-0.50			34.9	Run 4B
20		2.30	13.45	-0.50			34.8	
30		2.30	13.45	-0.50			35.0	
40		2.25	13.45	-0.50			34.8	
50		2.25	13.45	-0.50			34.0	
1000		2.30	13.45	-0.50			34.5	
10		2.30	13.40	-0.60			34.8	
20		2.30	13.40	-0.50			34.5	
30		2.30	13.40	-0.50			34.5	
1040		0.05	0.0	-0.02			1.2	Zero ✓
		7.86	16.0	16.0			84.5	Span ✓
		0.05	0.0	-0.05			1.2	Bias ✓ Zero
		7.84	15.95	16.0			84.0	Span
		0.05						QA/Leak ✓ OK

Miscellaneous Information

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

Wet Bulb: ______ Dry Bulb: ______
Barometric Press: ______

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

PROCESS DATA
Fuel Flow: ______
Steam Flow: ______
Rating: ______

CONVERTER GAS

	Cal Gas Values	Actual Values
NO		
NO_2		

Conv. Efficiency: ______

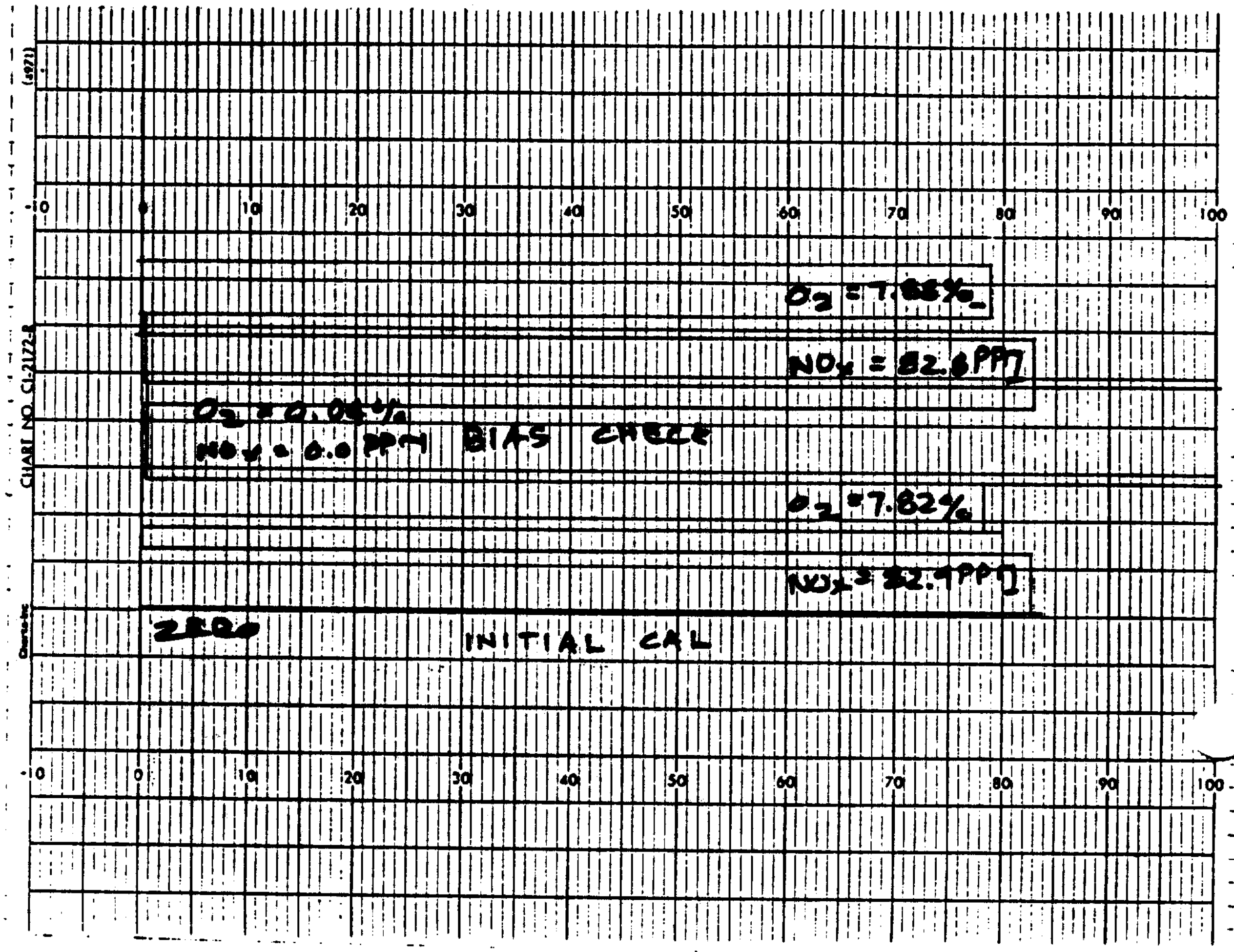
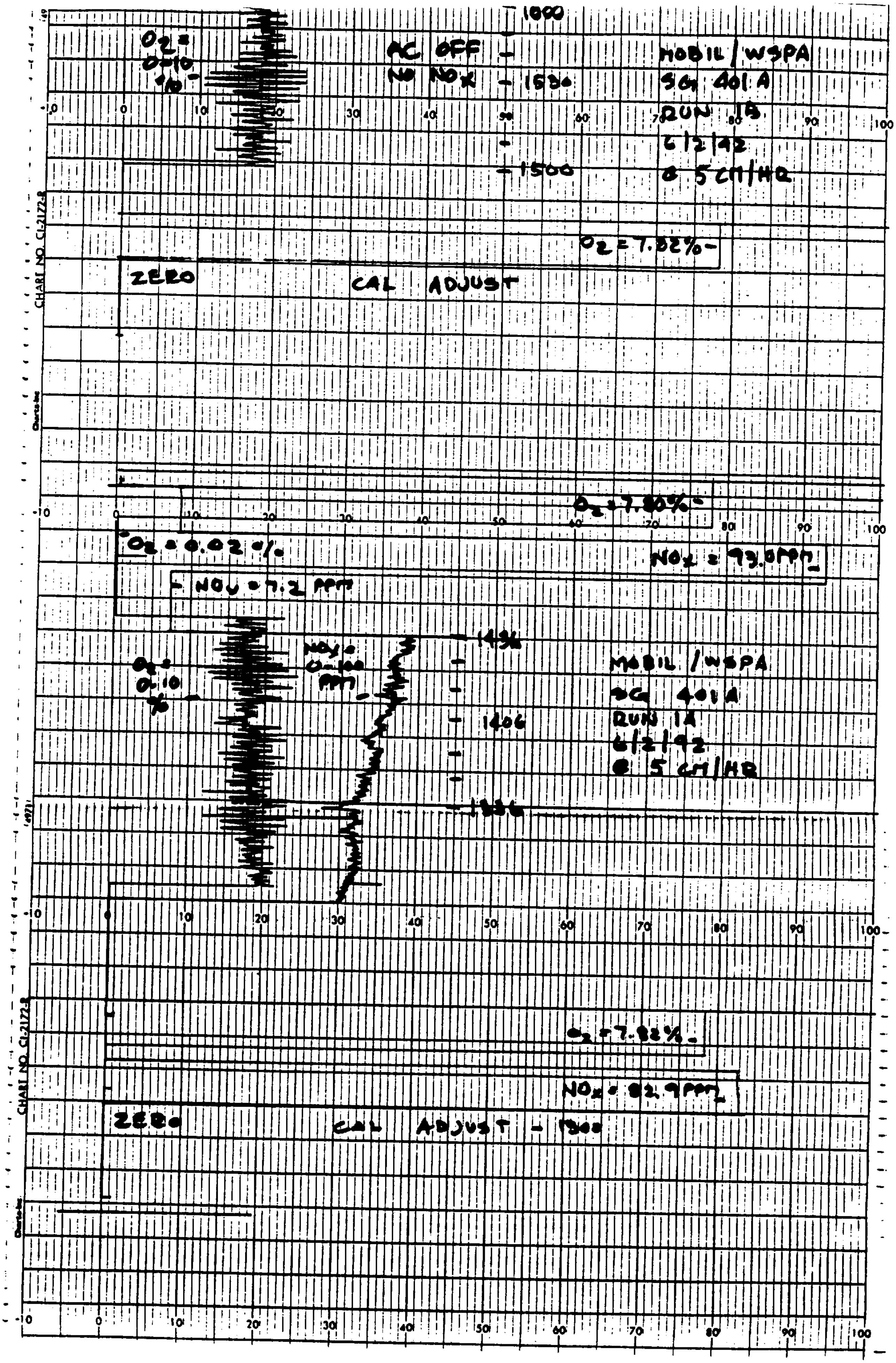


CHART NO. CL-2172-B
BIAS CHECK
O2 = 7.82%
INITIAL CAL



O2 = 0-10 %
AC OFF
NO NOx
1530
1500
MOBIL / WSPA
SG 401 A
RUN 1B
6/2/92
@ 5 CM/HR
O2 = 7.82%
ZERO
CAL ADJUST
O2 = 7.80%
O2 = 0.02 %
NOx = 93.0 PPM
NOx = 7.2 PPM
NOx 0-100 PPM
1406
MOBIL / WSPA
SG 401 A
RUN 1A
6/2/92
@ 5 CM/HR
O2 = 7.82%
NOx = 92.9 PPM
ZERO
CAL ADJUST - 1300
CHART NO. CL-2172-8

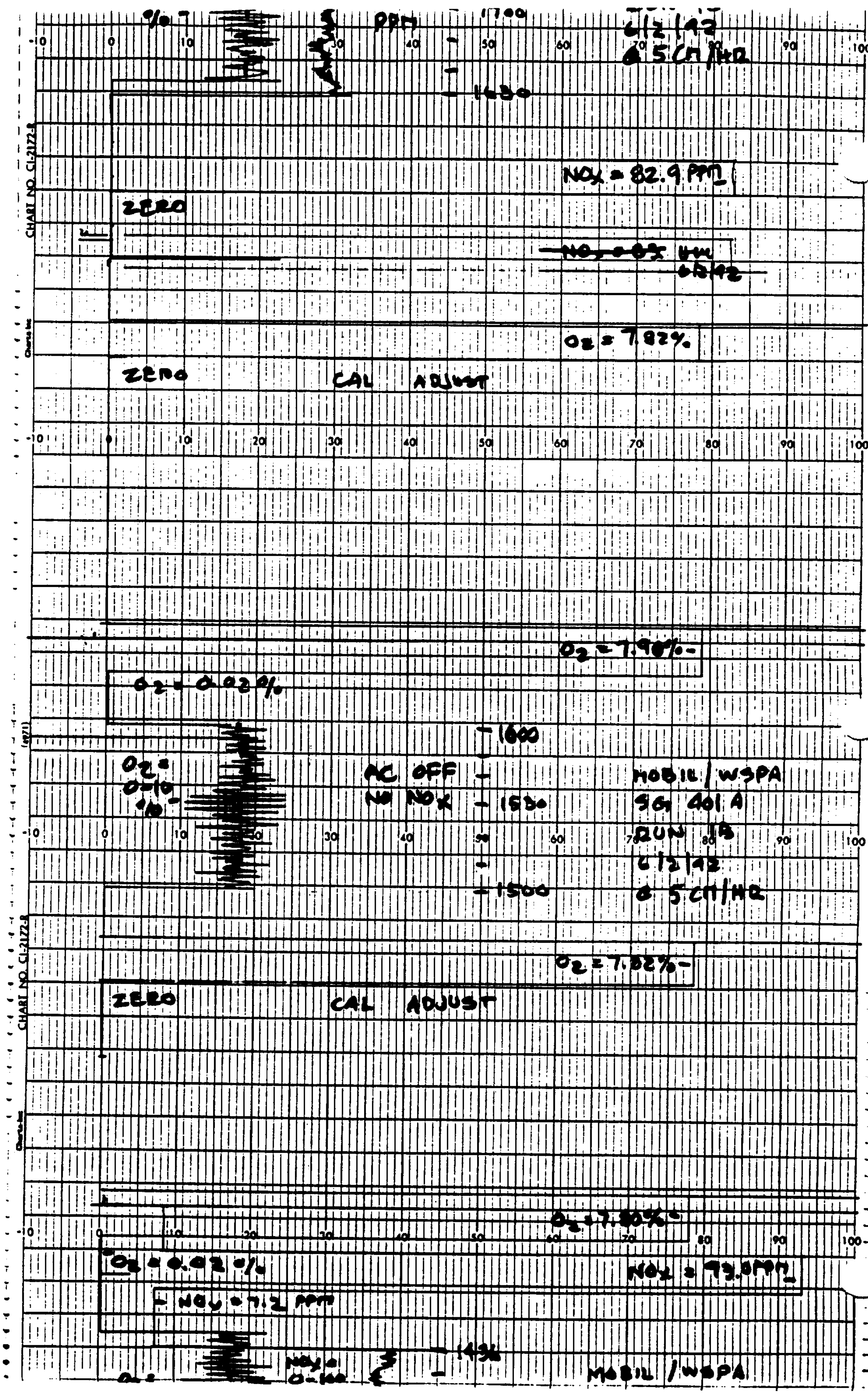


CHART NO. CL-2172-B
% PPM 1700
6/2/92
@ 5 CM/HR
1630
NOx = 82.9 PPM
ZERO
O2 = 7.82%
ZERO
CAL ADJUST
O2 = 7.90%
O2 = 0.02%
1600
O2 = 0-10 %
AC OFF
NO NOx
1530
MOBIL / WSPA
SG 401 A
RUN 1B
6/2/92
@ 5 CM/HR
1500
O2 = 7.82%
ZERO
CAL ADJUST
O2 = 7.80%
O2 = 0.02%
NOx = 93.8 PPM
NOx = 7.2 PPM
NOx = 0-100
1430
MOBIL / WSPA

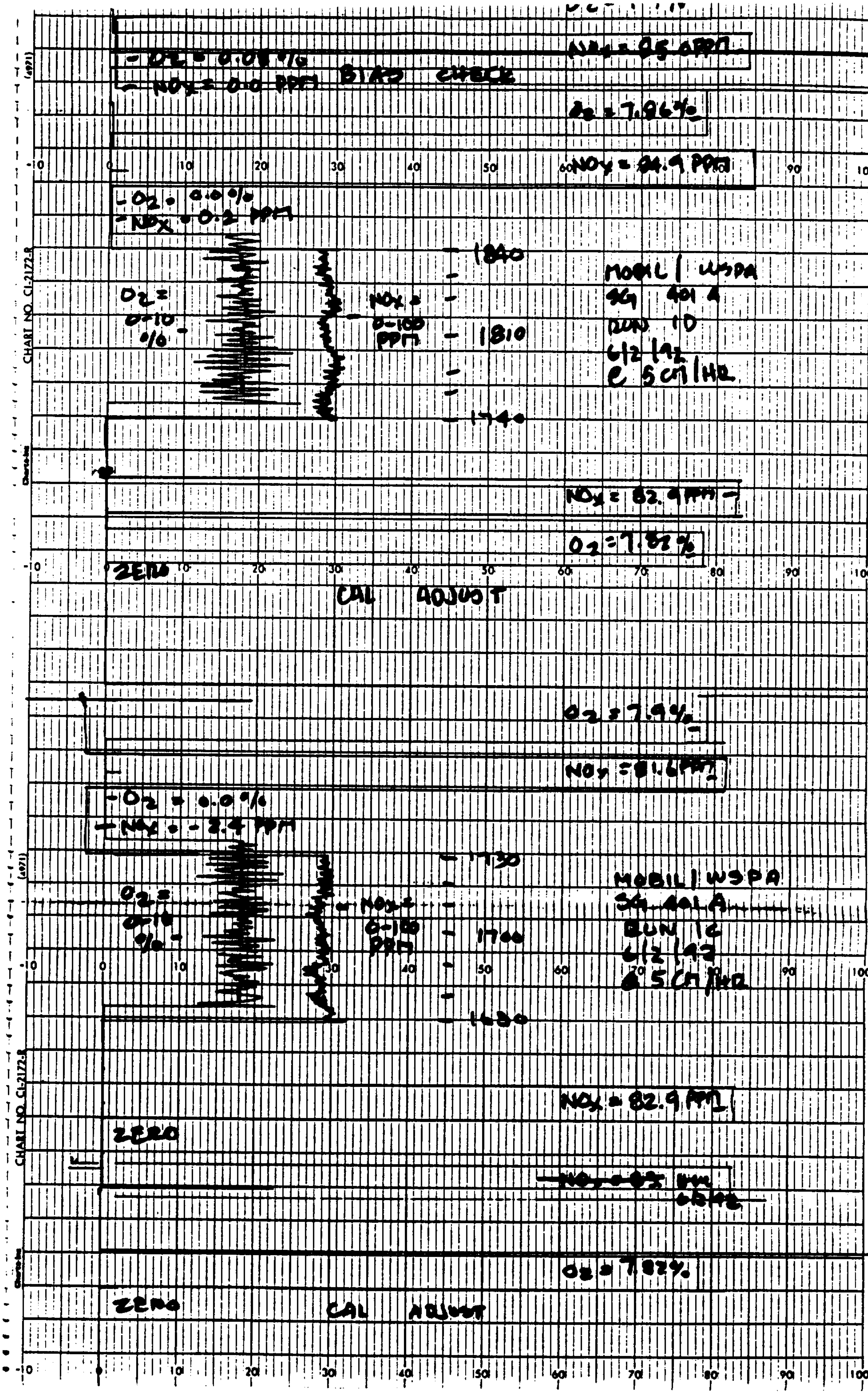
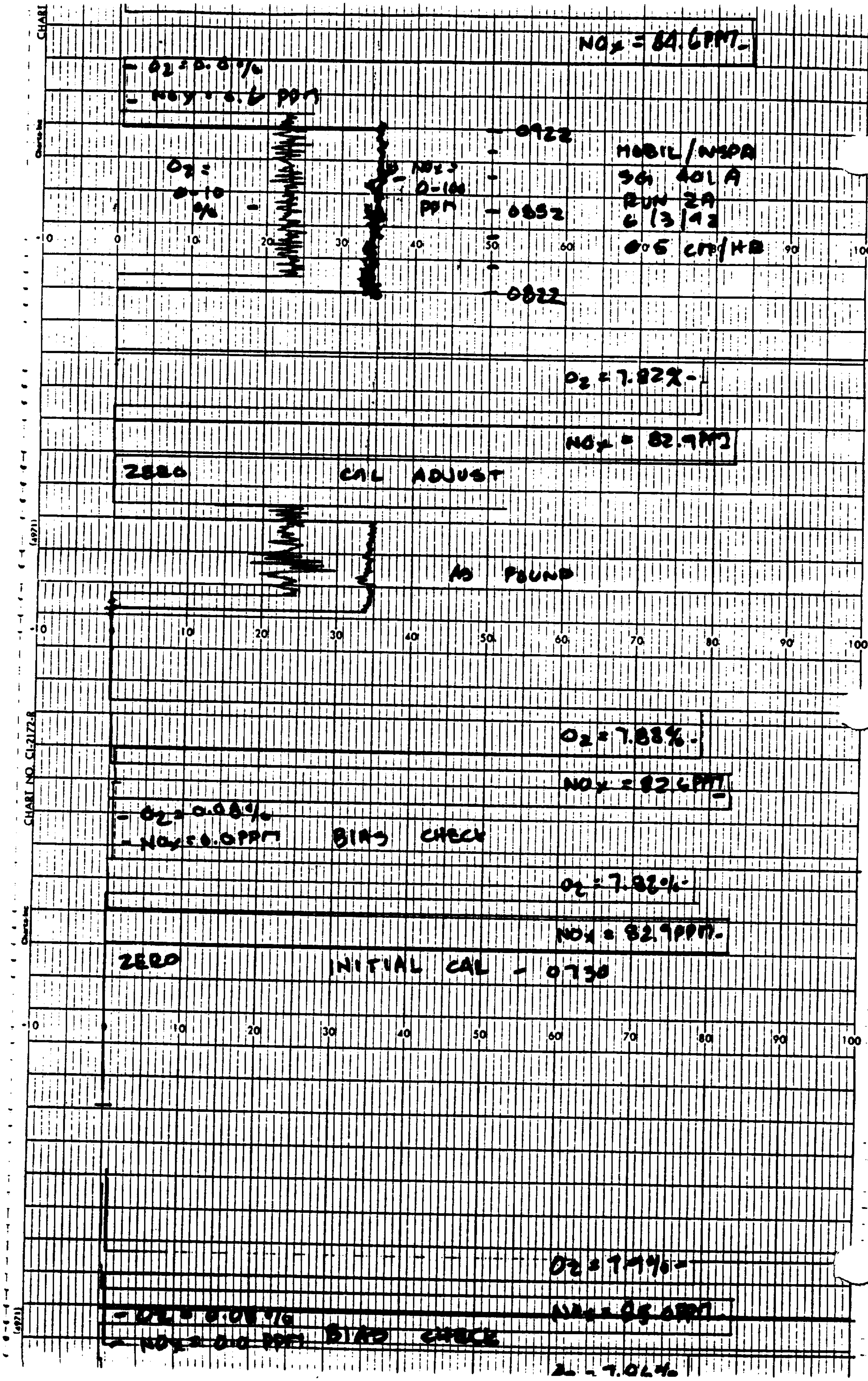
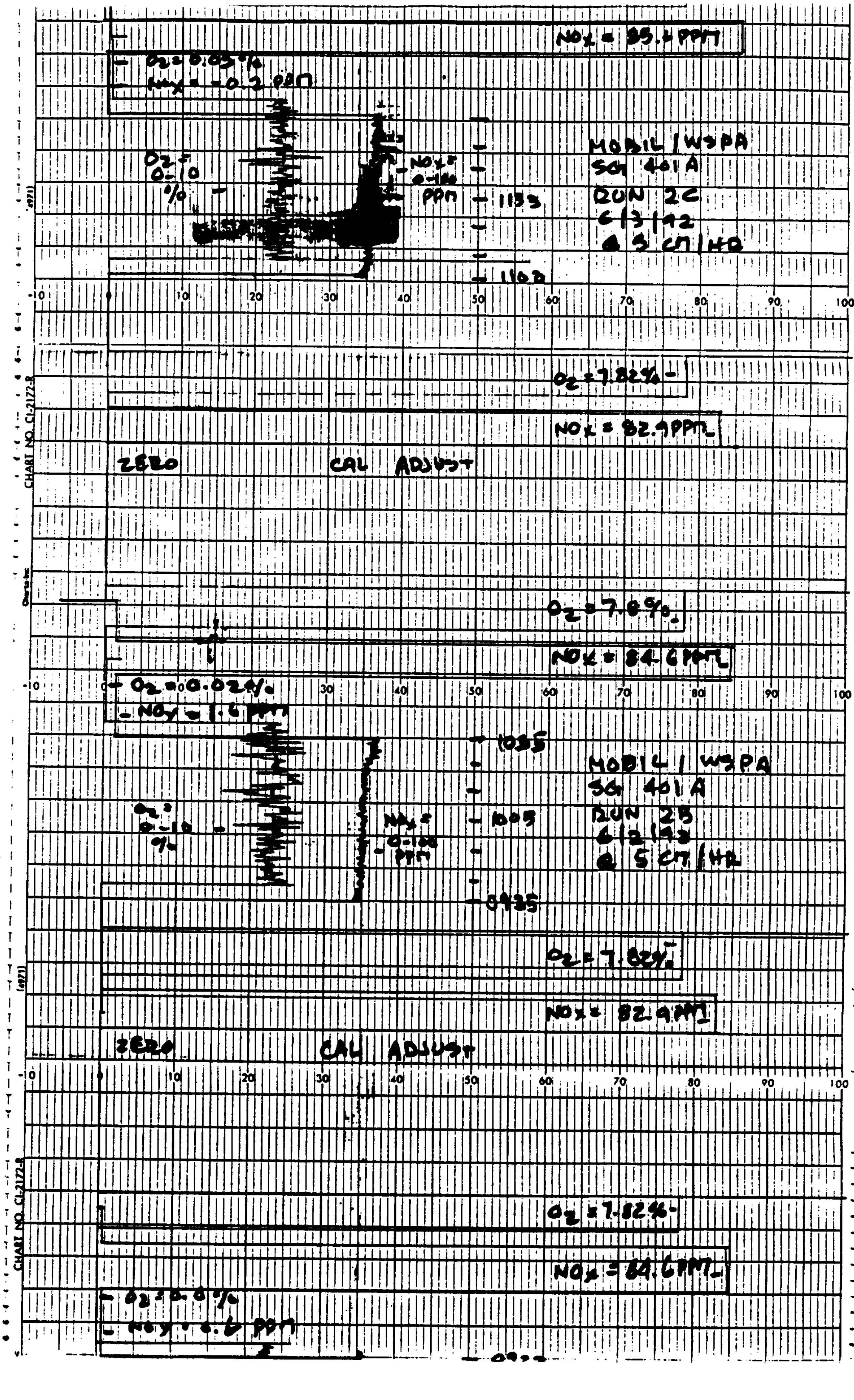


CHART NO. CL-2172-8
NOx = 85.0 PPM
O2 = 0.0 %
NOx = 0.0 PPM BIAS CHECK
O2 = 7.86 %
NOx = 84.9 PPM
O2 = 0.0 %
NOx = 0.2 PPM
1840
O2 = 0-10 %
NOx = 0-100 PPM
1810
1740
MOBIL / WSPA
SG 401 A
RUN 10
6/2/92
@ 5 CM/HR
NOx = 82.9 PPM
O2 = 7.82 %
ZERO
CAL ADJUST
O2 = 7.9 %
NOx = 81.6 PPM
O2 = 0.0 %
NOx = -2.4 PPM
1730
O2 = 0-10 %
NOx = 0-100 PPM
1700
1630
MOBIL / WSPA
SG 401 A
RUN 12
6/2/92
@ 5 CM/HR
NOx = 82.9 PPM
ZERO
O2 = 7.82 %
ZERO
CAL ADJUST


NOx = 84.6PPM
0922
MOBIL/WSPA
SG 401 A
RUN 2A
6/3/92
O2 = 0-10 %
NOx = 0-100 PPM
0852
0822
O2 = 7.82%
NOx = 82.9PPM
ZERO
CAL ADJUST
AS FOUND
O2 = 7.88%
NOx = 82.6PPM
O2 = 0.08%
NOx = 0.0PPM
BIAS CHECK
O2 = 7.82%
NOx = 82.9PPM
ZERO
INITIAL CAL - 0730
BIAS CHECK
CHART NO. CL-2172-8



NOx = 85.4 PPM
O2 = 0.05%
NOx = -0.2 PPM
O2 = 0-10 %
NOx = 0-100 PPM
1133
1103
MOBIL / WSPA
SG 401A
RUN 2C
6/3/92
@ 5 CM/HR
CHART NO. CL-2172-8
O2 = 7.82%
NOx = 82.9 PPM
ZERO
CAL ADJUST
O2 = 7.8%
NOx = 84.6 PPM
O2 = 0.02%
NOx = 1.6 PPM
1035
1005
0935
MOBIL / WSPA
SG 401A
RUN 2B
6/2/92
@ 5 CM/HR
O2 = 7.82%
NOx = 82.9 PPM
ZERO
CAL ADJUST
O2 = 7.82%
NOx = 84.6 PPM
O2 = 0.0%
NOx = 0.6 PPM
10
20
30
40
50
60
70
80
90
100

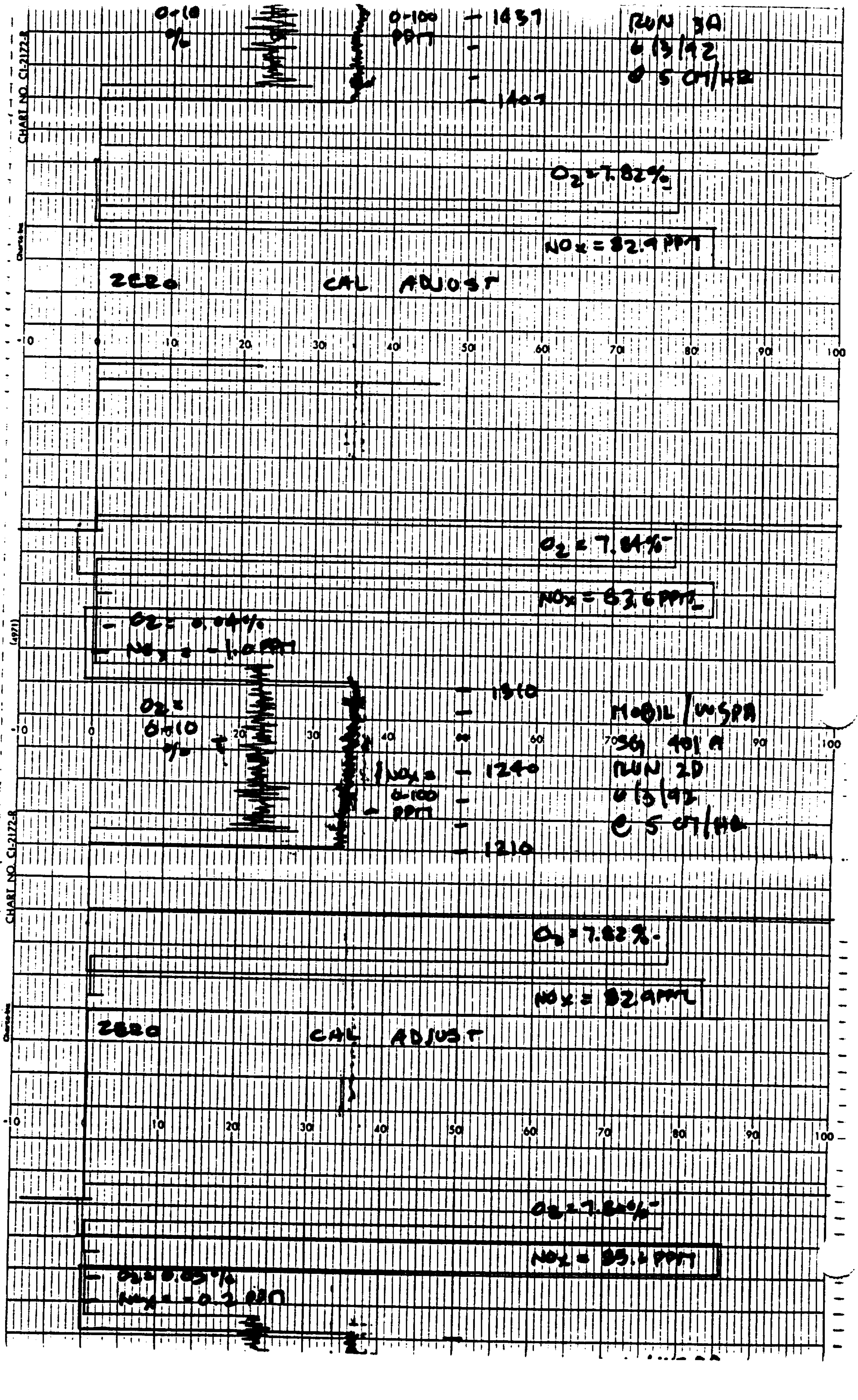


CHART NO. CL-2172-B
0-10 %
0-100 PPM
1437
1407
RUN 3A
6/3/92
@ 5 GT/HR
O2 = 7.82%
NOx = 82.9 PPM
ZERO
CAL ADJUST
O2 = 7.84%
NOx = 83.6 PPM
O2 = 0.04%
NOx = -1.0 PPM
(4921)
O2 = 0-10 %
NOx = 0-100 PPM
1310
1240
1210
MOBIL / WSPA
501 401 A
RUN 2D
6/3/92
@ 5 GT/HR
CHART NO. CL-2172-B
O2 = 7.82%
NOx = 82.9 PPM
ZERO
CAL ADJUST
O2 = 7.84%
NOx = 85.1 PPM
O2 = 0.05%
NOx = -0.2 PPM

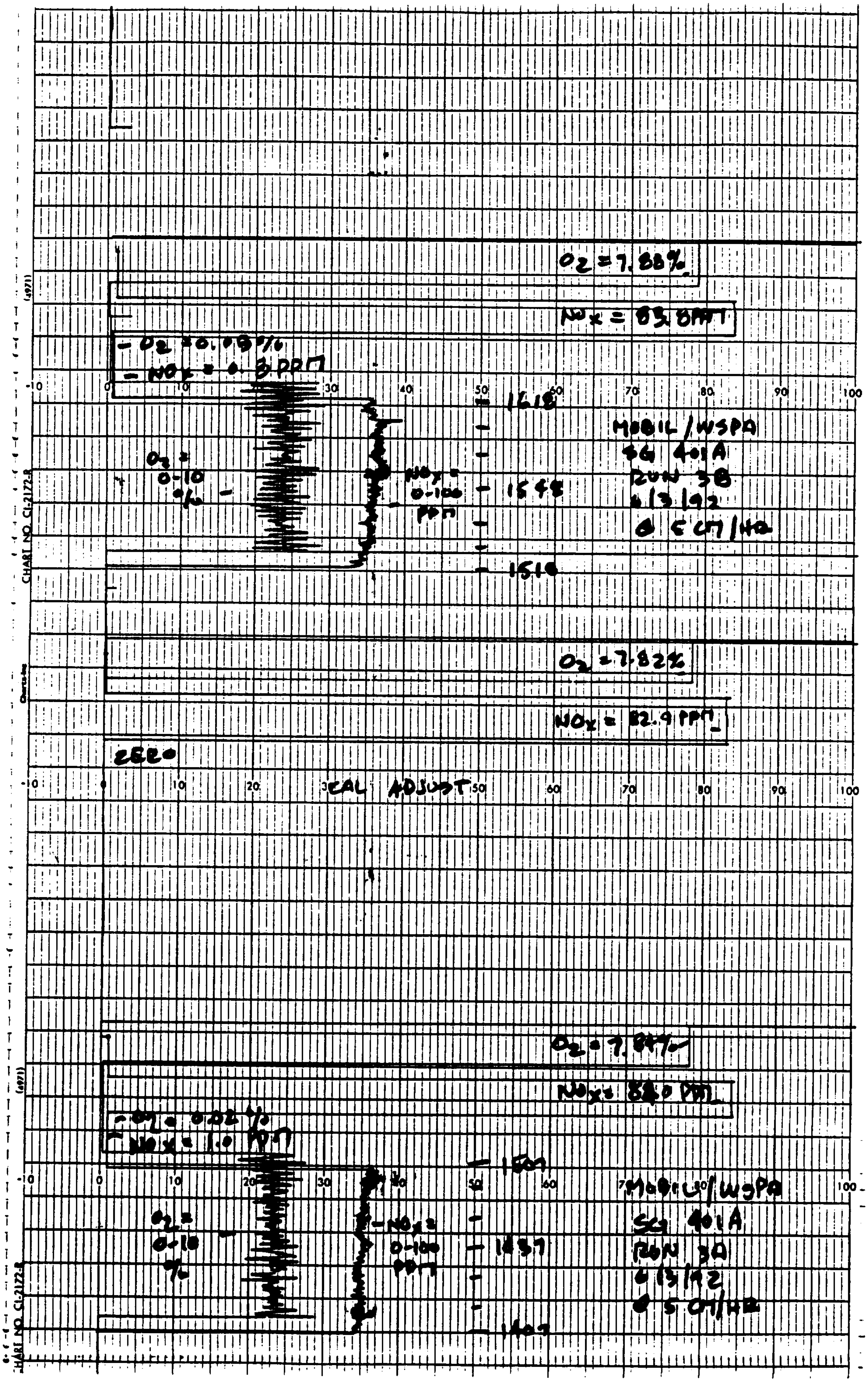


CHART NO CL-2172-B
O_2 = 7.88%
NO_x = 83.8 PPM
O_2 = 0.08%
NO_x = 0.3 PPM
1618
1548
1518
MOBIL / WSPA
SG 401A
RUN 3B
6/3/92
@ 6 CM/HR
O_2 = 0-10 %
NO_x = 0-100 PPM
O_2 = 7.82%
NO_x = 82.9 PPM
ZERO
CAL ADJUST
O_2 = 7.89%
NO_x = 84.0 PPM
O_2 = 0.02%
NO_x = 1.0 PPM
1507
1437
1407
MOBIL / WSPA
SG 401A
RUN 3A
6/3/92
@ 5 CM/HR

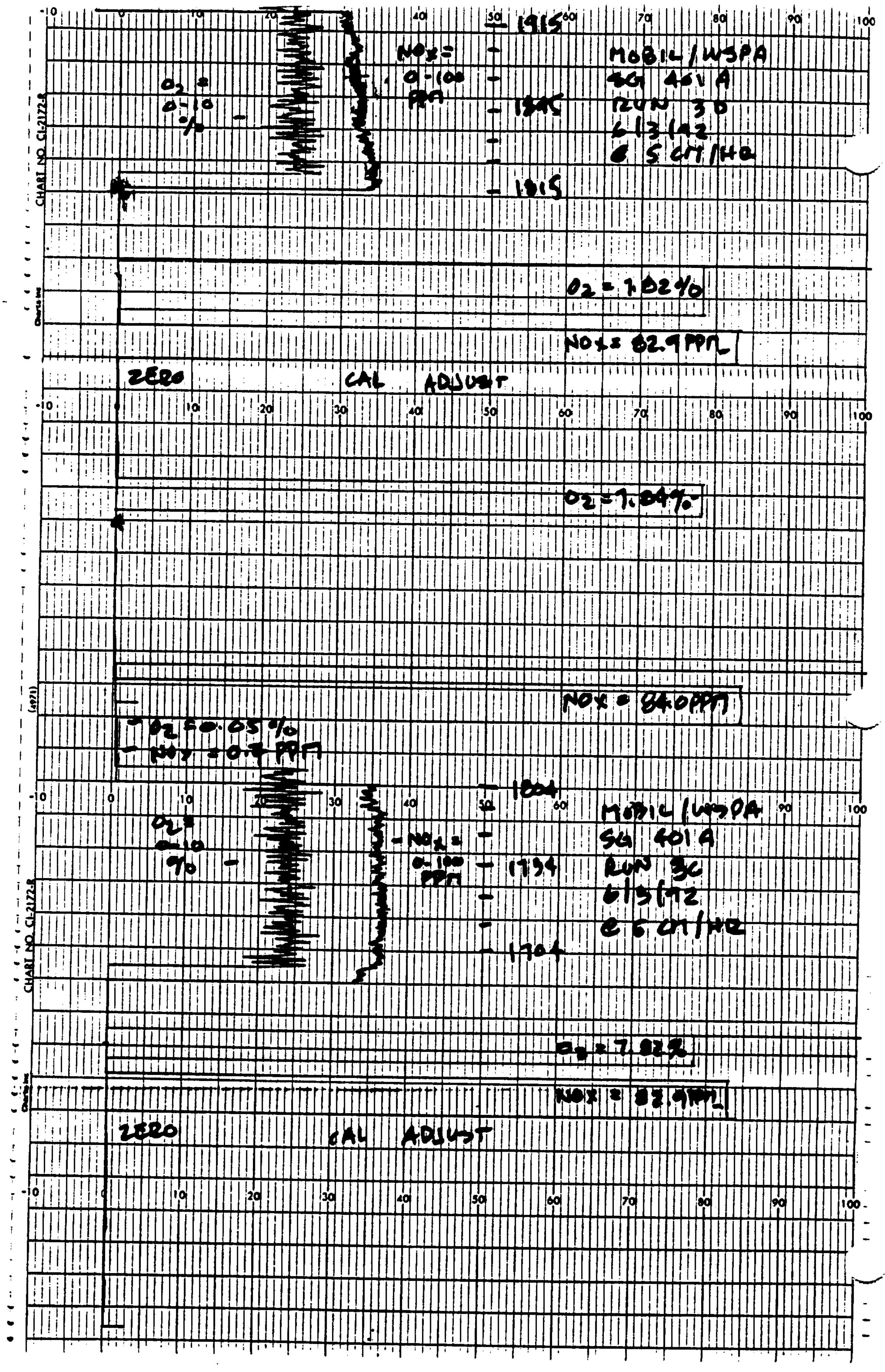


CHART NO. CL-2172-B
1915
NOx = 0-100 PPM
O2 = 0-10 %
1845
1815
MOBIL/WSPA
SG 401 A
RUN 3D
6/3/92
@ 5 CM/HR
O2 = 7.02%
NOx = 82.9 PPM
ZERO
CAL ADJUST
O2 = 7.04%
NOx = 84.0 PPM
O2 = 0.05 %
NOx = 0.7 PPM
1804
1734
1704
NOx = 0-100 PPM
O2 = 0-10 %
MOBIL/WSPA
SG 401A
RUN 3C
6/3/92
@ 5 CM/HR
ZERO
CAL ADJUST

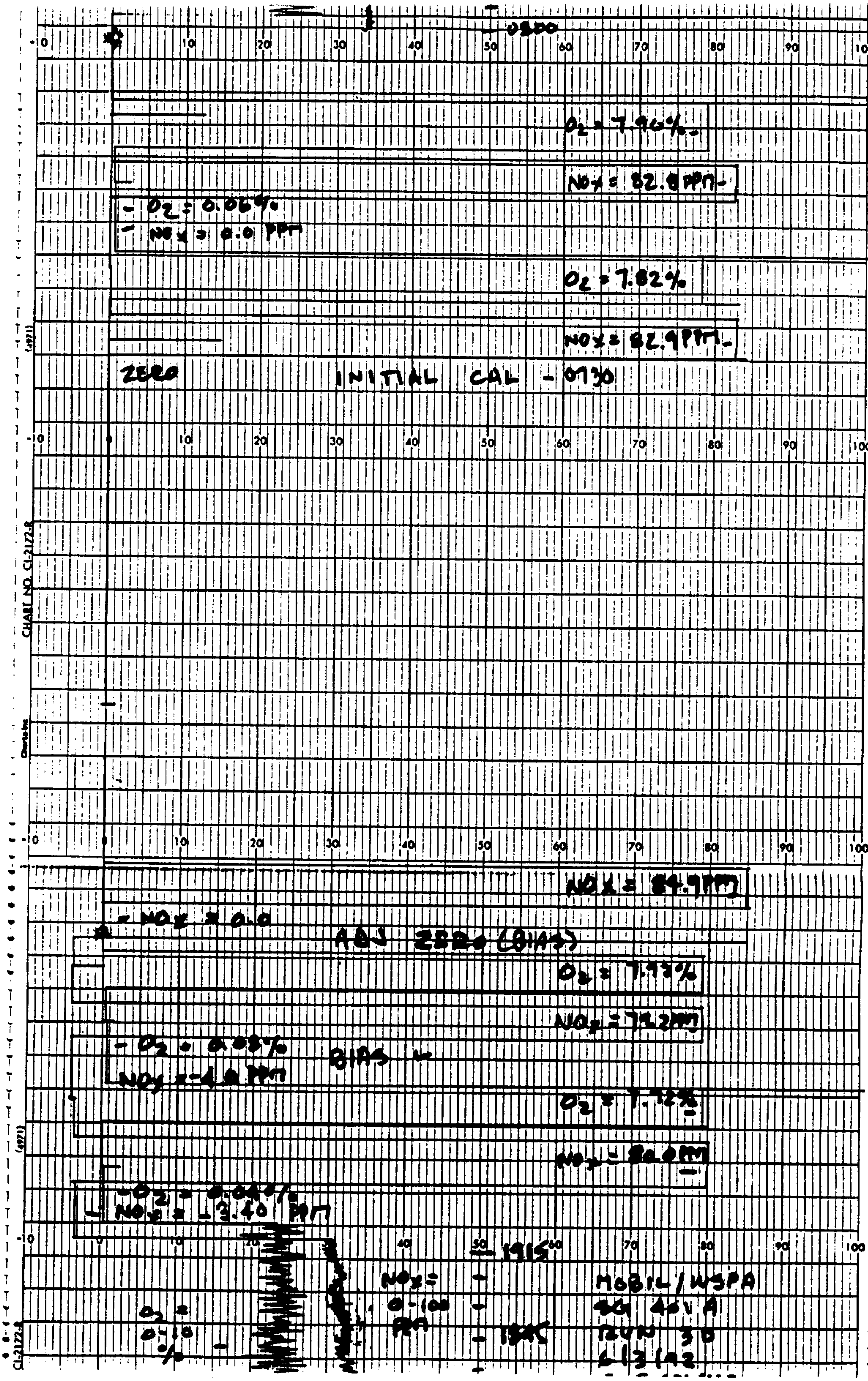


CHART NO CL-2172-8
0800
O2 = 7.96%
NOx = 82.8 PPM
O2 = 0.06%
NOx = 0.0 PPM
O2 = 7.82%
NOx = 82.9 PPM
ZERO
INITIAL CAL - 0730
NOx = 84.9 PPM
NOx = 0.0
ADJ ZERO (BIAS)
O2 = 7.93%
NOx = 73.2 PPM
O2 = 0.03%
NOx = -4.0 PPM
BIAS
NOx = 80.0 PPM
NOx = -3.40 PPM
1915
NOx = 0-100 PPM
O2 = 0-10 %
1845
MOBIL/WSPA

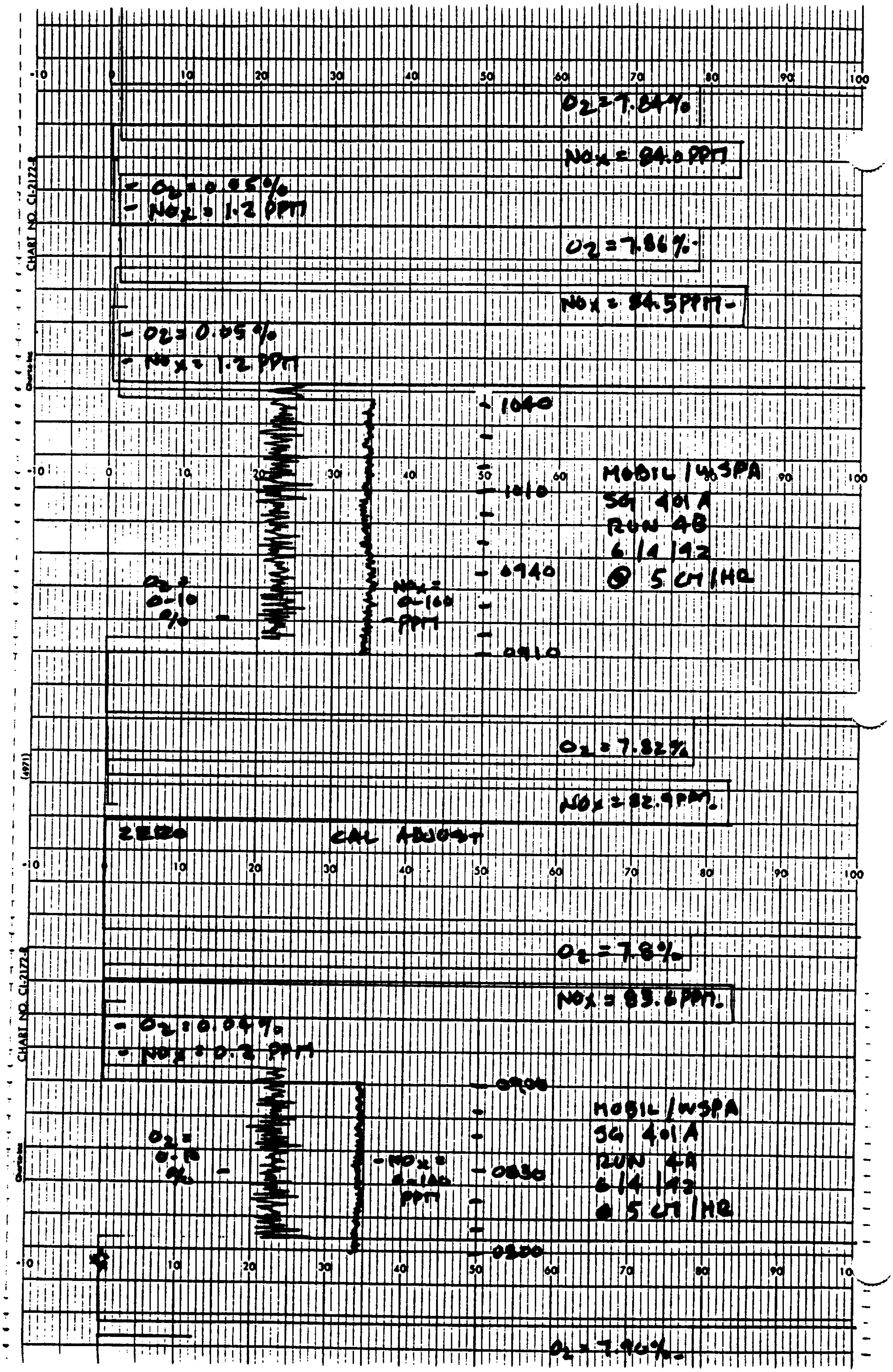


CHART NO. CL-2172-B
O2 = 7.84%
NOx = 84.0 PPM
- O2 = 0.05%
- NOx = 1.2 PPM
O2 = 7.86%
NOx = 84.5 PPM
- O2 = 0.05%
- NOx = 1.2 PPM
1040
MOBIL / WSPA
SG 401 A
RUN 4B
6/4/92
@ 5 CM/HR
1010
0940
O2 = 0-10 %
NOx = 0-100 PPM
0910
O2 = 7.82%
NOx = 82.9 PPM
ZERO
CAL ADJUST
O2 = 7.8%
NOx = 83.6 PPM
- O2 = 0.04%
- NOx = 0.2 PPM
0900
MOBIL / WSPA
SG 401 A
RUN 4A
6/4/92
@ 5 CM/HR
O2 = 0-10 %
NOx = 0-100 PPM
0830
0800
O2 = 7.96%

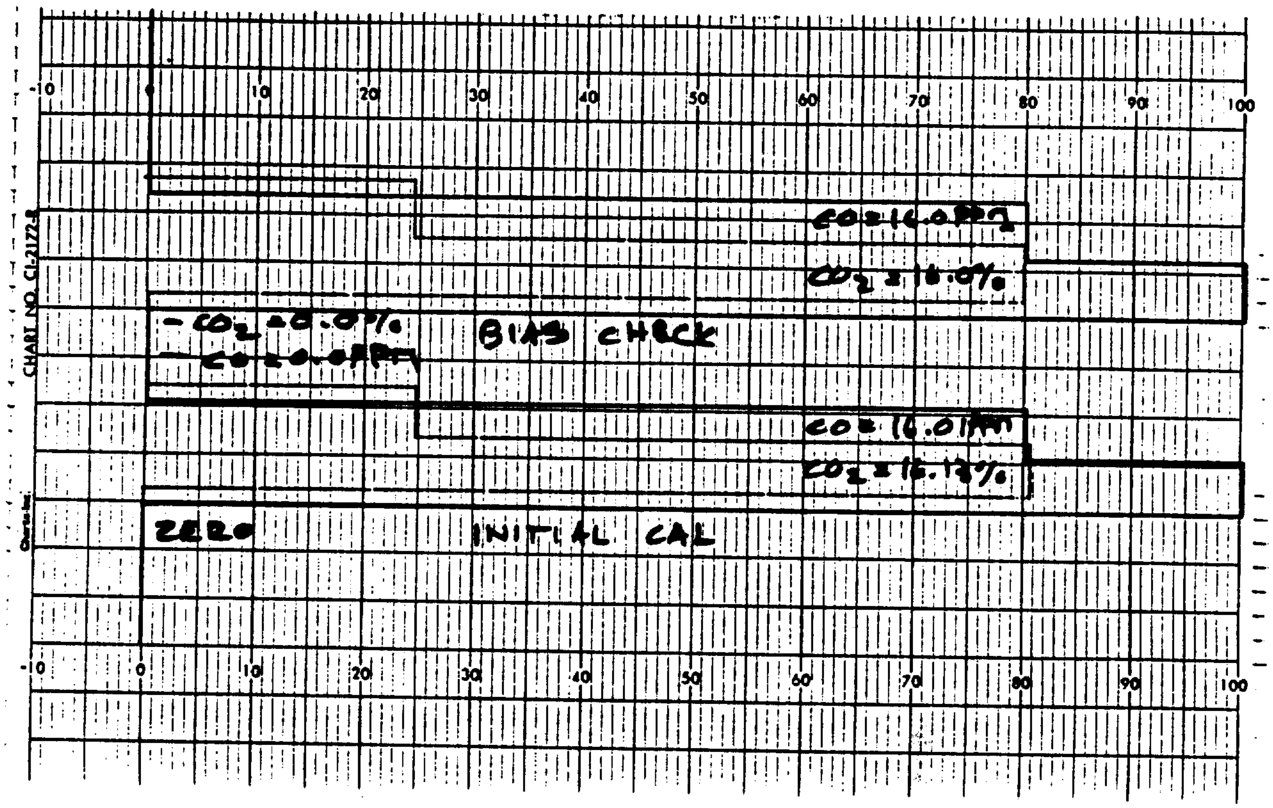
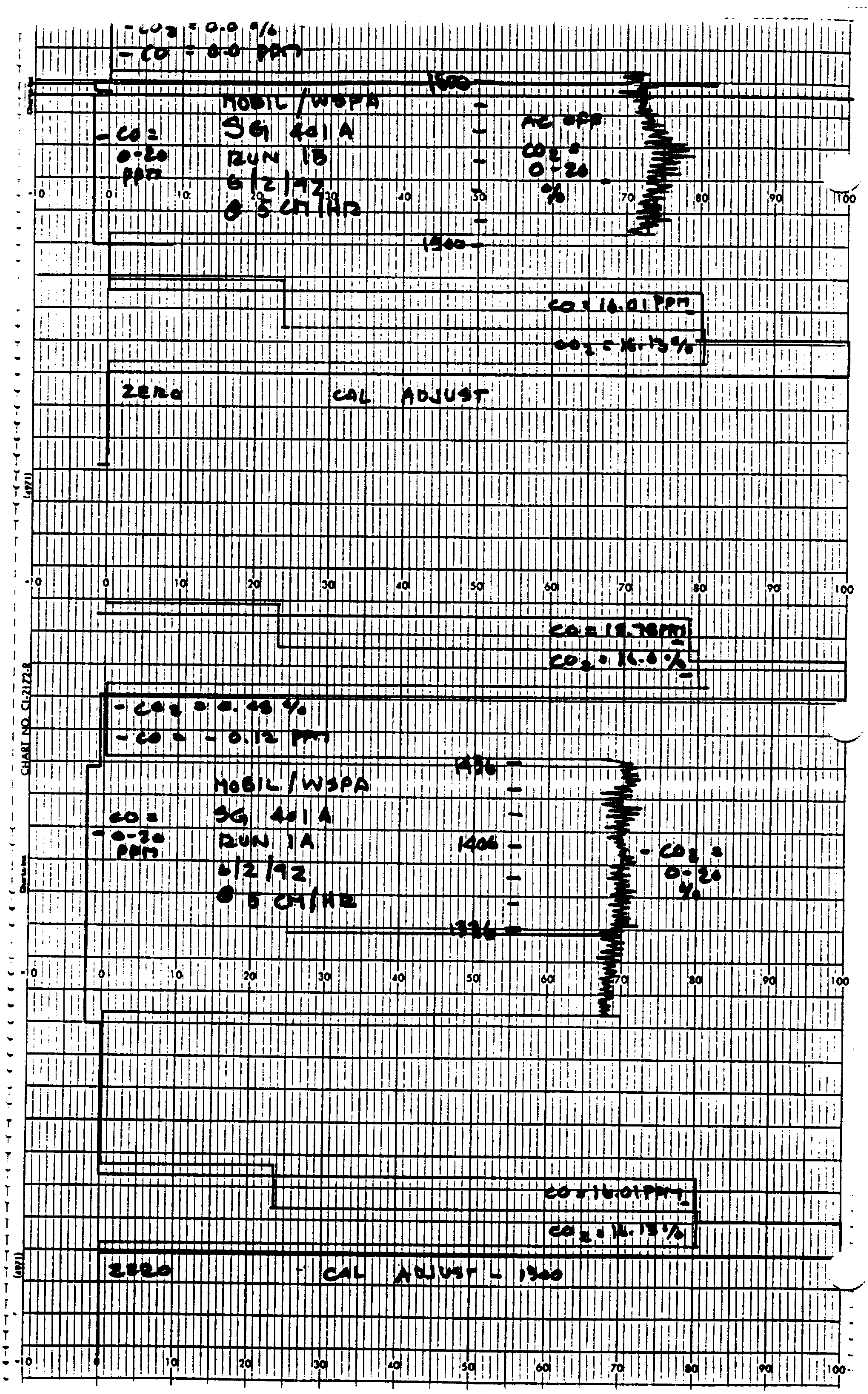
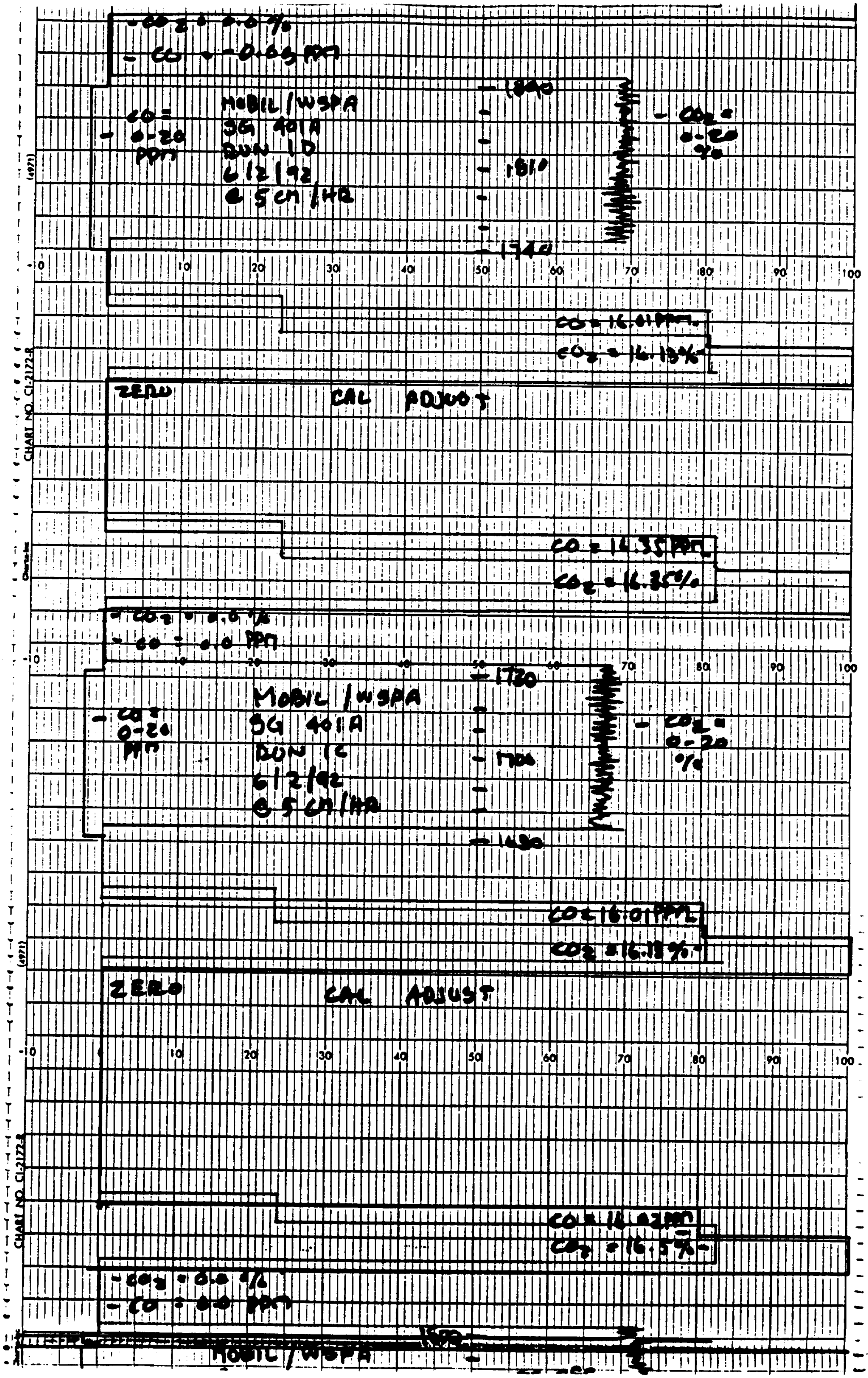


CHART NO. CL-2172-B
-10 0 10 20 30 40 50 60 70 80 90 100
CO = 16.0 PPM
CO2 = 16.0%
- CO2 = 0.0%
- CO = 0.0 PPM
BIAS CHECK
CO = 16.01 PPM
CO2 = 16.13%
ZERO
INITIAL CAL
-10 0 10 20 30 40 50 60 70 80 90 100


CO = 0.0 PPM
MOBIL/WSPA
SG 401 A
RUN 1B
6/2/92
@ 5 CM/HR
CO = 0-20 PPM
CO2 = 0-20 %
1500
CO = 16.01 PPM
CO2 = 16.13 %
ZERO
CAL ADJUST
CO = 15.78PPM
CO2 = 16.0 %
CO = -0.12 PPM
1436
MOBIL/WSPA
SG 401 A
RUN 1A
6/2/92
@ 5 CM/HR
CO = 0-20 PPM
1406
CO2 = 0-20 %
1336
CO = 16.01PPM
CO2 = 16.13 %
ZERO
CAL ADJUST - 1300
CHART NO CL-2172-8

6


CO2 = 0.0 %
CO = -0.03 PPM
CO = 0-20 PPM
MOBIL / WSPA
SG 401A
RUN 1D
6/2/92
@ 5 CM/HR
CO2 = 0-20 %
1880
1810
1740
CO = 16.01 PPM
CO2 = 16.13 %
ZERO
CAL ADJUST
CO = 14.35 PPM
CO2 = 16.35 %
CO2 = 0.0 %
CO = 0.0 PPM
CO = 0-20 PPM
MOBIL / WSPA
SG 401A
RUN 1C
6/2/92
@ 5 CM/HR
CO2 = 0-20 %
1780
1700
1630
CO = 16.01 PPM
CO2 = 16.18 %
ZERO
CAL ADJUST
CO = 16.02 PPM
CO2 = 16.5 %
CO2 = 0.0 %
CO = 0.0 PPM
MOBIL / WSPA
CHART NO CL-2172-8

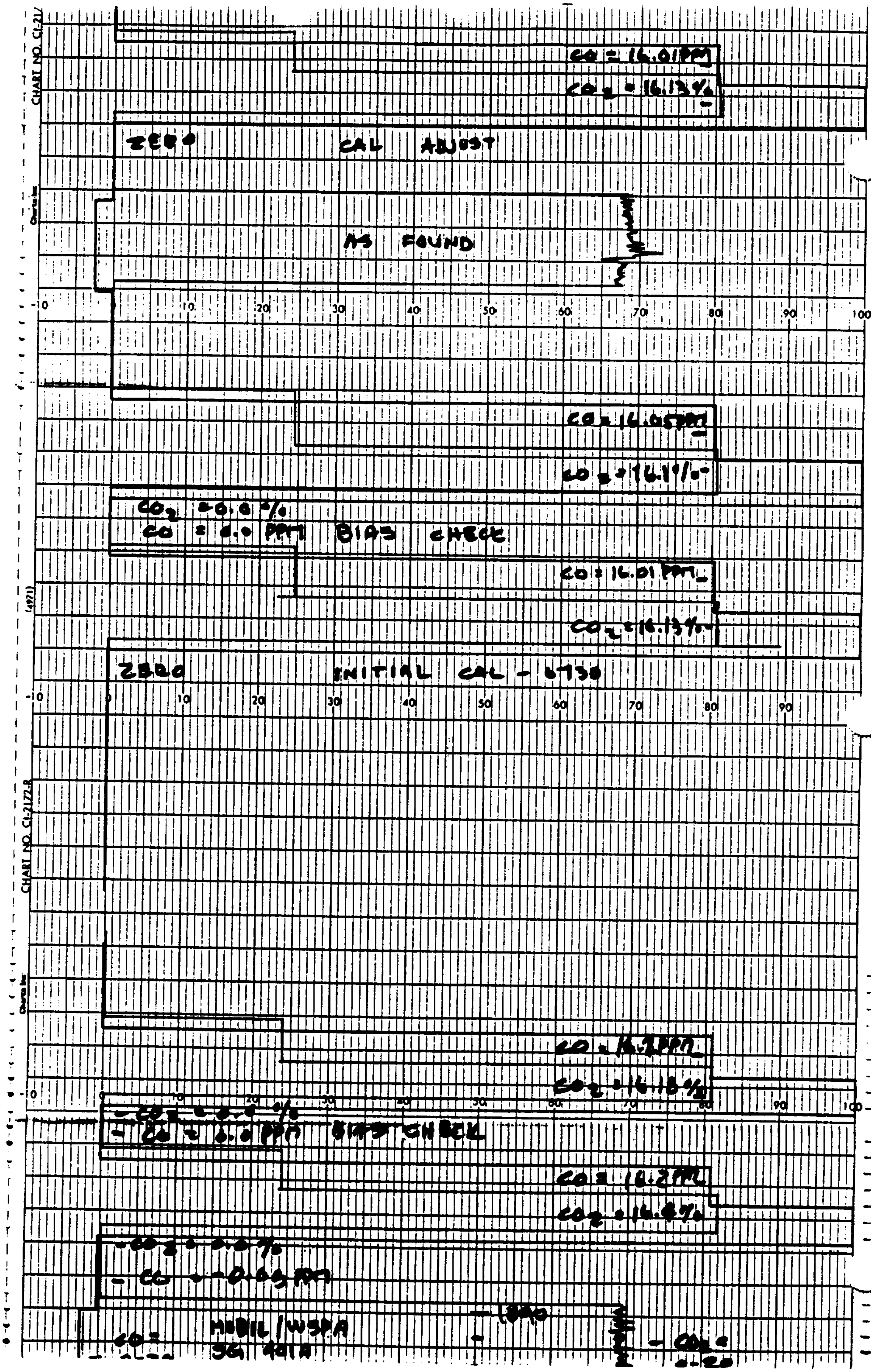
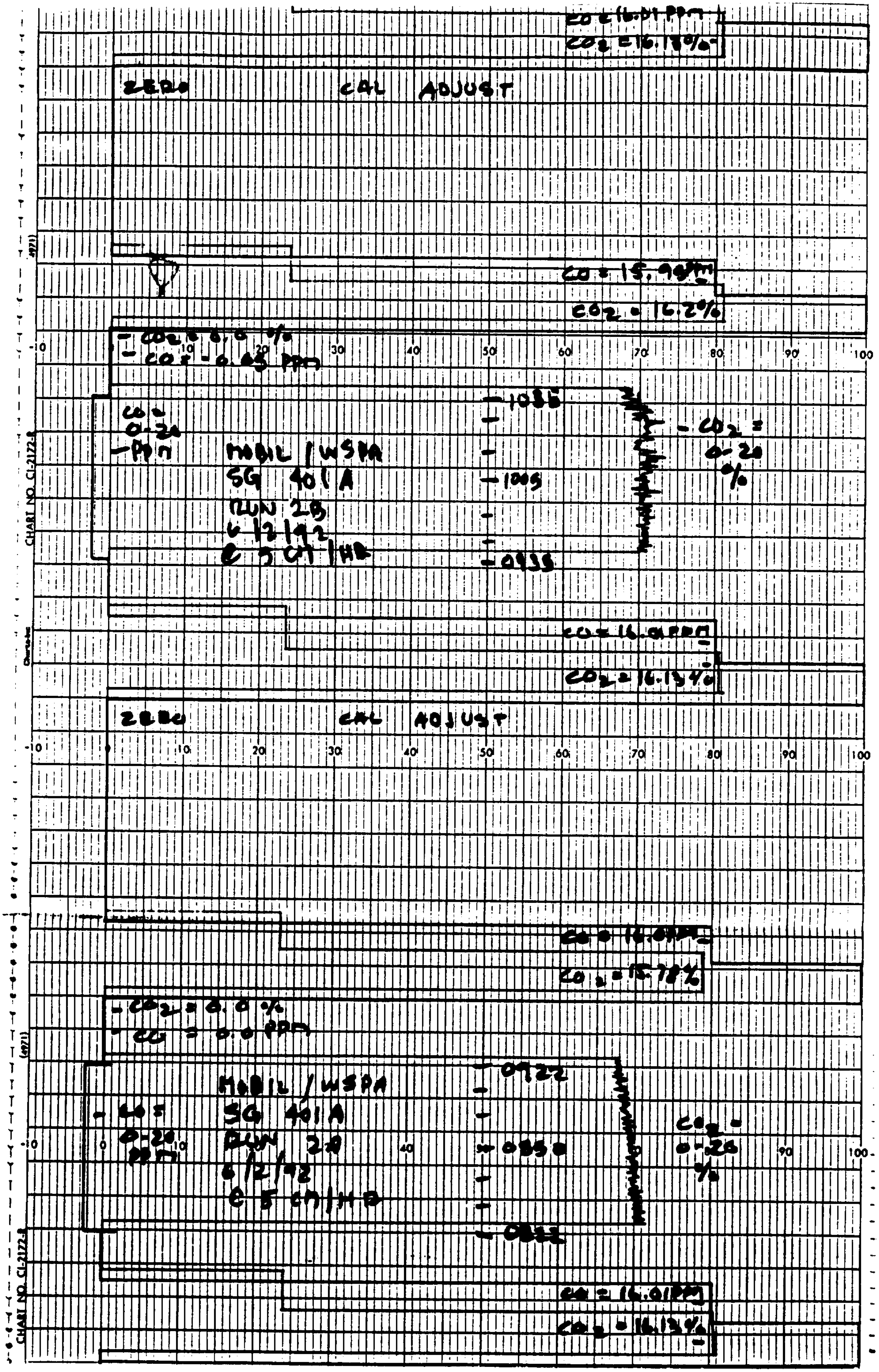


CHART NO. CL-2172-R
CO = 16.01PPM
CO2 = 16.13%
ZERO
CAL ADJUST
AS FOUND
CO = 16.05PPM
CO2 = 16.1%
CO2 = 0.0 %
CO = 0.0 PPM BIAS CHECK
CO = 16.01 PPM
CO2 = 16.13%
ZERO
INITIAL CAL - 0730
CO = 16.2PPM
CO2 = 16.18%
CO2 = 0.0 %
CO = 0.0 PPM BIAS CHECK
CO = 16.2PPM
CO2 = 16.4%
CO2 = 0.0 %
CO = -0.03 PPM
CO =
MOBIL/WSPA
SG 401A
CO2 =



CO = 16.01 PPM
CO2 = 16.13%
ZERO
CAL ADJUST
CO = 15.99PPM
CO2 = 16.2%
CO2 = 0.0 %
CO = -0.03 PPM
0 10 20 30 40 50 60 70 80 90 100
CO = 0-20 PPM
MOBIL / WSPA
SG 401A
RUN 2B
6/12/92
@ 5 CM/HR
1035
1005
0935
CO2 = 0-20 %
CHART NO. CI-2172-8
CO = 16.01 PPM
CO2 = 16.13%
ZERO
CAL ADJUST
0 10 20 30 40 50 60 70 80 90 100
CO = 16.0PPM
CO2 = 15.78%
CO2 = 0.0 %
CO = 0.0 PPM
0922
MOBIL / WSPA
CO = 0-20 PPM
SG 401A
RUN 2B
6/12/92
@ 5 CM/HR
0852
0822
CO2 = 0-20 %
0 10 40 90 100
CHART NO. CI-2172-8
CO = 16.01PPM
CO2 = 16.13%

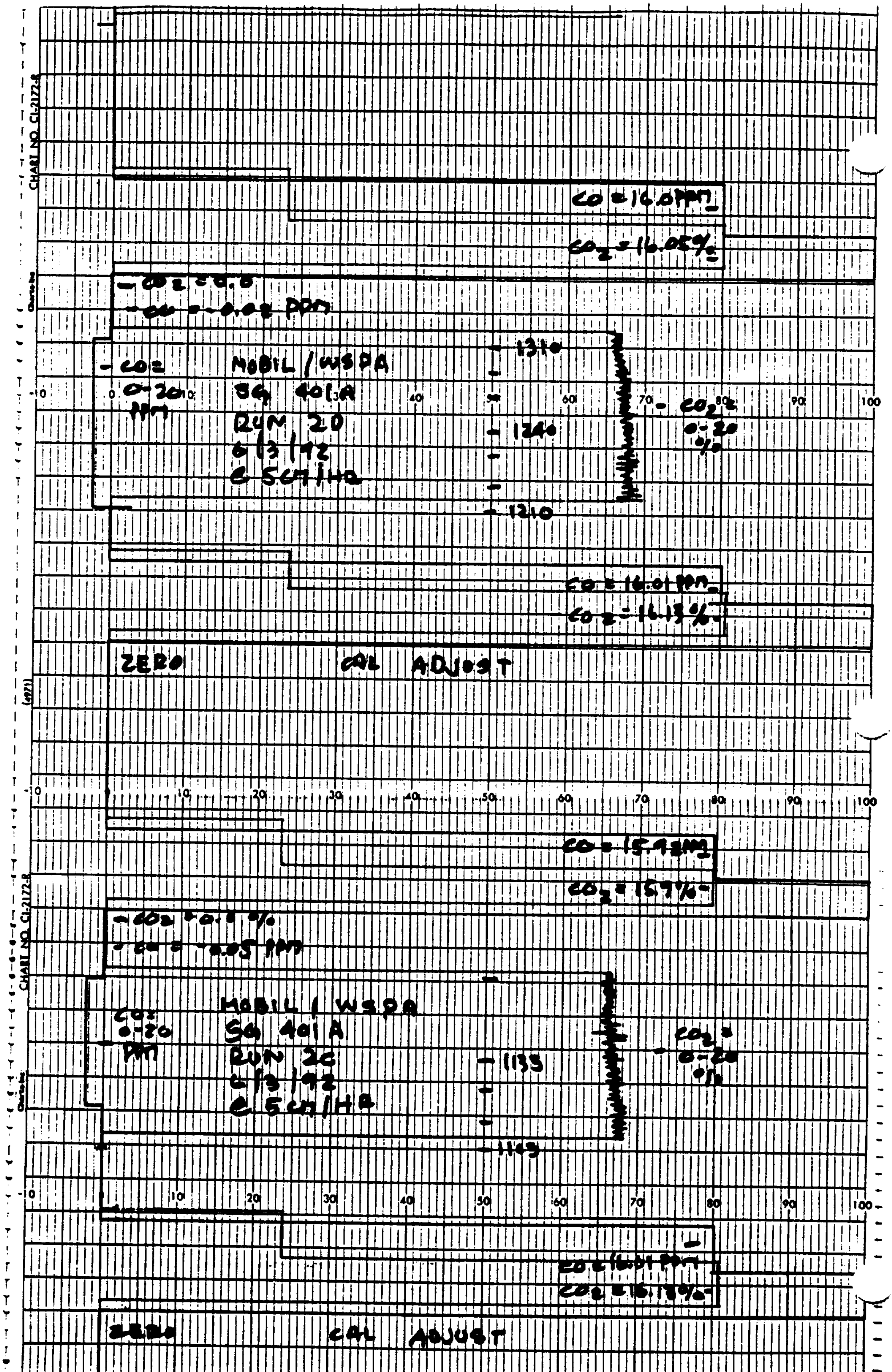
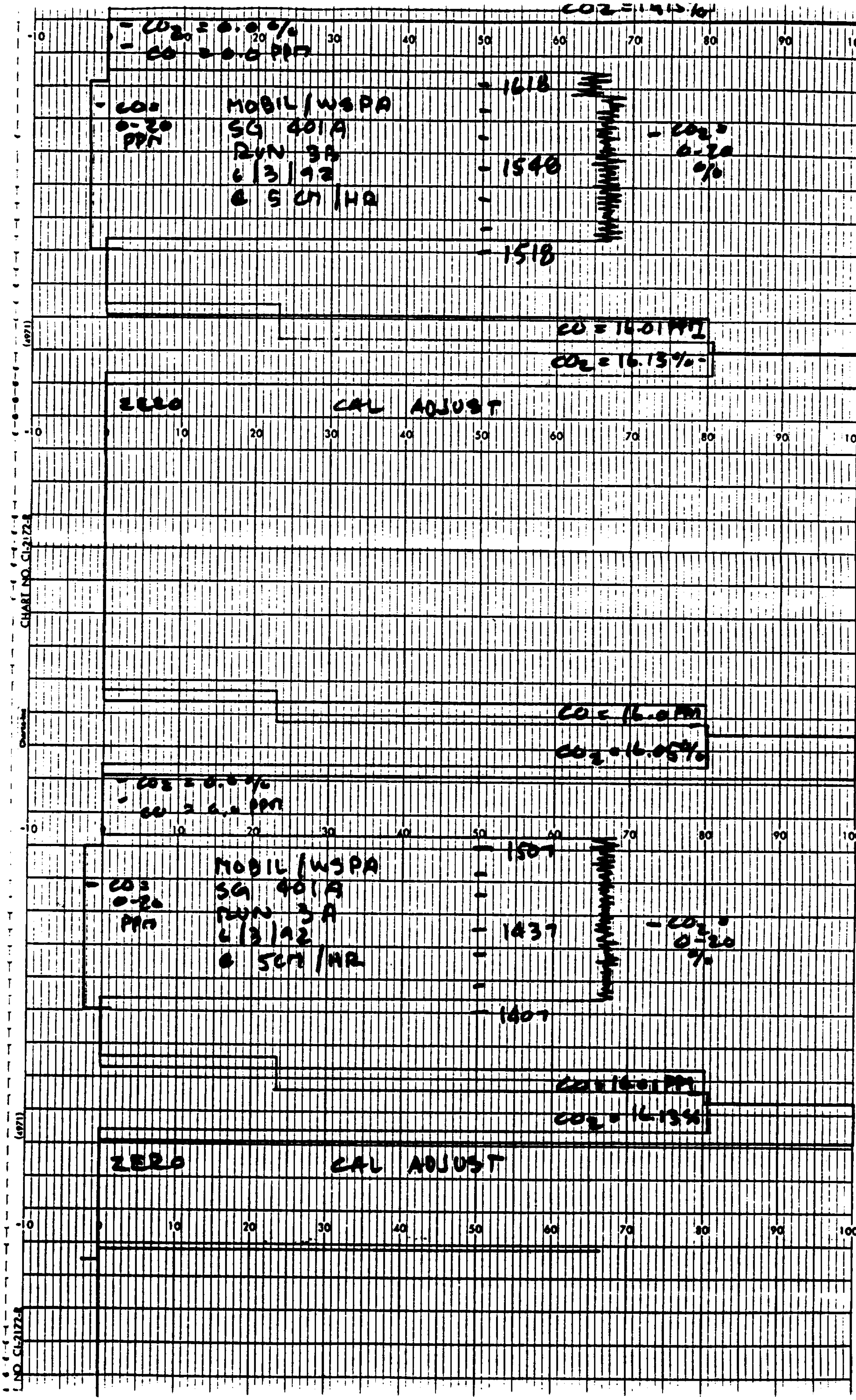


CHART NO. CI-2172-B
CO = 16.0 PPM
MOBIL / WSPA
RUN 20
1310
1260
1210
ZERO
CAL ADJUST
10
0
20
30
40
50
60
70
80
90
100
MOBIL / WSPA
SG 401A


- CO2 = 0.0%
- CO = 0.0 PPM
- CO 0-20 PPM
MOBIL/WSPA
SG 401A
RUN 3A
6/3/92
@ 5 CM/HR
1618
1548
1518
- CO2 0-20 %
CO = 16.01 PPM
CO2 = 16.13%
ZERO
CAL ADJUST
CO = 16.0 PPM
CO2 = 16.05%
- CO2 = 0.0%
- CO = 0.0 PPM
- CO 0-20 PPM
MOBIL/WSPA
SG 401A
RUN 3A
6/3/92
@ 5 CM/HR
1507
1437
1407
- CO2 0-20 %
CO = 16.01 PPM
CO2 = 16.13%
ZERO
CAL ADJUST
CHART NO. CL-2172-B

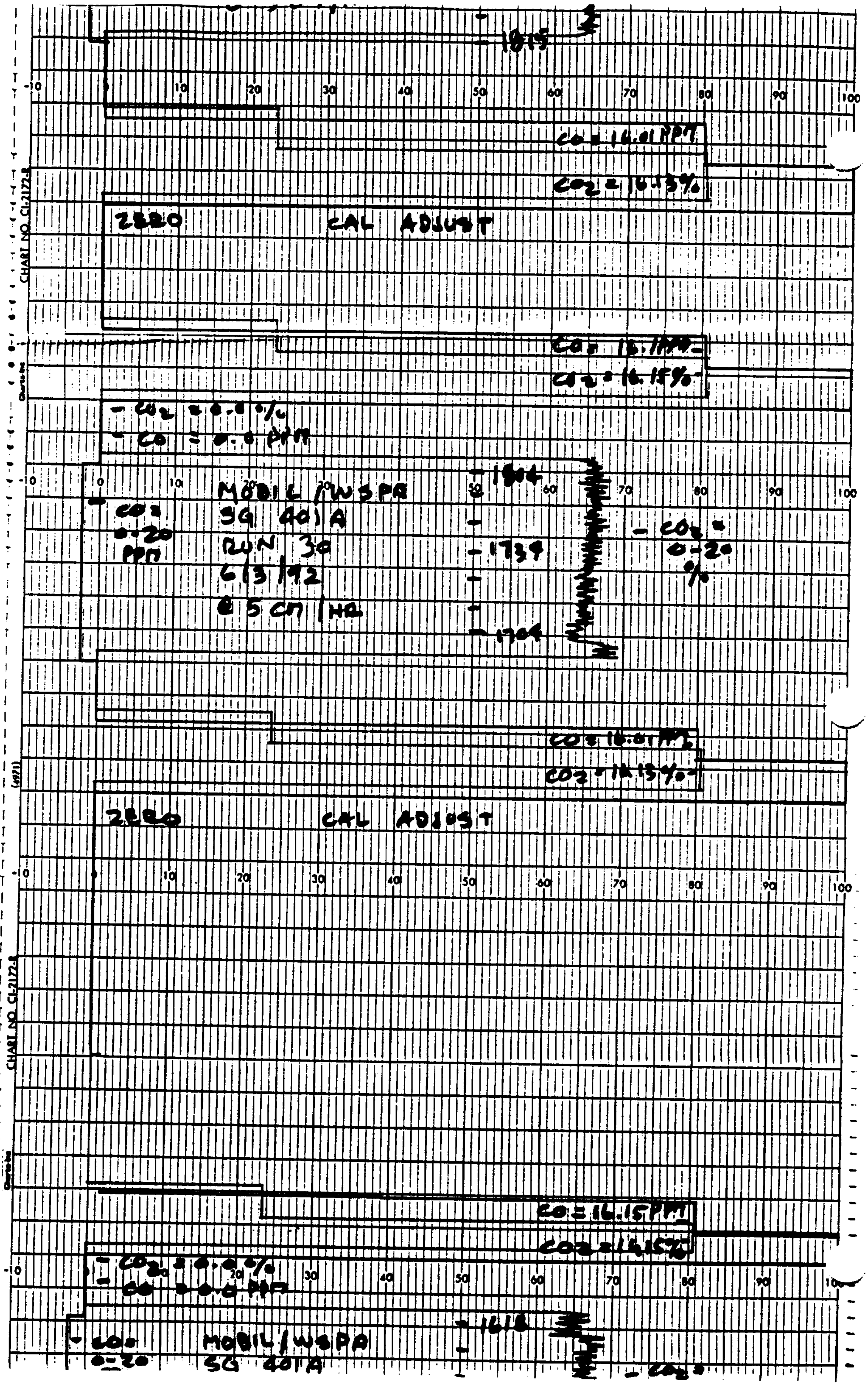
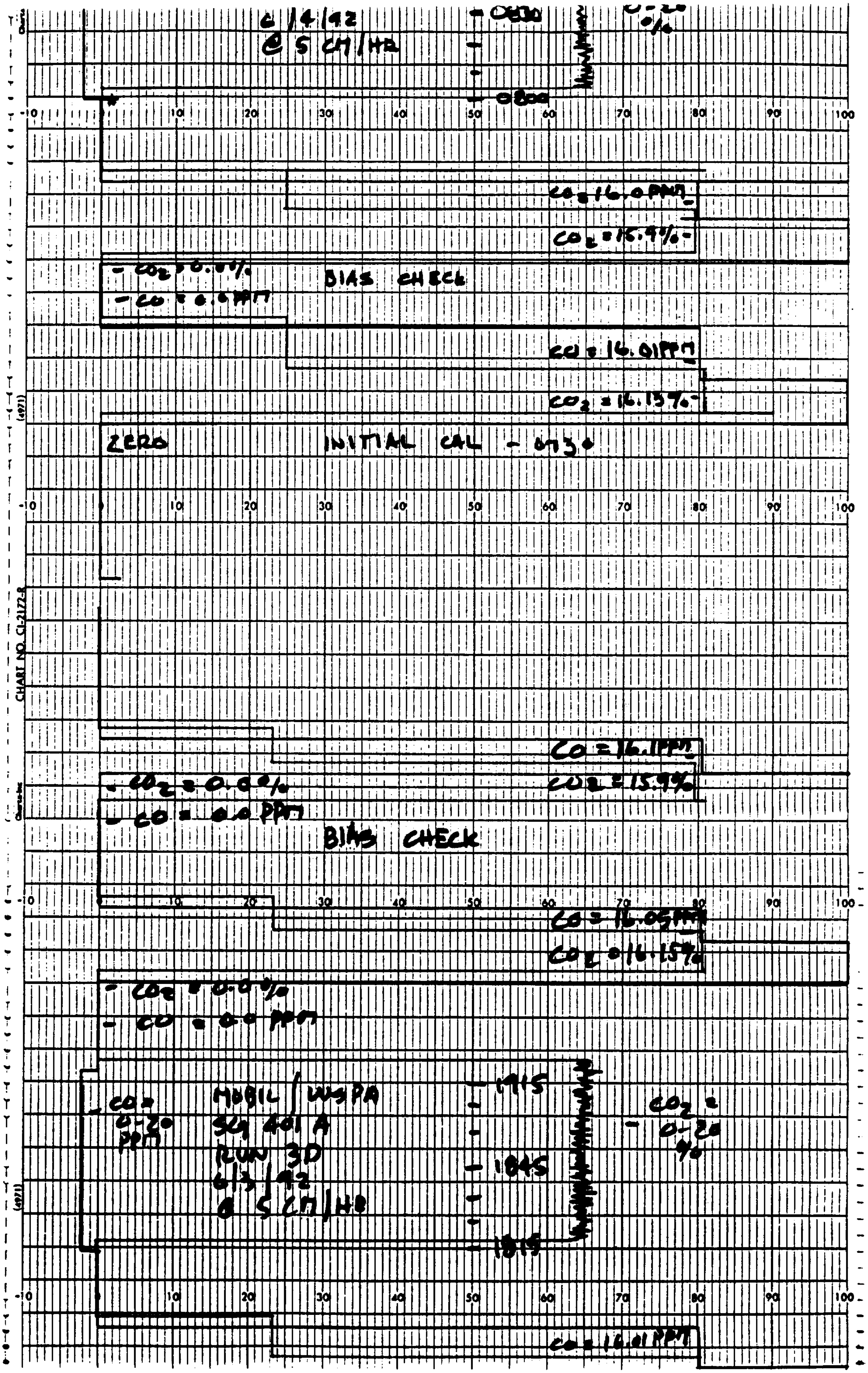


CHART NO CL-2172-8
1815
CO = 16.01 PPM
CO2 = 16.13%
ZERO
CAL ADJUST
CO = 15.1 PPM
CO2 = 16.15%
- CO2 = 0.0%
- CO = 0.0 PPM
1806
MOBIL / WSPA
SG 401A
RUN 30
6/3/92
@ 5 cm/HR
CO = 0-20 PPM
1739
1709
- CO2 = 0-20 %
CO = 16.01 PPM
CO2 = 16.13%
ZERO
CAL ADJUST
CHART NO CL-2172-8
CO = 16.15 PPM
CO2 = 16.15%
- CO2 = 0.0%
- CO = 0.0 PPM
1818
CO = 0-20
MOBIL/WSPA
SG 401A
- CO2 =


6/14/92
@ 5 CM/HR
0830
0-20 %
0800
CO = 16.0 PPM
CO2 = 15.9%
- CO2 = 0.0%
- CO = 0.0 PPM
BIAS CHECK
CO = 16.01 PPM
CO2 = 16.13%
ZERO
INITIAL CAL - 0730
CO = 16.1 PPM
CO2 = 15.9%
- CO2 = 0.0%
- CO = 0.0 PPM
BIAS CHECK
CO = 16.05 PPM
CO2 = 16.15%
- CO2 = 0.0%
- CO = 0.0 PPM
CO = 0-20 PPM
MOBIL / WSPA
SCG 401 A
RUN 3D
6/13/92
@ 5 CM/HR
1915
1845
1815
CO2 = 0-20 %
CO = 16.01 PPM
CHART NO. CL-2172-8

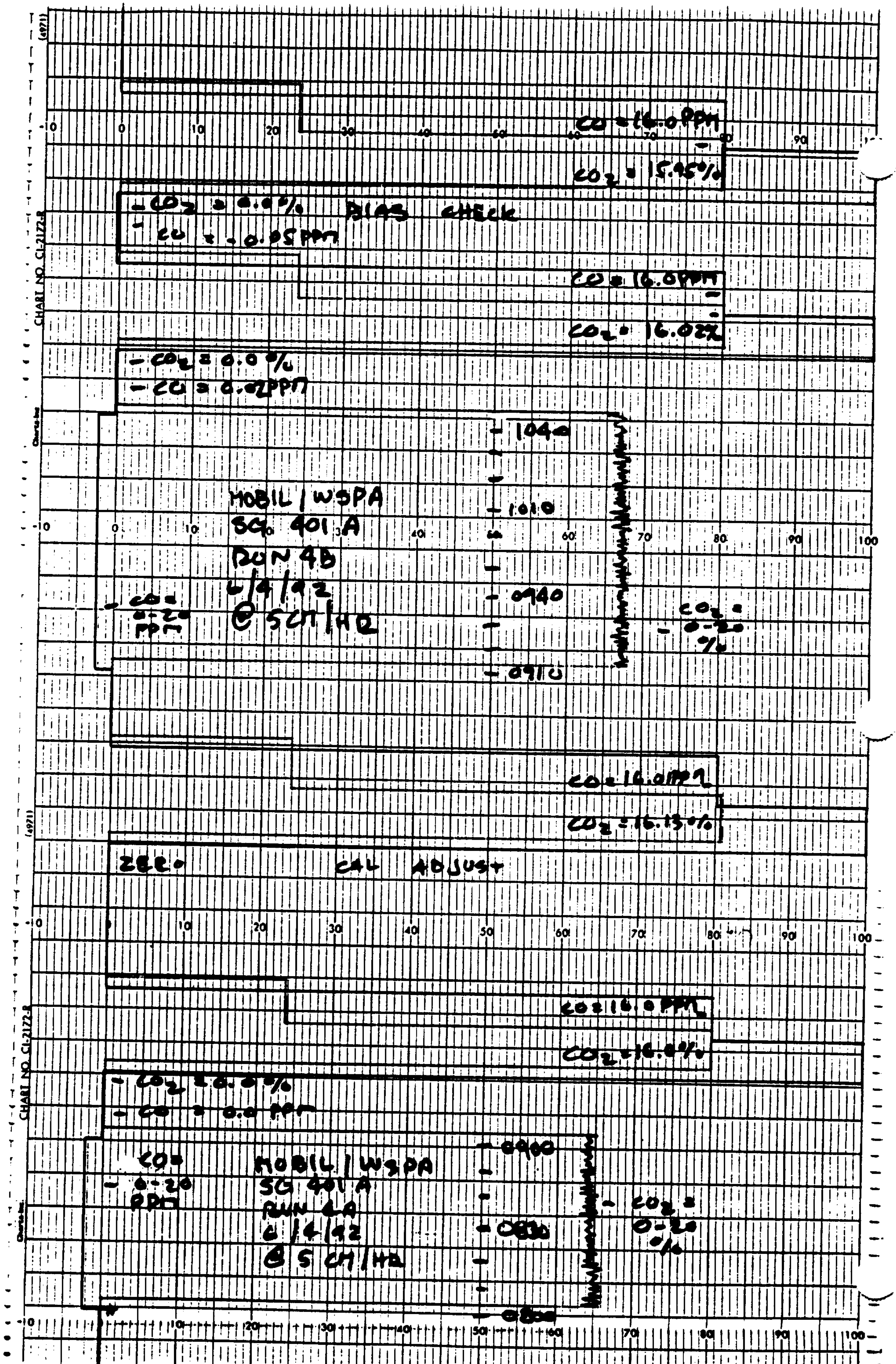


CHART NO. CL-2172-R
(4971)
CO = 16.0 PPM
CO2 = 15.95%
CO2 = 0.0%
BIAS CHECK
CO = -0.05 PPM
CO = 16.0 PPM
CO2 = 16.02%
CO2 = 0.0%
CO = 0.02 PPM
1040
1010
0940
0910
MOBIL / WSPA
SG 401 A
RUN 4B
6/4/92
@ 5CM/HR
CO = 0-20 PPM
CO2 = 0-20 %
CO = 16.0 PPM
CO2 = 16.13%
ZERO
CAL ADJUST
CO = 16.0 PPM
CO2 = 16.0%
CO2 = 0.0%
CO = 0.0 PPM
0900
0830
0800
CO = 0-20 PPM
MOBIL / WSPA
SG 401 A
RUN 4A
6/4/92
@ 5 CM/HR
CO2 = 0-20 %

SWEPI GAS TURBINE TEST DATA

(JUNE 9-10, 1992)

PAH EMISSION DATA

Table B-11: Polycyclic Aromatic Hydrocarbon (PAH) Emission Data - SWEPI (SEKR) Gas Turbine #2

Run Number		# 1	# 3	# 4
Date		06/09/92	06/10/92	06/10/92
Time		1025-1440	0750-1229	1447-1929
DGMCF	(---)=	0.993	0.993	0.993
Dry Gas Meter Volume	(cu. ft.)=	131.32	148.84	148.04
PTCF	(---)=	0.84	0.84	0.84
Barometric Pressure	(" Hg)=	29.57	29.59	29.41
Impinger Weight Gain	(grams)=	273.3	309.7	306.4
Percent Oxygen	(% O2)=	14.9	14.8	14.9
Percent Carbon Dioxide	(% CO2)=	2.9	2.8	2.9
Average Delta H	(" H2O)=	0.99	1.06	1.00
Pressure at Meter	(" Hg)=	29.64	29.67	29.48
Pressure in Stack	(" H2O)=	-0.14	-0.14	-0.19
Temp at Meter	(deg F)=	106	100	111
Temp in Stack	(deg F)=	290	294	291
Nozzle Diameter	(inches)=	0.208	0.208	0.208
Total Sampling Time	(minutes)=	240.0	264.0	264.0
Sq Rt Stack Gas Vel Press	((a))=	0.835	0.862	0.840
Standard Temp	(deg F)=	60.0	60.0	60.0
Standard Pressure	(" Hg)=	29.92	29.92	29.92
Diameter of Stack	(feet)=	3.85	3.85	3.85
Heat Input	(MMBtu/h)=	45.5	45.7	45.0
Volume of Gas Sampled	(dscf)=	118.78	136.01	131.92
Moisture Fraction	(% H2O)=	9.6%	9.6%	9.7%
Gas Molecular Weight	(g/mole)=	28.00	27.99	27.98
Stack Gas Velocity	(ft/sec)=	57.1	59.1	57.6
Percent Isokinetic	(%)=	98.9%	99.9%	99.7%
Volumetric Stack Flow	(acfm)=	39,861	41,274	40,252
Volumetric Stack Flow	(dscfm)=	24,683	25,437	24,730

(a) (in.H2O)**0.5

Table B-11: PAH Emission Data - SWEPI (Southeast Kern River) HRSG 102

Run Number Date	# 1 06/09/92	# 3 06/10/92	# 4 06/10/92	Avg.
PAH Compounds (ng/sample)=				
Naphthalene	1,100	880	950	--
Acenaphthylene	6.2	< 5.0	< 5.0	--
Acenaphthene	14	8.2	< 5.0	--
Fluorene	50	27	16	--
Phenanthrene	230	150	80	--
Anthracene	55	16	7.5	--
Fluoranthene	23	17	10	--
Pyrene	28	19	10	--
Chrysene*	10	5.5	< 5.0	--
Benz(a)anthracene*	9.3	< 5.0	< 5.0	--
Benzo(b)fluoranthene*	< 5.0	< 5.0	< 5.0	--
Benzo(k)fluoranthene*	< 5.0	< 5.0	< 5.0	--
Benzo(a)pyrene*	< 5.0	< 5.0	< 5.0	--
Indeno(1,2,3-c,d)pyrene*	< 5.0	< 5.0	< 5.0	--
Dibenz(a,h)anthracene*	< 5.0	< 5.0	< 5.0	--
Benzo(g,h,i)perylene	< 5.0	< 5.0	< 5.0	--
Total (7 Carcinogens (*))	32	21	18	-
Total (excluding naphthalene)	441	263	149	-
Total (including naphthalene)	1541	1143	1099	--
PAH Concentration (ng/dscm)=				
Naphthalene	327	228	254	27[illegible]
Acenaphthylene	1.8	< 1.3	< 1.3	0.8[illegible]
Acenaphthene	4.2	2.1	< 1.3	2.[illegible]
Fluorene	15	7.0	4.3	8.[illegible]
Phenanthrene	68	39	21	4[illegible]
Anthracene	16	4.2	2.0	7.[illegible]
Fluoranthene	6.8	4.4	2.7	4.[illegible]
Pyrene	8.3	4.9	2.7	5.[illegible]
Chrysene*	3.0	1.4	< 1.3	1.[illegible]
Benz(a)anthracene*	2.8	< 1.3	< 1.3	1.[illegible]
Benzo(b)fluoranthene*	< 1.5	< 1.3	< 1.3	0.6[illegible]
Benzo(k)fluoranthene*	< 1.5	< 1.3	< 1.3	0.6[illegible]
Benzo(a)pyrene*	< 1.5	< 1.3	< 1.3	0.6[illegible]
Indeno(1,2,3-c,d)pyrene*	< 1.5	< 1.3	< 1.3	0.6[illegible]
Dibenz(a,h)anthracene*	< 1.5	< 1.3	< 1.3	0.6[illegible]
Benzo(g,h,i)perylene	< 1.5	< 1.3	< 1.3	0.6[illegible]
Total (7 Carcinogens (*))	9.5	5.3	4.7	6.[illegible]
Total (excluding naphthalene)	131	68	40	8[illegible]
Total (including naphthalene)	458	297	294	35[illegible]

Table B-11: PAH Emission Data - SWEPI (Southeast Kern River) Gas Turbine HR

Run Number Date		# 1 06/09/92		# 3 06/10/92		# 4 06/10/92	Avg.
PAH Emission Rate (lb/hr x 10-9)=							
Naphthalene		30,237		21,770		23,558	25,188
Acenaphthylene		170	<	124	<	124	80
Acenaphthene		385		203	<	124	217
Fluorene		1,374		668		397	813
Phenanthrene		6,322		3,711		1,984	4,006
Anthracene		1,512		396		186	698
Fluoranthene		632		421		248	434
Pyrene		770		470		248	496
Chrysene*		275		136	<	124	158
Benz(a)anthracene*		256	<	124	<	124	126
Benzo(b)fluoranthene*	<	137	<	124	<	124	64
Benzo(k)fluoranthene*	<	137	<	124	<	124	64
Benzo(a)pyrene*	<	137	<	124	<	124	64
Indeno(1,2,3-c,d)pyrene*	<	137	<	124	<	124	64
Dibenz(a,h)anthracene*	<	137	<	124	<	124	64
Benzo(g,h,i)perylene	<	137	<	124	<	124	64
Total (7 Carcinogens (*))		874		507		434	605
Total (excluding naphthalene)		12,109		6,499		3,682	7,430
Total (including naphthalene)		42,346		28,268		27,240	32,618
PAH Emission Ratio (lb/MMBtu x 10-9)=							
Naphthalene		665		476		524	555
Acenaphthylene		3.7	<	2.7	<	2.8	1.8
Acenaphthene		8.5		4.4	<	2.8	4.8
Fluorene		30		15		8.8	18
Phenanthrene		139		81		44	88
Anthracene		33		8.7		4.1	15
Fluoranthene		14		9.2		5.5	9.5
Pyrene		17		10		5.5	11
Chrysene*		6.0		3.0	<	2.8	3.5
Benz(a)anthracene*		5.6	<	2.7	<	2.8	2.8
Benzo(b)fluoranthene*	<	3.0	<	2.7	<	2.8	1.4
Benzo(k)fluoranthene*	<	3.0	<	2.7	<	2.8	1.4
Benzo(a)pyrene*	<	3.0	<	2.7	<	2.8	1.4
Indeno(1,2,3-c,d)pyrene*	<	3.0	<	2.7	<	2.8	1.4
Dibenz(a,h)anthracene*	<	3.0	<	2.7	<	2.8	1.4
Benzo(g,h,i)perylene	<	3.0	<	2.7	<	2.8	1.4
Total (7 Carcinogens (*))		19		11.1		9.6	13
Total (excluding naphthalene)		266		142		82	163
Total (including naphthalene)		931		619		605	718

RADIAN CORPORATION

METHOD 5
FIELD DATA

RUN #1
PAGE 1 OF 3

PLANT	SWEPI	PROBE LENGTH AND TYPE	7' Glass	HEIGHT OF LOCATION (ft)	20'
DATE	6/9/92	NOZZLE I.D. (in)	0.208	DUCT DIMENSIONS	~~46.25~~ 46.25
SAMPLING LOCATION	HRSG the	METER BOX NUMBER	SAC-05	FILTER NUMBER	
SAMPLE TYPE	PAH	METER Δ H@	1.88	ASSUMED MOISTURE (%)	8.5
RUN NUMBER	#1	Yd	0.993	MOISTURE METHOD	CARB U
OPERATOR	MJ/KW	K FACTOR	1.3	MOISTURE DATA	
AMBIENT TEMPERATURE	90	PROBE HEATER SETTING	250	O2/CO2 METHOD	
BAROMETRIC PRESSURE	29.57	HEATER BOX SETTING	250	O2	
STATIC PRESSURE (Ps)	~~-0.42~~ -0.14			CO2	
INITIAL LEAKCHECK	0.010 cfm @ 10" Hg			FINAL LEAKCHECK	

READ AND RECORD ALL DATA EVERY ____ MINUTES

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	#1 Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	#3 Filter Temperature (°F)	Temperature (°F) Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	#4 / #5 Impinger / Exit	Pump Vacuum (in. Hg)	#2 Probe Temp (°F)
Bkd. Start	1025	0	999.740									
A-1	~~1030~~	~~5~~	—	0.92	293	1.25	247	99	97	80/48	4	253
A-1	1035	10	1003.5	0.92	293	1.25	245	100	97	66/46	4.5	~~253~~
A2	1040	15	1006.7	0.97	292	1.35	247	100	97	66/47	5.5	253
-2	1045	20	1010.2	0.98	293	1.40	250	101	98	71/50	6.0	257
-0.42 -3	1050	25	1013.0	0.93	293	1.30	249	102	98	74/54	5.8	253
-3	1055	30	1015.8	0.98	293	1.35	249	102	99	75/53	6.0	250
-4	1100	35	1019.5	0.95	294	1.30	249	104	100	74/53	5.8	252
-4	1105	40	1022.4	0.95	293	1.30	250	105	100	70/47	5.8	258
-5	1110	45	1025.5	0.95	292	1.30	249	106	101	68/47	5.8	254
-5	1115	50	1028.7	0.95	292	1.30	246	107	102	67/49	5.7	253
-6	1120	55	1032.2	0.85	292	1.20	248	108	103	68/52	5.6	252
-6	1125	60	1034.85	0.85	292	1.20	248	108	103	66/51	5.6	252
-7	1130	65	1037.5	0.65	292	0.86	249	109	105	63/46	4.8	251
-7	1135	70	1040.3	0.65	292	0.86	249	108	104	63/46	4.8	251
-8	1140	75	1042.9	0.62	291	0.88	249	108	104	61/46	4.9	257
-8	1145	80	1045.35	0.57	291	0.80	247	107	104	61/47	4.8	252
-9	1150	85	1048.2	0.56	290	0.79	248	107	104	62/48	4.5	253
-9	1155	90	1050.4	0.53	290	0.77	248	108	105	64/49	4.5	251
-10	1200	95	1052.9	0.51	290	[illegible]	251	109	106	65/50	4.3	253

Revision: 11/90

RADIAN CORPORATION

METHOD 5 FIELD DATA

RUN #1
PAGE 2 OF 3

PLANT	SWEPI
DATE	6/9/92
SAMPLING LOCATION	HRSG #2
SAMPLE TYPE	PAH
RUN NUMBER	#1
OPERATOR	KMW

P static	Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit	Pump Vacuum (in. Hg)	Probe Temp
		1200	95	1052.9									
-0.28	-10	1205	100	1055.3	0.53	288	0.74	250	108	106	60/49	-4.3	249
	-11	1210	105	1057.7	0.45	264	0.63	248	108	106	60/48	-4.0	256
	-11	1215	110	1059.9	0.47	264	0.62	247	108	106	61/47	-4.0	252
	-12	1220	115	1062.0	0.35	~~266~~	0.46	248	108	106	62/48	3.9	257
	-12	1225	120	1064.08	0.35	~~242~~	0.46	~~258~~	108	106	65/47	3.9	258
		1228		Midtest leak Rate 0.002 @ – 7 in Hg									
		1235		Midtest leak Rate 0.002 @ – 7 in Hg									
				1064.17									
start	~~B-1~~	1240	120	1064.17									
	B-1	1245	125	1066.4	0.51	293	0.71	244	105	105	73/44	4.8	253
	B-1	1250	130	1068.7	0.54	293	0.76	251	105	105	70/39	4.5	250
~~-.27~~ -0.27	B-2	1255	135	1071.1	0.52	293	0.74	250	106	105	68/39	4.5	249
	B-2	1300	140	1073.8	0.55	294	0.78	251	106	105	67/39	4.8	250
	B-3	1305	145	1076.0	0.50	294	0.71	249	107	105	65/40	4.8	251
	B-3	1310	150	1078.4	0.54	294	0.76	249	108	106	66/40	4.8	250
	B-4	1315	155	1081.7	0.50	294	0.71	249	109	106	66/40	4.0	250
	B-4	1320	160	1083.4	0.52	293	0.74	246	108	106	67/42	4.5	250
	B-5	1325	165	1085.9	0.52	292	0.74	250	108	106	69/42	4.5	257
	B-5	1330	170	1088.3	0.54	293	0.76	249	109	107	71/42	5	253

COMMENTS:

Revision: 1

RADIAN CORPORATION

METHOD 5 FIELD DATA

RUN #1
PAGE 3 OF 3

PLANT	SWEPI	PROBE LENGTH AND TYPE	7 Glass	HEIGHT OF LOCATION (ft)	20'
DATE	6/9/92	NOZZLE I.D. (in)	0.208	DUCT DIMENSIONS	46.25
SAMPLING LOCATION	HRSG #2	METER BOX NUMBER	Sac-05	FILTER NUMBER	
SAMPLE TYPE	PAH	METER Δ H@	1.88	ASSUMED MOISTURE (%)	8.5
RUN NUMBER	#1	Yd	0.993	MOISTURE METHOD	Carb 4
OPERATOR	KW/AL	K FACTOR	1.35	MOISTURE DATA	
AMBIENT TEMPERATURE	90	PROBE HEATER SETTING	250	O2/CO2 METHOD	
BAROMETRIC PRESSURE	29.57	HEATER BOX SETTING	250	O2	
STATIC PRESSURE (Ps)				CO2	
INITIAL LEAKCHECK	0.010 cfm @ 10" Hg			FINAL LEAKCHECK	.005 cfm @ 8" Hg

READ AND RECORD ALL DATA EVERY 5 MINUTES

Traverse Point Number	~~Sampling~~ Clock Time (min)	Sampling Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Dry Gas Meter Inlet (Tm in) (°F)	Dry Gas Meter Outlet (Tm out) (°F)	Impinger Exit / XAD-2 (°F)	Pump Vacuum (in. Hg)	Probe Temp (°F)
	—	—	—									
B-6	1335	175	1090.9	0.57	293	0.80	246	109	107	71/43	5	248
B-6	1340	180	1093.4	0.57	292	0.80	249	108	106	69/41	5	257
B-5 7	1345	185	1096.3	0.81	290	1.15	247	108	106	65/41	5.5	256
B-7	1350	190	1099.3	0.83	289	1.18	248	108	106	64/41	5.6	258
B-8	1355	195	1102.5	0.94	289	1.32	249	108	106	65/43	5.6	259
B-8	1400	200	1106.0	0.93	289	1.25	248	109	106	65/42	5.7	256
B-9	1405	205	1109.1	0.96	287	1.35	246	109	106	67/42	5.8	258
B-9	1410	210	1111.3	0.96	287	1.35	249	109	106	67/43	5.8	251
B-10	1415	215	1114.3	0.94	284	1.32	249	109	106	69/43	5.7	251
B-10	1420	220	1117.5	0.92	284	1.25	248	109	106	69/43	5.7	248
B-11	1425	225	1120.4	0.90	282	1.27	248	109	106	67/44	5.5	250
B-11	1430	230	1123.3	0.90	279	1.27	249	109	107	65/46	5.5	251
B-12	1435	235	1126.18	0.65	269	0.90	251	110	107	66/47	5.0	250
B-12	1440	240	1128.81	0.62	158	0.88	251	110	107	68/48	5.0	247
			~~131.32~~									
Ave		240	131.72	0.935	289.60	0.991			105.6			

Revision: 11/90

RADIAN CORPORATION

METHOD 5
FIELD DATA

RUN 3
PAGE 3 OF 3

PLANT	SWEPI	PROBE LENGTH AND TYPE	7', glass	HEIGHT OF LOCATION (ft)	≈ 25 ft
DATE	6/10/92	NOZZLE I.D. (in)	0.208	DUCT DIMENSIONS	46
SAMPLING LOCATION	HRSG #2	METER BOX NUMBER	SAC 05	FILTER NUMBER	
SAMPLE TYPE	PAH	METER Δ H@	1.88	ASSUMED MOISTURE (%)	9%
RUN NUMBER	3	Yd	0.99	MOISTURE METHOD	Cum M-4
OPERATOR	KMW	C FACTOR	1.35	MOISTURE DATA	
AMBIENT TEMPERATURE	75°	PROBE HEATER SETTING	250	O2/CO2 METHOD	
BAROMETRIC PRESSURE	29.59	HEATER BOX SETTING	250	O2	
STATIC PRESSURE (Ps)	~~-0.35~~ -0.14			CO2	
INITIAL LEAKCHECK	0.01 CFM @ -7 in Hg			FINAL LEAKCHECK	

READ AND RECORD ALL DATA EVERY 5.5 MINUTES

Static P	Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit	Pump Vacuum (in. Hg)	Probe Temp
		~~0750~~ 0800	~~0.00~~ 0750	0129.135									
	A-1	5.5	0755	0132.4	0.91	295	1.3	250	83	80	72/51	5.0	249
	A-1	11.0	0801	0135.5	0.91	295	1.3	251	85	81	[illegible]/46	5.0	249
	A-2	16.5	0806	0138.8	0.97	296	1.35	252	89	83	61/42	7.0	256
0.42	A-2	22.0	0811	141.9	0.99	296	1.40	249	89	83	61/43	7.5	253
	A-3	27.5	0819	146.4	1.00	296	1.40	249	91	85	59/43	7.8	252
	A-3	33.0	[illegible]	[illegible]	1.1	296	1.55	249	94	87	57/41	9.0	254
	A-4	38.5	0830	152.1	.96	276	1.35	250	95	88	57/42	8.0	250
-0.43	A-4	44.0	0835½	155.6	1.0	296	1.40	250	96	88	57/42	8.0	255
	A-5	49.5	0841	159.20	0.92	296	1.30	251	96	89	58/42	8.0	251
	A-5	55.0	0846½	162.70	0.95	296	1.35	247	97	90	57/43	8.0	251
	A-6	60.5	0852	166.4	0.92	296	1.30	250	98	91	58/43	8.0	254
	A-6	66.0	0857.5	170.05	0.92	296	1.30	251	99	92	58/43	8.0	251
	A-7	71.5	0901.5	173.1	0.86	296	1.20	248	100	93	59/43	7.5	253
	A-7	77.0	0907.25	176.47	0.85	296	1.15	248	100	94	59/43	7.5	250
	A-8	82.5	0913	179.70	0.66	295	0.93	247	98	94	60/44	6.8	247
	A-8	88.0	0918.12	182.43	0.66	296	0.93	249	100	95	61/45	6.8	259
	A-9	93.5	0923	185.7	0.58	296	0.81	249	100	95	62/47	6.2	249
	A-9	99.0	0929.12*	189.08	0.59	295	0.81	249	100	96	58/46	6.2	259
	A-10	104.5	0934.45*	190.05	0.60	293	0.83	250	99	95	56/45	6.4	252

COMMENTS: * Seconds

Revision: 11/90

RADIAN CORPORATION

METHOD 5
FIELD DATA

RUN 3
PAGE 2 OF 3

PLANT	SWEPI
DATE	6/10/92
SAMPLING LOCATION	
SAMPLE TYPE	PAH
RUN NUMBER	3
OPERATOR	KMW

P static	Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit	Pump Vacuum (in. Hg)	T probe
		104.5	0934.43*	190.05									
	A-10	110	940.68*	193.74	0.57	294	0.81	248	100	96	57/44	6.2	253
	A-11	115.5	945.39*	196.45	0.48	282	0.67	251	103	98	57/44	5.8	259
0.235	A-11	121.0	951.04*	199.08	0.52	279	0.72	248	103	98	57/45	6.0	256
	A-12	126.5	0956.38	201.47	0.38	~~274~~	0.53	251	103	99	60/44	5.2	254
	A-12	132.0	1002.13	203.79	0.39	—	0.54	251	104	100	61/45	5.2	~~400~~
				Mid-Test Leak Check #1				0.01					
		132.0	1012/1017.0	Mid-Test Leak Check #2				0.01					
	B-1	137.5	1022.35	203.92 206.65	0.52	296	0.72	252	102	100	74/46	6.8	253
0.25	B-1	143.0	1028.09	209.3	0.48	296	0.67	252	103	100	62/44	6.0	253
	B-2	148.5	1033.40	211.93	0.54	297	0.76	251	104	101	61/46	6.2	252
	B-2	154.0	1039.16	214.65	0.55	297	0.77	249	105	102	61/46	6.2	251
	B-3	159.5	1044.37	217.33	0.54	297	0.86	249	106	102	63/47	6.2	255
	B-3	165.0	1050.14	220.07	0.54	297	0.76	248	106	103	60/46	6.3	250
	B-4	170.5	1055.36	222.77	0.55	297	0.76	247	107	104	60/46	6.5	252
0.28	B-4	176.0	1101.08	225.5	0.55	296	0.76	245	107	104	60/46	6.5	253
	B-5	181.5	1106.37	228.28	0.56	297	0.78	247	108	104	62/47	6.5	252
	B-5	187.0	1112.06	231.01	0.55	297	0.76	247	108	105	63/45	6.5	250
	B-6	192.5	1117.43	233.9	0.62	297	0.86	249	108	105	64/45	6.8	256
0.35	B-6	198.0	1123.31	236.8	0.62	297	[illegible]	249	109	106	64/47	7.0	250

RADIAN CORPORATION

METHOD 5
FIELD DATA

RUN 3
PAGE 3 OF 3

PLANT	SWEPI
DATE	6/10/92
SAMPLING LOCATION	HRSG #2
SAMPLE TYPE	PAH
RUN NUMBER	3
OPERATOR	KW/SF

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Temperature (°F) Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit	Pump Vacuum (in. Hg)	
	198.0	1123.31	236.8									
B-7	203.5	1128.42	240.0	0.90	295	1.25	250	107	106	65/47	8.0	251
B-7	209.0	1134	243.50	0.86	296	1.20	249	110	106	66/47	8.0	252
B-8	214.5	1139½	247.00	1.1	295	1.50	253	110	107	67/49	8.5	251
B-8	220.0	1145	250.90	1.0	296	1.40	251	111	107	65/46	8.5	252
B-9	225.5	1150½	—	1.1	296	1.50	249	111	107	66/43	8.5	253
B-9	231.0	1156	258.4	1.1	296	1.50	249	110	107	66/43	8.5	251
-0.46 B-10	236.5	1201½	261.7	0.98	291	1.35	248	110	107	66/42	8.0	254
B-10	242.0	1207	265.4	0.95	291	1.35	250	111	108	67/45	8.0	252
B-11	247.5	1212½	268.6	0.84	282	1.15	251	111	108	68/45	8.0	250
B-11	253.0	1218	271.9	0.86	284	1.2	248	111	108	59/48	8.0	254
B-12	258.5	1223½	275.00	0.69	—	0.96	249	110	108	67/46	7.0	250
B-12	264.0	1229	278.10	0.69	—	0.96	248	110	107	64/43	7.0	251
		Leak Check 0.01 cfm @ 9" Hg										
Ave	264		148.842	0.862	294.43	1.06			100.3			

Revision: 1

RADIAN CORPORATION

METHOD 5 FIELD DATA

RUN 4
PAGE 1 OF 3

PLANT	SWEPI	PROBE LENGTH AND TYPE	7' glass	HEIGHT OF LOCATION (ft)	25
DATE	6/10/92	NOZZLE I.D. (in)	0.208	DUCT DIMENSIONS	46
SAMPLING LOCATION	HRSG #2	METER BOX NUMBER	Sac-05	FILTER NUMBER	
SAMPLE TYPE	PAH	METER Δ H@	1.88	ASSUMED MOISTURE (%)	9%
RUN NUMBER	4	Yd	0.993	MOISTURE METHOD	CARB 4
OPERATOR	SF/KW	K FACTOR	C= 1.35	MOISTURE DATA	
AMBIENT TEMPERATURE	98	PROBE HEATER SETTING	250	O2/CO2 METHOD	
BAROMETRIC PRESSURE	29.41	HEATER BOX SETTING	250	O2	
STATIC PRESSURE (Ps)	+ 0.44 -0.19			CO2	
INITIAL LEAKCHECK	0.01 cfm @10" Hg			FINAL LEAKCHECK	0.01 cFm @ 9" Hg

READ AND RECORD ALL DATA EVERY 5.5 MINUTES

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Dry Gas Meter Inlet (Tm in) (°F)	Dry Gas Meter Outlet (Tm out) (°F)	Impinger Exit (°F)	Pump Vacuum (in. Hg)	
	0	1447	310.76									
B-1	5.5	1452½	313.50	0.52	295	0.72	242	111	111	87/59	4.0	253
B-1	11.0	1458	316.00	0.52	296	0.72	252	112	112	74/50	3.0	255
B-2	16.5	1503½	318.75	0.55	296	0.77	251	113	113	70/51	3.0	252
B-2	22.0	1509	321.65	0.54	296	0.75	250	114	113	68/45	4.0	256
B-3	27.5	1514½	324.10	0.50	295	0.69	251	115	114	67/45	3.5	256
B-3	33.0	1520	326.80	0.52	294	0.72	248	115	113	63/45	4.0	256
B-4	38.5	1525½	329.56	0.52	294	0.72	251	115	114	65/45	4.5	253
B-4	44.0	1531	332.00	0.50	294	0.69	250	116	114	67/45	4.6	251
B-5	49.5	1536½	334.80	0.52	294	0.72	251	115	113	64/46	4.5	253
B-5	55.0	1542	337.55	0.52	294	0.72	251	115	114	69/45	4.5	256
B-6	60.5	1547½	340.20	0.50	294	0.69	250	116	114	69/44	4.5	252
B-6	66.0	1553	342.85	0.54	293	0.75	251	117	115	62/45	4.5	[illegible]
B-7	71.5	1558½	346.30	0.86	293	1.20	248	118	116	64/44	5.5	257
B-7	77	1604	349.60	0.83	293	1.15	248	119	116	59/43	5.0	253
B-8	82.5	1609½	353.10	0.95	293	1.30	251	120	117	61/43	5.5	256
B-8	88.0	1615	357.00	0.95	293	1.30	249	121	117	63/45	5.5	253
B-9	93.5	1620½	360.70	1.05	292	1.45	248	120	117	65/45	6.0	253
-0.51 B-9	99.0	1626	364.50	1.05	291	1.45	250	120	117	61/47	6.0	254
[illegible]	104.5	1631½	368.00	1.00	289	[illegible]2	248	121	117	63/46		255

Revision: 11/90

RADIAN CORPORATION

METHOD 5
FIELD DATA

RUN 4
PAGE 2 OF 3

PLANT	SWEPI
DATE	6/10/92
SAMPLING LOCATION	HRSG #2
SAMPLE TYPE	PAH
RUN NUMBER	4
OPERATOR	LP/KW

P Stat	Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit	Pump Vacuum (in. Hg)	T Probe
		104.5	1631.5	368.00									
	B-10	110	1637	371.70	1.00	289	1.40	248	120	117	63/45	6.0	251
	B-11	115.5	1642½	375.10	0.82	286	1.15	250	118	116	63/47	5.0	255
	B-11	121	1648	378.30	0.82	284	1.15	248	120	116	64/46	5.0	256
	B-12	126.5	1653½	381.40	0.68	—	0.93	248	117	115	66/46	5.0	250
-.29	B-12	132	1659	~~388~~ 384.375	0.68	—	0.93	249	117	114	67/46	5.0	250
			Post B traverse 0.008 cfm @ 8" Hg										
			Pre A traverse leak check 0.010 cfm @ 8" Hg										
	~~A-1~~	132	1718	384.510	0.92	~~292~~	1.33	247	~~110~~	111	69/47	6.0	246
	A-1	137.5	1723.44	~~388.1~~	~~0.92~~	292	~~1.33~~	~~249~~	110	~~110~~	~~65/46~~	~~5.8~~	~~251~~
	A-1	143	1721.16	391.55 ~~388~~	0.89	292	1.27	249	110	110	65/46	5.8	251
	A-2	148.5	1734	395.09	0.98	292	1.40	249	110	109	67/46	6.0	247
-0.42	A-2	154	1740	398.65	0.98	292	1.40	246	110	109	68/48	6.0	255
	A-3	159.5	1745.40	402.3	0.98	293	1.40	248	111	109	71/47	6.0	255
	A-3	165.0	1751	405.83	0.99	293	1.35	247	112	109	72/48	6.0	254
-0.47	A-4	170.5	1756.43	409.4	0.95	293	1.32	247	112	109	58/48	-6.0	250
	A-4	176.0	1802.03	412.98	0.95	293	1.32	250	112	109	56/46	-6.0	257
-0.45	A-5	181.5	1807.28	414.49	0.90	293	1.25	245	112	109	57/48	5.8	253
	A-5	187.0	1813.21	419.95	0.90	293	1.25	247	112	108	58/48	5.9	252

CO[illegible] [illegible]S:

Revision: 1

RADIAN CORPORATION

METHOD 5 FIELD DATA

RUN 4
PAGE 3 OF 3

PLANT	SWEPI
DATE	6/10/92
SAMPLING LOCATION	HRSG #2
SAMPLE TYPE	PAH
RUN NUMBER	4
OPERATOR	KW/SP

P Static	Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Dry Gas Meter Inlet (Tm in) (°F)	Dry Gas Meter Outlet (Tm out) (°F)	Impinger Exit (°F)	Pump Vacuum (in. Hg)	T Probe
		187.0	1813.21	419.95									
	A-6	192.5	1819.20	423.7	0.82	293	1.12	249	111	108	60/49	5.3	250
0.47	A-6	198.0	1824.10	426.66	0.84	292	1.15	246	110	107	59/50	5.3	253
	A-7	203.5	1829.39	429.74	0.66	292	0.91	248	110	107	61/48	5.0	257
	A-7	209.0	1835.12	432.71	0.67	292	0.93	247	109	106	62/49	5.0	249
	A-8	214.5	1840.47	435.64	0.681	291	~~0.91~~ 0.95	245	107	105	64/50	4.9	247
-0.39	A-8	220.0	1846.14	438.54	0.63	290	0.88	246	106	104	64/52	5.0	252
	A-9	225.5	1851	441.2	0.57	290	0.79	248	104	103	68/50	5.0	252
	A-9	231.0	1857.10	444.11	0.58	290	0.80	245	103	102	67/49	5.0	253
	A-10	236.5	1902	446.86	0.54	287	0.74	248	102	101	69/50	4.5	249
-0.35	A-10	242.0	1908.09	449.44	0.55	288	0.76	245	101	100	70/52	4.5	248
	A-11	247.5	1913.41	451.91	0.46	260	0.59	247	100	99	65/54	4.0	244
	A-11	253.0	1919.10	454.32	0.49	260	0.61	248	100	99	67/52	4.0	249
-0.31	A-12	258.5	1924.48	456.64	0.41	~~153~~	0.55	247	98	97	72/54	4.0	246
	A-12	264.0	1929	458.935	0.41	~~166~~	0.55	246	98	97	72/55	4.0	230
	Ave	264	~~283~~	149.036	0.840	290.66	1.00			~~110.0~~ 111.0			

RADIAN CORPORATION

IMPINGER SOLUTION RECOVERY FIELD DATA SHEET

Plant	~~[illegible]~~ SWEPI
Date	6/9/92
Sampling Location	HRSG #2
Sample Type	PAH
Run Number	1
Sample Box Number	SAC 04
Clean-up Person	KMW/SF
Solvent Rinses	Methanol, Hexane, Methylene Chloride
Sample Identification Code	S1-E, S1-F
XAD Trap Number	S1-D

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (g) Final	Initial	Weight Gain
1	KO None	Ø	MGS	669.65	428.80	240.85
2	DI H_2O	100g	GS	610.03	613.50	-3.47
3	DI H_2O	100g	MGS	592.96	590.30	2.66
4	Silica Gel	≈300g	FMGS	877.25	844.00	33.25
5						
6						
7						

TOTAL WEIGHT GAIN (g) 273.29

RADIAN

IMPINGER SOLUTION RECOVERY FIELD DATA SHEET

Plant	SWEPI
Date	6/10/92
Sampling Location	HRSG #2
Sample Type	PAH
Run Number	3
Sample Box Number	
Clean-up Person	SF
Solvent Rinses	methanol, Hexane, methylene chloride
Sample Identification Code	S3-E, S3-F
XAD Trap Number	S3-D

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (g) Final	Initial	Weight Gain
1	Empty		knock out	700.74	428.81	271.93
2	HPLC H_2O	100g	GS	608.89	608.64	0.25
3	HPLC H_2O	100g	MGS.	596.68	591.17	5.51
4	Silica Gel	≈300g	Inverted	881.46	849.43	32.03
5						
6						
7						

TOTAL WEIGHT GAIN (g) 309.72

RADIAN CORPORATION

IMPINGER SOLUTION RECOVERY FIELD DATA SHEET

Plant	SWEPI
Date	6/10/92
Sampling Location	HRSG #2
Sample Type	PAH
Run Number	4
Sample Box Number	
Clean-up Person	SF/KW
Solvent Rinses	Methanol, Hexane, Methylene Chloride
Sample Identification Code	S4-E, S3-F
XAD Trap Number	

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (g) Final	Initial	Weight Gain
1	Empty	--	Knock-out	687.61	428.76	258.85
2	HPLC H_2O	100g	GS	609.54	610.82	-1.28
3	HPLC H_2O	100g	MGS	597.23	593.09	4.14
4	Silica Gel	300g	Inverted	868.15	832.49	44.66
5						
6						
7						

TOTAL WEIGHT GAIN (g) 306.37

ALDEHYDE EMISSION DATA

ᵃble B-12: Formaldehyde, Acetaldehyde, and Acrolein Emission Data - SWEPI (Southeast Kern River) Gas Turbine HRSG #2

Run Number		# 1A		#1B		#2 (a)	AVG (b)
Date		06/09/92		06/09/92		06/09/92	
Time		1025-1238		1247-1501		1523-1743	
DGMCF (---)=		1.010		1.010		1.010	--
Dry Gas Meter Volume (liters)=		63.48		66.65		66.16	--
Barometric Pressure (" Hg)=		29.57		29.57		29.57	--
Meter Back-Pressure (" H2O)=		1.1		1.1		1.0	--
eter Pressure, Absolute(" Hg)=		29.65		29.65		29.65	--
Meter Temperature (deg F)=		110		114		116	--
tack Gas Flow Rate (c) (dscfm)=		24,683		24,683		24,140	--
Standard Temperature (deg F)=		60.0		60.0		60.0	--
Standard Pressure (" Hg)=		29.92		29.92		29.92	--
Heat Input (MMBTU/h)=		45.6		45.4		45.0	--
Aldehyde Qty Collected (ug)=							--
Formaldehyde		0.78	<	0.50	<	0.50	
Acetaldehyde		1.49		1.37	<	0.50	
Acrolein	<	0.50	<	0.50	<	0.50	
Volume of Gas Sampled (dscm)=		0.0589		0.0614		0.0607	--
ᵈehyde Concentration (ug/dscm)=							
Formaldehyde		13.2	<	8.1	<	8.2	7.1
Acetaldehyde		25.3		22.3	<	8.2	17.2
Acrolein	<	8.5	<	8.5	<	8.5	4.2
Aldehyde Concentration (ppbv)=							
Formaldehyde		10.5	<	6.4	<	6.5	5.6
Acetaldehyde		13.6		12.0	<	4.4	9.3
Acrolein	<	3.6	<	3.6	<	3.6	1.8
Aldehyde Emission Rate (lb/hr x 10-3)=							
Formaldehyde		1.2	<	0.75	<	0.74	0.66
Acetaldehyde		2.3		2.1	<	0.74	1.6
Acrolein	<	0.78	<	0.78	<	0.77	0.39
ldehyde Emission Ratio (lb/MMBTU x 10-6)=							
Formaldehyde		26.9	<	16.6	<	16.6	14.5
Acetaldehyde		51.3		45.4	<	16.6	35.0
Acrolein	<	17.2	<	17.3	<	17.1	8.6

a) Average of duplicate samples.
b) Average values were computed assuming that compounds that were below the detection limit were present at one-half of the detection limit.
c) Based on flow rate data collected during the PAH testing (refer to Table B-11).

RADIAN CORPORATION

Table B-13: Volumetric Flow Rate Data - SWEPI (SEKR) Gas Turbine HRSG #2 Exhaust Stack

Run Number		#2
Date		6/9/92
Time		1633-1650
PTCF	(---)=	0.84
Barometric Pressure	(" Hg)=	29.57
Percent Oxygen	(% O2)=	14.9
Percent Carbon Dioxide	(% CO2)=	3.0
Stack Gas Static Press.	(" H2O)=	-0.44
Stack Gas Temperature	(deg F)=	286
SQRT-Stack Gas V-Press.	(P*1/2)=	0.815
Stack Gas Moist. Content	(%)=	9.6
Diameter of Stack	(feet)=	3.85
Standard Temp	(deg F)=	60.0
Standard Pressure	(" Hg)=	29.92
Gas Molecular Weight	(g/mole)=	28.01
Stack Gas Velocity	(ft/sec)=	55.5
Volumetric Stack Gas Flow	(acfm)=	38,780
Volumetric Stack Gas Flow	(dscfm)=	24,140

RADIAN CORPORATION

Formaldehyde Field Data Sheet

Plant SWEPF

Date 6/9/92

Location HBSC # 2

Console # SACV02

DGMCF Y=1.01

Test ID 1A

Leak Rate (L/min) 0.000 @ 5"Hg

Barometric Pressure (in Hg) 29.57

Sampling Duration (min) 133

Operator KMW, ML

Time	DGM Reading (L)	Rotometer (L/min)	Meter Temp. (°C) Inlet	~~Outlet~~	Meter Pressure (in H2O)	Pump Vacuum (in Hg)
1025	192.95		39			
1035	198.5	0.5	40		1.1	<1
1046	203.0	0.5	41		1.1	<1
1058	209.0	0.5	42		1.1	<1
1107	—	0.5	43		1.1	<1
1121	219.0	0.5	45		1.0	<1
1127	223.5	0.5	45		1.0	<1
1142	230.0	0.5	45		1.1	<1
1152	235.0	0.5	45		1.1	<1
1208	244.0	0.5	46		1.1	<1
1222	249.5	0.5	45		1.1	<1
Stop @ 1238	256.425					
Avg. 133	63.475	0.5	43.3		1.08	<1

(109.94)

RADIAN CORPORATION

Formaldehyde Field Data Sheet

Plant SWEPI

Date 6/9/92

Location HRSG #2

Console # SAC-V02

DGMCF 1.01

Test ID 1B

Leak Rate (L/min) Pre-Test 0.000 lpm @ 12" Hg / Post-Test 0.000 lpm @ 12" Hg

Barometric Pressure (in Hg) 29.57

Sampling Duration (min) 133.7

Operator MJ / KW

Time	DGM Reading (L)	Rotometer (L/min)	Meter Temp. (°C) Inlet	~~Outlet~~	Meter Pressure (in H2O)	Pump Vacuum (in Hg)
Start @ 1247/0	256.740					
12	—	0.5	44	—	+1.0	<2
23	268.000	0.5	46	—	+1.0	<2
36	274.50	0.5	45	—	+1.0	<2
46	~~27~~ 279.50	0.5	46	—	+1.1	<2
60	287.0	0.5	45	—	+1.1	<2
70	292.0	0.5	46	—	+1.1	<2
89	301.7	0.5	46	—	+1.1	<2
106	309.8	0.5	47	—	+1.1	<2
Stop @ 1500 133.7	323.39					
Avg. 133.7	66.65	0.5	45.6		1.1	<2

(114.08)

RADIAN
CORPORATION

Formaldehyde Field Data Sheet

Plant SWEPI
Date 6/9/92
Location Gas Turbine #2
Console # SAC-V02
DGMCF 1.01

Test ID 2
Leak Rate (L/min) Pre-Test 0.000 @ 12" Hg / Post-test 0.000 @ 13" Hg
Barometric Pressure (in Hg) 29.57
Sampling Duration (min) 140
Operator [illegible]/KHW

Time	DGM Reading (L)	Rotometer (L/min)	Meter Temp. (°C) Inlet	~~Outlet~~	Meter Pressure (in H_2O)	Pump Vacuum (in Hg)
Start 1523/0	325.79					
6	328.5	0.5	46	—	1.0	< 2
28	340.3	0.5	47	—	1.0	< 2
39	345.5	0.5	47	—	1.0	< 2
49	350.6	0.5	48	—	1.05	< 2
81	367.0	0.5	46	—	1.05	< 2
101	376.5	0.5	46	—	1.05	< 2
110	381.0	0.5	46	—	1.05	< 2
129	390.3	0.5	46	—	1.05	< 2
133	391.95					
1743 →	Post test	leak	check	0.000		
Avg.	66.16	0.5	46.5		1.03	< 2

(115.7)

5000 Y/L [illegible]

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Velocity Traverse Data Sheet

PLANT SWEPI
DATE 6/9/92
LOCATION HRGT #2
STACK I.D. 4.25"
BAROMETRIC PRESSURE in. Hg 29.57
STACK GAUGE PRESSURE in. H2O -0.44
OPERATORS [illegible]/KW

Test 2

Start 16:33 Stop @ 1650

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
B-1	0.46	284
-2	0.52	288
-3	0.49	289
-4	0.49	289
-5	0.50	289
-6	0.52	290
-7	0.75	290
-8	0.88	289
-9	0.94	288
-10	0.94	288
-11	0.80	283
12	0.60	264
AVERAGE		

SCHEMATIC OF TRAVERSE POINT LAYOUT

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
A-1	0.91	287
-2	0.96	288
-3	0.97	288
-4	0.94	288
-5	0.90	289
-6	0.80	289
-7	0.65	289
-8	0.59	289
-9	0.54	289
-10	0.46	288
-11	0.40	285
-12	0.31	253
AVERAGE	0.8145	285.5

BTEX, PROPYLENE, AND THC EMISSION DATA

Table B-14: BTEX, Propylene, and Total Hydrocarbon Emission Data - SWEPI (SEKR) Gas Turbine #2

Run Number		# 2A	# 2B	# 3A(a)	AVG (b)
Date		06/09/92	06/09/92	06/10/92	
Time		1614-1644	1657-1727	0804-0835	
Barometric Pressure	(" Hg)=	29.57	29.57	29.59	--
Stack Gas Flow Rate(c)	(dscfm)=	24,140	24,140	24,730	--
Standard Temperature	(deg F)=	60.0	60.0	60.0	--
Standard Pressure	(" Hg)=	29.92	29.92	29.92	--
Heat Input	(MMBtu/h)=	44.7	45.0	45.5	--
VOC Concentration (ppbv)=					
Benzene		< 1.0	< 1.0	< 1.0	0.50
Toluene		3.0	< 1.0	2.5	2.0
Ethylbenzene		< 1.0	< 1.0	< 1.0	0.5
Xylenes		2.0	< 1.0	6.3	2.9
Propylene		530	450	375	452
Total Hydrocarbons(d)		15,000	5,875	3,938	8,271
VOC Concentration (ug/dscm)=					
Benzene		< 3.3	< 3.3	< 3.3	1.6
Toluene		11.8	< 3.9	9.8	7.9
Ethylbenzene		< 4.5	< 4.5	< 4.5	2
Xylenes		9.1	< 4.6	28.5	13.[illegible]
Propylene		940	798	665	801
Total Hydrocarbons		10,135	3,970	2,660	5,588
Emission Rate (lb/hr x 10-6)=					
Benzene		< 298	< 298	< 305	150
Toluene		1,065	< 355	910	718
Ethylbenzene		< 409	< 409	< 419	206
Xylenes		825	< 412	2,641	1,224
Propylene		85,008	72,177	61,617	72,934
Total Hydrocarbons		916,531	358,975	246,470	507,325
Emission Ratio (lb/MMBtu x 10-6)=					
Benzene		< 6.7	< 6.6	< 6.7	3.3
Toluene		23.8	< 7.9	20.0	15.9
Ethylbenzene		< 9.1	< 9.1	< 9.2	4.6
Xylenes		18.5	< 9.2	58.0	27.0
Propylene		1,902	1,604	1,354	1,620
Total Hydrocarbons		20,504	7,977	5,417	11,299

(a) Duplicate samples were collected during Test 3A; data represent the averages of the two analyses, with the exception of ethylbenzene (refe (refer to the lab data in Appendix C and Section 3.3.3 of the text.)

(b) Average values are computed assuming that compounds which are below the detection limit, are present at one-half of the detection limit

(c) Based on data collected during a velocity traverse and during the P emissions testing (refer to Table B-11 and B-13).

(d) Quantified as methane.

RADIAN CORPORATION

VOCs Field Data Sheet

Plant SWEPI

Date 6/9/92

Location Gas Turbine #2

Console # 218

DGMCF

Bag ID S-20-A

Leak Rate (L/min)

Barometric Pressure (in Hg) ~~24.~~ KW 29.57

Sampling Duration (min)

Operator ML KW

Run 2-A

	Time	Rotameter (L/min)	Pump Vacuum (in Hg)
Start @	1614	9.5	—
	1630	9.5	—
Stop @	1644	9.5	—
	~~TAE~~ KW		
	Avg.		

RADIAN CORPORATION

VOCs Field Data Sheet

Plant SWEPI

Date 6/9/92

Location Gas Turbine #2

Console # 218

DGMCF

Bag ID S-21-A

Leak Rate (L/min)

Barometric Pressure (in Hg) 29.57

Sampling Duration (min)

Operator ML, KMW

Run # 2B

	Time	Rotameter (L/min)	Pump Vacuum (in Hg)
START →	1657	10.0	—
STOP →	1712	10.0	—
	1727	9.5	—
	Avg.		

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VOCs Field Data Sheet

Plant SWEPI
Date 6/10/92
Location HRSG #2
Console #
DGMCF

Bag ID S22A, S22B
Leak Rate (L/min)
Barometric Pressure (in Hg)
Sampling Duration (min) 30
Operator KW/SF

Run ~~#2C~~ 3A

	Time	Rotometer (L/min)	Pump Vacuum (in Hg)
Start	0804	10	
	0811	10	
	0817	10	
	0825	10	
Stop	0835	10	
	Avg.		

NO_X, CO, O_2, AND CO_2 EMISSION DATA

B-15 : NOx and CO Emission Data - SWEPI (SEKR) Gas Turbine #2 Exhaust Stack

Run Number	# 1	# 2	# 3	# 4	Average
Date	6/9/92	6/9/92	6/10/92	6/10/92	
Time	1025-1501	1523-1743	0750-1229	1447-1929	
Barometric Pressure (" Hg)=	29.57	29.57	29.59	29.41	--
Oxygen Concentration (% O2)=	14.9	14.9	14.8	14.9	--
CO2 Concentration (% CO2)=	2.9	3.0	2.8	2.9	--
Stack Gas Flow Rate (dscfm)=	24,683	24,140	25,437	24,730	--
Standard Temperature (deg F)=	60.0	60.0	60.0	60.0	--
Standard Pressure (" Hg)=	29.92	29.92	29.92	29.92	--
Heat Input (MMBTU/h)=	45.5	45.0	45.8	45.0	--
Concentration (ppmv)=					
NOx	26.2	25.6	27.0	26.6	26.3
CO	4.1	4.1	4.0	3.8	4.0
Concentration (mg/dscm)=					
NOx	50.9	49.6	52.4	51.6	51.1
CO	4.8	4.8	4.7	4.5	4.7
Emission Rate (lb/hr)=					
NOx	4.70	4.49	4.99	4.78	4.74
CO	0.45	0.44	0.45	0.42	0.44
Emission Ratio (lb/MMBTU x 10-3)=					
NOx	103.4	99.7	109.0	106.3	104.6
CO	9.8	9.7	9.9	9.3	9.7

SUMMARY OF TEST RESULTS

Date	Location	Test No.	Test Time	NO_x (ppm)	CO (ppm)	CO_2 (%)	O_2 (%)
6/09/92	SEKR #2	1A	10:22 am - 11:22 am	28.53	4.02	3.02	14.87
		1B	11:45 am - 12:45 pm	25.98	4.02	2.99	14.96
		1C	1:00 pm - 2:00 pm	24.03	4.09	2.82	14.82
		1D	2:28 pm - 3:28 pm	26.16	4.18	2.91	14.89
		1E (2A)*	3:45 pm - 4:45 pm	25.48	4.14	2.96	14.88
		1F (2B)	4:55 pm - 5:35 pm	25.62	4.01	2.99	14.81
6/10/92	SEKR #2	2A (3A)	7:50 am - 8:50 am	27.42	3.98	2.81	14.93
		2B (3B)	9:17 am - 10:17 am	27.20	3.98	2.76	14.72
		2C (3C)	10:40 am - 11:40 am	26.94	4.14	2.91	14.87
		2D (3D)	12:07 pm - 12:37 pm	26.26	3.95	2.84	14.76
		~~4A~~	~~1:00 pm - 2:00 pm~~	~~26.52~~	~~3.94~~	~~2.78~~	~~14.90~~
		4B (4A)	2:50 pm - 3:50 pm	27.37	3.87	2.98	14.83
		4C (4B)	4:00 pm - 5:00 pm	25.92	3.82	2.83	14.90
		4D (4C)	5:15 pm - 6:15 pm	26.23	3.82	2.84	14.88
		4E (4D)	6:27 pm - 7:27 pm	26.75	3.85	2.86	14.86

* Note: Paranthetical test numbers refer to Radian test designations.

Steiner Environmental, Inc.

1/8

CONTINUOUS MONITOR DATA SHEET

Plant SWEPI (WSPA)
Date 6-9-92 Run No. #1-A & #1-B
Test Location SEKR #2
Operator JVM/SW
Fuel Type Nat. GAS Trailer No. #3

APCD Witness/Number
Client Rep Ken KirkPatrick.
Generator Type
Burner Type
O_2 Controller Type

Time	Sample Point	O_2 % (Dry Uncorrected)	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
		15.46	9.54	15.59			82.9	Span Gases
								Calibration
		0	0	0			0	Zero
		15.46	9.54	15.59			82.9	Span
		15.40	9.25	15.40			81.	Bias / Span
		0.0	0.0	0.0			0.0	Zero
		0.0						QA / Leak / OK.
		15.46	9.54	15.59			82.9	Cal Adjust
10:22		14.95	3.0	3.95			28.9	Run #1-A
10:32		14.95	3.0	3.97			29.5	
10:42		14.90	3.0	4.00			29.7	
10:52		14.75	3.0	4.10			28.2	
11:02		14.70	3.0	4.10			25.8	
11:12		14.65	3.0	4.05			25.2	
1122		0.05	0.0	0.0			-1.0	Zero ✓
		15.35	9.40	15.66			81.0	Span ✓
11:45		14.95	2.9	3.95			26.0	Run #1-B
11:55		14.90	2.9	4.05			26.0	
12:05		14.88	2.9	4.08			25.8	
12:15		14.88	3.0	4.00			25.9	
12:25		14.98	3.0	4.00			26.1	
12:35		14.88	3.0	4.00			26.1	

Miscellaneous Information

CALIBRATION GASES

NO_x CC98703
SO_2
CO
$CO/CO_2/O_2$ CC37858/CC98685

Wet Bulb: Dry Bulb:
Barometric Press:

RESPONSE TIME

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

PROCESS DATA

Fuel Flow:
Steam Flow:
Rating:

CONVERTER GAS

	Cal Gas Values	Actual Values
NO		
NO_2		

Conv. Efficiency:

Steiner Environmental, Inc.

CONTINUOUS MONITOR DATA SHEET

Plant SWEPI (WSPA)
Date 6-9-92 Run No. #1-C & #1-D
Test Location SEKR #2
Operator VVM/SW
Fuel Type Nat GAS Trailer No. #3

APCD Witness/Number
Client Rep KEN KirkPatrick
Generator Type
Burner Type
O_2 Controller Type

Time	Sample Point	O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
		Dry Uncorrected						
1246		+0.02	0.0	0.0			+0.2	ZERO ✓
		15.46	9.54	15.60			83.0	SPAN ✓
13:00		14.88	2.90	4.10			25.5	Run #1-C
13:10		14.83	2.90	4.10			25.7	
13:20		14.83	2.85	4.05			25.7	
13:30		14.80	2.80	4.08			25.5	
13:40		14.80	2.80	4.10			25.6	
13:50		14.77	2.85	4.08			25.7	
1400		0.0	0.0	0.0			0.0	ZERO ✓
		15.33	9.26	15.54			82.9	SPAN ✓
14:28		14.90	2.90	4.20			26.5	Run #1-D
14:38		14.90	2.90	4.15			27.0	Run 1 for PAH
14:48		14.90	2.92	4.20			24.6	ended @ 1435 ✓
14:58		14.90	2.95	4.19			28.0	Continue Monitoring
15:08		14.90	3.00	4.20			26.5	for formaldehyde
15:18		14.90	3.00	4.19			29.0	
		0.02	0.02	0.0			2.8	ZERO ✓
		15.43	9.70	15.52			87.0	SPAN ✓

Miscellaneous Information

CALIBRATION GASES

NO_x CC 98703
SO_2
CO
$CO/CO_2/O_2$ CC 37858 / CC 98685

Wet Bulb: Dry Bulb:
Barometric Press:

RESPONSE TIME

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

PROCESS DATA

Fuel Flow:
Steam Flow:
Rating:

CONVERTER GAS

	Cal Gas Values	Actual Values
NO		
NO_2		

Conv. Efficiency:

Steiner Environmental, Inc.

CONTINUOUS MONITOR DATA SHEET

Plant: SWEDI (USDA)
Date: 6/9/92 Run No.: 1E & 1F
Test Location: BEKR #2
Operator: VVM
Fuel Type: Natural Gas Trailer No.: 3

APCD Witness/Number: ______
Client Rep: ______
Generator Type: ______
Burner Type: ______
O_2 Controller Type: ______

Time	Sample Point	O_2 % (Dry Uncorrected)	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
		15.46	9.54	15.59			82.9	Span Gases
1545		14.90	2.98	4.20			25.8	Run 1E
55		14.90	2.98	4.20			26.0	
1605		14.90	2.98	4.10			26.2	
15		14.85	2.98	4.10			26.5	
25		14.80	2.95	4.10			26.2	
35		14.80	2.95	4.05			27.0	
1645		0.15	0.0	0.0			1.4	Zero ✓
		15.40	9.60	15.50			85.0	Span ✓
								Reset
1655		14.78	2.90	3.95			25.5	Run 1F
1705		14.78	3.00	4.00			26.0	
15		14.78	3.00	4.05			26.2	
25		14.80	3.05	4.00			26.6	
1735		0.10	0.0	0.0			1.0	Zero ✓
		15.40	9.45	15.50			83.6	Span ✓
		15.30	9.30	15.30			83.5	Bias ✓ Span
		0.12	0.0	0.0			0.0	Zero
		0.12						QA/Leak ✓ OK

Miscellaneous Information

CALIBRATION GASES
NO_x: cc 18703
SO_2: ______
CO: ______
$CO/CO_2/O_2$: cc 37858 ; cc 98685

Wet Bulb: ______ Dry Bulb: ______
Barometric Press: ______

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

PROCESS DATA
Fuel Flow: ______
Steam Flow: ______
Rating: ______

CONVERTER GAS
	Cal Gas Values	Actual Values
NO		
NO_2		

Conv. Efficiency: ______

Steiner Environmental, Inc.

CONTINUOUS MONITOR DATA SHEET

Plant SWEPI (W.S.P.A.)
Date 6-10-92 Run No. #2-A / #2-B
Test Location Unit #2
Operator SW/VVM
Fuel Type Nat. GAS Trailer No. #3

APCD Witness/Number
Client Rep Kirkpatrick - KEN
Generator Type
Burner Type
O_2 Controller Type

Dry Uncorrected: O_2 through NO_x columns

Time	Sample Point	O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
		15.46	9.54	15.59			82.9	SPAN GASES
								Calibration
		0.0	0.0	0.0			0.0	ZERO
		15.46	9.54	15.59			82.9	SPAN
								BIAS ✓ SPAN
		0.02	0.0	0.01			0.0	ZERO
		0.0						QA / LEAK ✓ O.K.
		15.46	9.54	15.59			82.9	Cal Adjust
07:50		14.87	2.75	4.00			27.5	Run #2-A
08:00		14.90	2.70	4.00			27.5	32835
08:10		14.95	2.68	4.00			27.2	
08:20		14.97	2.64	4.00			27.1	
08:30		15.00	2.62	4.00			27.0	
08:40		15.00	2.60	3.98			27.2	
0850		+0.05	-0.1	+0.04			-0.2	ZERO ✓
		15.50	8.80	15.60			82.3	SPAN ✓
09:17		14.82	2.76	4.05			27.7	Run #2-B
09:27		14.82	2.72	4.00			27.4	
09:37		14.85	2.68	3.97			27.8	
09:47		14.85	2.70	3.95			27.9	
09:57		14.85	2.75	3.95			28.0	
10:0[illegible]		14.85	2.80	3.9[illegible]			2[illegible]	

Miscellaneous Information

CALIBRATION GASES

NO_x CC 98703
SO_2
CO
$CO/CO_2/O_2$ CC 37858 / CC 98685

Wet Bulb: Dry Bulb:
Barometric Press:

RESPONSE TIME

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

PROCESS DATA

Fuel Flow:
Steam Flow:
Rating:

CONVERTER GAS

	Cal Gas Values	Actual Values
NO		
NO_2		

Conv. Efficiency:

Steiner Environmental, Inc.

CONTINUOUS MONITOR DATA SHEET

Plant SWEPI (WSPA)
Date 6-10-92 Run No. #2-C / #2-D
Test Location Unit #2
Operator SW/VVM
Fuel Type NAT GAS Trailer No. #3

APCD Witness/Number
Client Rep Ken Kirkpatrick
Generator Type
Burner Type
O_2 Controller Type

Time	Sample Point	O_2 % (Dry Uncorrected)	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
1017		+0.05	0.0	0.6			+1.0	ZERO ✓
		15.70	9.34	15.56			84.5	SPAN ✓
10:40		14.87	2.93	4.0			27.0	RUN #2-C
10:50		14.87	2.95	3.98			26.9	
11:00		14.87	2.95	4.20			27.3	
11:10		14.87	2.95	4.30			27.3	
11:20		14.87	2.95	4.20			27.1	
11:30		14.83	2.95	4.20			27.3	
		0.0	0.0	0.0			+0.09	ZERO ✓
		15.45	9.76	15.50			84.0	SPAN ✓
12:07		14.79	2.85	4.05			26.0	RUN #2-D
12:[illegible]7		14.75	2.80	4.10			26.0	
12:[illegible]7		14.82	2.80	4.05			26.0	
1237		0.0	0.0	0.0			0.02	ZERO ✓
		15.50	9.40	16.50			81.2	SPAN ✓

Miscellaneous Information

CALIBRATION GASES

NO_x CC 98703
SO_2
CO
$CO/CO_2/O_2$ CC 37858/CC 98685

Wet Bulb: Dry Bulb:
Barometric Press:

RESPONSE TIME

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

PROCESS DATA

Fuel Flow:
Steam Flow:
Rating:

CONVERTER GAS

	Cal Gas Values	Actual Values
NO		
NO_2		

Conv. Efficiency:

c/8

Steiner Environmental, Inc.

CONTINUOUS MONITOR DATA SHEET

Plant SWEPI (WSPA)
Date 6/10/92 Run No. 4A & 4B
Test Location SEKR #2
Operator VVM
Fuel Type Natural Gas Trailer No. 3

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

Time	Sample Point	Dry Uncorrected O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
		15.46	9.54	15.59			82.9	Span Gases
1308		14.95	2.80	3.99			26.5	Run 4A . Void
18		14.90	2.80	3.90			27.0	Problem w/PAH Train
28		14.99	2.80	3.95			27.0	
38		14.85	2.80	3.90			27.5	
48		14.85	2.85	3.95			27.2	
58		14.85	2.90	3.90			27.6	
1408		0.0	0.02	-0.02			1.2	zero ✓
		13.40	9.80	15.50			84.2	Span ✓
								Reset
1450		14.75	2.95	3.90			28.0	Run 4B . Restart
1500		14.75	3.00	3.90			28.2	
10		14.75	3.00	3.90			28.0	
20		14.75	3.00	3.85			28.5	
30		14.70	3.00	3.80			28.8	
40		14.70	3.00	3.80			29.2	
1550		0.0	0.05	0.0			2.2	zero ✓
		13.26	9.50	15.50			85.0	Span ✓
								Reset

Miscellaneous Information

CALIBRATION GASES

NO_x CC 98703
SO_2
CO
$CO/CO_2/O_2$ CC 37658; CC 98609

Wet Bulb: Dry Bulb:
Barometric Press:

RESPONSE TIME

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

PROCESS DATA

Fuel Flow:
Steam Flow:
Rating:

CONVERTER GAS

	Cal Gas Values	Actual Values
NO		
NO_2		

Conv. Efficiency:

Stein Environmental, Inc.

7/8

CONTINUOUS MONITOR DATA SHEET

Plant SWEPI (WSPA)
Date 6/10/92 Run No. 4C & 4D
Test Location SERU # 2
Operator VVM
Fuel Type Natural Gas Trailer No. 3

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

Time	Sample Point	O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
		Dry Uncorrected						
		18.46	9.34	15.59			82.9	Span Gases
1600		14.95	2.80	3.90			27.0	Run 4C
10		14.90	2.80	3.90			27.2	
20		14.90	2.85	3.85			27.5	
30		14.90	2.85	3.85			27.6	
40		14.90	2.85	3.80			27.5	
50		14.90	2.85	3.80			27.8	
1700		-0.02	-0.02	0.0			1.0	Zero ✓
		15.48	9.65	15.60			83.8	Span ✓
								Reset
1715		14.96	2.80	3.80			27.0	Run 4D
25		14.90	2.80	3.90			27.0	
35		14.90	2.85	3.85			26.6	
45		14.90	2.85	0.80			26.2	
55		14.90	2.85	3.80			26.0	
1805		14.90	2.85	3.80			25.6	
1815		0.0	0.0	0.0			1.0	Zero ✓
		15.50	9.38	15.60			81.8	Span ✓
								Reset

Miscellaneous Information

CALIBRATION GASES
NO_x CC 98703
SO_2
CO
$CO/CO_2/O_2$ CC 37858; CC 98683

Wet Bulb: Dry Bulb:
Barometric Press:

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

PROCESS DATA
Fuel Flow:
Steam Flow:
Rating:

CONVERTER GAS

	Cal Gas Values	Actual Values
NO		
NO_2		

Conv. Efficiency:

Steiner Environmental, Inc.

CONTINUOUS MONITOR DATA SHEET

Plant SWEPI (WSPA)
Date 6/10/92 Run No. 4E
Test Location SERR #2
Operator VDM
Fuel Type Natural Gas Trailer No. 3

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

Time	Sample Point	O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NO_x ppm	Comments
		Dry Uncorrected						
		15.46	9.34	16.69			82.9	Span Gases
1827		14.90	2.85	3.85			26.5	Run 4E
31		14.85	2.85	3.85			26.0	
47		14.88	2.85	3.85			25.8	
57		14.88	2.88	3.88			25.5	
1907		14.85	2.96	3.86			25.5	
17		14.90	2.96	3.85			25.2	
1921		0.0	0.0	0.0			-1.8	zero ✓
		16.48	9.60	15.6			80.5	span ✓
		0.05	0.0	0.0			-2.0	Bias ✓ zero
		15.60	9.40	15.65			80.0	span
		0.05						QA / leak ✓ OK

Miscellaneous Information

CALIBRATION GASES
NO_x CC98783
SO_2
CO
$CO/CO_2/O_2$ CC37858 ; CC93685

Wet Bulb: Dry Bulb:
Barometric Press:

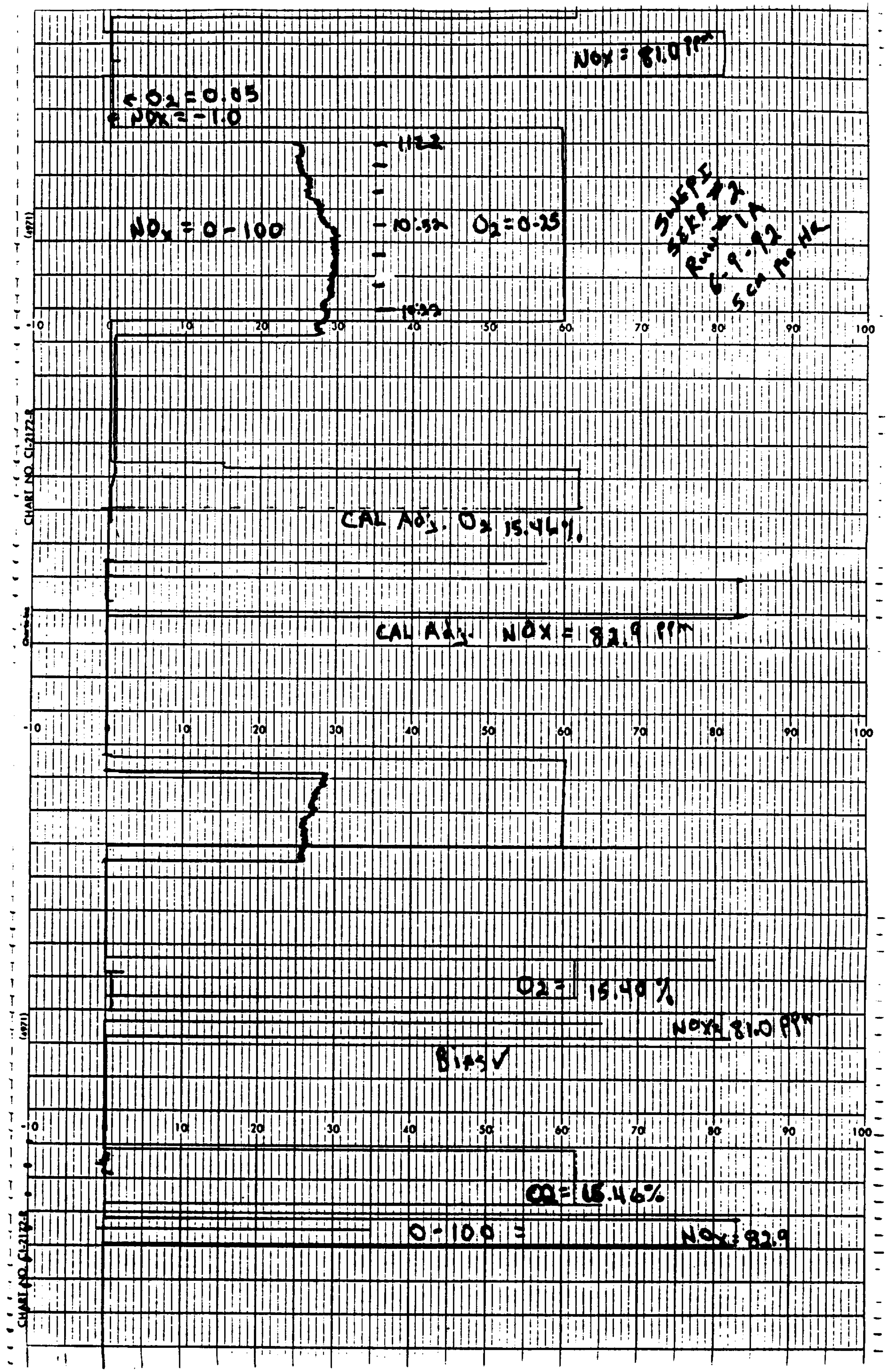
RESPONSE TIME
Upscale: Downscale:
Upscale: Downscale:
Upscale: Downscale:

PROCESS DATA
Fuel Flow:
Steam Flow:
Rating:

CONVERTER GAS

	Cal Gas Values	Actual Values
NO		
NO_2		

Conv. Efficiency:



NOx = 81.0 ppm
O2 = 0.05
NOx = -1.0
1122
NOx = 0-100
10:52
O2 = 0-25
10:22
CHART NO. CL-2172-R
CAL Adj. O2 15.46%
CAL Adj. NOx = 82.9 ppm
O2 = 15.40%
NOx = 81.0 ppm
Bias ✓
O2 = 15.46%
0-100 =
NOx = 82.9

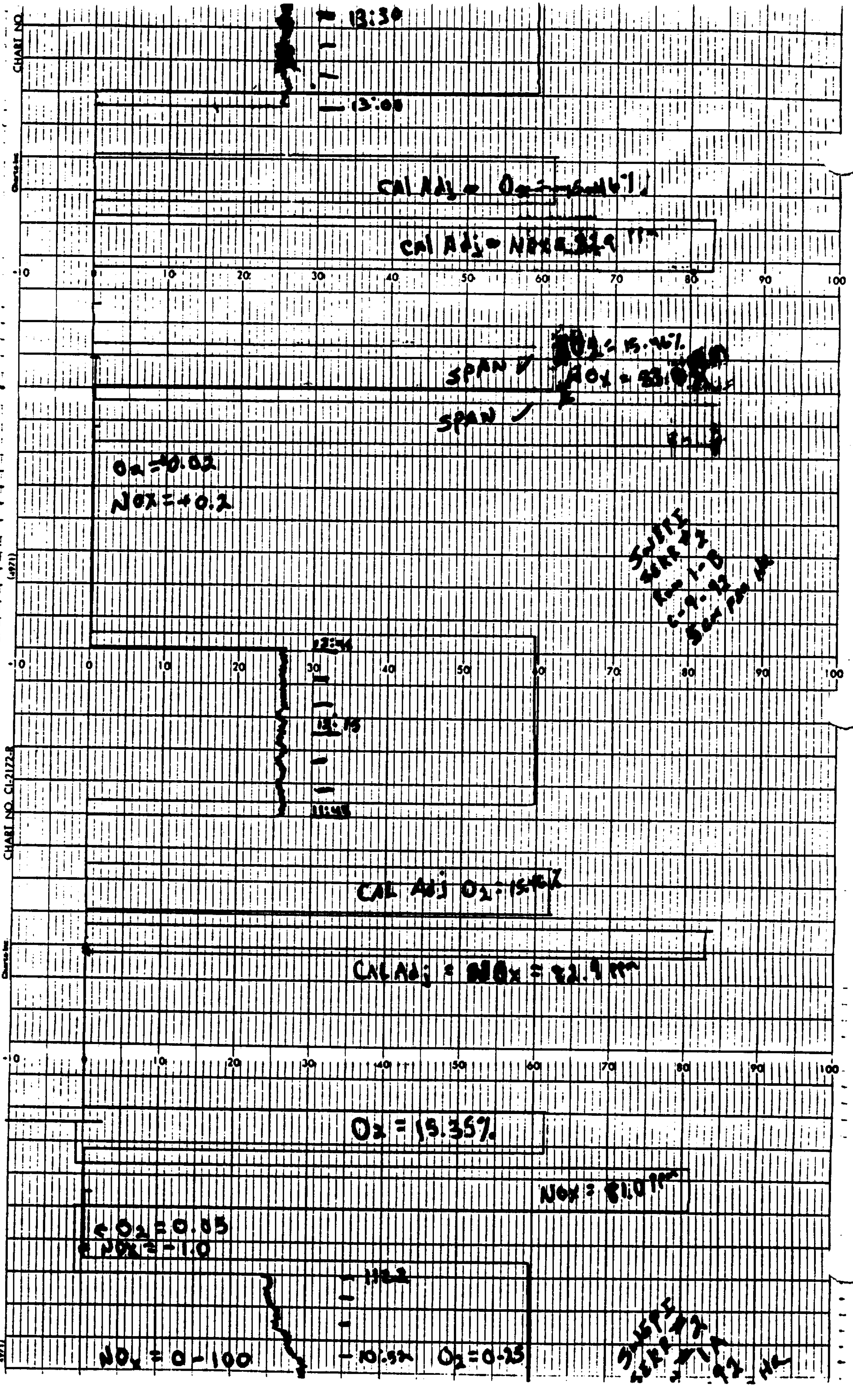
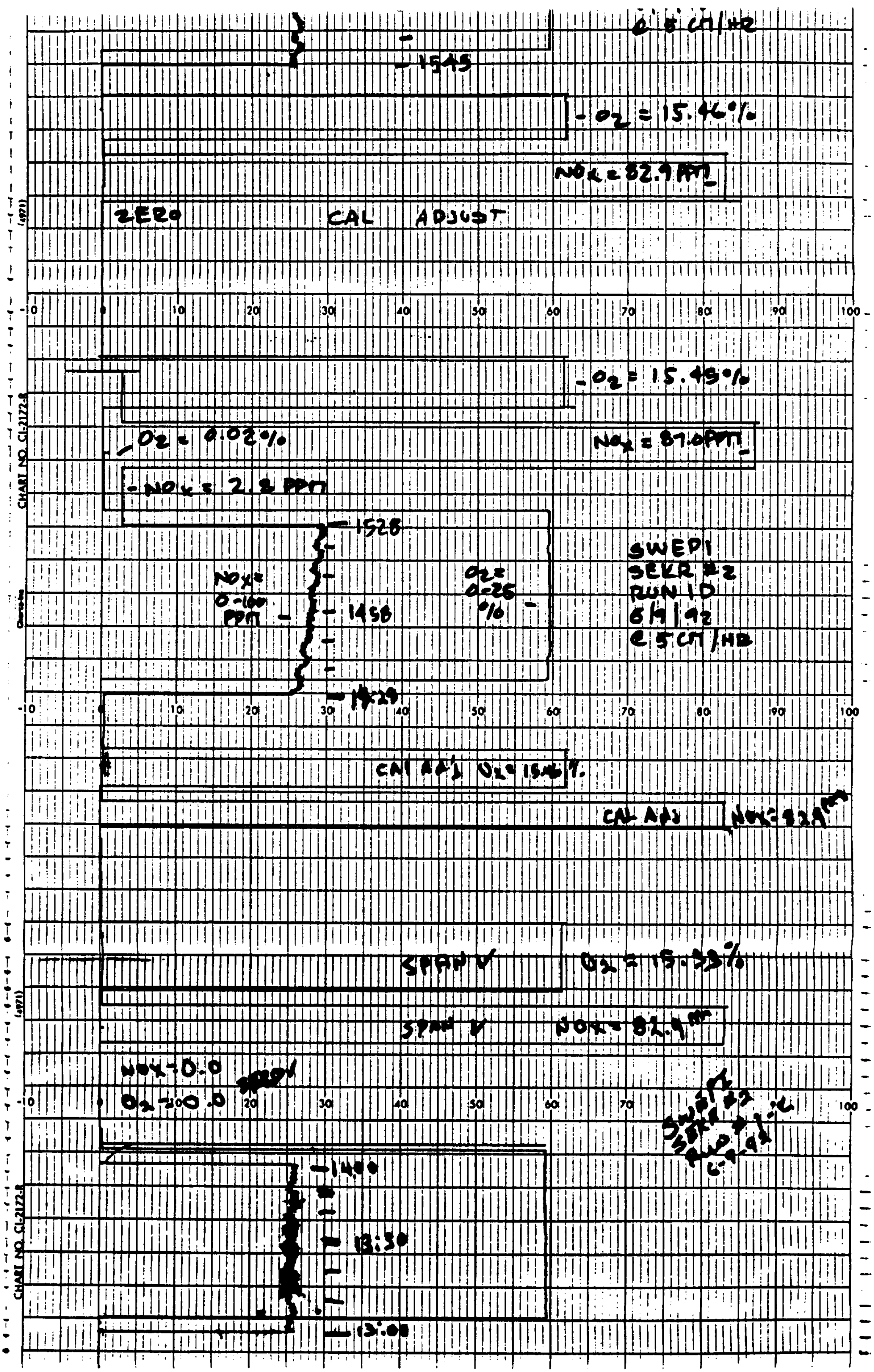


CHART NO
13:30
13:00
CAL Adj = NOx = 82.9 ppm
-10 0 10 20 30 40 50 60 70 80 90 100
SPAN
SPAN
O2 = +0.02
NOx = +0.2
-10 0 10 20 30 40 50 60 70 80 90 100
11:45
CHART NO. CL-2172-B
CAL Adj O2 = 15.46%
-10 0 10 20 30 40 50 60 70 80 90 100
O2 = 15.35%
NOx = 81.0 ppm
O2 = 0.05
NOx = -1.0
10:52
NOx = 0-100
O2 = 0-25



@ 5 CM/HR
1545
O2 = 15.46%
NOx = 82.9 PPM
ZERO
CAL ADJUST
O2 = 15.49%
O2 = 0.02%
NOx = 87.0 PPM
NOx = 2.8 PPM
1528
NOx = 0-100 PPM
1458
O2 = 0-25 %
SWEPI
SEKR #2
RUN 1D
6/9/92
@ 5 CM/HR
1429
CAL ADJ O2 = 15.46%
CAL ADJ NOx = 82.9 PPM
SPAN ✓
O2 = 15.33%
SPAN ✓
NOx = 82.9 PPM
NOx - 0.0
O2 - 0.0
ZERO ✓
SWEPI #2
SEKR #2
RUN 1C
6-9-92
1400
13:30
13:00
CHART NO. CL-2172-8
10
20
30
40
50
60
70
80
90
100

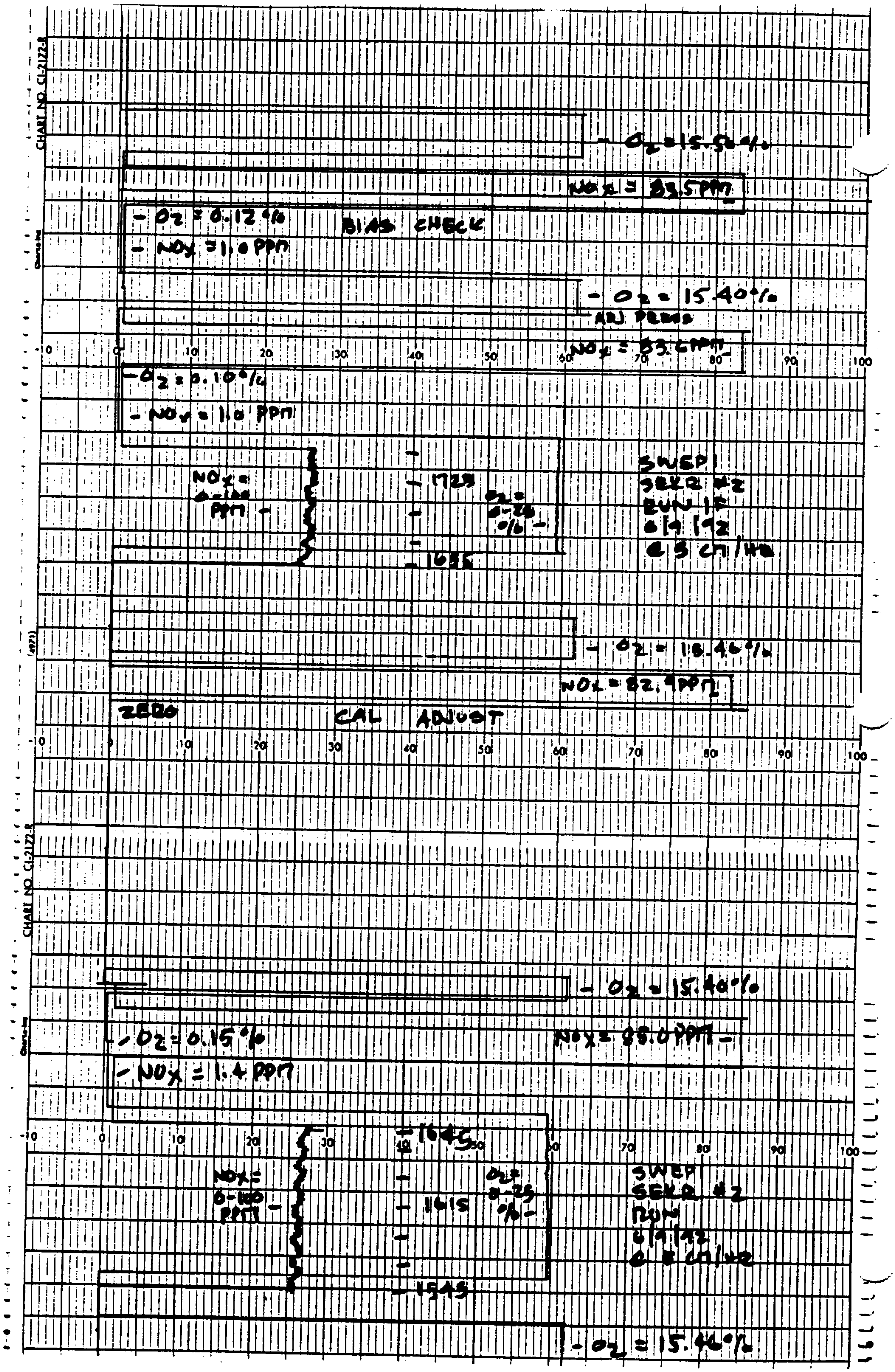
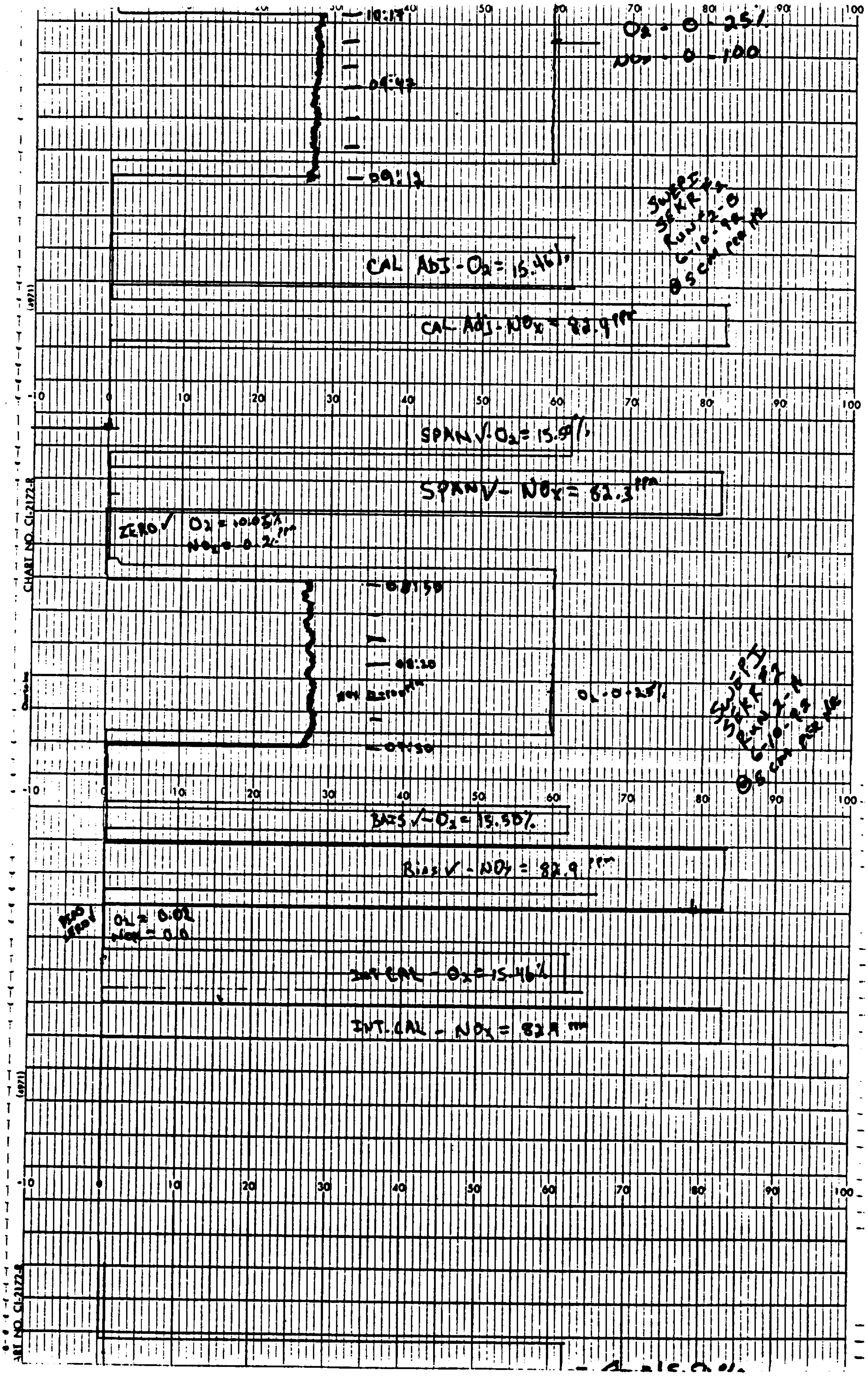


CHART NO CL-2122-R
- O2 = 15.50%
NOx = 83.5 PPM
- O2 = 0.12 %
- NOx = 1.0 PPM
BIAS CHECK
- O2 = 15.40%
NOx = 83.6 PPM
-O2 = 0.10 %
- NOx = 1.0 PPM
0 10 20 30 40 50 60 70 80 90 100
NOx = 0-100 PPM
1725
O2 = 0-25 %
1655
SWEPI
SEKR #2
RUN 1F
6/9/92
@ 5 cm/hr
- O2 = 15.46%
NOx = 82.9 PPM
ZERO
CAL ADJUST
0 10 20 30 40 50 60 70 80 90 100
CHART NO CL-2122-R
- O2 = 15.40%
- O2 = 0.15%
NOx = 85.0 PPM
- NOx = 1.4 PPM
0 10 20 30 40 50 60 70 80 90 100
1645
NOx = 0-100 PPM
1615
O2 = 0-25 %
SWEPI
SEKR #2
RUN
6/9/92
@ 5 cm/hr
1545
- O2 = 15.46%



O_2 - 0 - 25%
NOx - 0 - 100
10:17
09:47
09:17
CAL ADJ - O_2 = 15.46%
CAL ADJ - NOx = 82.9 ppm
SPAN ✓ O_2 = 15.59%
SPAN ✓ - NOx = 82.3 ppm
ZERO ✓ O_2 = 0.03% NOx = 0.2 ppm
08:50
08:20
NOx 0-100 ppm
O_2 - 0 - 25%
07:50
BIAS ✓ - O_2 = 15.50%
Bias ✓ - NOx = 82.9 ppm
O_2 = 0.02 NOx = 0.0
INT CAL - O_2 = 15.46%
INT. CAL - NOx = 82.9 ppm
CHART NO CL-2172-8

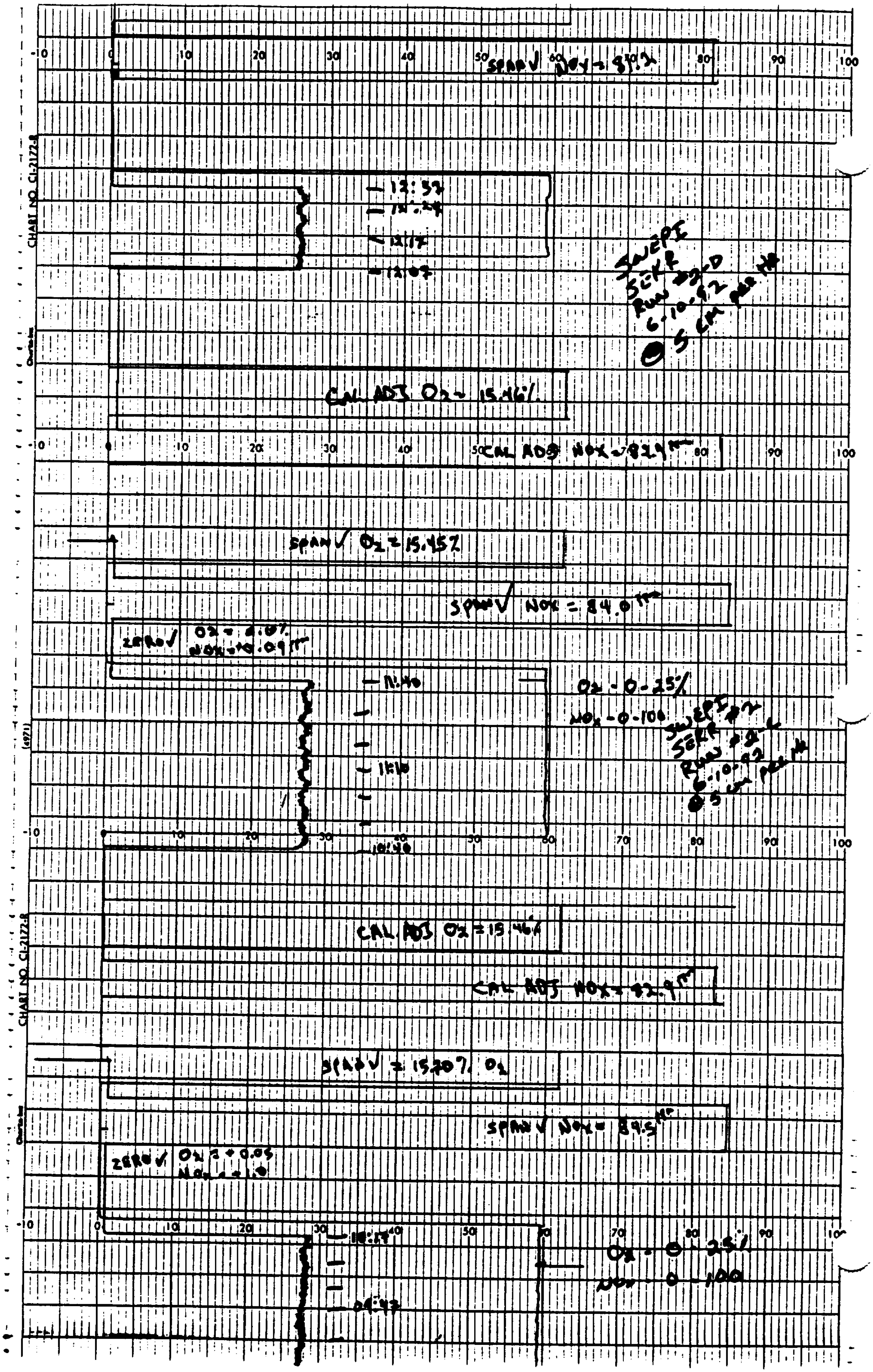
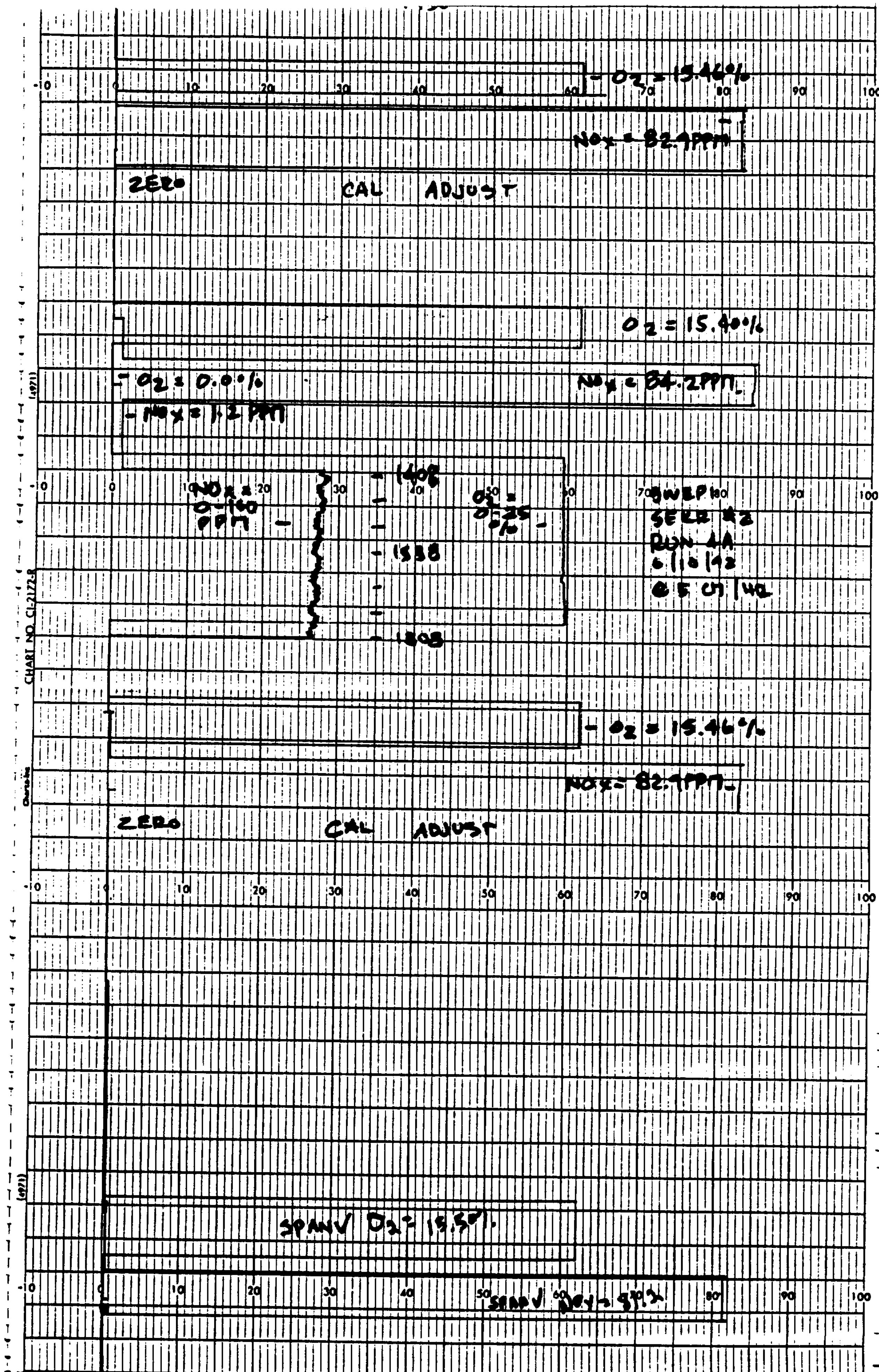
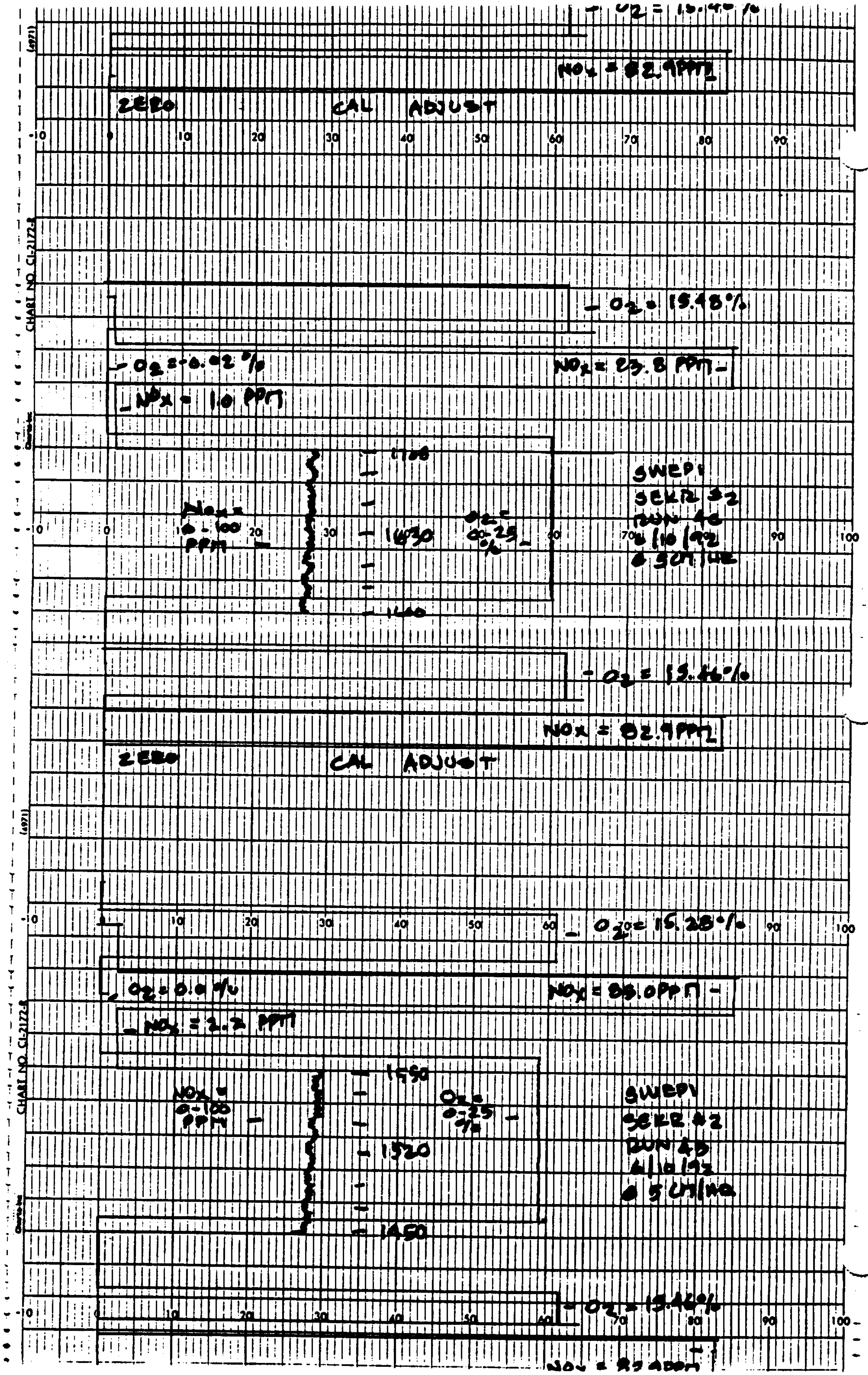


CHART NO. CL-2172-8
SPAN ✓ NOx = 83.2
12:07
SWEPI
SCKR
RUN #2-D
6-10-92
@ 5 cm per hr
CAL ADJ O2 = 15.46%
CAL ADJ NOx = 82.9 ppm
SPAN ✓ O2 = 15.45%
SPAN ✓ NOx = 84.0 ppm
ZERO ✓ O2 = 0.0%
NOx = 0.9 ppm
11:40
11:10
10:40
O2 - 0-25%
NOx - 0-100
SWEPI #2
SCKR
RUN #2-C
6-10-92
@ 5 cm per hr
CAL ADJ O2 = 15.46%
CAL ADJ NOx = 82.9 ppm
SPAN ✓ = 15.20% O2
SPAN ✓ NOx = 84.5 ppm
ZERO ✓ O2 = +0.05
NOx = +1.0
O2 - 0 - 25%
NOx - 0 - 100


O2 = 15.46%
NOx = 82.9PPM
ZERO
CAL ADJUST
O2 = 15.40%
O2 = 0.0%
NOx = 84.2PPM
NOx = 1.2 PPM
NOx = 0-100 PPM
1408
1338
1308
O2 = 0-25 %
SWEP
SEER #2
RUN 4A
6/10/92
@ 5 CT/HR
CHART NO. CL-2172-8
O2 = 15.46%
NOx = 82.9PPM
ZERO
CAL ADJUST
SPAN✓ O2 = 15.5%
SPAN✓ NOx = 83.2



NOx = 82.9PPM
ZERO
CAL ADJUST
O2 = 15.48%
O2 = -0.02 %
NOx = 83.8 PPM
NOx = 1.0 PPM
1700
1630
NOx = 0-100 PPM
O2 = 0-25 %
SWEPI
SEKR #2
RUN 46
6/10/92
@ 5CM/HR
O2 = 15.46%
NOx = 82.9PPM
ZERO
CAL ADJUST
CHART NO. CL-2172-8
O2 = 15.28%
O2 = 0.0 %
NOx = 83.0PPM
NOx = 2.2 PPM
1590
NOx = 0-100 PPM
O2 = 0-25 %
1520
SWEPI
SEKR #2
RUN 45
6/10/92
@ 5CM/HR
1450
O2 = 15.46%

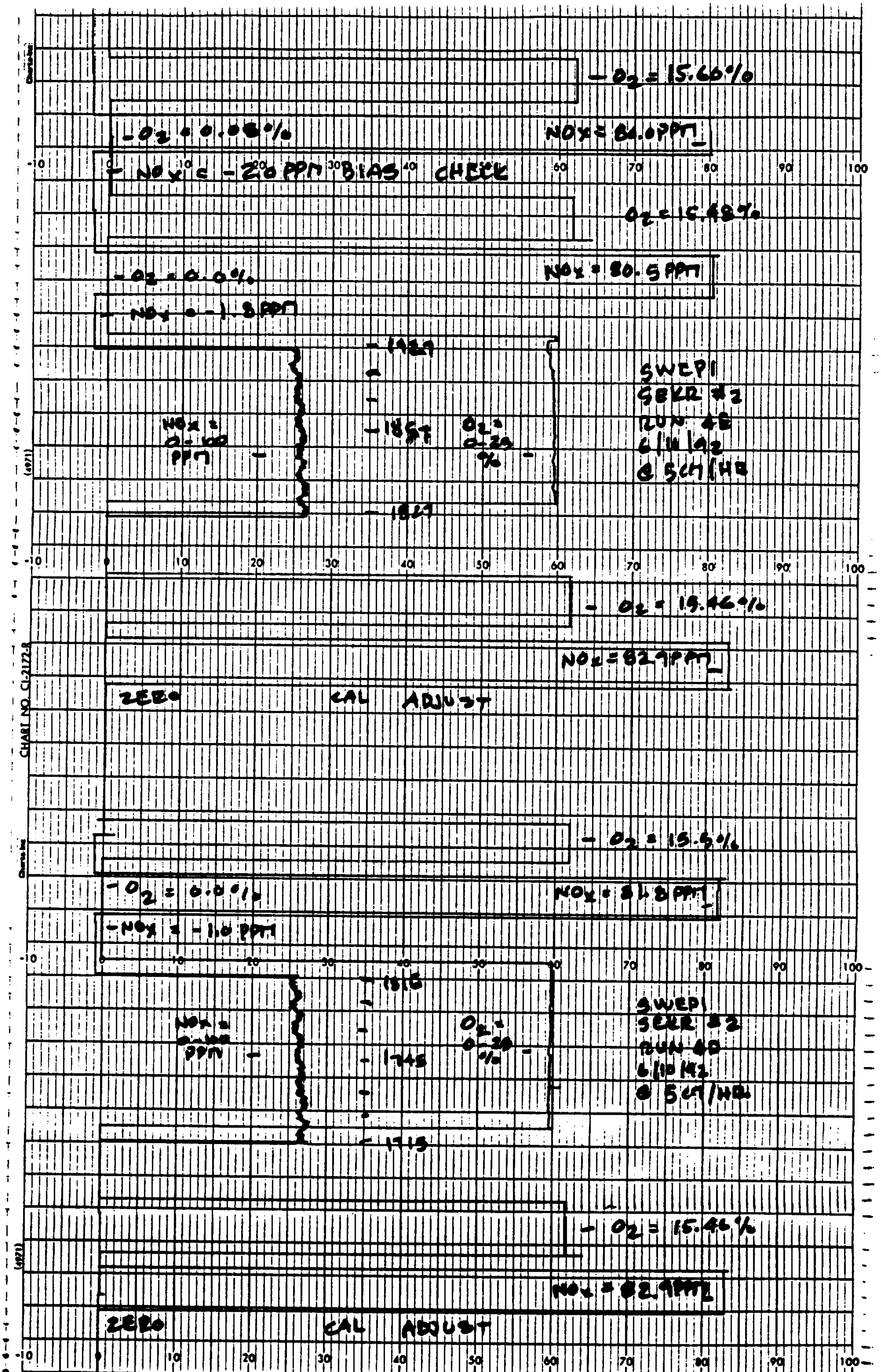
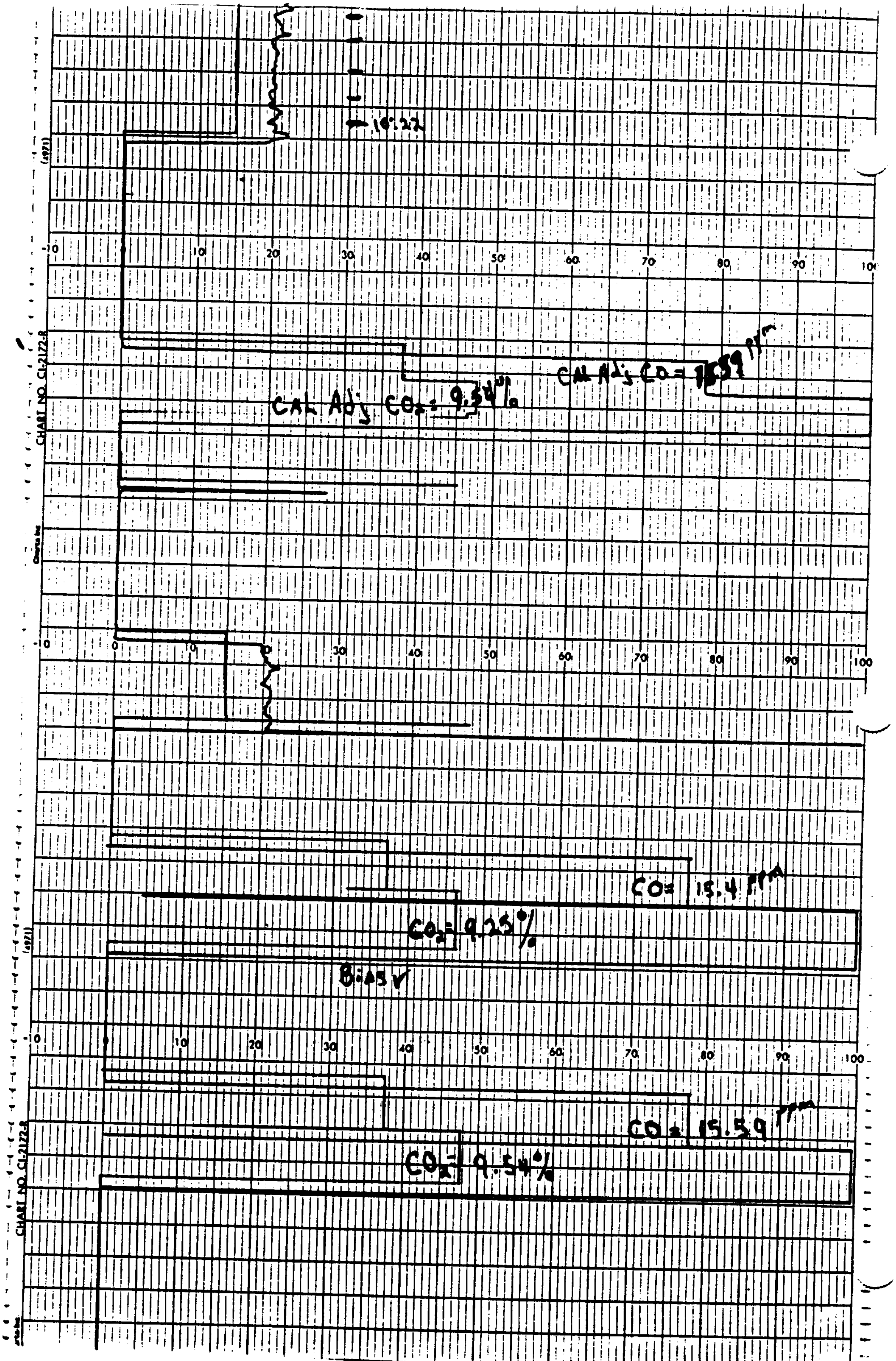


CHART NO. CL-2172-8
O2 = 15.60%
O2 = 0.08%
NOx = 84.0 PPM
NOx = -2.0 PPM BIAS CHECK
O2 = 15.48%
NOx = 80.5 PPM
O2 = 0.0%
NOx = -1.8 PPM
1929
1857
1827
NOx = 0-100 PPM
O2 = 0-25 %
SWEPI
SEKR #2
RUN 4E
6/11/92
@ 5CM/HR
O2 = 15.46%
NOx = 82.9 PPM
ZERO
CAL
ADJUST
O2 = 15.5%
O2 = 0.0%
NOx = 81.8 PPM
NOx = -1.0 PPM
1815
1745
1715
NOx = 0-100 PPM
O2 = 0-25 %
SWEPI
SEKR #2
RUN 4D
6/10/92
@ 5CM/HR
O2 = 15.46%
NOx = 82.9 PPM
ZERO
CAL
ADJUST


10:22
CAL Adj CO2 = 9.54%
CAL Adj CO = 15.59 ppm
CO = 15.4 PPM
CO2 = 9.25%
Bias ✓
CO = 15.59 ppm
CO2 = 9.54%
CHART NO CI-2172-8

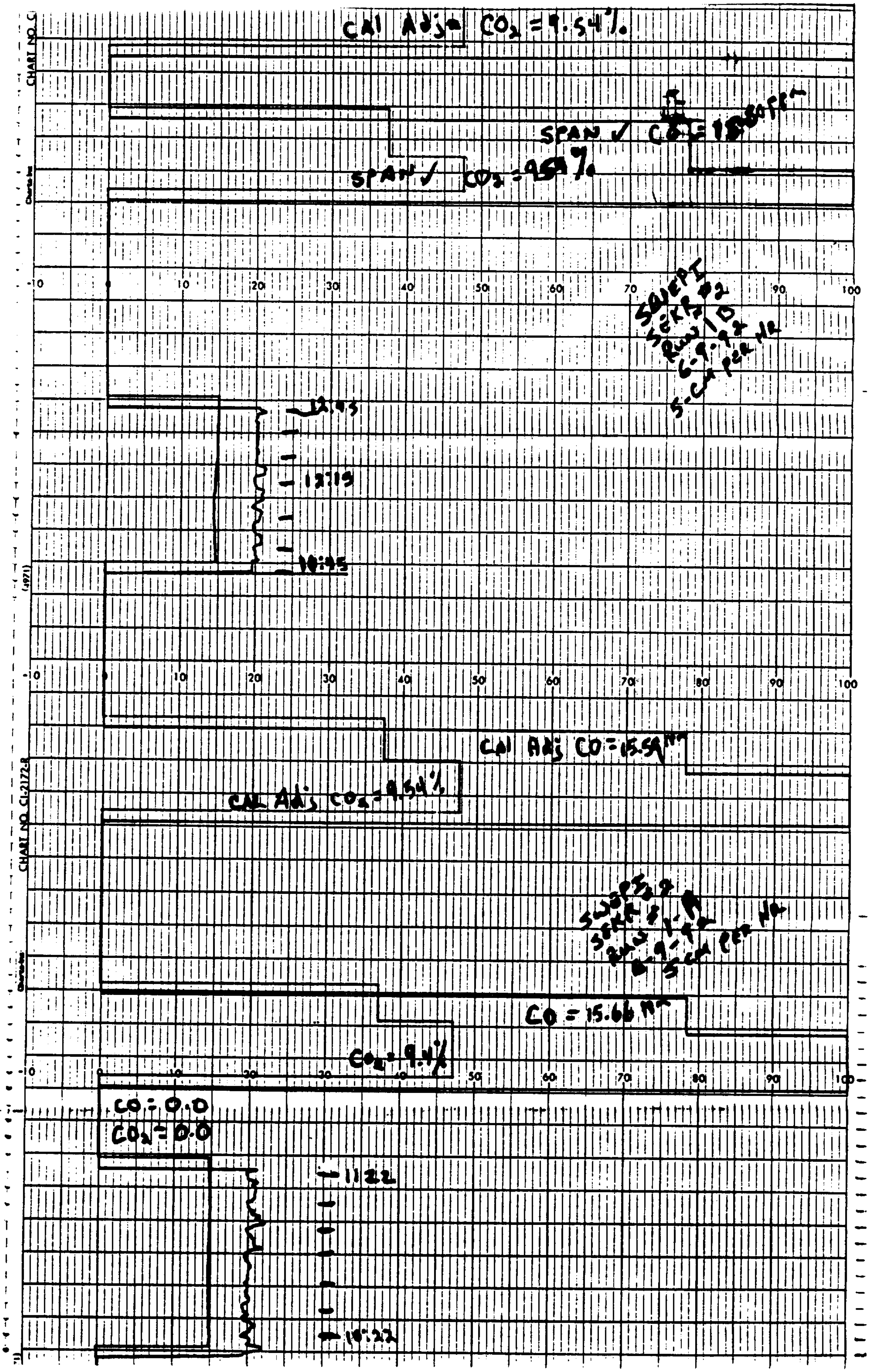
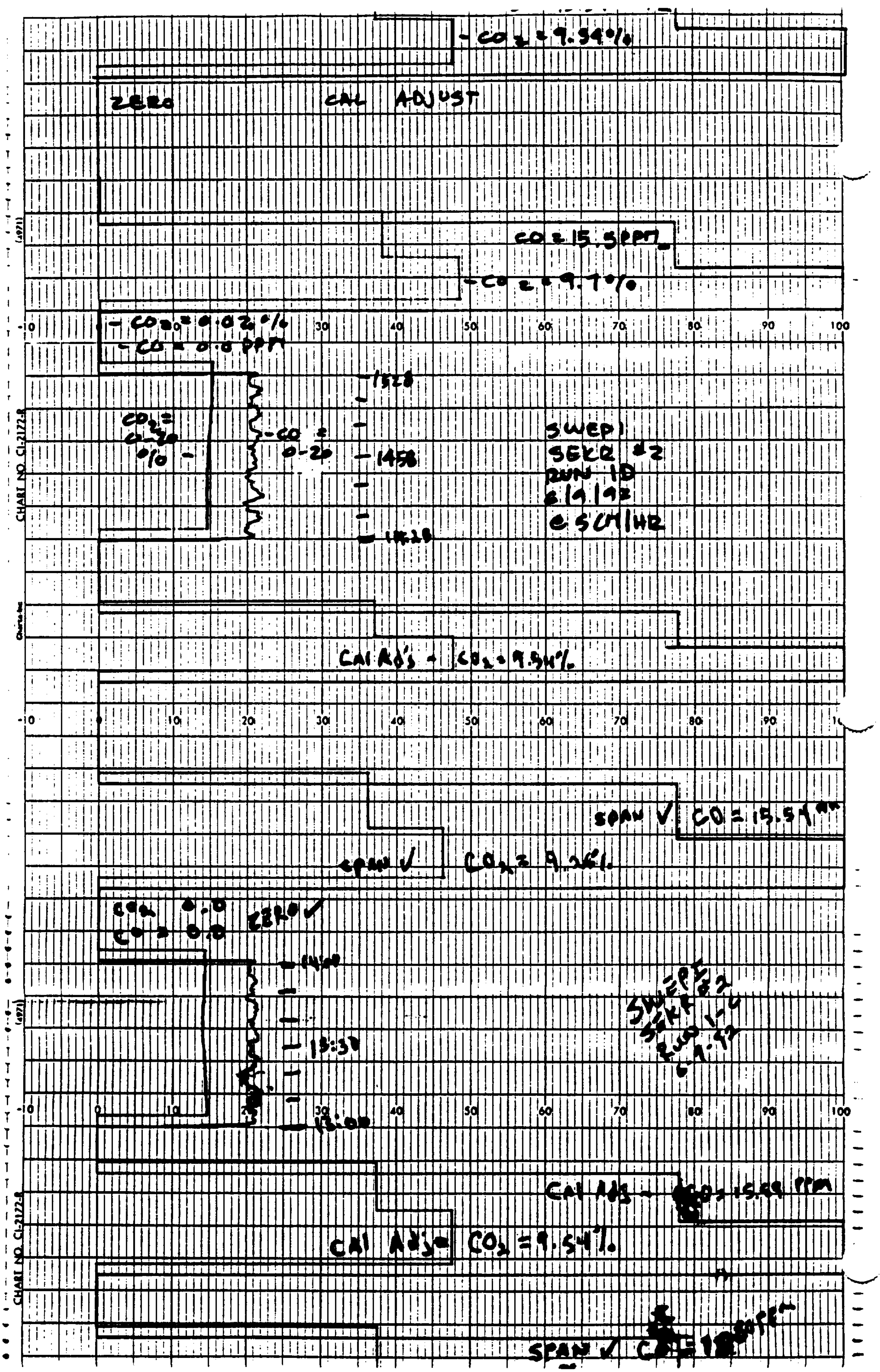


CHART NO. CL-2172-B
Cal Adj CO2 = 9.54%
SPAN ✓
SPAN ✓ CO2 = 9.59%
12:45
12:15
11:45
Cal Adj CO = 15.59 ppm
CAL Adj CO2 = 9.54%
CO = 15.66 ppm
CO2 = 9.4%
CO = 0.0
CO2 = 0.0
11:22
10:22
0 10 20 30 40 50 60 70 80 90 100



CO2 = 9.54%
ZERO
CAL ADJUST
CO = 15.5 PPM
CO2 = 9.7%
CO2 = 0.02%
CO = 0.0 PPM
CO2 = 0-20 %
CO = 0-20
SEKR #2
CAL ADJ - CO2 = 9.54%
SPAN ✓
ZERO ✓
CAL ADJ - CO2 = 9.54%
SPAN ✓
0 10 20 30 40 50 60 70 80 90 100
CHART NO. CL-2172-B

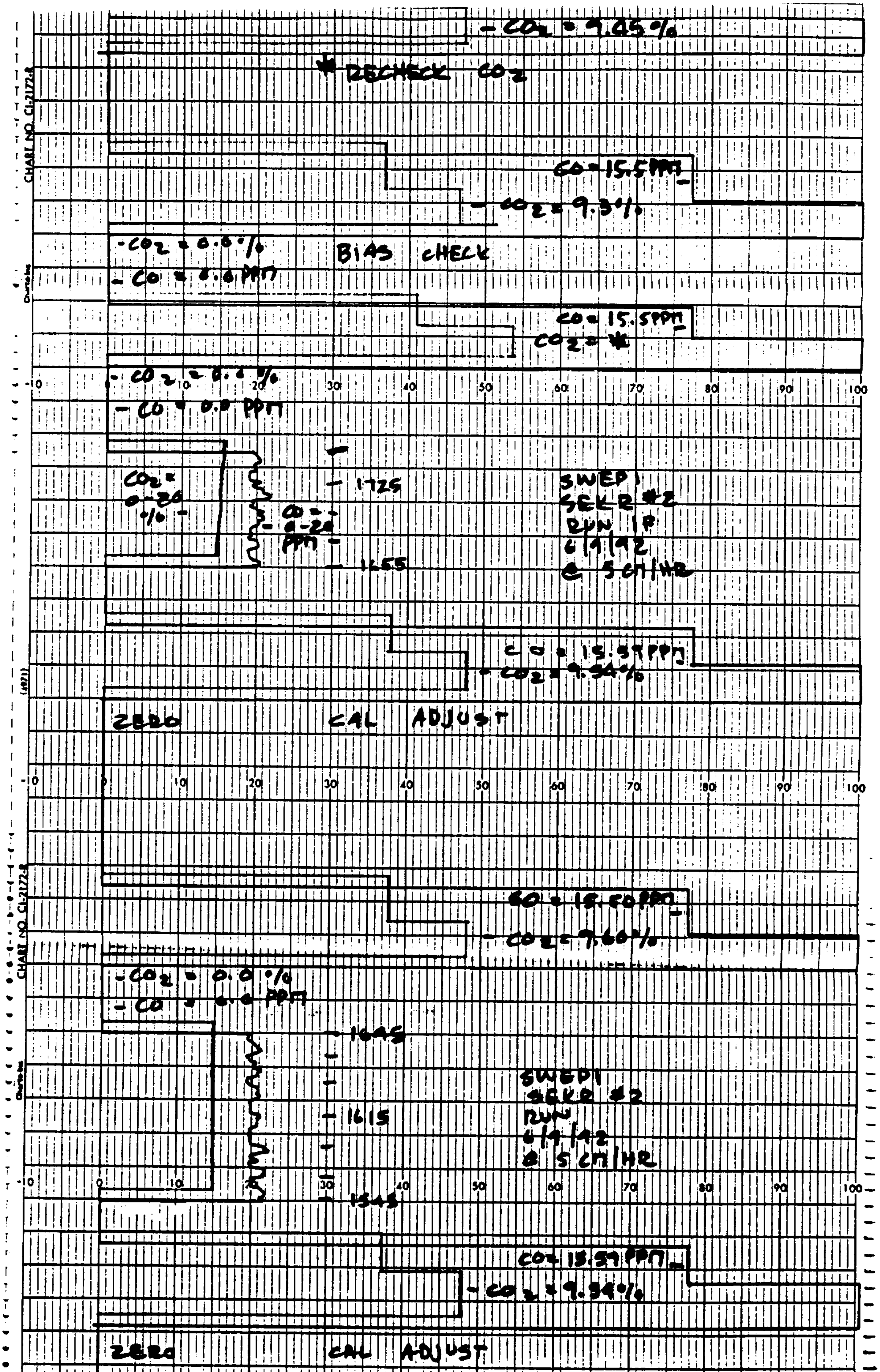
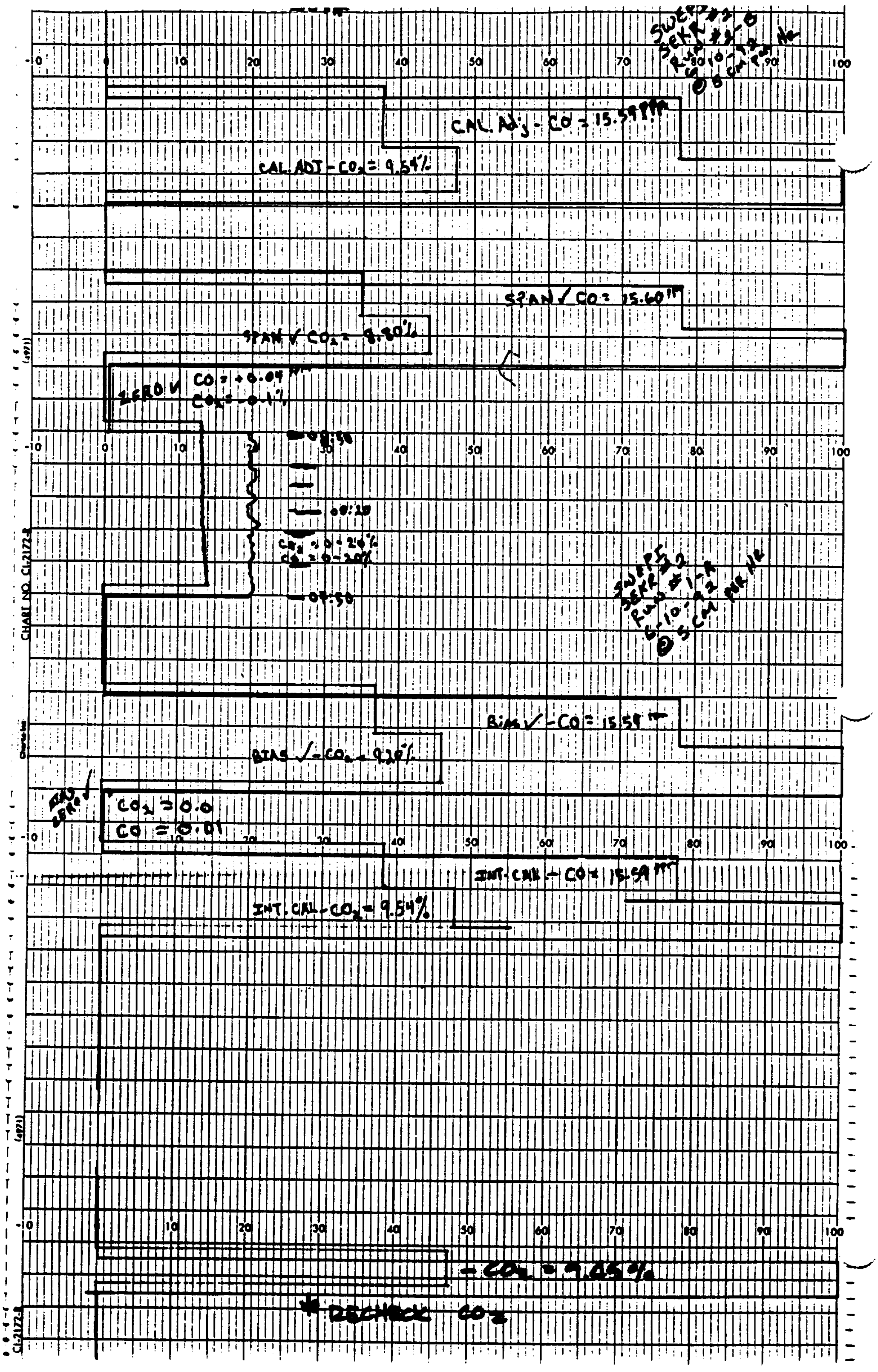


CHART NO. CL-2172-B
- CO2 = 9.45%
* RECHECK CO2
CO = 15.5 PPM
- CO2 = 9.3%
- CO2 = 0.0%
BIAS CHECK
- CO = 0.0 PPM
CO = 15.5 PPM
CO2 = *
- CO2 = 0.0%
- CO = 0.0 PPM
-10 0 10 20 30 40 50 60 70 80 90 100
CO2 = 0-20 %
1725
CO = 0-20 PPM
1655
SWEPI
SEKR #2
RUN 1P
6/9/92
@ 5 CM/HR
CO = 15.59 PPM
- CO2 = 9.54%
ZERO
CAL ADJUST
-10 0 10 20 30 40 50 60 70 80 90 100
CHART NO. CL-2172-B
CO = 15.60 PPM
- CO2 = 9.60%
- CO2 = 0.0%
- CO = 0.0 PPM
1645
1615
1545
SWEPI
SEKR #2
RUN
6/9/92
@ 5 CM/HR
-10 0 10 30 40 50 60 70 80 90 100
CO = 15.59 PPM
- CO2 = 9.59%
ZERO
CAL ADJUST


CAL. ADJ - CO = 15.59 PPM
CAL. ADJ - CO2 = 9.54%
SPAN ✓ CO = 15.60 PPM
SPAN ✓ CO2 = 9.80%
ZERO ✓ CO = +0.04 PPM
CO2 = 0.1%
CO2 = 0-20%
BIAS ✓ - CO = 15.59
BIAS ✓ - CO2 = 9.20%
CO2 = 0.0
CO = 0.01
INT. CAL - CO = 15.59 PPM
INT. CAL - CO2 = 9.54%
CO2 = 9.05%
* RECHECK CO2
CHART NO CL-2172-8

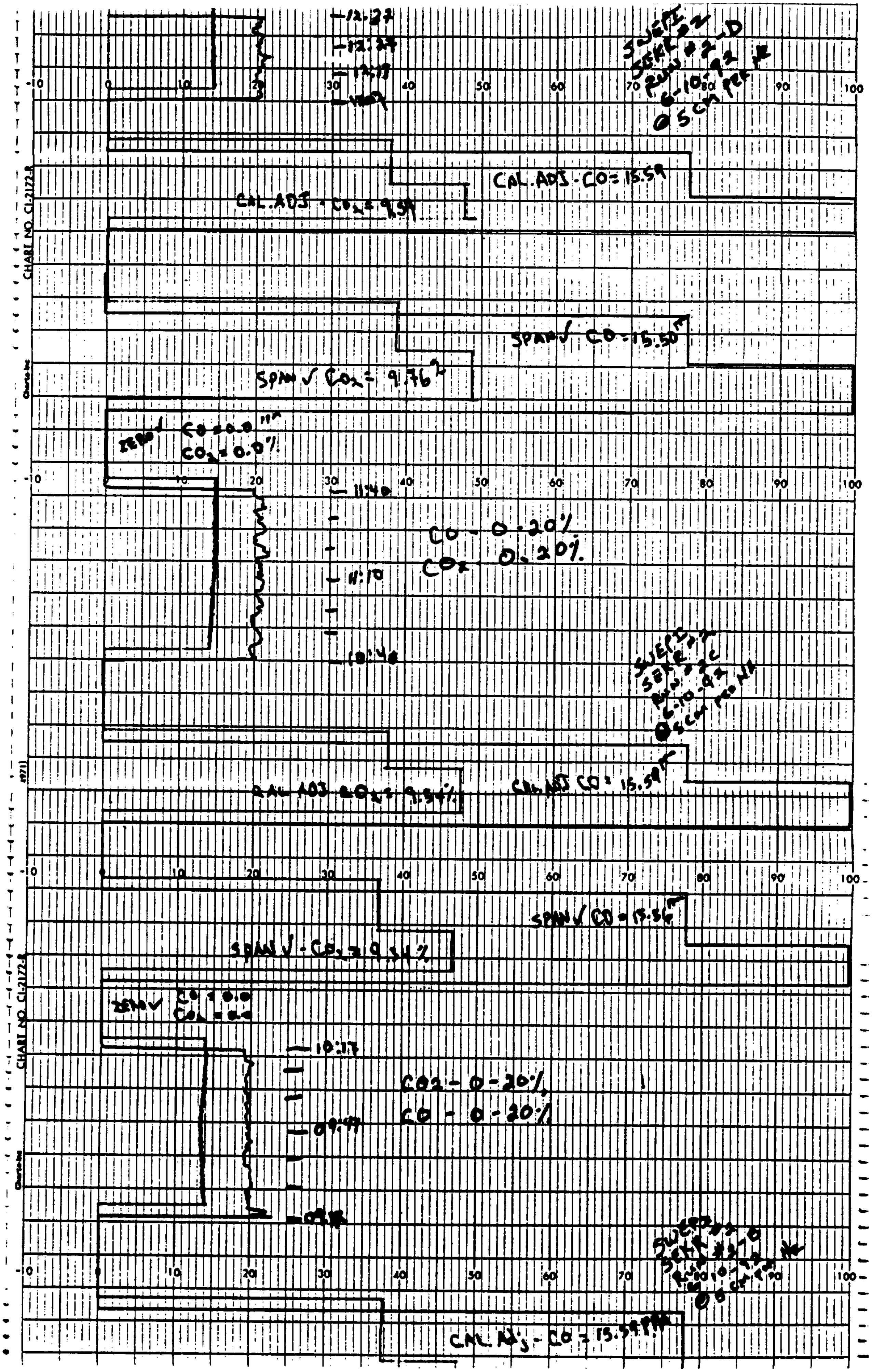
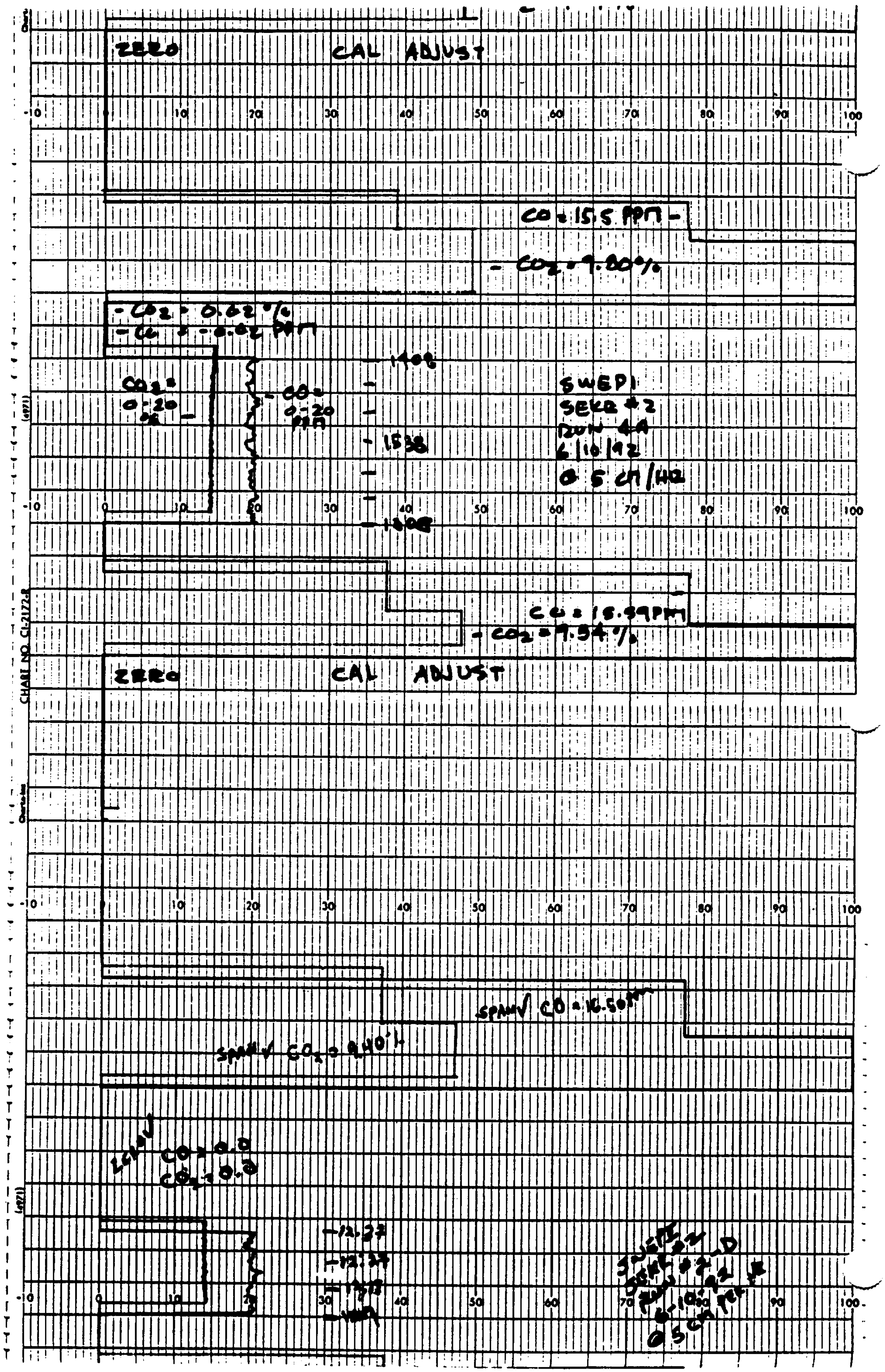


CHART NO. CL-2172-B
CAL. ADJ. CO = 15.59
CAL. ADJ. - CO2 = 9.59
SPAN✓ CO = 15.50
SPAN✓ CO2 = 9.76
ZERO✓ CO = 0.0 ppm
CO2 = 0.0%
CO - 0-20%
CO2 - 0-20%
11:40
11:10
10:40
CAL ADJ CO2 = 9.54%
CAL ADJ CO = 15.59
SPAN✓ CO = 15.56
SPAN✓ - CO2 = 9.54%
ZERO✓ CO = 0.0
CO2 = 0.0
10:27
09:47
CO2 - 0-20%
CO - 0-20%
CAL. ADJ. - CO = 15.59 PPM


ZERO
CAL ADJUST
CO = 15.5 PPM
CO2 = 9.80%
CO2 = 0.62 %
CO2 = 0-20 %
CO = 0-20 PPM
SWEPI
SEKR #2
RUN 4A
6/10/92
@ 5 CM/HR
CO = 15.59 PPM
CO2 = 9.54 %
ZERO
CAL ADJUST
SPAN✓ CO = 16.50 PPM
SPAN✓ CO2 = 9.40%
ZERO✓
CO = 0.0
CO2 = 0.0

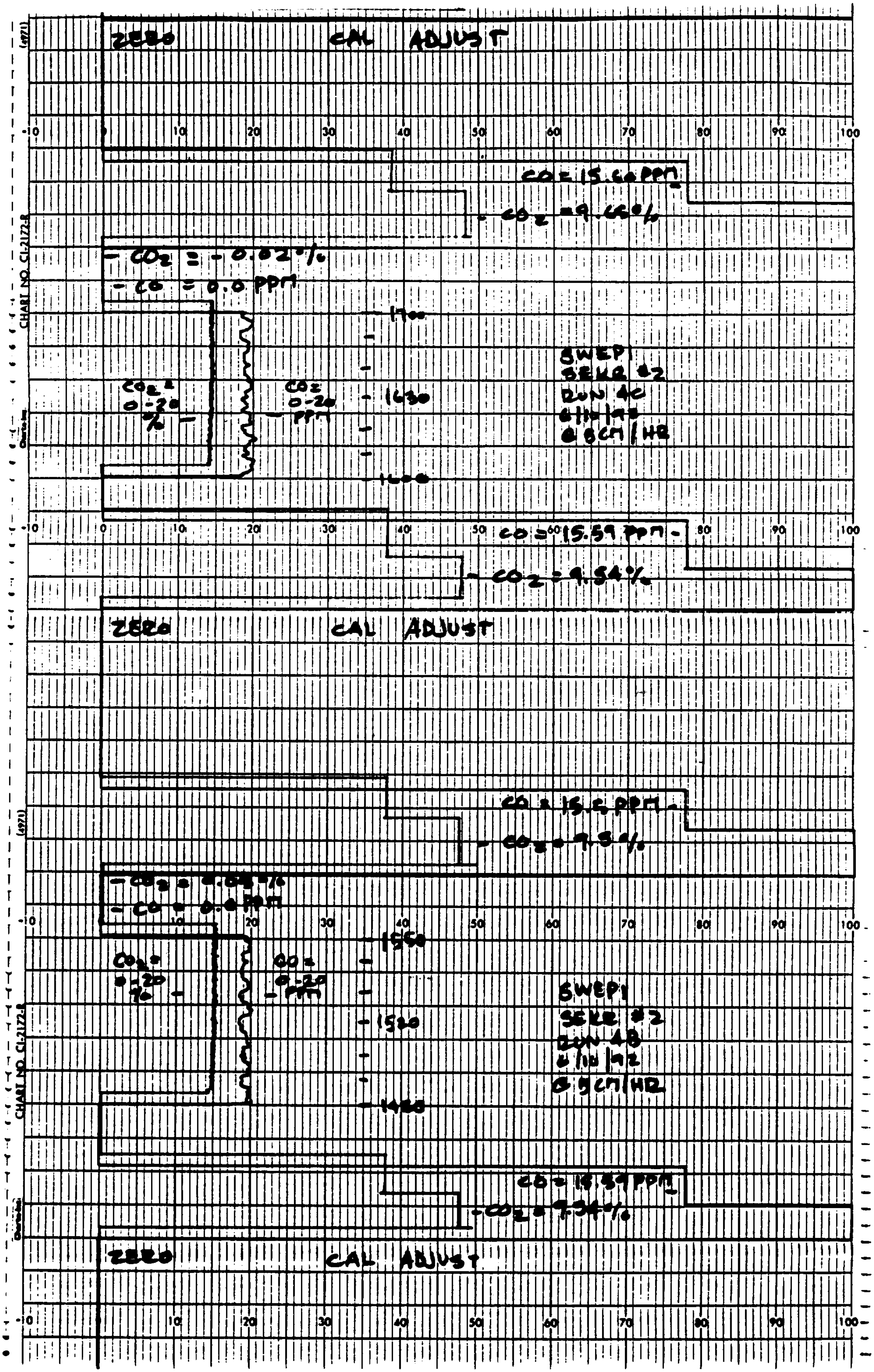
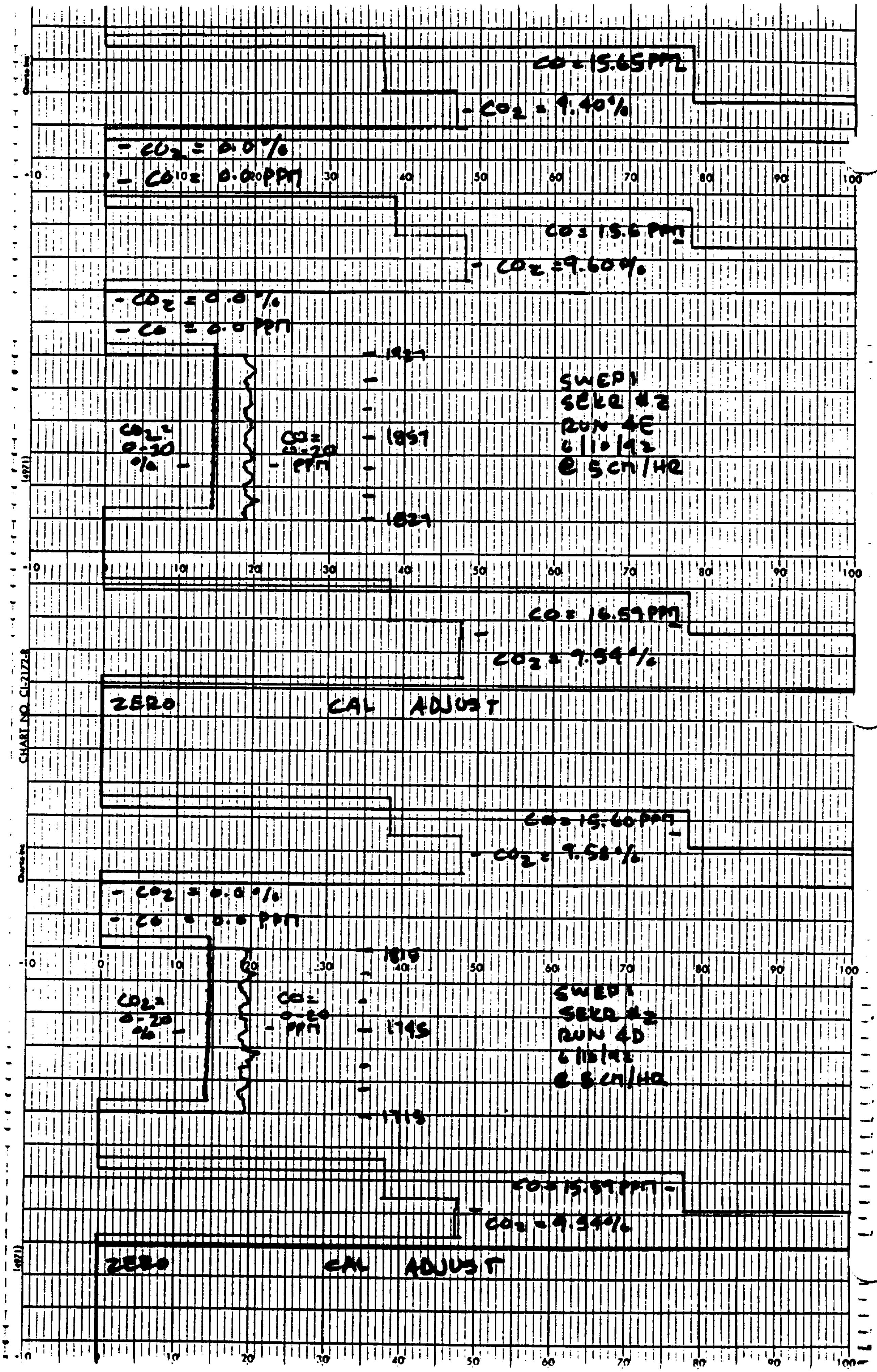


CHART NO. CL-2172-8
ZERO
CAL ADJUST
-10 0 10 20 30 40 50 60 70 80 90 100
CO = 15.60 PPM
CO2 = -0.02%
CO = 0.0 PPM
CO2 = 0-20 %
CO 0-20 PPM
1630
1600
SWEPI
SEKR #2
RUN 4C
@ 5CM/HR
CO = 15.59 PPM
CO2 = 9.54%
RUN 4B
@ 5CM/HR
1520
CO = 15.59 PPM


CO = 15.65 PPM
- CO2 = 9.40%
- CO2 = 0.0%
- CO = 0.0 PPM
CO = 15.6 PPM
- CO2 = 9.60%
- CO2 = 0.0%
- CO = 0.0 PPM
1857
SWEPI
SEKR #2
RUN 4E
@ 5 CM/HR
CO = 16.59 PPM
CO2 = 9.54%
ZERO
CAL ADJUST
CHART NO. CL-2172-8
CO = 15.60 PPM
- CO2 = 9.58%
- CO = 0.0 PPM
1745
SWEPI
SEKR #2
RUN 4D
@ 5 CM/HR
CO = 15.59 PPM
CO2 = 9.54%
ZERO
CAL ADJUST

APPENDIX C

LABORATORY DATA AND CHAIN-OF-CUSTODY SHEETS

TEXACO HEATER TREATER TEST DATA

(MAY 28-30, 1992)

PAH ANALYSIS DATA

ALTA

DATA QUALIFIERS & ABBREVIATIONS

A	**The amount detected is below the Method Quantitation Limit.**
B	**This compound was also detected in the blank.**
C	**The amount detected is less than five times the Method Quantitation Limit.**
D	**The amount reported is the maximum possible concentration.**
E	**The detection limit was raised above the Method Quantitation Limit due to chemical interferences.**
F	**This result has been reported off the DB-225 column.**
G	**This resulted has been reported off the SP-2331 column.**
H	**The signal-to-noise ratio is greater than 10:1.**
I	**Chemical Interference**

Conc.	**Concentration**
D.L.	**Detection Limit**
NA	**Not applicable**
S/N	**Signal-to-noise**
MPC	**Maximum Possible Concentration**
*****	**See Cover Letter**
R.L.	**Reporting Limit**

ALTA

June 17, 1992

Alta Batch I.D.: 11328

Mr. Larry Edwards
Radian Corp.
10395 Old Placerville Rd.
Sacramento, CA 95827

Dear Mr. Edwards,

Enclosed are the results for the four MM5 trains received at Alta Analytical Laboratory on June 4, 1992. This work was identified as your WSPA Project. These samples were analyzed by CARB Method 429 for polycyclic aromatic hydrocarbons (PAH) using High Resolution Mass Spectrometry (HRMS). A standard turnaround time was requested for this work.

Some of the internal standard recoveries associated with the PAH analysis had internal standard recoveries below 50%. However, in every instance the signal-to-noise ratio was greater than 10:1, therefore no further action was required, as per the method.

The following report consists of a Sample Inventory (Section I), Analytical Results (Section II) and the Appendix. The Appendix contains a copy of the chain-of-custody, a list of data qualifiers and abbreviations and copies of the raw data (if requested).

If you have any questions regarding this report please feel free to contact me.

Sincerely,

Robert S. Mitzel

Robert S. Mitzel
Director of Operations

Alta Analytical Laboratory Inc.

5070 Robert J. Mathews Pkwy., Suite 2
El Dorado Hills, CA 95630

FAX (916) 933-0940
(916) 933-1640

ALTA

POLYCYCLIC AROMATIC HYROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

Sample ID: T1
Lab ID: 11328-001-PAH
Matrix: MM5

Date Received: 6/04/92
Date Extracted: 6/04/92
Sample Amount: Sample

ICAL ID: IPAH
QC Lot: LC0604M
Units: ng/sample

Compound	Conc.	R.L.	Qualifier
Naphthalene	1300	12.5	B
Acenaphthylene	150	5.0	
Acenaphthene	7.5	5.0	
Fluorene	27	5.0	
Phenanthrene	220	12.5	
Anthracene	8.5	5.0	
Fluoranthene	83	5.0	
Pyrene	54	5.0	
Benz(a)anthracene	8.8	5.0	
Chrysene	8.5	5.0	
Benzo(b)fluoranthene	ND	5.0	
Benzo(k)fluoranthene	ND	5.0	
Benzo(a)pyrene	ND	5.0	
Benzo(e)pyrene	NA	NA	
Indeno(1,2,3-c,d)pyrene	ND	5.0	
Dibenz(a,h)anthracene	ND	5.0	
Benzo(g,h,i)perylene	6.6	5.0	

Analyst: [signature]

Reviewer: [signature]

ALTA

POLYCYCLIC AROMATIC HYROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

Sample ID: T2
Lab ID: 11328-002-PAH
Matrix: MM5

Date Received: 6/04/92
Date Extracted: 6/04/92
Sample Amount: Sample

ICAL ID: IPAH
QC Lot: LC0604M
Units: ng/sample

Compound	Conc.	R.L.	Qualifier
Naphthalene	1000	12.5	B
Acenaphthylene	12	5.0	
Acenaphthene	5.9	5.0	
Fluorene	19	5.0	
Phenanthrene	140	12.5	
Anthracene	7.8	5.0	
Fluoranthene	45	5.0	
Pyrene	12	5.0	
Benz(a)anthracene	ND	5.0	
Chrysene	ND	5.0	
Benzo(b)fluoranthene	ND	5.0	
Benzo(k)fluoranthene	ND	5.0	
Benzo(a)pyrene	ND	5.0	
Benzo(e)pyrene	NA	NA	
Indeno(1,2,3-c,d)pyrene	ND	5.0	
Dibenz(a,h)anthracene	ND	5.0	
Benzo(g,h,i)perylene	ND	5.0	

Analyst: [signature]

Reviewer: [signature]

ALTA

POLYCYCLIC AROMATIC HYROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

Sample ID: T3
Lab ID: 11328-003-PAH
Matrix: MM5

Date Received: 6/04/92
Date Extracted: 6/04/92
Sample Amount: Sample

ICAL ID: IPAH
QC Lot: LC0604M
Units: ng/sample

Compound	Conc.	R.L.	Qualifier
Naphthalene	720	12.5	B
Acenaphthylene	ND	5.0	
Acenaphthene	5.5	5.0	
Fluorene	13	5.0	
Phenanthrene	51	12.5	
Anthracene	ND	5.0	
Fluoranthene	ND	5.0	
Pyrene	5.7	5.0	
Benz(a)anthracene	ND	5.0	
Chrysene	ND	5.0	
Benzo(b)fluoranthene	ND	5.0	
Benzo(k)fluoranthene	ND	5.0	
Benzo(a)pyrene	ND	5.0	
Benzo(e)pyrene	NA	NA	
Indeno(1,2,3-c,d)pyrene	ND	5.0	
Dibenz(a,h)anthracene	ND	5.0	
Benzo(g,h,i)perylene	ND	5.0	

Analyst: [signature]

Reviewer: [signature]

ALTA

POLYCYCLIC AROMATIC HYROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

Sample ID: T4
Lab ID: 11328-004-PAH
Matrix: MM5

Date Received: 6/04/92
Date Extracted: 6/04/92
Sample Amount: Sample

ICAL ID: IPAH
QC Lot: LC0604M
Units: ng/sample

Compound	Conc.	R.L.	Qualifier
Naphthalene	840	12.5	B
Acenaphthylene	ND	5.0	
Acenaphthene	ND	5.0	
Fluorene	15	5.0	
Phenanthrene	89	12.5	
Anthracene	ND	5.0	
Fluoranthene	31	5.0	
Pyrene	10	5.0	
Benz(a)anthracene	ND	5.0	
Chrysene	ND	5.0	
Benzo(b)fluoranthene	ND	5.0	
Benzo(k)fluoranthene	ND	5.0	
Benzo(a)pyrene	ND	5.0	
Benzo(e)pyrene	NA	NA	
Indeno(1,2,3-c,d)pyrene	ND	5.0	
Dibenz(a,h)anthracene	ND	5.0	
Benzo(g,h,i)perylene	ND	5.0	

Analyst: [signature]

Reviewer: [signature]

ALT

POLYCYCLIC AROMATIC HYROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

METHOD BLANK
Lab ID: 11328-MB-PAH
Matrix: MM5

Date Received: NA
Date Extracted: 6/04/92
Sample Amount: Sample

ICAL ID: IPAH
QC Lot: LC0604M
Units: ng/sample

Compound	Conc.	R.L.	Qualifier
Naphthalene	780	12.5	
Acenaphthylene	ND	5.0	
Acenaphthene	ND	5.0	
Fluorene	ND	5.0	
Phenanthrene	ND	12.5	
Anthracene	ND	5.0	
Fluoranthene	ND	5.0	
Pyrene	ND	5.0	
Benz(a)anthracene	ND	5.0	
Chrysene	ND	5.0	
Benzo(b)fluoranthene	ND	5.0	
Benzo(k)fluoranthene	ND	5.0	
Benzo(a)pyrene	ND	5.0	
Benzo(e)pyrene	NA	NA	
Indeno(1,2,3-c,d)pyrene	ND	5.0	
Dibenz(a,h)anthracene	ND	5.0	
Benzo(g,h,i)perylene	ND	5.0	

Analyst: [signature]

Reviewer: [signature]

ALTA

POLYCYCLIC AROMATIC HYDROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

Sample ID: T1
Lab ID: 11328-001-PAH

Isotopic Recovery Results

Internal Standard:	% R	Qualifier
d_8-Naphthalene	53	
d_8-Acenaphthylene	45	H
d_{10}-Acenaphthene	49	H
d_{10}-Fluorene	45	H
d_{10}-Phenanthrene	59	
d_{10}-Anthracene	42	H
d_{10}-Fluoranthene	74	
d_{10}-Pyrene	77	
d_{12}-Benz(a)anthracene	72	
d_{12}-Chrysene	65	
d_{12}-Benzo(b)fluoranthene	74	
d_{12}-Benzo(k)fluoranthene	67	
d_{12}-Benzo(a)pyrene	65	
d_{12}-Indeno(1,2,3-c,d)pyrene	72	
d_{12}-Benzo(g,h,i)perylene	70	
d_{14}-Dibenz(a,h)anthracene	71	
Pre-spike Recovery Standard:		
d_{12}-Benzo(e)pyrene	102	
d_{14}-Terphenyl	107	

$\overline{\%R} = 62.5$

$\bar{s} = 11.9$

Date Analyzed: 6/10/92

Analyst: B

Reviewer: bmf

ALTA

POLYCYCLIC AROMATIC HYDROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

Sample ID: T2
Lab ID: 11328-002-PAH

Isotopic Recovery Results

Internal Standard:	% R	Qualifier
d_8-Naphthalene	58	
d_8-Acenaphthylene	50	
d_{10}-Acenaphthene	64	
d_{10}-Fluorene	50	
d_{10}-Phenanthrene	62	
d_{10}-Anthracene	58	
d_{10}-Fluoranthene	90	
d_{10}-Pyrene	92	
d_{12}-Benz(a)anthracene	78	
d_{12}-Chrysene	74	
d_{12}-Benzo(b)fluoranthene	78	
d_{12}-Benzo(k)fluoranthene	73	
d_{12}-Benzo(a)pyrene	65	
d_{12}-Indeno(1,2,3-c,d)pyrene	75	
d_{12}-Benzo(g,h,i)perylene	76	
d_{14}-Dibenz(a,h)anthracene	76	
Pre-spike Recovery Standard:		
d_{12}-Benzo(e)pyrene	107	
d_{14}-Terphenyl	106	

$\overline{\%R} = 69.9$

$\sigma = 12.5\%$

Date Analyzed: 6/10/92

Analyst: [signature]

Reviewer: [signature]

ALTA

POLYCYCLIC AROMATIC HYDROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

Sample ID: T3
Lab ID: 11328-003-PAH

Isotopic Recovery Results

Internal Standard:	% R	Qualifier
d_8-Naphthalene	31	H
d_8-Acenaphthylene	31	H
d_{10}-Acenaphthene	33	H
d_{10}-Fluorene	34	H
d_{10}-Phenanthrene	52	
d_{10}-Anthracene	54	
d_{10}-Fluoranthene	74	
d_{10}-Pyrene	81	
d_{12}-Benz(a)anthracene	80	
d_{12}-Chrysene	74	
d_{12}-Benzo(b)fluoranthene	83	
d_{12}-Benzo(k)fluoranthene	78	
d_{12}-Benzo(a)pyrene	70	
d_{12}-Indeno(1,2,3-c,d)pyrene	80	
d_{12}-Benzo(g,h,i)perylene	78	
d_{14}-Dibenz(a,h)anthracene	81	
Pre-spike Recovery Standard:		
d_{12}-Benzo(e)pyrene	101	
d_{14}-Terphenyl	109	

$\overline{\%R} = 63.37\%$

$s = 20.6\%$

Date Analyzed: 6/10/92

Analyst: [signature]

Reviewer: [signature]

ALTA

POLYCYCLIC AROMATIC HYDROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

Sample ID: T4
Lab ID: 11328-004-PAH

Isotopic Recovery Results

Internal Standard:	% R	Qualifier
d_8-Naphthalene	40	H
d_8-Acenaphthylene	43	H
d_{10}-Acenaphthene	44	H
d_{10}-Fluorene	42	H
d_{10}-Phenanthrene	63	
d_{10}-Anthracene	51	
d_{10}-Fluoranthene	82	
d_{10}-Pyrene	82	
d_{12}-Benz(a)anthracene	74	
d_{12}-Chrysene	71	
d_{12}-Benzo(b)fluoranthene	79	
d_{12}-Benzo(k)fluoranthene	73	
d_{12}-Benzo(a)pyrene	69	
d_{12}-Indeno(1,2,3-c,d)pyrene	75	
d_{12}-Benzo(g,h,i)perylene	73	
d_{14}-Dibenz(a,h)anthracene	74	
Pre-spike Recovery Standard:		
d_{12}-Benzo(e)pyrene	104	
d_{14}-Terphenyl	107	

$\overline{\%R} = 64.6$

$s = 15.2$

Date Analyzed: 6/10/92

Analyst: [signature]

Reviewer: [signature]

ALTA

POLYCYCLIC AROMATIC HYDROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

METHOD BLANK
Lab ID: 11328-MB-PAH

Isotopic Recovery Results

Internal Standard:	% R	Qualifier
d_8-Naphthalene	64	
d_8-Acenaphthylene	47	H
d_{10}-Acenaphthene	50	
d_{10}-Fluorene	46	H
d_{10}-Phenanthrene	53	
d_{10}-Anthracene	43	H
d_{10}-Fluoranthene	81	
d_{10}-Pyrene	83	
d_{12}-Benz(a)anthracene	59	
d_{12}-Chrysene	70	
d_{12}-Benzo(b)fluoranthene	76	
d_{12}-Benzo(k)fluoranthene	73	
d_{12}-Benzo(a)pyrene	64	
d_{12}-Indeno(1,2,3-c,d)pyrene	72	
d_{12}-Benzo(g,h,i)perylene	75	
d_{14}-Dibenz(a,h)anthracene	69	

$\bar{x}R = 64$

$s = 12.9$

Pre-spike Recovery Standard:

d_{12}-Benzo(e)pyrene	NA
d_{14}-Terphenyl	NA

Date Analyzed: 6/09/92

Analyst: BS

Reviewer: [illegible]

ALTA

POLYCYCLIC AROMATIC HYDROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

LCS RESULTS
Lab ID: 11328-LCS1/LCS2
Matrix: MM5

Date Received: NA
Date Extracted: 6/04/92
Sample Amount: Sample

ICAL ID: IPAH
QC Lot: LC0604M
Units: NA

COMPOUND	LCS1 % R	LCS2 % R	RPD %
Naphthalene	153	119	25
Acenaphthylene	115	102	12
Acenaphthene	103	94	9.1
Fluorene	101	96	5.1
Phenanthrene	93	88	5.5
Anthracene	105	91	14
Fluoranthene	102	99	3.0
Pyrene	103	100	3.0
Benz(a)anthracene	100	93	7.2
Chrysene	100 101 %	94	6.2
Benzo(b)fluoranthene	81	85	4.8
Benzo(k)fluoranthene	93	87	6.7
Benzo(a)pyrene	107	92	15
Benzo(e)pyrene	NA	NA	NA
Indeno(1,2,3-c,d)pyrene	90	82	9.3
Dibenz(a,h)anthracene	87	81	7.1
Benzo(g,h,i)perylene	87	88	7.1

Analyst: SS

Reviewer: [illegible]

ALTA

POLYCYCLIC AROMATIC HYDROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

LCS RESULTS
Lab ID: 11328-LCS1/LCS2

Isotopic Recovery Results

Internal Standard:	LCS1 % R	LCS2 % R
d_8-Napththalene	59	51
d_8-Acenaphthylene	44	44
d_{10}-Acenaphthene	49	47
d_{10}-Fluorene	48	48
d_{10}-Phenanthrene	52	56
d_{10}-Anthracene	43	43
d_{10}-Fluoranthene	114	94
d_{10}-Pyrene	117	95
d_{12}-Benz(a)anthracene	75	71
d_{12}-Chrysene	85	76
d_{12}-Benzo(b)fluoranthene	85	77
d_{12}-Benzo(k)fluoranthene	75	71
d_{12}-Benzo(a)pyrene	63	63
d_{12}-Indeno(1,2,3-c,d)pyrene	71	73
d_{12}-Benzo(g,h,i)perylene	76	72
d_{14}-Dibenz(a,h)anthracene	72	71

70.5 65.7

Date Analyzed: 6/09/92

Analyst: _____

Reviewer: _____

ALDEHYDE ANALYSIS DATA

AIR TOXICS LTD.

SAMPLE NAME: T10-A

ID#: 9206001B-01A

Test #1A, Imp. A

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[illegible]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

Comments:

AIR TOXICS LTD.

SAMPLE NAME: T10-A Duplicate

ID#: 9206001B-01AA

Test #1A, Imp. A
(Duplicate)

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[redacted]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

Comments:

AIR TOXICS LTD.

SAMPLE NAME: T10-B

ID#: 9206001B-01B

Test #1A, Imp. B

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[illegible]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	0.51
Acrolein	0.50	Not Detected

Comments:

AIR TOXICS LTD.

SAMPLE NAME: T11-A

ID#: 9206001B-02A

Test #1B, Imp. A

Stationary Source Test Method - Formaldehyde
(CARB Method 430)
High Pressure Liquid Chromatography

[redacted]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	0.55
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

Comments:

AIR TOXICS LTD.

SAMPLE NAME: T11-B

ID#: 9206001B-02B

Test #1B, Imp. B

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[illegible]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

Comments:

AIR TOXICS LTD.

SAMPLE NAME: T12-A

ID#: 9206001B-03A

Test #2, Imp. A

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[redacted]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

Comments:

AIR TOXICS LTD.

SAMPLE NAME: T12-B

ID#: 9206001B-03B

Test #2, Imp. B

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[illegible]
[illegible]
[illegible]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

Comments:

AIR TOXICS LTD.

SAMPLE NAME: T13-A

ID#: 9206001B-04A

Field Blank #1, Imp. A

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[redacted]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

Comments:

AIR TOXICS LTD.

SAMPLE NAME: T13-B

ID#: 9206001B-04B

Field Blank #1, Imp. B

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[illegible]

[illegible]

[illegible]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

Comments:

AIR TOXICS LTD.

SAMPLE NAME: T14-A

ID#: 9206001B-05a

Field Blank #2, Imp. A

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[illegible]

Total Volume: 16.1 mL   Date of Analysis: [illegible]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

Comments:

AIR TOXICS LTD.

SAMPLE NAME: T14-B

ID#: 9206001B-05B

Field Blank #2, Imp. B

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[illegible]
[illegible] 1.0
[illegible]
[illegible] 14.0 mL

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

Comments:

AIR TOXICS LTD.

SAMPLE NAME: T15-A

ID#: 9206001B-06A

Field Blank #3, Imp. A

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[redacted]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

Comments:

AIR TOXICS LTD.

SAMPLE NAME: T15-B

ID#: 9206001B-06B

Field Blank #3, Imp. B

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	1.0	[illegible]	[illegible]
Total Volume:	15.0 mL	Date of Analysis:	[illegible]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

Comments:

AIR TOXICS LTD.

SAMPLE NAME: T10-B Matrix Spike

ID#: 9206001B-01BB

Test #1A, Imp. B
(Matrix Spike)

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[redacted]

Compound	MDL (uG)	% Recovery
Formaldehyde	0.50	100
Acetaldehyde	0.50	74
Acrolein	0.50	66 Q

Comments: **Q = Exceeds Quality Control limits of +/- 30%.**

AIR TOXICS LTD.

SAMPLE NAME: T17-A (Trip Blank)

ID#: 9206001B-07A

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[illegible]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

Comments:

AIR TOXICS LTD.

SAMPLE NAME: T16-A (Trip Spike)

ID#: 9206001B-08A

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[redacted]

Compound	MDL (uG)	% Recovery
Formaldehyde	0.50	107
Acetaldehyde	0.50	84
Acrolein	0.50	NA

Comments:

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank

ID#: 9206001B-09A

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[illegible]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

Comments:

AIR TOXICS LTD.

SAMPLE NAME: Lab Spike

ID#: 9206001B-10A

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[illegible]

Compound	MDL (uG)	% Recovery
Formaldehyde	0.50	91
Acetaldehyde	0.50	82
Acrolein	0.50	41 Q

Comments: **Q = Exceeds Quality Control limits of +/- 30%.**

BTEX, PROPYLENE, AND THC ANALYSIS DATA

AIR TOXICS LTD.

SAMPLE NAME: T20-A

ID#: 9206001A-01A

Test #4A

Stationary Source Test Method - Low Level BTEX & Propylene

(Modified CARB Method 410A)

Cryofocusing GC FID/PID

File Name: [illegible] **Date of Collection:** 5/30/92

Dil. Factor: 1.0 **Date of Analysis:** 6/1/92

Compound	MDL (ppbv)	Amount (ppbv)
Benzene	1.0	Not Detected
Toluene	1.0	7.0
Ethyl Benzene	1.0	Not Detected
Total Xylenes	1.0	9.0
Propylene	1.0	360
Total Hydrocarbons*	10	2400

*Referenced to Propylene (MW=42)

Comments:

Container Type: Tedlar Bag

9206001A Radian

AIR TOXICS LTD.

SAMPLE NAME: T21-A

ID#: 9206001A-02A

Test #4B

Stationary Source Test Method - Low Level BTEX & Propylene

(Modified CARB Method 410A)

Cryofocusing GC FID/PID

File Name: 0000110 **Date of Collection: 5/30/92**

Dil. Factor: 1.0 **Date of Analysis: 6/1/92**

Compound	MDL (ppbv)	Amount (ppbv)
Benzene	1.0	Not Detected
Toluene	1.0	38
Ethyl Benzene	1.0	Not Detected
Total Xylenes	1.0	13
Propylene	1.0	700
Total Hydrocarbons*	10	2400

*Referenced to Propylene (MW=42)

Comments:

Container Type: Tedlar Bag

AIR TOXICS LTD.

SAMPLE NAME: T22-A

ID#: 9206001A-03A

Test #4C

(Duplicate)

Stationary Source Test Method - Low Level BTEX & Propylene

(Modified CARB Method 410A)

Cryofocusing GC FID/PID

File Name: 9060123 **Date of Collection: 5/30/92**

Dil. Factor: 1.0 **Date of Analysis: 6/2/92**

Compound	MDL (ppbv)	Amount (ppbv)
Benzene	1.0	Not Detected
Toluene	1.0	Not Detected
Ethyl Benzene	1.0	Not Detected
Total Xylenes	1.0	3.0
Propylene	1.0	460
Total Hydrocarbons*	10	2600

*Referenced to Propylene (MW=42)

Comments:

Container Type: Tedlar Bag

AIR TOXICS LTD.

SAMPLE NAME: T22-B

ID#: 9206001A-04A

Test #4C

(Duplicate)

Stationary Source Test Method - Low Level BTEX & Propylene

(Modified CARB Method 410A)

Cryofocusing GC FID/PID

File Name: 8060112 **Date of Collection: [illegible]/92**
Dil. Factor: 1.0 **Date of Analysis: 6/1/92**

Compound	MDL (ppbv)	Amount (ppbv)
Benzene	1.0	4.0
Toluene	1.0	8.0
Ethyl Benzene	1.0	Not Detected
Total Xylenes	1.0	2.0
Propylene	1.0	570
Total Hydrocarbons*	10	2200

*Referenced to Propylene (MW=42)

Comments:

Container Type: Tedlar Bag

AIR TOXICS LTD.

SAMPLE NAME: T23-A

ID#: 9206001A-06A

Field Blank

Stationary Source Test Method - Low Level BTEX & Propylene

(Modified CARB Method 410A)

Cryofocusing Full Scan GC/MS

File Name: 6060108 | **Date of Collection: 5/30/92**
Dil. Factor: 1.0 | **Date of Analysis: 6/1/92**

Compound	MDL (ppbv)	Amount (ppbv)
Benzene	1.0	4.0
Toluene	1.0	5.0
Ethyl Benzene	1.0	2.0
Total Xylenes	1.0	9.0
Propylene	1.0	12
Total Hydrocarbons*	10	2500

*Referenced to Propylene (MW=42)

Comments:

Container Type: Tedlar Bag

AIR TOXICS LTD.

SAMPLE NAME: T24-A

ID#: 9206001A-07A

QC Sample

Stationary Source Test Method - Low Level BTEX & Propylene

(Modified CARB Method 410A)

Cryofocusing Full Scan GC/MS

File Name: 6060202 **Date of Collection:** 5/20/92

Dil. Factor: 1.0 **Date of Analysis:** 6/2/92

Compound	MDL (ppbv)	Recovery (%)
Benzene	1.0	105
Toluene	1.0	110
Ethyl Benzene	1.0	118
Total Xylenes	1.0	125
Propylene	1.0	99
Total Hydrocarbons*	10	99

*Referenced to Propylene (MW=42)

Comments:

Container Type: Tedlar Bag

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank

ID#: 9206001A-08A

Stationary Source Test Method - Low Level BTEX & Propylene

(Modified CARB Method 410A)

Cryofocusing Full Scan GC/MS

File Name: [illegible] **Date of Collection: NA**
Dil. Factor: 1.0 **Date of Analysis: 6/1/92**

Compound	MDL (ppbv)	Amount (ppbv)
Benzene	1.0	Not Detected
Toluene	1.0	Not Detected
Ethyl Benzene	1.0	Not Detected
Total Xylenes	1.0	Not Detected
Propylene	1.0	Not Detected
Total Hydrocarbons*	10	Not Detected

*Referenced to Propylene (MW=42)

Comments:

Container Type: NA

MOBIL STEAM GENERATOR TEST DATA

(JUNE 2-4, 1992)

PAH ANALYSIS DATA

ALTA

DATA QUALIFIERS & ABBREVIATIONS

A	The amount detected is below the Method Quantitation Limit.
B	This compound was also detected in the blank.
C	The amount detected is less than five times the Method Quantitation Limit.
D	The amount reported is the maximum possible concentration.
E	The detection limit was raised above the Method Quantitation Limit due to chemical interferences.
F	This result has been reported off the DB-225 column.
G	This resulted has been reported off the SP-2331 column.
H	The signal-to-noise ratio is greater than 10:1.
I	Chemical Interference

Conc.	Concentration
D.L.	Detection Limit
NA	Not applicable
S/N	Signal-to-noise
MPC	Maximum Possible Concentration
*****	See Cover Letter
R.L.	Reporting Limit

ALTA

June 17, 1992

Alta Batch I.D.: 11333

Mr. Larry Edwards
Radian Corp.
10395 Old Placerville Rd.
Sacramento, CA 95827

Dear Mr. Edwards,

Enclosed are the results for the four MM5 trains received at Alta Analytical Laboratory on June 6, 1992. This work was identified as your WSPA Project. These samples were analyzed by CARB Method 429 for polycyclic aromatic hydrocarbons (PAH) using High Resolution Mass Spectrometry (HRMS). A standard turnaround time was requested for this work.

The following report consists of a Sample Inventory (Section I), Analytical Results (Section II) and the Appendix. The Appendix contains a copy of the chain-of-custody, a list of data qualifiers and abbreviations and copies of the raw data (if requested).

If you have any questions regarding this report please feel free to contact me.

Sincerely,

Robert S. Mitzel

Robert S. Mitzel
Director of Operations

Alta Analytical Laboratory Inc.

5070 Robert J. Mathews Pkwy., Suite 2
El Dorado Hills, CA 95630

FAX (916) 933-0940
(916) 933-1640

ALTA

POLYCYCLIC AROMATIC HYROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

Sample ID: M1	Date Received: 6/06/92	ICAL ID: IPAH
Lab ID: 11333-001-PAH	Date Extracted: 6/08/92	QC Lot: LC0608M
Matrix: MM5	Sample Amount: Sample	Units: ng/sample

Compound	Conc.	R.L.	Qualifier
Naphthalene	1300	12.5	B
Acenaphthylene	ND	5.0	
Acenaphthene	ND	5.0	
Fluorene	15	5.0	
Phenanthrene	68	12.5	
Anthracene	13	5.0	
Fluoranthene	14	5.0	
Pyrene	13	5.0	
Benz(a)anthracene	8.5	5.0	
Chrysene	7.0	5.0	
Benzo(b)fluoranthene	ND	5.0	
Benzo(k)fluoranthene	ND	5.0	
Benzo(a)pyrene	ND	5.0	
Benzo(e)pyrene	NA	NA	
Indeno(1,2,3-c,d)pyrene	ND	5.0	
Dibenz(a,h)anthracene	ND	5.0	
Benzo(g,h,i)perylene	ND	5.0	

Analyst: *[signature]*

Reviewer: *[signature]*

ALTA

POLYCYCLIC AROMATIC HYROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

Sample ID: M2
Lab ID: 11333-002-PAH
Matrix: MM5

Date Received: 6/06/92
Date Extracted: 6/08/92
Sample Amount: Sample

ICAL ID: IPAH
QC Lot: LC0608M
Units: ng/sample

Compound	Conc.	R.L.	Qualifier
Naphthalene	1400	12.5	B
Acenaphthylene	ND	5.0	
Acenaphthene	6.0	5.0	
Fluorene	22	5.0	
Phenanthrene	120	12.5	
Anthracene	30	5.0	
Fluoranthene	7.9	5.0	
Pyrene	23	5.0	
Benz(a)anthracene	17	5.0	
Chrysene	17	5.0	
Benzo(b)fluoranthene	ND	5.0	
Benzo(k)fluoranthene	ND	5.0	
Benzo(a)pyrene	ND	5.0	
Benzo(e)pyrene	NA	NA	
Indeno(1,2,3-c,d)pyrene	ND	5.0	
Dibenz(a,h)anthracene	ND	5.0	
Benzo(g,h,i)perylene	ND	5.0	

Analyst: *bm*

Reviewer: *[signature]*

ALTA

POLYCYCLIC AROMATIC HYROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

Sample ID: M3
Lab ID: 11333-003-PAH
Matrix: MM5

Date Received: 6/06/92
Date Extracted: 6/08/92
Sample Amount: Sample

ICAL ID: IPAH
QC Lot: LC0608M
Units: ng/sample

Compound	Conc.	R.L.	Qualifier
Naphthalene	1100	12.5	B
Acenaphthylene	ND	5.0	
Acenaphthene	ND	5.0	
Fluorene	13	5.0	
Phenanthrene	66	12.5	
Anthracene	6.6	5.0	
Fluoranthene	7.5	5.0	
Pyrene	6.0	5.0	
Benz(a)anthracene	ND	5.0	
Chrysene	ND	5.0	
Benzo(b)fluoranthene	ND	5.0	
Benzo(k)fluoranthene	ND	5.0	
Benzo(a)pyrene	ND	5.0	
Benzo(e)pyrene	NA	NA	
Indeno(1,2,3-c,d)pyrene	ND	5.0	
Dibenz(a,h)anthracene	ND	5.0	
Benzo(g,h,i)perylene	ND	5.0	

Analyst: SM

Reviewer: WL

ALTA

POLYCYCLIC AROMATIC HYROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

Sample ID: M4 (Field Blank)
Lab ID: 11333-004-PAH
Matrix: MM5

Date Received: 6/06/92
Date Extracted: 6/08/92
Sample Amount: Sample

ICAL ID: IPAH
QC Lot: LC0608M
Units: ng/sample

Compound	Conc.	R.L.	Qualifier
Naphthalene	750	12.5	B
Acenaphthylene	ND	5.0	
Acenaphthene	ND	5.0	
Fluorene	8.1	5.0	
Phenanthrene	29	12.5	
Anthracene	ND	5.0	
Fluoranthene	ND	5.0	
Pyrene	ND	5.0	
Benz(a)anthracene	ND	5.0	
Chrysene	ND	5.0	
Benzo(b)fluoranthene	ND	5.0	
Benzo(k)fluoranthene	ND	5.0	
Benzo(a)pyrene	ND	5.0	
Benzo(e)pyrene	NA	NA	
Indeno(1,2,3-c,d)pyrene	ND	5.0	
Dibenz(a,h)anthracene	ND	5.0	
Benzo(g,h,i)perylene	ND	5.0	

Analyst: Dry

Reviewer: hy

ALTA

POLYCYCLIC AROMATIC HYROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

METHOD BLANK
Lab ID: 11333-MB-PAH
Matrix: MM5

Date Received: NA
Date Extracted: 6/08/92
Sample Amount: Sample

ICAL ID: IPAH
QC Lot: LC0608M
Units: ng/sample

Compound	Conc.	R.L.	Qualifier
Naphthalene	800	12.5	
Acenaphthylene	ND	5.0	
Acenaphthene	ND	5.0	
Fluorene	ND	5.0	
Phenanthrene	ND	12.5	
Anthracene	ND	5.0	
Fluoranthene	ND	5.0	
Pyrene	ND	5.0	
Benz(a)anthracene	ND	5.0	
Chrysene	ND	5.0	
Benzo(b)fluoranthene	ND	5.0	
Benzo(k)fluoranthene	ND	5.0	
Benzo(a)pyrene	ND	5.0	
Benzo(e)pyrene	NA	NA	
Indeno(1,2,3-c,d)pyrene	ND	5.0	
Dibenz(a,h)anthracene	ND	5.0	
Benzo(g,h,i)perylene	ND	5.0	

Analyst: *GM*

Reviewer: *[illegible]*

ALTA

POLYCYCLIC AROMATIC HYDROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

Sample ID: M1
Lab ID: 11333-001-PAH

Isotopic Recovery Results

Internal Standard:	% R	Qualifier
d_8-Naphthalene	70	
d_8-Acenaphthylene	72	
d_{10}-Acenaphthene	102	
d_{10}-Fluorene	96	
d_{10}-Phenanthrene	87	
d_{10}-Anthracene	93	
d_{10}-Fluoranthene	113	
d_{10}-Pyrene	117	
d_{12}-Benz(a)anthracene	142	
d_{12}-Chrysene	117	
d_{12}-Benzo(b)fluoranthene	124	
d_{12}-Benzo(k)fluoranthene	108	
d_{12}-Benzo(a)pyrene	93	
d_{12}-Indeno(1,2,3-c,d)pyrene	132	
d_{12}-Benzo(g,h,i)perylene	105	
d_{14}-Dibenz(a,h)anthracene	125	
Pre-spike Recovery Standard:		
d_{12}-Benzo(e)pyrene	98	
d_{14}-Terphenyl	145	

$\overline{\%R} = 106\%$
$s = 20.4$

Date Analyzed: 6/12/92

Analyst: SM Page 2 of 2 Reviewer: MA

ALTA

POLYCYCLIC AROMATIC HYDROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

Sample ID: M2
Lab ID: 11333-002-PAH

Isotopic Recovery Results

Internal Standard:	% R	Qualifier
d_8-Naphthalene	57	
d_8-Acenaphthylene	61	
d_{10}-Acenaphthene	87	
d_{10}-Fluorene	87	
d_{10}-Phenanthrene	85	
d_{10}-Anthracene	106	
d_{10}-Fluoranthene	97	
d_{10}-Pyrene	102	
d_{12}-Benz(a)anthracene	127	
d_{12}-Chrysene	100	
d_{12}-Benzo(b)fluoranthene	105	$\overline{\%R}$ = 92.4%
d_{12}-Benzo(k)fluoranthene	85	S = 18.9%
d_{12}-Benzo(a)pyrene	76	
d_{12}-Indeno(1,2,3-c,d)pyrene	110	
d_{12}-Benzo(g,h,i)perylene	88	
d_{14}-Dibenz(a,h)anthracene	106	
Pre-spike Recovery Standard:		
d_{12}-Benzo(e)pyrene	97	
d_{14}-Terphenyl	144	

Date Analyzed: 6/12/92

Analyst: BQJ

Reviewer: [illegible]

ALTA

POLYCYCLIC AROMATIC HYDROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

Sample ID: M3
Lab ID: 11333-003-PAH

Isotopic Recovery Results

Internal Standard:	% R	Qualifier
d_8-Naphthalene	50	
d_8-Acenaphthylene	60	
d_{10}-Acenaphthene	76	
d_{10}-Fluorene	84	
d_{10}-Phenanthrene	69	
d_{10}-Anthracene	83	
d_{10}-Fluoranthene	96	
d_{10}-Pyrene	104	
d_{12}-Benz(a)anthracene	110	
d_{12}-Chrysene	92	
d_{12}-Benzo(b)fluoranthene	93	$\overline{\%R}$ 83.8%
d_{12}-Benzo(k)fluoranthene	78	
d_{12}-Benzo(a)pyrene	68	s = 16.4
d_{12}-Indeno(1,2,3-c,d)pyrene	100	
d_{12}-Benzo(g,h,i)perylene	82	
d_{14}-Dibenz(a,h)anthracene	96	
Pre-spike Recovery Standard:		
d_{12}-Benzo(e)pyrene	96	
d_{14}-Terphenyl	133	

Date Analyzed: 6/12/92

Analyst: BM

Reviewer: [illegible]

ALTA

POLYCYCLIC AROMATIC HYDROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

Sample ID: M4 (Field Blank)
Lab ID: 11333-004-PAH

Isotopic Recovery Results

Internal Standard:	% R	Qualifier
d_8-Naphthalene	60	
d_8-Acenaphthylene	57	
d_{10}-Acenaphthene	79	
d_{10}-Fluorene	71	
d_{10}-Phenanthrene	106	
d_{10}-Anthracene	141	
d_{10}-Fluoranthene	97	
d_{10}-Pyrene	100	
d_{12}-Benz(a)anthracene	101	
d_{12}-Chrysene	87	
d_{12}-Benzo(b)fluoranthene	97	91.37
d_{12}-Benzo(k)fluoranthene	90	90R
d_{12}-Benzo(a)pyrene	73	
d_{12}-Indeno(1,2,3-c,d)pyrene	109	s = 20.7
d_{12}-Benzo(g,h,i)perylene	91	
d_{14}-Dibenz(a,h)anthracene	103	
Pre-spike Recovery Standard:		
d_{12}-Benzo(e)pyrene	102	
d_{14}-Terphenyl	130	

Date Analyzed: 6/12/92

Analyst: [signature] Page 2 of 2 Reviewer: [signature]

ALTA

POLYCYCLIC AROMATIC HYDROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

METHOD BLANK
Lab ID: 11333-MB-PAH

Isotopic Recovery Results

Internal Standard:	% R	Qualifier
d_8-Naphthalene	79	
d_8-Acenaphthylene	75	
d_{10}-Acenaphthene	85	
d_{10}-Fluorene	83	
d_{10}-Phenanthrene	93	
d_{10}-Anthracene	122	
d_{10}-Fluoranthene	111	
d_{10}-Pyrene	117	
d_{12}-Benz(a)anthracene	94	
d_{12}-Chrysene	96	
d_{12}-Benzo(b)fluoranthene	120	
d_{12}-Benzo(k)fluoranthene	98	
d_{12}-Benzo(a)pyrene	95	
d_{12}-Indeno(1,2,3-c,d)pyrene	119	
d_{12}-Benzo(g,h,i)perylene	109	
d_{14}-Dibenz(a,h)anthracene	110	

$\overline{\%R} = 100$

$s = 15.3$

Pre-spike Recovery Standard:

d_{12}-Benzo(e)pyrene	NA
d_{14}-Terphenyl	NA

Date Analyzed: 6/12/92

Analyst: [signature]

Reviewer: [signature]

ALTA

POLYCYCLIC AROMATIC HYDROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

LCS RESULTS
Lab ID: 11333-LCS1/LCS2
Matrix: MM5

Date Received: NA
Date Extracted: 6/08/92
Sample Amount: Sample

ICAL ID: IPAH
QC Lot: LC0608M
Units: NA

COMPOUND	LCS1 % R	LCS2 % R	RPD %
Naphthalene	86	93	7.8
Acenaphthylene	90	96	6.5
Acenaphthene	88	92	4.4
Fluorene	91	94	3.2
Phenanthrene	82	87	5.9
Anthracene	78	86	9.8
Fluoranthene	76	77	1.3
Pyrene	77	75	2.6
Benz(a)anthracene	85	84	1.2
Chrysene	87	86	1.2
Benzo(b)fluoranthene	81	82	1.2
Benzo(k)fluoranthene	83	84	1.2
Benzo(a)pyrene	90	95	5.4
Benzo(e)pyrene	NA	NA	NA
Indeno(1,2,3-c,d)pyrene	89	88	1.1
Dibenz(a,h)anthracene	91	92	1.1
Benzo(g,h,i)perylene	88	90	2.2

Analyst: *[signature]*

Reviewer: *[signature]*

ALTA

POLYCYCLIC AROMATIC HYDROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

LCS RESULTS
Lab ID: 11333-LCS1/LCS2

Isotopic Recovery Results

Internal Standard:	LCS1 % R	LCS2 % R
d_8-Napththalene	56	74
d_8-Acenaphthylene	57	72
d_{10}-Acenaphthene	63	79
d_{10}-Fluorene	67	78
d_{10}-Phenanthrene	89	86
d_{10}-Anthracene	106	107
d_{10}-Fluoranthene	88	105
d_{10}-Pyrene	91	113
d_{12}-Benz(a)anthracene	79	108
d_{12}-Chrysene	81	115
d_{12}-Benzo(b)fluoranthene	81	109
d_{12}-Benzo(k)fluoranthene	81	109
d_{12}-Benzo(a)pyrene	72	98
d_{12}-Indeno(1,2,3-c,d)pyrene	82	117
d_{12}-Benzo(g,h,i)perylene	77	108
d_{14}-Dibenz(a,h)anthracene	80	110

Date Analyzed: 6/12/92

Analyst:

Reviewer:

ALDEHYDE ANALYSIS DATA

9206023 Radian/Kern

AIR TOXICS LTD.

SAMPLE NAME: M11-A

ID#: 9206023-01A

Test #1, Imp. A

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[illegible]	[illegible]	[illegible]
[illegible]	1.0	[illegible]
Total Volume:	25 mL	Date of Analysis: 6/8/92

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: M11-B

ID#: 9206023-01B

Test #1, Imp. B

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[redacted]

Compound	**MDL (uG)**	**Amount (uG)**
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: M12-A

ID#: 9206023-02A

Test #2A, Imp. A

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[illegible]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	0.50
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: M12-B

ID#: 9206023-02B

Test #2A, Imp. B

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[illegible] [illegible]
[illegible] [illegible]
[illegible] [illegible]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: M13-A

ID#: 9206023-03A

Test #2B, Imp. A

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[illegible]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: M13-A Duplicate

ID#: 9206023-03AA

Test #2B, Imp. A
(Duplicate)

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[illegible]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: M13-B

ID#: 9206023-03B

Test #2B, Imp. B

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[illegible]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: M13-B Matrix Spike

ID#: 9206023-03B-MS

Test #2B, Imp. B
(Matrix Spike)

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[redacted]

Compound	MDL (uG)	% Recovery
Formaldehyde	0.50	81
Acetaldehyde	0.50	52 Q
Acrolein	0.50	63 Q

Comments: Q = Exceeds Quality Control limits of +/- 30%.

AIR TOXICS LTD.

SAMPLE NAME: M14-A

ID#: 9206023-04A

Field Blank #1, Imp. A

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[illegible]
[illegible] 1.0 [illegible]
[illegible]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: M14-B

ID#: 9206023-04B

Field Blank #1, Imp. B

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[illegible]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: M15-A

ID#: 9206023-05A

Field Blank #2, Imp. A

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[illegible]	[illegible]	[illegible]
[illegible]	1.0	[illegible]
Total Volume:	17.6 mL	Date of Analysis: 6/8/92

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: M15-B

ID#: 9206023-05B

Field Blank #2, Imp. B

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[illegible]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: M16-A

ID#: 9206023-06A

Field Blank #3, Imp. A

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[illegible] 1.0
Total Volume: 15.0 mL
[illegible]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: M16-B

ID#: 9206023-06B

Field Blank #3, Imp. B

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[illegible]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: Trip Blank (M17-A)

ID#: 9206023-07A

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[illegible] 4060616	[illegible] NA
[illegible] 1.0	[illegible] /92
[illegible] 10.0 mL	[illegible]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank

ID#: 9206023-08A

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[redacted]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: Lab Spike

ID#: 9206023-09A

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

File Name:	**4060621**	**Date of Collection: NA**
Dil. Factor:	**1.0**	**Date of Extraction: 6/5/92**
Total Volume:	**11.0 mL**	**Date of Analysis: 6/6/92**

Compound	MDL (uG)	% Recovery
Formaldehyde	1.0	72
Acetaldehyde	1.0	79
Acrolein	1.0	86

Pre-Test DNPH Reagent Blank Data

	A	B	C	D	E	F	G	H	I	J	K
1	FORMALDEHYDE CALCULATIONS FOR DNPH CERTIFICATION										
2											
3	RADIAN CORPORATION										
4	6/1/92										
5											
6	FORMALDEHYDE RESPONSE FACTOR =			66141							
7	ACTEALDEHYDE RESPONSE FACTOR =			60220							
8	ACROLEIN RESPONSE FACTOR =			42800							
9	SAMPLE	FILE	DILUTION	VOLUME	TOTAL	FORMALDEHYDE	ACTEALDEHYDE	ACROLEIN	uGRAM	uGRAM	uGRAM
10	NAME	NUMBER	FACTOR	EXTRACTED	VOLUME	AREA	AREA	AREA	FORMALDEHYDE	ACETALDEHYDE	ACROLEIN
11						COUNTS	COUNTS	COUNTS			
12		4060108	1	9.2	9.2	16123	0	0.0	0.17	0.00	0.0
13		4060109	1	9.4	9.4	11213	24833	0.0	0.12	0.40	0.0
14		4060110	1	9.3	9.3	13912	8164	0.0	0.15	0.13	0.0
15		4060111	1	9.4	9.4	9728	13605	0.0	0.11	0.22	0.0
16		4060112	1	9.6	9.6	7367	18042	0.0	0.09	0.41	0.0
17								AVERAGE	0.13	0.23	

Robert [illegible]
6/1/92

BTEX, PROPYLENE, AND THC ANALYSIS DATA

9206029 Radian/Kern

AIR TOXICS LTD.

SAMPLE NAME: M-30A

ID#: 9206029-01A

Test #4A

Stationary Source Test Method - Low Level BTEX & Propylene

(Modified CARB Method 410A)

Cryofocusing GC FID/PID

File Name:	**6060509**	**Date of Collection:**	**6/4/92**
Dil. Factor:	**1.4**	**Date of Analysis:**	**6/5/92**

Compound	MDL (ppbv)	Amount (ppbv)
Benzene	1.4	Not Detected
Toluene	1.4	6.5
Ethyl Benzene	1.4	4.5
Total Xylenes	1.4	16
Propylene	1.4	430
Total Hydrocarbons*	14	1200

*Referenced to Heptane (MW=100)

Comments:

Container Type: Tedlar Bag

9206029 Radian/Kern

AIR TOXICS LTD.

SAMPLE NAME: M-30B

ID#: 9206029-02A

Test #4B

Stationary Source Test Method - Low Level BTEX & Propylene

(Modified CARB Method 410A)

Cryofocusing GC FID/PID

File Name: 6060510 **Date of Collection:** 6/4/92
Dil. Factor: 1.4 **Date of Analysis:** 6/5/92

Compound	MDL (ppbv)	Amount (ppbv)
Benzene	1.4	Not Detected
Toluene	1.4	6.5
Ethyl Benzene	1.4	7.1
Total Xylenes	1.4	5.1
Propylene	1.4	610
Total Hydrocarbons*	14	1500

*Referenced to Heptane (MW=100)

Comments:

Container Type: Tedlar Bag

AIR TOXICS LTD.

SAMPLE NAME: M-30C

ID#: 9206029-03A

Test #4C

Stationary Source Test Method - Low Level BTEX & Propylene

(Modified CARB Method 410A)

Cryofocusing GC FID/PID

File Name: 9060511 **Date of Collection: 6/4/92**

Dil. Factor: 1.4 **Date of Analysis: 6/5/92**

Compound	MDL (ppbv)	Amount (ppbv)
Benzene	1.4	Not Detected
Toluene	1.4	7.7
Ethyl Benzene	1.4	Not Detected
Total Xylenes	1.4	3.3
Propylene	1.4	640
Total Hydrocarbons*	14	1600

*Referenced to Heptane (MW=100)

Comments:

Container Type: Tedlar Bag

AIR TOXICS LTD.

SAMPLE NAME: M-30D

ID#: 9206029-04A

Test #4C (Duplicate)

Stationary Source Test Method - Low Level BTEX & Propylene

(Modified CARB Method 410A)

Cryofocusing GC FID/PID

File Name: 6060512 **Date of Collection: 6/4/92**
Dil. Factor: 1.4 **Date of Analysis: 6/5/92**

Compound	MDL (ppbv)	Amount (ppbv)
Benzene	1.4	Not Detected
Toluene	1.4	12
Ethyl Benzene	1.4	Not Detected
Total Xylenes	1.4	5.1
Propylene	1.4	390
Total Hydrocarbons*	14	1000

*Referenced to Heptane (MW=100)

Comments:

Container Type: Tedlar Bag

AIR TOXICS LTD.

SAMPLE NAME: M-31

ID#: 9206029-05A

Field Blank

Stationary Source Test Method - Low Level BTEX & Propylene
(Modified CARB Method 410A)
Cryofocusing GC FID/PID

File Name: 6060513 **Date of Collection: 6/4/92**
Dil. Factor: 1.0 **Date of Analysis: 6/5/92**

Compound	MDL (ppbv)	Amount (ppbv)
Benzene	1.0	Not Detected
Toluene	1.0	4.9
Ethyl Benzene	1.0	Not Detected
Total Xylenes	1.0	Not Detected
Propylene	1.0	19
Total Hydrocarbons*	10	1200

*Referenced to Heptane (MW=100)

Comments:

Container Type: Tedlar Bag

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank

ID#: 9206029-08A

Stationary Source Test Method - Low Level BTEX & Propylene
(Modified CARB Method 410A)
Cryofocusing GC FID/PID

File Name:	**8060801**	**Date of Collection: NA**
Dil. Factor:	**1.0**	**Date of Analysis: 6/8/92**

Compound	MDL (ppbv)	Amount (ppbv)
Benzene	1.0	Not Detected
Toluene	1.0	Not Detected
Ethyl Benzene	1.0	Not Detected
Total Xylenes	1.0	Not Detected
Propylene	1.0	Not Detected
Total Hydrocarbons*	10	Not Detected

*Referenced to Heptane (MW=100)

Comments:

Container Type: NA

H2S ANALYSIS DATA

Steiner Environmental, Inc.

ANALYTICAL REPORT – H_2S (Casing Gas)

SAMPLE TYPE Method 11 H_2S

DATE 6/4/92

SAMPLE COMPONENT Cd SO_4 Abs Soln.

ANALYST WB/MC

REQUESTED BY Radian\Mobil Fuel Line

ANALYTICAL METHOD Iodometric

Sample ID No.	Test No.	Sample Volume	ml I_2 Added	Titer mls	Sample Color	Normality of Iodine
32767 32770	1 B	80 80	120 10	20.10 9.45	Dark Yellow Clear	N_{I_2} = .00982 $N_{Na_2S_2O_3}$ = .01 N Standardized
32768 32769 32770	2 3 B	80 80 80	20 20 10	9.00 7.70 8.80	Dark Yellow Dark Yellow Clear	N_{I_2} = .092 $N_{Na_2S_2O_3}$ = .1 N Standardized
	1 Blank					16.62 mg H_2S/Sample .0629 mg H_2S/Sample
	2 3 Bk					15.98 mg H_2S/Sample 18.19 mg H_2S/Sample 0.68 mg H_2S/Sample.

Steiner Environmental, Inc.

ANALYTICAL REPORT – H_2S (Stack Gas)

SAMPLE TYPE: Method 11 H_2S

DATE: 6/4/92

SAMPLE COMPONENT: Cd SO4 Abs Soln

ANALYST: WB / MC

REQUESTED BY: Radian / WSPA

ANALYTICAL METHOD: Iodometric

Sample ID No.	Test No.	Sample Volume	ml I_2 Added	Titer mls	Sample Color	Normality of Iodine
Radian Samples 22 B		64	10	9.55	Clear	N_{I_2} = .00982
23 B		62	10	9.45	Clear	$N_{Na_2S_2O_3}$ = .01
24 B		60	10	9.20	Clear	
25 B		58	10	9.60	Clear	Total mg H_2S Sample
22 B						0.0459
23 B						0.0629
24 B						0.0204
25 B						0.0374

SWEPI GAS TURBINE TEST DATA

(JUNE 9-10, 1992)

PAH ANALYSIS DATA

AIR TOXICS LTD.

SAMPLE NAME: S20-A

ID#: 9206067-01A

Test #2A

Stationary Source Test Method - Low Level BTEX & Propylene

(Modified CARB Method 410A)

Cryofocusing GC FID/PID

File Name:	**8061205**	**Date of Collection: 6/9/92**
Dil. Factor:	**1.0**	**Date of Analysis: 6/12/92**

Compound	MDL (ppbv)	Amount (ppbv)
Benzene	1.0	Not Detected
Toluene	1.0	3.0
Ethyl Benzene	1.0	Not Detected
Total Xylenes	1.0	2.0
Propylene	1.0	530
Total Hydrocarbons*	10	2400

*Referenced to Heptane (MW=100)

Container Type: Tedlar Bag

ALTA

July 2, 1992

Alta Batch I.D.: 11351

Mr. Mark Ludwiczak
Radian Corp.
10395 Old Placerville Rd.
Sacramento, CA 95827

Dear Mr. Ludwiczak,

Enclosed are the results for the four MM5 trains received at Alta Analytical Laboratory on June 12, 1992. This work was authorized under your Purchase Order #150888. These samples were analyzed using CARB Method 429 for polycyclic aromatic hydrocarbons (PAH) using High Resolution Mass Spectrometry (HRMS). A standard turnaround time was requested for this work.

Some of the internal standard recoveries associated with the PAH analysis had internal standard recoveries below 50%. However, in every instance the signal-to-noise ratio was greater than 10:1, therefore no further action was required, as per the method.

The following report consists of a Sample Inventory (Section I), Analytical Results (Section II) and the Appendix. The Appendix contains a copy of the chain-of-custody, a list of data qualifiers and abbreviations and copies of the raw data (if requested).

If you have any questions regarding this report please feel free to contact me.

Sincerely,

Robert S. Mitzel
Robert S. Mitzel
Director of Operations

Alta Analytical Laboratory Inc.

5070 Robert J. Mathews Pkwy., Suite 2
El Dorado Hills, CA 95630

FAX (916) 933-0940
(916) 933-1640

Pre-Test DNPH Reagent Blank Data

	A	B	C	D	E	F	G	H	I
1	DNPH / SAMPLE TRAIN CETIFICATION								
2									
3	6/8/92		9205066						
4				extracted 5/15/92					
5									
6	FORMALDEHYDE RESPONSE FACTOR=			554942					
7	ACETALDEHYDE RESPONSE FACTOR=			591039					
8	ACROLEIN RESPONSE FACTOR=			584467					
9									
10	SAMPLE	FILE	DILUTION	VOLUME	TOTAL	FORMALDEHYDE	ACETALDEHYDE	ACROLEIN	uGRAM
11	NAME	NUMBER	FACTOR	EXTRACTED	VOLUME	AREA	AREA	AREA	FORMALDEHYDE
12						COUNTS	COUNTS	COUNTS	
13		4060801	1	10	10	51461	0	0	0.066
14		4060802	1	10	10	74071	0	0	0.095
15		4060803	1	10	10	41552	0	0	0.053
16		4060804	1	10	10	50271	0	0	0.065
17							0		AVE: = 0.070

6/8/92
R Freeman

ALTA

POLYCYCLIC AROMATIC HYROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

Sample ID: S2 A-F (Field Blank)
Lab ID: 11351-002-PAH
Matrix: MM5

Date Received: 6/12/92
Date Extracted: 6/15/92
Sample Amount: Sample

ICAL ID: IPAH
QC Lot: LC0615M
Units: ng/sample

Compound	Conc.	R.L.	Qualifier
Naphthalene	1000	12.5	B
Acenaphthylene	8.3	5.0	
Acenaphthene	17	5.0	
Fluorene	56	5.0	
Phenanthrene	310	12.5	
Anthracene	62	5.0	
Fluoranthene	32	5.0	
Pyrene	38	5.0	
Benz(a)anthracene	ND	5.0	
Chyrsene	8.8	5.0	
Benzo(b)fluoranthene	ND	5.0	
Benzo(k)fluoranthene	ND	5.0	
Benzo(a)pyrene	ND	5.0	
Benzo(e)pyrene	NA	NA	
Indeno(1,2,3-c,d)pyrene	ND	5.0	
Dibenz(a,h)anthracene	ND	5.0	
Benzo(g,h,i)perylene	ND	5.0	

Analyst: JWN

Reviewer: [signature]

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank

ID#: 9206068-09A

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[redacted]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

Comments:

ALTA

POLYCYCLIC AROMATIC HYROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

Sample ID: S4 A-F
Lab ID: 11351-004-PAH
Matrix: MM5

Date Received: 6/12/92
Date Extracted: 6/15/92
Sample Amount: Sample

ICAL ID: IPAH
QC Lot: LC0615M
Units: ng/sample

Compound	Conc.	R.L.	Qualifier
Naphthalene	950	12.5	B
Acenaphthylene	ND	5.0	
Acenaphthene	ND	5.0	
Fluorene	16	5.0	
Phenanthrene	80	12.5	
Anthracene	7.5	5.0	
Fluoranthene	10	5.0	
Pyrene	10	5.0	
Benz(a)anthracene	ND	5.0	
Chrysene	ND	5.0	
Benzo(b)fluoranthene	ND	5.0	
Benzo(k)fluoranthene	ND	5.0	
Benzo(a)pyrene	ND	5.0	
Benzo(e)pyrene	NA	NA	
Indeno(1,2,3-c,d)pyrene	ND	5.0	
Dibenz(a,h)anthracene	ND	5.0	
Benzo(g,h,i)perylene	ND	5.0	

Analyst: HWL

Reviewer: [signature]

AIR TOXICS LTD.

SAMPLE NAME: S16-A (Trip Blank)

ID#: 9206068-07A

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[redacted]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

Comments:

ALTA

POLYCYCLIC AROMATIC HYDROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

Sample ID: S1 A-F
Lab ID: 11351-001-PAH

Isotopic Recovery Results

Internal Standard:	% R	Qualifier
d_8-Naphthalene	75	
d_8-Acenaphthylene	90	
d_{10}-Acenaphthene	104	
d_{10}-Fluorene	114	
d_{10}-Phenanthrene	123	
d_{10}-Anthracene	131	
d_{10}-Fluoranthene	58	
d_{10}-Pyrene	60	
d_{12}-Benz(a)anthracene	78	
d_{12}-Chrysene	66	
d_{12}-Benzo(b)fluoranthene	92	
d_{12}-Benzo(k)fluoranthene	88	
d_{12}-Benzo(a)pyrene	81	
d_{12}-Indeno(1,2,3-c,d)pyrene	113	
d_{12}-Benzo(g,h,i)perylene	106	
d_{14}-Dibenz(a,h)anthracene	116	

$\overline{\%R} = 93.4$

$s = 22.7$

Pre-spike Recovery Standard:

d_{12}-Benzo(e)pyrene	102
d_{14}-Terphenyl	150

Date Analyzed: 7/1/92

Analyst: [signature]

Reviewer: [signature]

AIR TOXICS LTD.

SAMPLE NAME: S15-A

ID#: 9206068-06A

Field Blank #3, Imp. A

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[redacted]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

Comments:

ALTA

POLYCYCLIC AROMATIC HYDROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

Sample ID: S3 A-F
Lab ID: 11351-003-PAH

Isotopic Recovery Results

Internal Standard:	% R	Qualifier
d_8-Naphthalene	65	
d_8-Acenaphthylene	80	
d_{10}-Acenaphthene	82	
d_{10}-Fluorene	91	
d_{10}-Phenanthrene	113	
d_{10}-Anthracene	91	
d_{10}-Fluoranthene	61	
d_{10}-Pyrene	63	
d_{12}-Benz(a)anthracene	76	
d_{12}-Chrysene	72	
d_{12}-Benzo(b)fluoranthene	82	
d_{12}-Benzo(k)fluoranthene	84	
d_{12}-Benzo(a)pyrene	73	
d_{12}-Indeno(1,2,3-c,d)pyrene	59	
d_{12}-Benzo(g,h,i)perylene	70	
d_{14}-Dibenz(a,h)anthracene	55	

$\bar{\%R} = 76.1$
$s = 14.7$

Pre-spike Recovery Standard:

d_{12}-Benzo(e)pyrene	103	
d_{14}-Terphenyl	146	

Date Analyzed: 6/30/92

Analyst: Mlu

Reviewer: Jmo

AIR TOXICS LTD.

SAMPLE NAME: S14-A

ID#: 9206068-05A

Field Blank #2, Imp. A

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[redacted]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

Comments:

ALTA

POLYCYCLIC AROMATIC HYDROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

METHOD BLANK
Lab ID: 11351-MB-PAH

Isotopic Recovery Results

Internal Standard:	% R	Qualifier
d_8-Naphthalene	79	
d_8-Acenaphthylene	81	
d_{10}-Acenaphthene	86	
d_{10}-Fluorene	94	
d_{10}-Phenanthrene	83	
d_{10}-Anthracene	61	
d_{10}-Fluoranthene	93	
d_{10}-Pyrene	93	
d_{12}-Benz(a)anthracene	85	
d_{12}-Chrysene	88	
d_{12}-Benzo(b)fluoranthene	90	
d_{12}-Benzo(k)fluoranthene	82	
d_{12}-Benzo(a)pyrene	74	
d_{12}-Indeno(1,2,3-c,d)pyrene	57	
d_{12}-Benzo(g,h,i)perylene	60	
d_{14}-Dibenz(a,h)anthracene	53	

$\overline{\%R} = 78.6$
$s = 13.7$

Pre-spike Recovery Standard:

d_{12}-Benzo(e)pyrene	NA	
d_{14}-Terphenyl	NA	

Date Analyzed: 6/30/92

Analyst: MRL

Reviewer: [signature]

AIR TOXICS LTD.

SAMPLE NAME: S13-A

ID#: 9206068-04A

Field Blank #1, Imp. A

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[redacted]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

Comments:

ALTA

POLYCYCLIC AROMATIC HYDROCARBONS (PAH)
CALIFORNIA AIR RESOURCES BOARD METHOD 429

LCS RESULTS
Lab ID: 11351-LCS1/LCS2
Matrix: MM5

Date Received: NA
Date Extracted: 6/15/92
Sample Amount: Sample

ICAL ID: IPAH
QC Lot: LC0615M
Units: NA

COMPOUND	LCS1 % R	LCS2 % R	RPD %
Naphthalene	71	77	8.1
Acenaphthylene	85	70	19
Acenaphthene	85	84	1.2
Fluorene	80	80	0.0
Phenanthrene	90	92	2.2
Anthracene	85	94	10
Fluoranthene	79	80	1.3
Pyrene	85	83	2.4
Benz(a)anthracene	90	82	9.3
Chrysene	89	89	0.0
Benzo(b)fluoranthene	84	85	1.2
Benzo(k)fluoranthene	91	85	6.8
Benzo(a)pyrene	89	92	3.3
Benzo(e)pyrene	NA	NA	NA
Indeno(1,2,3-c,d)pyrene	94	85	10
Dibenz(a,h)anthracene	86	83	3.6
Benzo(g,h,i)perylene	92	87	5.6

Analyst: [signature]

Reviewer: [signature]

AIR TOXICS LTD.

SAMPLE NAME: S12-B

ID#: 9206068-03B

Test #2, Imp. B

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[redacted]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	0.50
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

Comments:

9206068 Radian/Kern

AIR TOXICS LTD.

SAMPLE NAME: S10-A

ID#: 9206068-01A

Test #1A, Imp. A

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

File Name:	6061603	Date of Collection: 6/9/92
Dil. Factor:	1.0	Date of Extraction: 6/12/92
Total Volume:	20.0mL	Date of Analysis: 6/18/92

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	0.78
Acetaldehyde	0.50	0.76
Acrolein	0.50	Not Detected

Comments:

AIR TOXICS LTD.

SAMPLE NAME: S12-A

ID#: 9206068-03A

Test #2, Imp. A

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[redacted]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected

Comments:

AIR TOXICS LTD.

SAMPLE NAME: S11-A

ID#: 9206068-02A

Test #1B, Imp. A

Stationary Source Test Method - Formaldehyde

(CARB Method 430)

High Pressure Liquid Chromatography

[redacted]

Compound	MDL (uG)	Amount (uG)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	0.57
Acrolein	0.50	Not Detected

Comments:

9206067 Radian/Kern

AIR TOXICS LTD.

SAMPLE NAME: S21-A

ID#: 9206067-02A

Test #2B

Stationary Source Test Method - Low Level BTEX & Propylene

(Modified CARB Method 410A)

Cryofocusing GC FID/PID

File Name:	**[illegible]**	**Date of Collection:**	**6/9/92**
Dil. Factor:	**1.0**	**Date of Analysis:**	**6/12/92**

Compound	MDL (ppbv)	Amount (ppbv)
Benzene	1.0	Not Detected
Toluene	1.0	Not Detected
Ethyl Benzene	1.0	Not Detected
Total Xylenes	1.0	Not Detected
Propylene	1.0	450
Total Hydrocarbons*	10	940

*Referenced to Heptane (MW=100)

Container Type: Tedlar Bag

@ AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

TO: Lisa La Fe
Radian Corporation FAX: 362-5332

FROM: Linda Freeman - Director

SUBJECT: False Positive Results in Field Duplicate Sample - WSPA Project

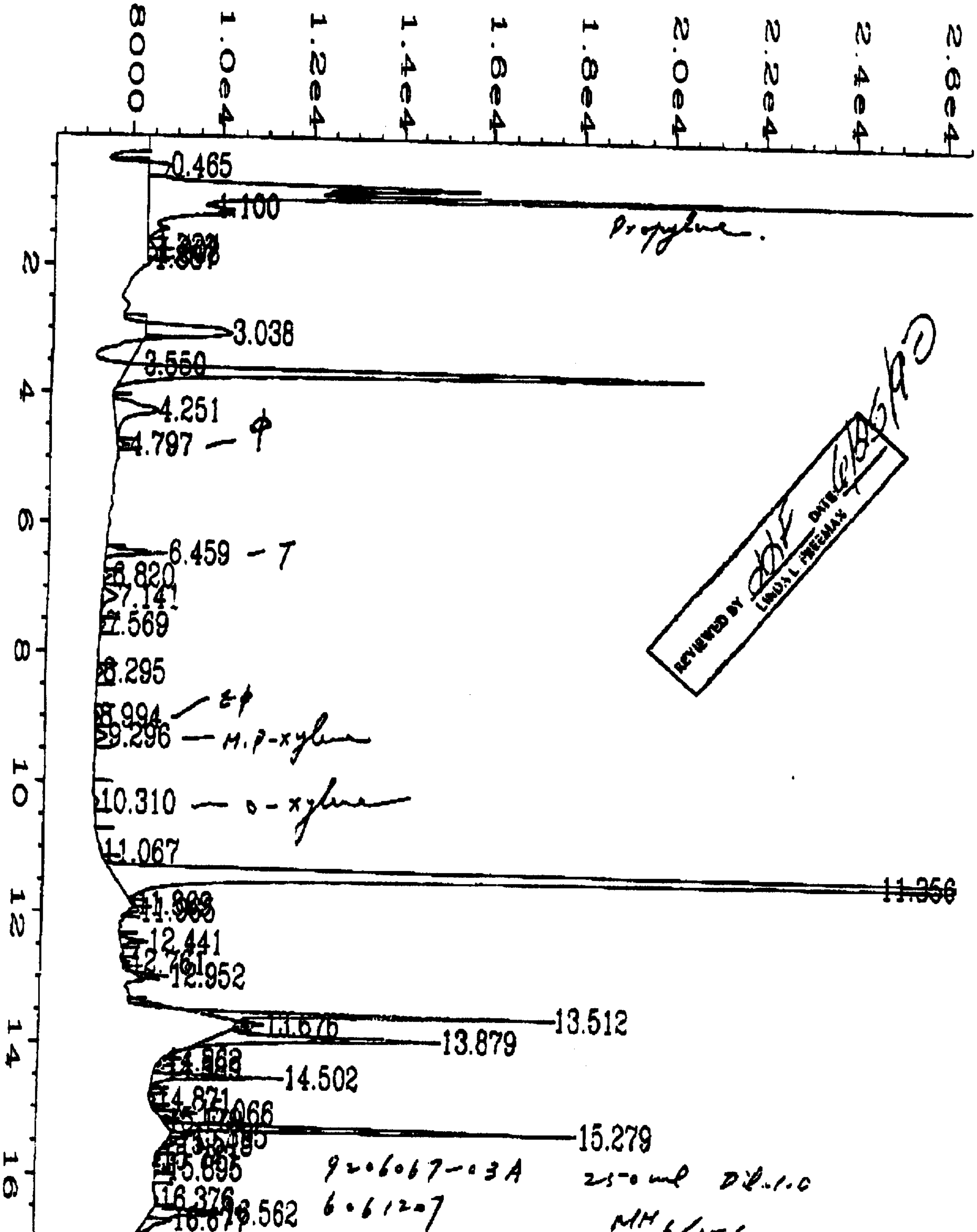
DATE: August 4, 1992

I have reviewed the data associated with the field duplicate samples S22-A and S22-B on the WSPA project. The samples were analyzed by cryofocusing GC/PID/FID under CARB 410A. Field samples as you know were collected in Tedlar bags. The appearance of ethyl benzene in one sample but not the other was due to an apparent interference peak which masked the area where ethyl benzene eluted. The interferences eluted a little more downfield in the other sample and consequently did not interfere with reporting of the target analytes. As you know, false positives are problematic when using GC based systems. There was no evidence with which the lab could have rejected the hit for ethyl benzene other than the recent knowledge that the two samples were duplicates.

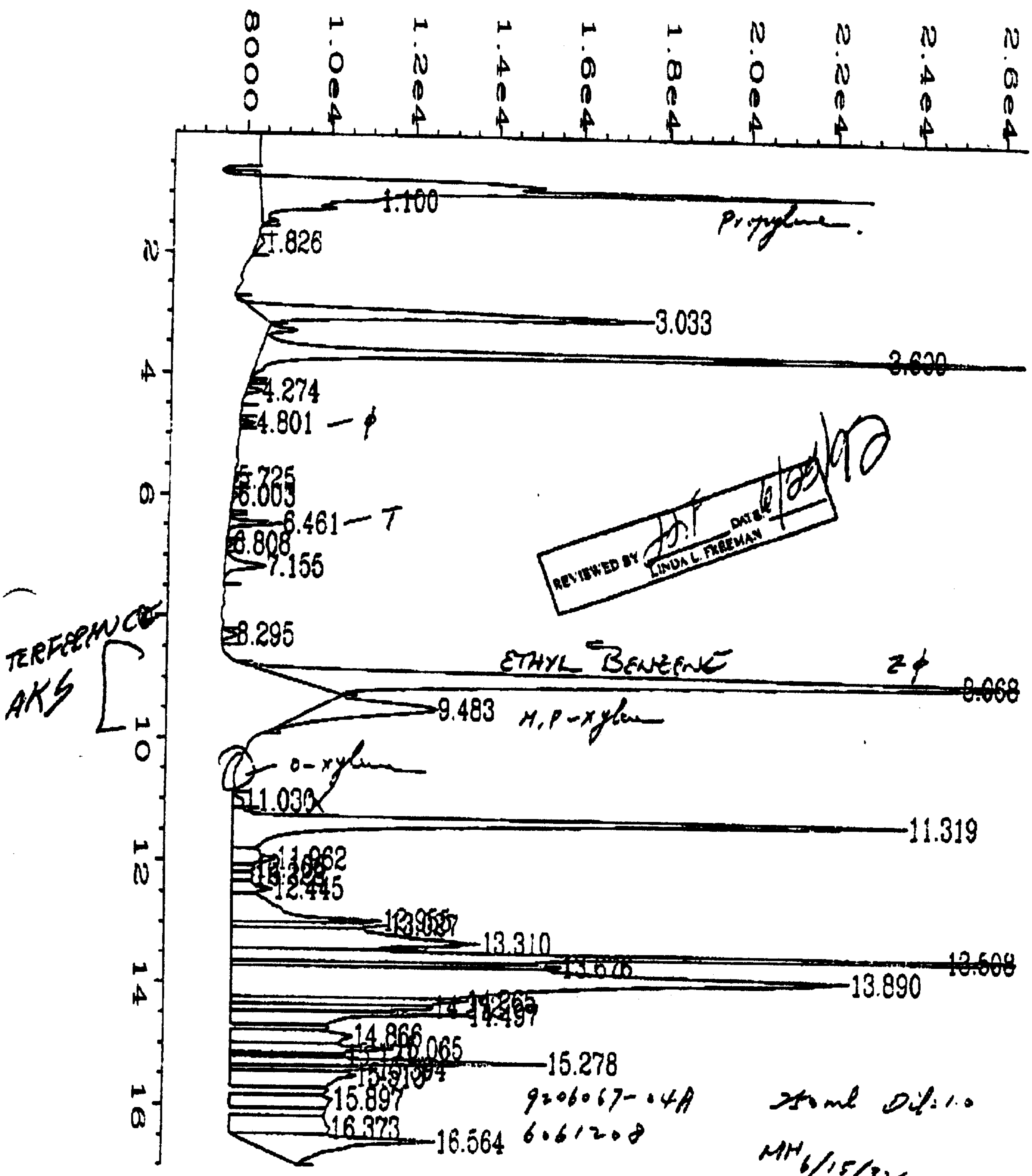
I have attached a copy of the two sample chromatograms so that you can see the nature of the problem. To be honest, we see these sort of interference peaks quite often in Tedlar bag sampling. They , however, usually elute down field enough to not cause a problem .

Please let me know if I can be of further assistance.

11325 SUNRISE GOLD CIRCLE, SUITE E • RANCHO CORDOVA, CA 95742
(916) 638-9892 • FAX (916) 638-9917



Data File Name	: C:\HPCHEM\1\DATA\6-12JUN.\6061207A.D		
Operator	: MH		
Instrument	: GC-6	Page Number	: 1
Sample Name	: 9206067-03A	Vial Number	:
Run Time Bar Code:		Injection Number	:
Acquired on	: 12 Jun 92 03:46 PM	Sequence Line	:
Report Created on:	12 Jun 92 04:03 PM	Instrument Method:	BTEX-2.MTH
Last Recalib on	: 12 JUN 92 02:07 PM	Analysis Method	: BTEX-2.MTH
Multiplier		Sample Amount	: 1



MH 6/15/92

ata File Name	: C:\HPCHEM\1\DATA\6-12JUN\6061208A.D			
perator	: MH	Page Number	:	1
rument	: GC-6	Vial Number	:	
ple Name	: 9206067-04A	Injection Number	:	
n Time Bar Code	:	Sequence Line	:	
quired on	: 12 Jun 92 04:16 PM	Instrument Method	:	BTEX-2.MTH
port Created on	: 15 Jun 92 09:30 AM	Analysis Method	:	BTEX-2.MTH
st Recalib on	: 12 JUN 92 02:07 PM	Sample Amount	:	1
ltiplier	: 1	ISTD Amount	:	

AIR TOXICS LTD.

SAMPLE NAME: S22-A

ID#: 9206067-03A

Test #3.

(Duplicate)

Stationary Source Test Method - Low Level BTEX & Propylene

(Modified CARB Method 410A)

Cryofocusing GC FID/PID

File Name: [illegible]1207	**Date of Collection: [illegible]/92**
Dil. Factor: 1.0	**Date of Analysis: [illegible]/92**

Compound	MDL (ppbv)	Amount (ppbv)
Benzene	1.0	Not Detected
Toluene	1.0	3.0
Ethyl Benzene	1.0	Not Detected
Total Xylenes	1.0	Not Detected
Propylene	1.0	360
Total Hydrocarbons*	10	560

*Referenced to Heptane (MW=100)

Container Type: Tedlar Bag

AIR TOXICS LTD.

SAMPLE NAME: S22-B

ID#: 9206067-04A

Test #3

(Duplicate)

Stationary Source Test Method - Low Level BTEX & Propylene

(Modified CARB Method 410A)

Cryofocusing GC FID/PID

File Name: [illegible] | Date of Collection: [illegible]
Dil. Factor: 1.0 | Date of Analysis: [illegible]

Compound	MDL (ppbv)	Amount (ppbv)
Benzene	1.0	1.0
Toluene	1.0	2.0
Ethyl Benzene	1.0	71
Total Xylenes	1.0	12
Propylene	1.0	390
Total Hydrocarbons*	10	700

*Referenced to Heptane (MW=100)

Container Type: Tedlar Bag

AIR TOXICS LTD.

SAMPLE NAME: S23-A

ID#: 9206067-05A

Field Blank

Stationary Source Test Method - Low Level BTEX & Propylene

(Modified CARB Method 410A)

Cryofocusing GC FID/PID

File Name: [illegible] | Date of Collection: [illegible]
Dil. Factor: 1.0 | Date of Analysis: [illegible]

Compound	MDL (ppbv)	Amount (ppbv)
Benzene	1.0	Not Detected
Toluene	1.0	2.0
Ethyl Benzene	1.0	Not Detected
Total Xylenes	1.0	Not Detected
Propylene	1.0	10
Total Hydrocarbons*	10	640

*Referenced to Heptane (MW=100)

Container Type: Tedlar Bag

AIR TOXICS LTD.

SAMPLE NAME: Method Spike

ID#: 9206067-07A

Stationary Source Test Method - Low Level BTEX & Propylene
(Modified CARB Method 410A)
Cryofocusing GC FID/PID

File Name: [illegible]	Date of Collection: NA
Dil. Factor: 1.0	Date of Analysis: [illegible]

Compound	MDL (ppbv)	% Recovery
Benzene	1.0	77
Toluene	1.0	80
Ethyl Benzene	1.0	77
Total Xylenes	1.0	79
Propylene	1.0	81
Total Hydrocarbons*	10	95

*Referenced to Heptane (MW=100)

Container Type: Tedlar Bag

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank

ID#: 9206067-08A

Stationary Source Test Method - Low Level BTEX & Propylene
(Modified CARB Method 410A)
Cryofocusing GC FID/PID

File Name:	**9061201**	**Date of Collection: NA**
Dil. Factor:	**1.0**	**Date of Analysis: 6/12/92**

Compound	MDL (ppbv)	Amount (ppbv)
Benzene	1.0	Not Detected
Toluene	1.0	Not Detected
Ethyl Benzene	1.0	Not Detected
Total Xylenes	1.0	Not Detected
Propylene	1.0	Not Detected
Total Hydrocarbons*	10	95

*Referenced to Heptane (MW=100)

Container Type: NA

CHAIN-OF-CUSTODY FORMS

TEXACO HEATER TREATER TEST DATA

(MAY 28-30, 1992)

SAM # ____________

RADIAN
CORPORATION

10395 OLD PLACERVILLE ROAD
SACRAMENTO, CALIFORNIA 95827

Pg 1/2

CHAIN OF CUSTODY RECORD

FIELD SECTION

CLIENT NAME: WSPA

PROJECT ADDRESS: 10395 (Number) Old Placerville Rd (Street) Sacramento (City), CA 95827 (Zip)

SAMPLED BY: Mark Ludwiczak (Name (PRINT)), Radian Corporation (Organization)

CONTAINERS OBTAINED FROM: Mark Ludwiczak

PRESERVATIVE USED: —

STORAGE TEMPERATURE: ☐ Ambient ☐ 4° C ☐ −10° C Other: 45°

☐ HAZARDOUS ☒ NON-HAZARDOUS

SPECIAL HANDLING INSTRUCTIONS: Note Labels/Marks on Bottles

FIELD REMARKS: Combine fractions A through F (Fraction B is in an accompanying cooler) One analysis per sample set (i.e. Test)

COLLECTORS SAMPLE NO.	DATE	COMP.	GRAB	TYPE (soil, H_2O)	FIELD DATA			STATION LOCATION (grid, depth, etc.)	NO. OF CON-TAINERS	ANALYSIS REQUIRED				REMARKS
T1-A	5/28							Test 1	1	X				FH Rinse (Meth., Hex, MC)
T2-A	5/29							2						
T3-A	5/29							3						
T4-A	5/30							4						
T1-C	5/28							Test 1						BH Rinse (Meth., Hex, MC)
T2-C	5/29							2						
T3-C	5/29							3						
T4-C	5/30							4						
T1-D	5/28							Test 1						XAD-2
T2-D	5/29							2						

Released by	Organization	Date/Time	Received by	Organization	Date/Time
[illegible signature]	Radian Corp	6-1-92 / 3 PM	[illegible signature]	AHA Analytical	6-4-92 1335

LABORATORY SECTION

TEMPERATURE RECEIVED: 3.5°C FEDX AIRBILL#: ____________ HAND DELIVERED: ____________

ANALYSIS RECORD

TYPE OF ANALYSIS	PERFORMED BY (Signed)	DATE OF ANALYSIS	RECORDED (LAB BOOK NO.)	COMMENTS

12-85-2223Q

Original (Page 1) Laboratory (Page 2) Samples (Page 3)

RADIAN
CORPORATION

10395 OLD PLACERVILLE ROAD
SACRAMENTO, CALIFORNIA 95827

SAM # ______

Pg 2

CHAIN OF CUSTODY RECORD

FIELD SECTION

CLIENT NAME WSPA PROJECT ADDRESS ______ (Number, Street, City, Zip)

SAMPLED BY ______ (Name (PRINT), Organization) CONTAINERS OBTAINED FROM ______

PRESERVATIVE USED ______ STORAGE TEMPERATURE ☐ Ambient ☐ 4° C ☐ -10° C Other 4°

☐ HAZARDOUS ☐ NON-HAZARDOUS SPECIAL HANDLING INSTRUCTIONS Note Level Marks on Bottles

FIELD REMARKS (See Page 1)

Gas Stripper

COLLECTORS SAMPLE NO.	DATE	COMP.	GRAB	TYPE (soil, H_2O)	FIELD DATA			STATION LOCATION (grid, depth, etc.)	NO. OF CON-TAINERS	ANALYSIS REQUIRED PAH	CARB 429	[illegible]	[illegible]	REMARKS
T3-D	5/31	X						Test 3						
T4-D	5/30							4	1	X				XAD-2
T1-F	5/28							Test 1						
T2-E	5/29							2						Imp #1 (+ Rinse)
T3-E	5/29							3						
T4-F	5/30							4						
T1-F	5/28							Test 1						
T2-F	5/29							2						Imp #2+3 + Rinse
T3-F	5/29							3						
T4-F	5/31							4						

Released by	Organization	Date/Time	Received by	Organization	Date/Time
[illegible]	Radian	6-1-92/3PM	[signature]	Alta Analytical	6-4-92 13

LABORATORY SECTION

TEMPERATURE RECEIVED ______ FEDX AIRBILL# ______ HAND DELIVERED ______

ANALYSIS RECORD

TYPE OF ANALYSIS	PERFORMED BY (Signed)	DATE OF ANALYSIS	RECORDED (LAB BOOK NO.)	COMMENTS

Original (Page 1) Laboratory (Page 2) Samples (Page 3)

RADIAN
CORPORATION

10395 OLD PLACERVILLE ROAD
SACRAMENTO, CALIFORNIA 95827

SAM # ____________

791/1

CHAIN OF CUSTODY RECORD

FIELD SECTION

CLIENT NAME WSPA

PROJECT ADDRESS 10395 Old Placerville Rd Sacramento CA 958
Number Street City Zip

SAMPLED BY Mark Ludwiczak Radian Corp
Name (PRINT) Organization

CONTAINERS OBTAINED FROM Mark Ludwiczak

PRESERVATIVE USED —

STORAGE TEMPERATURE ☐ Ambient ☐ 4° C ☐ -10° C Other —

☐ HAZARDOUS ☐ NON-HAZARDOUS

SPECIAL HANDLING INSTRUCTIONS ____________

FIELD REMARKS Combine with Fractions A-F (in the accompanying cooler) One analysis per sample set (i.e. Test)

COLLECTOR'S SAMPLE NO.	DATE	COMP.	GRAB	TYPE (soil, H_2O)	FIELD DATA			STATION LOCATION (grid, depth, etc.)	NO. OF CON-TAINERS	ANALYSIS REQUIRED				REMARKS
T1-K	5/28	X							1					Filter, Test 1
T2-K	5/28								1					" " 2
T3-K	5/29								1					" " 3
T4-K	6/3								1					" " 4

Released by	Organization	Date/Time	Received by	Organization	Date/Time
Mark Ludwiczak	Radian, SD	6-4-92 / 3PM	[signature]	Alta Analytical	6-4-92 1335

LABORATORY SECTION

TEMPERATURE RECEIVED 24°C
Filters on Dry Ice < -15°C

FEDX AIRBILL# ____________ HAND DELIVERED ____________

ANALYSIS RECORD

TYPE OF ANALYSIS	PERFORMED BY (Signed)	DATE OF ANALYSIS	RECORDED (LAB BOOK NO.)	COMMENTS

Original (Page 1) Laboratory (Page 2) Samples (Page 3)

12-85-22239

ALTA Analytical Laboratory

Batch ID: 11328

Sample Log-In Checklist	Yes	No
1. Samples Arrived by: Courier		
2. Airbill Present? Number ______		X
3. Shipping Container is Intact?	X	
4. Custody Seals Present? Number ______		X
If yes, are they intact? N/A		
5. Sample Containers Intact?	X	
6. Shipping Preservation: Ice/Blue Ice/None Filters on Dry Ice		
7. Temperature: 24°C Filters < -15°C Dry Ice		
8. Chain of Custody Present?	X	
9. Discrepancies in Chain of Custody?		X
10. Packing Retained?	X	

Name: [signature] Date Rcv'd: 6-4-92

Comments:

ALTA Analytical Laboratory

Batch ID: 11328

Sample Log-In Checklist	Yes	No
1. Samples Arrived by: Courier		
2. Airbill Present? Number ______		X
3. Shipping Container is Intact?	X	
4. Custody Seals Present? Number ______		X
If yes, are they intact? N/A		
5. Sample Containers Intact?		
6. Shipping Preservation: Ice/Blue Ice/None		
7. Temperature: 15°C		
8. Chain of Custody Present?	X	
9. Discrepancies in Chain of Custody?		X
10. Packing Retained?	X	

Name: [signature] Date Rcv'd: 6-4-92

Comments:

SAM # ______

RADIAN
CORPORATION

10395 OLD PLACERVILLE ROAD
SACRAMENTO, CALIFORNIA 95827

CHAIN OF CUSTODY RECORD

FIELD SECTION

CLIENT NAME WSPA

PROJECT ADDRESS 10395 Old Placerville Rd, Sacramento, CA 95827
(Number, Street, City, Zip)

SAMPLED BY Mark Ludwiczak, Radian Corp
(Name (PRINT), Organization)

CONTAINERS OBTAINED FROM ______

PRESERVATIVE USED —

STORAGE TEMPERATURE ☒ Ambient ☐ 4° C ☐ −10° C Other ______

☐ HAZARDOUS ☒ NON-HAZARDOUS

SPECIAL HANDLING INSTRUCTIONS ______

FIELD REMARKS Please Analyze by 1PM, Monday, 6/1/92

COLLECTORS SAMPLE NO.	DATE	COMP.	GRAB	TYPE (soil,H₂O)	FIELD DATA			STATION LOCATION (grid, depth, etc.)	NO. OF CON-TAINERS	ANALYSES REQUIRED: BTEX	ANALYSES REQUIRED: Paraffins			REMARKS
T20-A	5/30		X						1	X	X			CARB 410A Analysis
T21-A	↓		X						1	X	X			↓
T22-A	↓		X						1	X	X			↓
T22-B	↓		X						1	X	X			↓
T30-A	↓		X						1	X	X			Fuel Sample (Not CARB 410A Analysis)
T23-A	↓		X						1	X	X			↓
T24-A	↓		X						1	X	X			↓

Released by	Organization	Date/Time	Received by	Organization	Date/Time
Mark Ludwiczak	Radian Corp.	5-30-92/3PM	[signature]	Air Toxics	6/1/92 09:[illegible]

LABORATORY SECTION

TEMPERATURE RECEIVED ______ FEDX AIRBILL# ______ HAND DELIVERED ______

ANALYSIS RECORD

TYPE OF ANALYSIS	PERFORMED BY (Signed)	DATE OF ANALYSIS	RECORDED (LAB BOOK NO.)	COMMENTS

AIR TOXICS LTD.
AN ENVIRONMENTAL ANALYTICAL LABORATORY

11325 SUNRISE GOLD CIRCLE, SUITE 'E'
RANCHO CORDOVA, CA 95742
(916) 638-9892 • FAX (916) 638-9917

CHAIN OF CUSTODY RECORD

PROJECT # WSPA II PO # COLLECTED BY (Signature) [signature]
REMARKS Samples should be extracted ASAP

FIELD SAMPLE I.D.#	SAMPLING MEDIA (Tenax, Canister etc.)	DATE/TIME	ANALYSIS	VAC./PRESSURE	LAB I.D. #
T10-A	01 DNPH	5/28/92	Aldehydes* - CARB 430	[redacted]	
T10-B	02	5/28/92			
T11-A		5/28/92			
T11-B		5/28/92			
T12-A		5/29/92			
T12-B					
T13-A					
T13-B					
T14-A					
T14-B		5/29/92			

*Formaldehyde, Acetaldehyde, Acrolein

RELINQUISHED BY: DATE/TIME	RECEIVED BY: DATE/TIME	RELINQUISHED BY: DATE/TIME	RECEIVED BY: DATE/TIME
[signature] - 5/30/92 - 4PM Radian Corporation	[signature] 6/1/92 09:10		

[redacted]

AIR TOXICS LTD.
AN ENVIRONMENTAL ANALYTICAL LABORATORY

11325 SUNRISE GOLD CIRCLE, SUITE 'E'
RANCHO CORDOVA, CA 95742
(916) 638-9892 • FAX (916) 638-9917

CHAIN OF CUSTODY RECORD

PROJECT # DSPA II PO #
REMARKS Samples should be extracted ASAP
COLLECTED BY (Signature) [illegible signature]

FIELD SAMPLE I.D.#	SAMPLING MEDIA (Tenax, Canister etc.)	DATE/TIME	ANALYSIS	VAC./PRESSURE	LAB I.D. #
T15-A	DNPH	5/29/92	Aldehydes (CARB 430)		
T15-B	DNPH	5/29/92	↓		
T16-A	DNPH	5/30/92	↓		
T17-A	DNPH	5/30/92	↓		

01A
01AA Dup
01B
07 [illegible]

RELINQUISHED BY: DATE/TIME	RECEIVED BY: DATE/TIME	RELINQUISHED BY: DATE/TIME	RECEIVED BY: DATE/TIME
[signature] 5/31/92-4PM Rodrigo G. [illegible]	Alejo Mendez [illegible] 6/1/92 [illegible]		

CONDITION

REMARKS

Steiner Environmental, Inc.

Date: 5/29/92

Test Location: WSPA / Radian

SAMPLE HANDLING/LOG-IN

NO	SAMPLE TYPE	VOLUME	COMMENTS
1	32766 ASTM (Meth) FS (Sample) 1 (Test)		Texaco Heater Treater
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

CHAIN-OF-CUSTODY

Signature	Date/Time	Signature	Date/Time
[illegible signature]	5/29/92		
M. Carrasco	5/30/92		

SAM # ____

RADIAN CORPORATION

10395 OLD PLACERVILLE ROAD
SACRAMENTO, CALIFORNIA 95827

1/2

CHAIN OF CUSTODY RECORD

FIELD SECTION

CLIENT NAME WSPA PROJECT ADDRESS 10389 Old Placerville Rd Sacramento, CA 95 (Number Street City Zip)

SAMPLED BY Mark Ludwiczak, Radian (Name (PRINT) Organization) CONTAINERS OBTAINED FROM Mark Ludwiczak

PRESERVATIVE USED — STORAGE TEMPERATURE ☐ Ambient ☑ 4° C (Solutions) ☐ -10° C Other -10 (Resin)

☐ HAZARDOUS ☒ NON-HAZARDOUS SPECIAL HANDLING INSTRUCTIONS ____

FIELD REMARKS Analysis needs to be initiated by 6/9/92

COLLECTORS SAMPLE NO.	DATE	COMP.	GRAB	TYPE (soil, H_2O)	FIELD DATA			STATION LOCATION (grid, depth, etc.)	NO. OF CON-TAINERS	ANALYSIS REQUIRED: PAH (CARB 429)			REMARKS
M1-A	6/2/92	X							1	X			FH Rinse (M, H, HC)
M2-A	6/3/92	↓							↓	↓			↓
M3-A	6/3/92												
M4-A	6/4/92												
M1-C	6/2/92												BH Rinse (M, H, HC)
M2-C	6/3/92												↓
M3-C	6/4/92												
M4-C	6/4/92												
M1-D	6/2/92												XAD-2
M2-D	6/3/92												↓

*— HRGC/HRMS

Released by	Organization	Date/Time	Received by	Organization	Date/Time
Mark Ludwiczak	Radian Corp.	6/6/92 / 10AM	[illegible]	ALTA	6-6-92 10

LABORATORY SECTION

TEMPERATURE RECEIVED ____ FEDX AIRBILL# ____ HAND DELIVERED ____

ANALYSIS RECORD

TYPE OF ANALYSIS	PERFORMED BY (Signed)	DATE OF ANALYSIS	RECORDED (LAB BOOK NO.)	COMMENTS

Original (Page 1) Laboratory (Page 2) Samples (Page 3)

SAM #

RADIAN
CORPORATION

10395 OLD PLACERVILLE ROAD
SACRAMENTO, CALIFORNIA 95827

2/2

CHAIN OF CUSTODY RECORD

FIELD SECTION

CLIENT NAME WSPA PROJECT ADDRESS (See page 1)
Number / Street City Zip

SAMPLED BY Mark Ludwiczak / Radian CONTAINERS OBTAINED FROM
Name (PRINT) / Organization

PRESERVATIVE USED STORAGE TEMPERATURE ☐ Ambient ☐ 4° C ☐ -10° C Other

☐ HAZARDOUS ☐ NON-HAZARDOUS SPECIAL HANDLING INSTRUCTIONS

FIELD REMARKS

COLLECTORS SAMPLE NO.	DATE	COMP.	GRAB	TYPE (soil, H_2O)	FIELD DATA			STATION LOCATION (grid, depth, etc.)	NO. OF CON-TAINERS	ANALYSIS REQUIRED PAH (CARB 429)				REMARKS
M3-D	6/3/92								1	X				XAD-2
M4-D	6/4/92													
M1-E	6/2/92													Imp 1 + Rinse (M, H, MC)
M2-E	6/2/92													
M3-E	6/3/92													
M4-E	6/4/92													
M1-F	6/2/92													Imp 2+3 + Rinse (M, H, MC)
M2-F	6/2/92													
M3-F	6/3/92													
M4-F	6/4/92													

Mark Ludwiczak / Radian Corp 6/6/92 10AM [signature] ACTA 6-6-92 10:00am

Released by / Organization / Date/Time / Received by / Organization / Date/Time

Released by / Organization / Date/Time / Received by / Organization / Date/Time

Released by / Organization / Date/Time / Received by / Organization / Date/Time

LABORATORY SECTION

TEMPERATURE RECEIVED FEDX AIRBILL# HAND DELIVERED

ANALYSIS RECORD

TYPE OF ANALYSIS	PERFORMED BY (Signed)	DATE OF ANALYSIS	RECORDED (LAB BOOK NO.)	COMMENTS

Original (Page 1) Laboratory (Page 2) Samples (Page 3)

SAM # ______

RADIAN CORPORATION

10395 OLD PLACERVILLE ROAD
SACRAMENTO, CALIFORNIA 95827

CHAIN OF CUSTODY RECORD

FIELD SECTION

CLIENT NAME WSPA

PROJECT ADDRESS 10389 Old Placerville Rd Sacramento, CA 958 (Number / Street / City / Zip)

SAMPLED BY Mark Ludwiczak, Radian Corp (Name (PRINT) / Organization)

CONTAINERS OBTAINED FROM Mark Ludwiczak

PRESERVATIVE USED —

STORAGE TEMPERATURE ☐ Ambient ☐ 4° C ☐ −10° C Other 40F

☐ HAZARDOUS ☑ NON-HAZARDOUS

SPECIAL HANDLING INSTRUCTIONS ______

FIELD REMARKS Analysis needs to be initiated by 6/9/92

COLLECTORS SAMPLE NO.	DATE	COMP.	GRAB	TYPE (soil, H2O)	FIELD DATA			STATION LOCATION (grid, depth, etc.)	NO. OF CONTAINERS	ANALYSIS REQUIRED				REMARKS
										PAH	(HRGC/HRMS)			
M1-B	6/5/92	x							1	X				Filter
M2-B	6/5/92													
M3-B	6/5/92													
M4-B	6/5/92													

Released by	Organization	Date/Time	Received by	Organization	Date/Time
Mark Ludwiczak	Radian Corp	6/8/92 - 10AM	*HRGC/HRMS	ALTA	6.6.92 10:(

LABORATORY SECTION

TEMPERATURE RECEIVED ______ FEDX AIRBILL# ______ HAND DELIVERED ______

ANALYSIS RECORD

TYPE OF ANALYSIS	PERFORMED BY (Signed)	DATE OF ANALYSIS	RECORDED (LAB BOOK NO.)	COMMENTS

Original (Page 1) **Laboratory (Page 2)** **Samples (Page 3)**

ALTA Analytical Laboratory

Batch ID: 11332

Sample Log-In Checklist		Yes	No
1.	Samples Arrived by: Courier		
2.	Airbill Present? Number ____		✓
3.	Shipping Container is Intact?	X	
4.	Custody Seals Present? Number ____		X
	If yes, are they intact? N/A		
5.	Sample Containers Intact?	X	
6.	Shipping Preservation: Ice/Blue Ice/None		
7.	Temperature: 9°C		
8.	Chain of Custody Present?	X	
9.	Discrepancies in Chain of Custody?		X
10.	Packing Retained?	X	

Name: [signature] Date Rcv'd: 6/6/92

Comments:

ALTA Analytical Laboratory

Batch ID: 11333

Sample Log-In Checklist	Yes	No
1. Samples Arrived by: Courier		
2. Airbill Present? Number ________		✓
3. Shipping Container is Intact?	X	
4. Custody Seals Present? Number ________		X
If yes, are they intact? N/A		
5. Sample Containers Intact?		
6. Shipping Preservation: Ice/Blue Ice/None		
7. Temperature: 16°		
8. Chain of Custody Present?	X	
9. Discrepancies in Chain of Custody?		X
10. Packing Retained?	X	

Name: [signature] Date Rcv'd: 6/6/92

Comments:

MOBIL STEAM GENERATOR TEST DATA

(JUNE 2-4, 1992)

RADIAN CORPORATION

10395 OLD PLACERVILLE ROAD
SACRAMENTO, CALIFORNIA 95827

SAM # ______

1/2

CHAIN OF CUSTODY RECORD

FIELD SECTION

CLIENT NAME: USPA

PROJECT ADDRESS: Old Placerville Rd, Sacramento CA 95 (Number / Street / City / Zip)

SAMPLED BY: Mark Ludwiczak, Radian Corp (Name (PRINT) / Organization)

CONTAINERS OBTAINED FROM: Mark Ludwiczak

PRESERVATIVE USED: —

STORAGE TEMPERATURE: ☐ Ambient ☒ 4° C ☐ -10° C Other —

☒ HAZARDOUS ☐ NON-HAZARDOUS

SPECIAL HANDLING INSTRUCTIONS: Keep Cold until analysis

FIELD REMARKS: Check Sol'n levels (marked on labels)

COLLECTORS SAMPLE NO.	DATE	COMP.	GRAB	TYPE (soil, H_2O)	FIELD DATA			STATION LOCATION (grid, depth, etc.)	NO. OF CON-TAINERS	ANALYSIS REQUIRED: Aldehydes* (TO-11)				REMARKS
M11-A	6/2/92								1	X				
M11-B	6/2/92								1					
M12-A	6/3/92								1					
M12-B									1					
M13-A									1					
M13-B									1					
M14-A									1					-Matrix Spike Sam
M14-B									1					
M15-A									1					
M15-B									1					

* Formaldehyde, Acetaldehyde, Acetone

Released by	Organization	Date/Time	Received by	Organization	Date/Time
Mark Ludwiczak	Radian Corp	6/4/92 - 0715	Linda L. Freeman	ATL	6/4/92 14:

LABORATORY SECTION

TEMPERATURE RECEIVED ______ FEDX AIRBILL# ______ HAND DELIVERED ______

ANALYSIS RECORD

TYPE OF ANALYSIS	PERFORMED BY (Signed)	DATE OF ANALYSIS	RECORDED (LAB BOOK NO.)	COMMENTS

Original (Page 1) Laboratory (Page 2) Samples (Page 3)

SAM # ______

2/2

RADIAN CORPORATION

10395 OLD PLACERVILLE ROAD
SACRAMENTO, CALIFORNIA 95827

CHAIN OF CUSTODY RECORD

FIELD SECTION

CLIENT NAME WSPA PROJECT ADDRESS ______ Number Street City Zip

SAMPLED BY ______ Name (PRINT) Organization CONTAINERS OBTAINED FROM ______

PRESERVATIVE USED ______ STORAGE TEMPERATURE ☐ Ambient ☐ 4° C ☐ -10° C Other ______

☐ HAZARDOUS ☐ NON-HAZARDOUS SPECIAL HANDLING INSTRUCTIONS ______

FIELD REMARKS See Page (17)

COLLECTORS SAMPLE NO.	DATE	COMP.	GRAB	TYPE (soil, H_2O)	FIELD DATA			STATION LOCATION (grid, depth, etc.)	NO. OF CON-TAINERS	ANALYSIS REQUIRED				REMARKS
										HW				
M16-A	6/3/92								1	X				
M16-B	6/3/92								↓	↓				
M17-A	6/1/92								↓	↓				
M17-B	6/1/92								↓	↓				

Released by	Organization	Date/Time	Received by	Organization	Date/Time
[signature]	Radian Corp	6/4/92-0715	[signature]	ATI	6/4/92 14:00

LABORATORY SECTION

TEMPERATURE RECEIVED ______ FEDX AIRBILL# ______ HAND DELIVERED ______

ANALYSIS RECORD

TYPE OF ANALYSIS	PERFORMED BY (Signed)	DATE OF ANALYSIS	RECORDED (LAB BOOK NO.)	COMMENTS

Original (Page 1) Laboratory (Page 2) Samples (Page 3)

RADIAN CORPORATION
10395 OLD PLACERVILLE ROAD
SACRAMENTO, CALIFORNIA 95827

SAM # ____

CHAIN OF CUSTODY RECORD

FIELD SECTION

CLIENT NAME WSPA PROJECT ADDRESS Old Placerville Rd, Sacramento, CA
Number Street City Zip

SAMPLED BY Mark Ludwiczak / Radian CONTAINERS OBTAINED FROM Mark Ludwiczak
Name (PRINT) / Organization

PRESERVATIVE USED — STORAGE TEMPERATURE ☒ Ambient ☐ 4° C ☐ −10° C Other ____

☐ HAZARDOUS ☒ NON-HAZARDOUS SPECIAL HANDLING INSTRUCTIONS Please analyze promptly (i.e. by Sat. 6/6 - pm)

FIELD REMARKS ____

COLLECTORS SAMPLE NO.	DATE	COMP.	GRAB	TYPE (soil, H_2O)	FIELD DATA			STATION LOCATION (grid, depth, etc.)	NO. OF CON-TAINERS	ANALYSIS REQUIRED BTEX	Propylene	THC		REMARKS
M-30A	6/4		X						1	X	X	X		
M-30B	↓		↓						1	X	X	X		
M-30C	↓		↓						1	X	X	X		
M-30D	↓		↓						1	X	X	X		
M-31	↓		↓						1	X	X	X		
M-32	↓		↓						1	X	X			Natural Gas Sample
M-33	↓		↓						1	X	X			Casing Gas Sample

Released by ____ Organization ____ Date/Time ____ Received by Allen Meredith Organization Air Toxics Date/Time 6/5/92

Released by ____ Organization ____ Date/Time ____ Received by ____ Organization ____ Date/Time ____

Released by ____ Organization ____ Date/Time ____ Received by ____ Organization ____ Date/Time ____

1884297575

LABORATORY SECTION

TEMPERATURE RECEIVED ____ FEDX AIRBILL# ____ HAND DELIVERED ____

ANALYSIS RECORD

TYPE OF ANALYSIS	PERFORMED BY (Signed)	DATE OF ANALYSIS	RECORDED (LAB BOOK NO.)	COMMENTS

Original (Page 1) Laboratory (Page 2) Samples (Page 3)

Steiner Environmental, Inc.

Date: 6/3/92

Test Location: WSPA / Radian

SAMPLE HANDLING/LOG-IN

NO	SAMPLE TYPE	VOLUME	COMMENTS
1	32767 11 Meth H2S Sample 1 Test		Mobil - Lost Hills SG 401 A
2	32768 11 Meth H2S Sample 2 Test		
3	32769 11 Meth H2S Sample 3 Test		
4	32770 11 Meth H2S Sample Blk Test		
5	32771 ASTM Meth FS Sample 1 Test		
6	32772 ASTM Meth FS Sample 1 Test		
7			
8			
9			
10			
11			
12			

CHAIN-OF-CUSTODY

Signature	Date/Time	Signature	Date/Time
M. Carrasco	6/3/92		

SAM # ______

RADIAN CORPORATION

10395 OLD PLACERVILLE ROAD
SACRAMENTO, CALIFORNIA 95827

CHAIN OF CUSTODY RECORD

FIELD SECTION

CLIENT NAME WSPA PROJECT ADDRESS Old Placerville Rd Sacramento, CA
Number Street City Zip

SAMPLED BY Mark Ludwiczak Radian CONTAINERS OBTAINED FROM Mark Ludwiczak
Name (PRINT) Organization

PRESERVATIVE USED — STORAGE TEMPERATURE ☐ Ambient ☑ 4° C ☐ -10° C Other ____

☐ HAZARDOUS ☑ NON-HAZARDOUS SPECIAL HANDLING INSTRUCTIONS Analyze promptly (within 2

FIELD REMARKS Check Fluid levels (marked on back of bottles)

COLLECTOR'S SAMPLE NO.	DATE	COMP.	GRAB	TYPE (soil,H$_2$O)	FIELD DATA			STATION LOCATION (grid, depth, etc.)	NO. OF CON-TAINERS	ANALYSIS REQUIRED H_2S	[illegible]	"	[illegible]	REMARKS
M-22A	6/3												X	Do Not Analyze, Hold
M-22B	"									X				
M-23A													X	Do Not Analyze, Hold
M-23B										X				

Mark Ludwiczak, Radian 6-3-92/1930

Released by	Organization	Date/Time	Received by	Organization	Date/Time
Mark Ludwiczak	Radian	6-3-92/1930			
Released by	Organization	Date/Time	Received by	Organization	Date/Time
Released by	Organization	Date/Time	Received by	Organization	Date/Time

LABORATORY SECTION

TEMPERATURE RECEIVED ______ FEDX AIRBILL# ______ HAND DELIVERED ______

ANALYSIS RECORD

TYPE OF ANALYSIS	PERFORMED BY (Signed)	DATE OF ANALYSIS	RECORDED (LAB BOOK NO.)	COMMENTS

Original (Page 1) Laboratory (Page 2) Samples (Page 3)

SWEPI GAS TURBINE TEST DATA

(JUNE 9-10, 1992)

RADIAN CORPORATION

10389 Old Placerville Road
Sacramento CA 95827

SAM # ______

CHAIN OF CUSTODY RECORD

FIELD SECTION

CLIENT NAME WSPA PROJECT ADDRESS Bakersfield, CA
Number Street City Zip

SAMPLED BY Mark Ludwiczak Radian CONTAINERS OBTAINED FROM ______
Name (PRINT) Organization

PRESERVATIVE USED ______ STORAGE TEMPERATURE ☐ Ambient ☒ 4° C ☐ -10° C Other ___

☐ HAZARDOUS ☒ NON-HAZARDOUS SPECIAL HANDLING INSTRUCTIONS ______

FIELD REMARKS ______

COLLECTORS SAMPLE NO.	DATE	COMP.	GRAB	TYPE (soil,H_2O)	FIELD DATA			STATION LOCATION (grid, depth, etc.)	NO. OF CON-TAINERS	ANALYSIS REQUIRED			REMARKS
S1-A	6/9/92	X		Air				SWEPT ARSG#2	1	PAH (CARB 429)			FH Rinse
S1-C	6/9/92								1				BH Rinse
S1-D	6/9/92								1				XAD-2
S1-E	6/9/92								1				Imp 1 + Rinse
S1-F	6/9/92								1				Imp 2+3+Rinse
S2-A	6/9/92								1				FH Rinse
S2-C	6/9/92								1				BH Rinse
S2-D	6/9/92								1				XAD-2
S2-E	6/9/92								1				Imp 1 + Rinse
S2-F	6/9/92								1				Imp 2+3+Rinse

Released by	Organization	Date/Time	Received by	Organization	Date/Time
[signature]	Radian	6/11/92	Larry Edwards	Radian	6/11/92 @7PM
Larry Edwards	Radian	6/12/92 8:15 AM	[signature]	AtA Analytical	6-12-92 0915

LABORATORY SECTION

TEMPERATURE RECEIVED ______ FEDX AIRBILL# ______ HAND DELIVERED ______

ANALYSIS RECORD

TYPE OF ANALYSIS	PERFORMED BY (Signed)	DATE OF ANALYSIS	RECORDED (LAB BOOK NO.)	COMMENTS

Original (Page 1) Laboratory (Page 2) Samples (Page 3)

SAM # ____

RADIAN CORPORATION

10389 Old Placerville Road
Sacramento CA 95827

CHAIN OF CUSTODY RECORD

FIELD SECTION

CLIENT NAME WSPA

PROJECT ADDRESS Bakersfield, CA (Number / Street / City / Zip)

SAMPLED BY Mark Ludwiczak (Name (PRINT)) Radian (Organization)

CONTAINERS OBTAINED FROM ____

PRESERVATIVE USED —

STORAGE TEMPERATURE ☐ Ambient ☒ 4° C ☐ -10° C Other ____

☐ HAZARDOUS ☒ NON-HAZARDOUS

SPECIAL HANDLING INSTRUCTIONS ____

FIELD REMARKS ____

COLLECTOR'S SAMPLE NO.	DATE	COMP.	GRAB	TYPE (soil, H_2O)	FIELD DATA			STATION LOCATION (grid, depth, etc.)	NO. OF CON-TAINERS	ANALYSIS REQUIRED				REMARKS
S3-A	6/10/92	X		Air				SWERI HRSG #2	1	PAH (CARB 429)				FH Rinse
S3-C	6/10/92	↓		↓				↓	1	↓				BH Rinse
S3-D	6/10/92								1					XAD-2
S3-E	6/10/92								1					Imp 1 + Rinse
S3-F	6/10/92								1					Imp 2+3 + Rinse
S4-A	6/10/92								1					FH Rinse
S4-C	6/10/92								1					BH Rinse
S4-D	6/10/92								1					XAD-2
S4-E	6/10/92								1					Imp 1 + Rinse
S4-F	6/10/92								1					Imp 2+3 + Rinse

Released by	Organization	Date/Time	Received by	Organization	Date/Time
[signature]	Radian	6/11/92	[signature]	Alta Analytical	6-12-92 0815
Larry Edwards	Radian	6/12/92 8:15	Larry Edwards	Radian	6/11/92 7PM

LABORATORY SECTION

TEMPERATURE RECEIVED ____ FEDX AIRBILL# ____ HAND DELIVERED ____

ANALYSIS RECORD

TYPE OF ANALYSIS	PERFORMED BY (Signed)	DATE OF ANALYSIS	RECORDED (LAB BOOK NO.)	COMMENTS

6-92-22239

Original (Page 1) Laboratory (Page 2) Samples (Page 3)

RADIAN CORPORATION

10389 Old Placerville Road
Sacramento CA 95827

SAM # ____________

CHAIN OF CUSTODY RECORD

FIELD SECTION

CLIENT NAME WSPA PROJECT ADDRESS Bakersfield, CA (Number Street City Zip)

SAMPLED BY Mark Ludwiczak (Name (PRINT)) Radian (Organization) CONTAINERS OBTAINED FROM ____________

PRESERVATIVE USED ____________ STORAGE TEMPERATURE ☐ Ambient ☐ 4° C ☐ -10° C Other Dry

☐ HAZARDOUS ☒ NON-HAZARDOUS SPECIAL HANDLING INSTRUCTIONS ____________

FIELD REMARKS ____________

COLLECTOR'S SAMPLE NO.	DATE	COMP.	GRAB	TYPE (soil, H_2O)	FIELD DATA			STATION LOCATION (grid, depth, etc.)	NO. OF CON-TAINERS	ANALYSIS REQUIRED				REMARKS
S1-B	6/9/92			Air				SWEPI HRSG #2	1	PAH (CARB 429)				Filter
S2-B	6/9/92			↓				↓	1	↓				↓
S3-B	6/9/92			↓				↓	1	↓				↓
S4-B	6/9/92			↓				↓	1	↓				↓

SAP

Released by	Organization	Date/Time	Received by	Organization	Date/Time
[signature]	Radian	6/11/92	Larry Edwards	RADIAN	6/11/92 7:[illegible]
Larry Edwards	Radian	6/12/92 8:15AM	[signature]	AHA analytical	6-12-92 081[illegible]

LABORATORY SECTION

TEMPERATURE RECEIVED ____________ FEDX AIRBILL# ____________ HAND DELIVERED ____________

ANALYSIS RECORD

TYPE OF ANALYSIS	PERFORMED BY (Signed)	DATE OF ANALYSIS	RECORDED (LAB BOOK NO.)	COMMENTS

Original (Page 1) Laboratory (Page 2) Samples (Page 3)

ALTA Analytical Laboratory

Batch ID: 11351

Sample Log-In Checklist	Yes	No
1. Samples Arrived by: Hand Delivered by Client		
2. Airbill Present? Number ______		X
3. Shipping Container is Intact?	X	
4. Custody Seals Present? Number ______		X
If yes, are they intact? N/A		
5. Sample Containers Intact?	X	
6. Shipping Preservation: Ice/Blue Ice/None		
7. Temperature: -10°C		
8. Chain of Custody Present?	X	
9. Discrepancies in Chain of Custody?		X
10. Packing Retained?	X	

Name: [signature] Date Rcv'd: 6/12/92

Comments:

SAM # ____________

RADIAN
CORPORATION

10395 OLD PLACERVILLE ROAD
SACRAMENTO, CALIFORNIA 95827

1/2

CHAIN OF CUSTODY RECORD

FIELD SECTION

CLIENT NAME WSPA PROJECT ADDRESS Old Placerville Rd, Sacramento, CA
Number Street City Zip

SAMPLED BY Mark Ludwiczak, Radian CONTAINERS OBTAINED FROM Mark Ludwiczak
Name (PRINT) Organization

PRESERVATIVE USED — STORAGE TEMPERATURE ☐ Ambient ☒ 4° C ☐ -10° C Other —

☐ HAZARDOUS ☐ NON-HAZARDOUS SPECIAL HANDLING INSTRUCTIONS Please extract samples by

FIELD REMARKS Note Solution levels (marked on bottles)

COLLECTORS SAMPLE NO.	DATE	COMP.	GRAB	TYPE (soil,H₂O)	FIELD DATA			STATION LOCATION (grid, depth, etc.)	NO. OF CON-TAINERS	ANALYSIS REQUIRED				REMARKS
										Aldehydes	(2)			
S10-A	6/9	X							1	X				Analyze for Formaldehyde, Acetaldehyde and acrolein
S10-B	↓	↓							↓	↓				↓
S11-A														
S11-B														
S12-A														
S12-B														
S13-A														
S13-B	↓													
S14-A	6/10													
S14-B	↓	↓							↓	↓				↓

Mark Ludwiczak Radian Corp. 6/10/92 - 4:30PM Alexis Thompson Air Toxics 6/10/92 4:
Released by Organization Date/Time Received by Organization Date/Time

Released by Organization Date/Time Received by Organization Date/Time

Released by Organization Date/Time Received by Organization Date/Time

LABORATORY SECTION

TEMPERATURE RECEIVED ________ FEDX AIRBILL# ________ HAND DELIVERED ________

ANALYSIS RECORD

TYPE OF ANALYSIS	PERFORMED BY (Signed)	DATE OF ANALYSIS	RECORDED (LAB BOOK NO.)	COMMENTS

Original (Page 1) Laboratory (Page 2) Samples (Page 3)

SAM # ___

RADIAN CORPORATION

10395 OLD PLACERVILLE ROAD
SACRAMENTO, CALIFORNIA 95827

2/2

CHAIN OF CUSTODY RECORD

FIELD SECTION

CLIENT NAME WSPA PROJECT ADDRESS Old Placerville Rd, Sacramento, CA
Number Street City Zip

SAMPLED BY Mark Lucki..., Radian CONTAINERS OBTAINED FROM ___
Name (PRINT) Organization

PRESERVATIVE USED — STORAGE TEMPERATURE ☐ Ambient ☒ 4° C ☐ -10° C Other ___

☐ HAZARDOUS ☐ NON-HAZARDOUS SPECIAL HANDLING INSTRUCTIONS See Page 1

FIELD REMARKS ___

COLLECTORS SAMPLE NO.	DATE	COMP.	GRAB	TYPE (soil,H_2O)	FIELD DATA			STATION LOCATION (grid, depth, etc.)	NO. OF CON-TAINERS	ANALYSIS REQUIRED				REMARKS
										Aldehydes	(CARB 430)			
S15-A	6/10	x							1					Formaldehyde, Acetaldehyde, Acrolein
S15-B	↓	↓							↓					↓
S16-A	6/8								1					
S16-B	6/8	↓							1					

Released by	Organization	Date/Time	Received by	Organization	Date/Time
[signature]	Radian Corp.	6/10/92-4:30pm	[signature]	Air Toxics	6/10/92 4:30p

LABORATORY SECTION

TEMPERATURE RECEIVED ___ FEDX AIRBILL# ___ HAND DELIVERED ___

ANALYSIS RECORD

TYPE OF ANALYSIS	PERFORMED BY (Signed)	DATE OF ANALYSIS	RECORDED (LAB BOOK NO.)	COMMENTS

Original (Page 1) Laboratory (Page 2) Samples (Page 3)

SAM #

RADIAN CORPORATION

10395 OLD PLACERVILLE ROAD
SACRAMENTO, CALIFORNIA 95827

1/1

CHAIN OF CUSTODY RECORD

FIELD SECTION

CLIENT NAME WSPA PROJECT ADDRESS Old Placerville Rd, Sacramento, CA
Number Street City Zip

SAMPLED BY Mark Ludwiczak, Radian Corp.
Name (PRINT) Organization
CONTAINERS OBTAINED FROM Mark Ludwiczak

PRESERVATIVE USED — STORAGE TEMPERATURE ☒ Ambient ☐ 4° C ☐ −10° C Other

☐ HAZARDOUS ☒ NON-HAZARDOUS SPECIAL HANDLING INSTRUCTIONS Please Analyze by 2PM, Th 6/

FIELD REMARKS

COLLECTOR'S SAMPLE NO.	DATE	COMP.	GRAB	TYPE (soil,H_2O)	FIELD DATA			STATION LOCATION (grid, depth, etc.)	NO. OF CON-TAINERS	ANALYSIS REQUIRED BTEX	Hexane	THC		REMARKS
S20-A	6/9	X							1	X	X	X		CARB 410A
S21-A	6/9	↓							↓	↓	↓	↓		↓
S22-A	6/10	↓							↓	↓	↓	↓		↓
S22-B	6/10	↓							↓	↓	↓	↓		↓
S23-A	6/9	↓							↓	↓	↓	↓		↓
S24-A	6/10	↓							↓	↓	↓	–		Natural Gas Sample

Released by	Organization	Date/Time	Received by	Organization	Date/Time
Mark Ludwiczak	Radian Corp.	6/10/92 – 4:30PM	Alejo Merediz	Air Toxics	6/10/92 4:

LABORATORY SECTION

TEMPERATURE RECEIVED ______ FEDX AIRBILL# ______ HAND DELIVERED ______

ANALYSIS RECORD

TYPE OF ANALYSIS	PERFORMED BY (Signed)	DATE OF ANALYSIS	RECORDED (LAB BOOK NO.)	COMMENTS

Original (Page 1) Laboratory (Page 2) Samples (Page 3)

Steiner Environmental, Inc.

Date: 6/10/92

Test Location: WSPA / Radian

SAMPLE HANDLING/LOG-IN

NO	SAMPLE TYPE	VOLUME	COMMENTS
1	32835 ~~ASTM~~ FS 1 (Meth / Sample / Test)		SWEP1 - SEKR#2 Fuel Line
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

CHAIN-OF-CUSTODY

Signature	Date/Time	Signature	Date/Time
[signature]	6/10/92 @ 1000		

APPENDIX D

CALIBRATION DATA

Pre-Test Calibration
WSPA
(Texaco, Mobil, SWER
PAH Train

RADIAN CORPORATION

DRY GAS METER CALIBRATION DATA

Dry Gas Meter # Sac-05

Calibration Meter # 309

Barometric Pressure Pb = 30.26 in. Hg

Orifice Manometer (ΔH) in H_2O		Gas Volume, ft³ Cal. Meter (V_c)	Gas Volume, ft³ Dry Gas Meter (V_d)		Temperatures, °F Calibration Meter (T_c)	Dry Gas Meter (T_d) In	Dry Gas Meter (T_d) Out	Time (Δt) minutes	γ [a]	ΔH@ [b]
4.0	final	670.417	100.890	initial	75	71	70	7.6	0.992	2.01
	initial	662.865	92.900	mid.	75	73	71			
	total	8.052	7.99	final	75	75	72			
				avg.	75	72				
2.0	final	676.326	106.300	initial	75	73	72	6.95	0.991	1.91
	initial	671.000	100.962	mid.	75	75	73			
	total	5.326	5.338	final	76	78	74			
				avg.	75.3	74.2				
1.0	final	682.557	112.550	initial	76	77	74	10.85	0.997	1.81
	initial	676.527	106.500	mid.	76	80	76			
	total	6.03	6.05	final	77	81	77			
				avg.	76.3	77.5				
0.5	final	687.755	117.800	initial	77	80	77	12.9	0.994	1.80
	initial	682.663	112.660	mid.	78	82	78			
	total	5.092	5.14	final	78	83	80			
				avg.	77.7	80				

Pre-Test X	Avg.	0.993	1.88
Post-Test ___ Vacuum ___	Pre-Test Avg.	—	—

$$^{a}\ \gamma = \frac{V_c}{V_d}\left[\frac{T_d + 460}{T_c + 460}\right]\left[\frac{P_b}{P_b + (\Delta H/13.6)}\right]$$

$$^{b}\ \Delta H@ = 0.0317\,(\Delta H)\left(\frac{\Delta t}{V_c}\right)^2 \frac{(T_c + 460)^2}{P_b\,(T_d + 460)}$$

Date Calibrated: 5/21/92 By: SAF

The γ and ΔH@ values have been checked using the 'DGM-Calc' Program.

NOTE: Use a minimum volume of 5 ft³ at all ΔH values.
Acceptable Pre-Test Values: $(\bar{\gamma} \times 0.98) \le \gamma \le (\bar{\gamma} \times 1.02)$
$(\Delta H@ \times 0.8) \le \Delta H@ \le (\Delta H@ \times 1.2)$
Acceptable Post-Test Values: $(\gamma_{Pre} \times 0.95) \le \gamma_{Post} \le (\gamma_{Pre} \times 1.05)$

0691-079-5

Post-Test Calib
WSPA
(Texaco, Mobil, ~
PAH Train

RADIAN CORPORATION

DRY GAS METER CALIBRATION DATA

Dry Gas Meter # Sac 05

Calibration Meter # 309

Barometric Pressure Pb = 30.31 in. Hg

Orifice Manometer (ΔH) in H_2O		Gas Volume, ft³ Cal. Meter (V_c)	Dry Gas Meter (V_d)		Temperatures, °F Calibration Meter (T_c)	Dry Gas Meter (T_d) In	Out	Time (Δt) minutes	γ[a]	ΔH@[b]
1.55	final	703.260	477.312	initial	86	87	85	8.5	1.010	1.98
	initial	697.588	471.699	mid.	86	90	86			
	total	5.672	5.613	final	86	91	87			
				avg.	86	87.7				
1.55	final	733.500	507.881	initial	89	91	90	8.5	0.991	1.94
	initial	727.751	502.059	mid.	89	92	91			
	total	5.749	5.822	final	89	94	91			
				avg.	89	91.5				
1.55	final	738.892	513.330	initial	89	92	91	9.0	~~Loose~~ 0.992	1.9
	initial	733.500	507.881	mid.	89	94	92			
	total	5.392	5.449	final	89	95	92			
				avg.	89	92.6				
	final			initial						
	initial			mid.						
	total			final						
				avg.						

Pre-Test ____	Avg.	0.998	1.9
Post-Test X Vacuum 10	Pre-Test Avg.	0.993	1.8

$$^{a}\gamma = \frac{V_c}{V_d}\left[\frac{T_d + 460}{T_c + 460}\right]\left[\frac{P_b}{P_b + (^{\Delta H}/_{13.6})}\right]$$

$$^{b}\Delta H@ = 0.0317\,(\Delta H)\left(\frac{\Delta t}{V_c}\right)^2 \frac{(T_c + 460)^2}{P_b\,(T_d + 460)}$$

Date Calibrated: 6-16-92 By: RAH

The γ and ΔH@ values have been checked using the 'DGM-Calc' Program.

NOTE: Use a minimum volume of 5 ft³ at all ΔH values.
Acceptable Pre-Test Values: $(\bar{\gamma} \times 0.98) \leq \gamma \leq (\bar{\gamma} \times 1.02)$
$(\Delta H@ \times 0.8) \leq \Delta H@ \leq (\Delta H@ \times 1.2)$
Acceptable Post-Test Values: $(\gamma_{Pre} \times 0.95) \leq \gamma_{Post} \leq (\gamma_{Pre} \times 1.05)$

0691-079-5

Pre-Test Calibration
WSPA
(Texaco) Mobil, Sweet
Aldehydes, H_2S

DRY GAS METER (LOW FLOW) CALIBRATION DATA

Dry Gas Meter # Sac V02

Calibration Meter # 257

Barometric Pressure Pb = 30.31 in. Hg

Rotameter Indication lpm	Meter Pressure (ΔH) in. H_2O		Gas Volume, liters Calibration Meter (V_c)	Gas Volume, liters Dry Gas Meter (V_d)		Temperatures, °C [°F][b] Calibration Meter (T_c)	Temperatures, °C [°F][b] Dry Gas Meter (T_d)	Time (Δt) minutes	γ*	Flow Rate lpm
0.5	1.0	final	404.31	712.50	initial	25 (77)	25 (77)	11.4	1.012	
		initial	398.73	707.00	mid.	25 (77)	25 (77)			
		total	5.58	5.5	final	26 (78.8)	25 (77)			
					avg.	77.6	77			
0.5	1.0	final	409.390	717.500	initial	26 (78.8)	25 (77)		1.015	
		initial	404.310	712.500	mid.	26 (78.8)	27 (80.6)			
		total	5.080	500	final	25 (77)	27 (80.6)			
					avg.	78.4	79.4			
0.5	1.0	final	416.350	724.46	initial	26.5 (79.7)	27 (80.6)	14.5	1.003	
		initial	409.390	717.50	mid.	27 (80.6)	28 (82.4)			
		total	6.96	6.96	final	27 (80.6)	30 (86)			
					avg.	80.3	83			
		final			initial					
		initial			mid.					
		total			final					
					avg.					

$$* \gamma = \frac{V_c}{V_d}\left[\frac{T_d + 460}{T_c + 460}\right]\left[\frac{P_b}{P_b + (^{\Delta H}/_{13.6})}\right]$$

Pre-Test X	Avg.	1.010	
Post-Test ___	Pre-Test Avg.	—	—

$$\text{Flow Rate} = \frac{V_c}{\Delta t}$$

[b]Note: T_d, T_c are expressed in °F for the above formulas, where °F = (°C x 9/5) + 32

Date Calibrated: 5/20/92 By: SAF

Have the γ values been checked using the 'DGM-CalcB' Program?

NOTE: Use a minimum volume of 3 liters at all flow rates
Acceptable Pre-Test Values: $0.98 \leq \gamma \leq 1.02$
Acceptable Post-Test Values: $(\gamma_{Pre} \times 0.95) \leq \overline{\gamma_{Post}} \leq (\gamma_{Pre} \times 1.05)$

Post-Test Calibr
WSPA
(Texaco, Mobil, S
Aldehydes, H

DRY GAS METER (LOW FLOW) CALIBRATION DATA

Dry Gas Meter # Sac VO2

Calibration Meter # 257

Barometric Pressure Pb = 30.31 in. Hg

Rotameter Indication lpm	Meter Pressure (ΔH) in. H_2O	Gas Volume, liters	Calibration Meter (V_c)	Dry Gas Meter (V_d)	Temperatures (°C) (°F)*	Calibration Meter (T_c)	Dry Gas Meter (T_d)	Time (Δt) minutes	γ*	Flow Rate lpm
0.5	1.0	final	439.25	426.83	initial	30	37	10.8	.999	
		initial	433.92	421.42	mid.	30	37			
		total	5.33	5.41	final	30	38			
					avg.	30	37.3			
0.5	1.0	final	444.69	432.36	initial	30	37	11.0	.998	
		initial	439.25	426.83	mid.	30	38			
		total	5.44	5.53	final	30	38			
					avg.	30	37.6			
0.5	1.0	final	433.92	421.42	initial	30	36	10.5	1.007	
		initial	428.74	416.22	mid.	30	37			
		total	5.18	5.20	final	30	37			
					avg.	30	36.6			
		final			initial					
		initial			mid.					
		total			final					
					avg.					

$$^{*}\gamma = \frac{V_c}{V_d}\left[\frac{T_d + 460}{T_c + 460}\right]\left[\frac{P_b}{P_b + (\Delta H/13.6)}\right]$$

$$\text{Flow Rate} = \frac{V_c}{\Delta t}$$

Pre-Test ____	Avg.	1.001
Post-Test X	Pre-Test Avg.	1.010

*Note: T_d, T_c are expressed in °F for the above formulas, where °F = (°C x 9/5) + 32

Date Calibrated: 6-16-92 By: C.A.H.

Have the γ values been checked using the 'DGM-CalcB' Program?

NOTE: Use a minimum volume of 3 liters at all flow rates
Acceptable Pre-Test Values: $0.98 \leq \gamma \leq 1.02$
Acceptable Post-Test Values: $(\gamma_{Pre} \times 0.95) \leq \overline{\gamma_{Post}} \leq (\gamma_{Pre} \times 1.05)$

Pre-Test Calibration
WSPA
(Mobil)
H_2S, Aldehydes

DRY GAS METER (LOW FLOW) CALIBRATION DATA

Dry Gas Meter # Sac V01

Calibration Meter # 757

Barometric Pressure Pb = 30.31 **in. Hg**

Rotameter Indication lpm	Meter Pressure (ΔH) in. H_2O	Gas Volume, liters			Temperatures, °C [°F]°			Time (Δt) minutes	γ*	Flow Rate lpm
			Calibration Meter (V_c)	Dry Gas Meter (V_d)		Calibration Meter (T_c)	Dry Gas Meter (T_d)			
0.5	0.7	final	389.930	928.000	initial	59	66.[illegible]	7.75	1.011	
		initial	385.940	924.000	mid.	59	66.2			
		total	3.99	4.00	final	59	68			
					avg.	59	66.8			
0.5	0.[illegible]	final	393.910	932.040	initial	59	68	8.0	1.002	
		initial	389.930	928.000	mid.	59.9	69.8			
		total	3.98	4.04	final	59.9	69.8			
					avg.	59.6	69.2			
0.5	0.7	final	398.470	936.620	initial	59.9	[illegible]	9.0	1.016	
		initial	393.910	9[illegible].040	mid.	59.9	[illegible]5			
		total	4.56	4.58	final	60.8	7[illegible]			
					avg.	60.2	71.6			
		final			initial					
		initial			mid.					
		total			final					
					avg.					

Pre-Test X	Avg.	1.010
Post-Test ___	Pre-Test Avg.	

$$*\gamma = \frac{V_c}{V_d}\left[\frac{T_d + 460}{T_c + 460}\right]\left[\frac{P_b}{P_b + (\Delta H/13.6)}\right]$$

$$\text{Flow Rate} = \frac{V_c}{\Delta t}$$

°Note: T_d, T_c are expressed in °F for the above formulas, where °F = (°C x 9/5) + 32

Date Calibrated: 5/20/97 **By:** SAF

Have the γ values been checked using the 'DGM-CalcB' Program?

NOTE: Use a minimum volume of 3 liters at all flow rates
Acceptable Pre-Test Values: $0.98 \leq \gamma \leq 1.02$
Acceptable Post-Test Values: $(\gamma_{Pre} \times 0.95) \leq \overline{\gamma_{Post}} \leq (\gamma_{Pre} \times 1.05)$

Post-Test Calibra
WSPA
(Mobil)
H_2S, Aldehyde

DRY GAS METER (LOW FLOW) CALIBRATION DATA

Dry Gas Meter # Soc V01

Calibration Meter # 237

Barometric Pressure Pb = 30.21 **in. Hg**

Rotameter Indication lpm	Meter Pressure (ΔH) in. H_2O	Gas Volume, liters			Temperatures, °C [°F][b]			Time (Δt) minutes	γ*	Flow Rate lpm
			Calibration Meter (V_c)	Dry Gas Meter (V_d)		Calibration Meter (T_c)	Dry Gas Meter (T_d)			
0.5	0.8	final	473.34	359.33	initial	24	30	7.0	1.007	
		initial	469.67	355.62	mid.	24 (75.2)	30			
		total	3.67	3.71	final	24	30 (86)			
					avg.	24	30			
0.[illegible]	0.8	final	464.76	350.62	initial	23	27 (80.6)	7.2	1.005	
		initial	460.95	346.78	mid.	23	27			
		total	3.81	3.84	final	23 (73.4)	28 (82.4)			
					avg.	23	27.3 (81.4)			
0.5	0.8	final	460.68	346.51	initial	23	26	7.0	1.007	
		initial	456.95	342.77	mid.	23	27			
		total	3.73	3.74	final	23	[illegible]			
					avg.	23	26.6 (79.9)			
		final			initial					
		initial			mid.					
		total			final					
					avg.					

$$* \gamma = \frac{V_c}{V_d}\left[\frac{T_d + 460}{T_c + 460}\right]\left[\frac{P_b}{P_b + (\Delta H/13.6)}\right]$$

$$\textbf{Flow Rate} = \frac{V_c}{\Delta t}$$

Pre-Test ___	Avg.	1.006
Post-Test X	Pre-Test Avg.	1.010

[b]Note: T_d, T_c are expressed in °F for the above formulas, where °F = (°C x 9/5) + 32

Date Calibrated: 6-9-96 **By:** RAH

Have the γ values been checked using the 'DGM-CalcB' Program?

NOTE: Use a minimum volume of 3 liters at all flow rates
Acceptable Pre-Test Values: $0.98 \leq \gamma \leq 1.02$
Acceptable Post-Test Values: $(\gamma_{Pre} \times 0.95) \leq \overline{\gamma_{Post}} \leq (\gamma_{Pre} \times 1.05)$

H_2S Testing - Mobil (Casing Gas)

DRY GAS METER / ORIFICE METER CALIBRATION DATA

Date ....APR 20,1992
Bar. Press, in.Hg 29.90
Meter Box No. ... 16289

Dry Gas Meter No. ... 2409937
Standard Test Meter # 69279
Operator .... AB

STANDARD TEST METER			DRY TEST METER				
Press. dHs (in. H2O)	Temp. Ts (dF)	Volume Vs (ft3)	Press. dH (in. H2O)	Temp. Tdi (dF)	Temp. Tdo (dF)	Volume Vd (ft3)	Time t (min)
	69.0	698.884		80	77	516.766	
-0.8	67.0	675.202	0.5	80	78	492.481	58.0
Avg/Net :	68.0	23.682			79	24.285	
	67.0	674.531		81	78	491.788	
-1.4	67.0	641.286	1.0	81	77	457.826	58.0
Avg/Net :	67.0	33.245			79	33.962	
	66.0	586.199		79	76	402.294	
-1.8	66.0	561.106	1.5	76	77	376.890	36.0
Avg/Net :	66.0	25.093			77	25.404	
	67.0	613.204		80	77	429.519	
-2.3	66.0	587.227	2.0	77	76	403.338	32.0
Avg/Net :	66.5	25.977			78	26.181	
	66.0	639.862		81	77	456.378	
-3.3	67.0	614.066	3.0	80	77	430.388	26.0
Avg/Net :	66.5	25.796			79	25.990	

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

Ko = [(Vs/t) x [(Tdo + 460) / (Ts + 460)] x [(Pbar + (dHs/13.6) / (Pbar + (dH/13.6)] / [((Tdo + 460) x dH) / [(Pbar + (dH/13.6) x (Mm)]^0.5

dH :	0.5	1.0	1.5	2.0	3.0	Avg.	Std.Dev.
y :	0.9918	0.9957	1.0003	1.0023	1.0000	0.9980	0.0010
Ko :	0.7442	0.7386	0.7328	0.7371	0.7332	0.7372	0.0021

y : 0.10 % Relative Std. Dev.

Ko : 0.21 % Relative Std. Dev.

TEXACO HEATER TREATER TEST DATA

(MAY 28-30, 1992)

A. CALIBRATION AND CORRECTION DATA

Company : TEXACO FITZGERALD LEASE

Station : HEATER TREATER

Date : 5/28/92
Test Run : 1A
Test Condition: FIELDGAS

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
Point #	A	B	A	B	A	B	A	B	A	B
1	2.30	2.30	11.60	11.61	3.40	3.38			54.00	53.78
2	2.15	2.13	12.00	12.03	2.00	1.94			56.00	55.33
3	2.15	2.12	12.20	12.26	8.50	8.34			56.00	54.89
MEAN		2.18		11.97		4.55				54.67

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.05	-0.10	0.10		0.20
Span Check	7.86	14.40	38.40		79.20
Cal. Gas	7.88	14.46	37.90		77.40
Scf	-0.00296	0.00092	0.00352		0.00689
Zcf	0.01667	-0.03333	0.03333		0.06667

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

A. CALIBRATION AND CORRECTION DATA

Company : TEXACO FITZGERALD LEASE

Station : HEATER TREATER

Date : 5/28/92
Test Run : 1B
Test Condition: FIELDGAS

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
Point #	A	B	A	B	A	B	A	B	A	B
1	1.70	1.70	12.15	12.15	7.50	7.50			55.20	55.19
2	1.90	1.90	12.05	12.06	7.00	7.01			56.00	55.97
3	1.65	1.65	12.10	12.12	7.50	7.52			56.00	55.95
4	1.20	1.20	12.50	12.53	10000.00	10039.74			54.00	53.93
5	1.00	1.00	12.40	12.43	10000.00	10051.15			49.00	48.91
6	0.80	0.80	12.50	12.54	10000.00	10062.58			53.50	53.40
7	1.40	1.39	12.45	12.50	10000.00	10074.05			55.00	54.88
MEAN		1.38		12.33		>5749.94				54.03

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.00	0.00		0.20
Span Check	7.92	14.40	37.60		77.50
Cal. Gas	7.88	14.46	37.90		77.40
Scf	0.00073	-0.00059	-0.00113		-0.00018
Zcf	0.00000	0.00000	0.00000		0.02857

Scf, Span Drift Correction Factor = (% Drift / 1 / # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift / # of Readings

A. CALIBRATION AND CORRECTION DATA

Company : TEXACO FITZGERALD LEASE

Station : HEATER TREATER

Date : 5/28/92
Test Run : 1C
Test Condition: FIELDGAS

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
Point #	A	B	A	B	A	B	A	B	A	B
1	1.80	1.80	12.35	12.34	10000.00	9986.82			56.00	55.95
2	1.70	1.70	12.60	12.56	10000.00	9960.58			57.00	56.85
3	1.60	1.60	12.60	12.54	10000.00	9934.47			57.00	56.75
4	1.40	1.40	12.70	12.61	10000.00	9908.50			57.00	56.64
5	1.60	1.61	12.80	12.69	10000.00	9882.66			57.50	57.05
MEAN		1.62		12.55		> 9934.61				56.65

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.00	0.00		0.80
Span Check	7.85	14.60	38.40		77.80
Cal. Gas	7.88	14.46	37.90		77.40
Scf	-0.00076	0.00194	0.00264		-0.00103
Zcf	0.00000	0.00000	0.00000		0.16000

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

A. CALIBRATION AND CORRECTION DATA

Company : TEXACO FITZGERALD LEASE

Station : HEATER TREATER

Date : 5/28/92
Test Run : 1D
Test Condition: FIELDGAS

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
Point #	A	B	A	B	A	B	A	B	A	B
1	1.80	1.80	12.20	12.19	3.00	3.03			56.00	56.04
2	1.80	1.80	12.20	12.18	8.00	8.05			56.20	56.31
3	1.75	1.75	12.20	12.16	12.50	12.53			56.50	56.69
4	2.10	2.10	12.00	11.94	4.00	4.17			56.00	56.27
5	1.90	1.90	12.10	12.03	8.50	8.63			54.20	54.54
6	1.90	1.90	12.10	12.01	9.00	9.15			55.40	55.82
MEAN		1.88		12.09		7.59				55.94

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	-0.12	-0.40		-0.60
Span Check	7.86	14.60	38.50		77.00
Cal. Gas	7.88	14.46	37.90		77.40
Scf	-0.00042	0.00300	0.00440		0.00043
Zcf	0.00000	-0.02000	-0.06667		-0.10000

Scf, Span Drift Correction Factor = (% Drift / 1(/ # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift /(# Readings

A. CALIBRATION AND CORRECTION DATA

Company : TEXACO FITZGERALD LEASE

Station : HEATER TREATER

Date : 5/29/92
Test Run : 2A
Test Condition: FIELD GAS

Point #	%O2 A	%O2 B	%CO2 A	%CO2 B	ppm CO A	ppm CO B	ppm SO2 A	ppm SO2 B	ppm NOx A	ppm NOx B
1	2.75	2.75	11.60	11.60	0.50	0.49			52.60	52.52
2	2.70	2.70	11.65	11.66	0.50	0.47			53.00	52.76
3	2.50	2.50	11.70	11.72	0.40	0.34			53.20	52.80
4	2.50	2.50	11.70	11.73	1.00	0.93			54.50	53.93
5	2.60	2.60	11.60	11.64	0.50	0.40			56.00	55.25
6	2.70	2.70	11.50	11.55	0.40	0.28			54.00	53.11
7	2.70	2.70	11.60	11.66	0.40	0.25			56.00	54.92
8	2.60	2.60	11.50	11.57	0.30	0.13			54.50	53.29
9	2.74	2.74	11.50	11.58	0.20	0.01			54.00	52.64
10	2.65	2.64	11.60	11.69	0.00	-0.22			56.00	54.44
11	2.60	2.59	11.55	11.65	0.20	-0.04			54.60	52.91
MEAN		2.64		11.64		0.28				53.51

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.02	-0.10	0.25		0.40
Span Check	7.86	14.35	37.50		79.80
Cal. Gas	7.88	14.46	37.90		77.40
Scf	-0.00046	-0.00006	-0.00156		0.00235
Zcf	0.00182	-0.00909	0.02273		0.03636

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

A. CALIBRATION AND CORRECTION DATA

Company : TEXACO FITZGERALD LEASE

Station : HEATER TREATER

Date : 5/29/92
Test Run : 2B
Test Condition: FIELD GAS

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

Point #	%O2 A	%O2 B	%CO2 A	%CO2 B	ppm CO A	ppm CO B	ppm SO2 A	ppm SO2 B	ppm NOx A	ppm NOx B
1	2.60	2.60	11.60	11.60	0.50	0.50			55.00	54.97
2	3.35	3.35	11.80	11.81	4.00	3.99			56.00	55.91
3	2.00	2.00	12.20	12.22	10000.00	9960.58			55.00	54.86
4	2.70	2.70	11.70	11.72	6.30	6.27			56.50	56.30
5	2.00	2.00	12.00	12.03	12.50	12.41			56.50	56.24
MEAN		2.53		11.88		> 1996.75				55.66

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.00	0.00		0.00
Span Check	7.86	14.42	38.20		77.80
Cal. Gas	7.88	14.46	37.90		77.40
Scf	-0.00051	-0.00055	0.00158		0.00103
Zcf	0.00000	0.00000	0.00000		0.00000

Scf, Span Drift Correction Factor = (% Drift / 1(/ # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift (of Readings

A. CALIBRATION AND CORRECTION DATA

Company : TEXACO FITZGERALD LEASE

Station : HEATER TREATER

Date : 5/29/92
Test Run : 2C
Test Condition: FIELD GAS

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
Point #	A	B	A	B	A	B	A	B	A	B
1	1.60	1.60	12.40	12.40	25.00	25.01			54.20	54.23
2	2.60	2.59	11.60	11.61	10.00	9.99			56.20	56.29
3	2.40	2.39	11.80	11.82	2.50	2.46			56.80	56.95
4	2.30	2.29	12.00	12.03	10000.00	10055.65			57.00	57.21
5	2.00	1.99	12.00	12.04	7.50	7.46			56.60	56.86
MEAN		2.17		11.98		> 2020.11				56.31

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.05	0.10		0.00
Span Check	7.94	14.40	37.70		77.00
Cal. Gas	7.88	14.46	37.90		77.40
Scf	0.00152	-0.00152	-0.00158		-0.00103
Zcf	0.00000	0.01000	0.02000		0.00000

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

A. CALIBRATION AND CORRECTION DATA

Company : TEXACO FITZGERALD LEASE

Station : HEATER TREATER

Date : 5/30/92
Test Run : 4A
Test Condition: FIELD GAS

Point #	%O2 A	%O2 B	%CO2 A	%CO2 B	ppm CO A	ppm CO B	ppm SO2 A	ppm SO2 B	ppm NOx A	ppm NOx B
1	2.80	2.80	11.50	11.50	1.50	1.50			54.00	53.97
2	2.80	2.79	11.50	11.51	0.50	0.50			55.20	55.11
3	2.75	2.74	11.50	11.51	0.40	0.40			53.40	53.27
4	2.78	2.77	11.50	11.52	0.50	0.50			56.00	55.80
5	2.62	2.60	11.60	11.62	0.40	0.40			54.20	53.96
6	2.80	2.78	11.45	11.47	0.40	0.40			56.50	56.17
7	2.85	2.82	11.50	11.53	0.40	0.40			56.50	56.12
8	3.00	2.97	11.30	11.33	0.00	0.00			57.00	56.55
9	3.20	3.16	11.20	11.24	0.00	0.00			57.00	56.49
10	3.00	2.96	11.30	11.34	0.00	0.00			56.00	55.45
11	3.00	2.95	11.30	11.34	0.00	0.00			57.00	56.37
MEAN		2.85		11.45		0.37				55.39

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

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.04	0.00	0.00		-0.80
Span Check	7.94	14.40	37.50		78.60
Cal. Gas	7.88	14.46	37.90		77.40
Scf	0.00023	-0.00038	-0.00096		0.00235
Zcf	0.00364	0.00000	0.00000		-0.07273

Scf, Span Drift Correction Factor = (% Drift / 10 / # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift / : Readings

A. CALIBRATION AND CORRECTION DATA

Company : TEXACO FITZGERALD LEASE

Station : HEATER TREATER

Date : 5/30/92
Test Run : 4B
Test Condition: FIELD GAS

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
Point #	A	B	A	B	A	B	A	B	A	B
1	2.80	2.80	11.55	11.54	0.50	0.50			56.50	56.52
2	2.40	2.39	11.70	11.67	0.75	0.75			57.00	57.07
3	2.35	2.34	11.70	11.65	0.75	0.76			56.50	56.62
4	2.50	2.48	11.70	11.63	0.50	0.51			58.00	58.18
5	2.40	2.38	11.60	11.52	2.00	2.03			58.00	58.23
6	2.48	2.45	11.70	11.60	1.00	1.02			58.50	58.78
MEAN		2.47		11.60		0.93				57.57

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.04	0.00	0.00		0.00
Span Check	7.88	14.60	37.10		77.00
Cal. Gas	7.88	14.46	37.90		77.40
Scf	-0.00085	0.00161	-0.00352		-0.00086
Zcf	0.00667	0.00000	0.00000		0.00000

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

A. CALIBRATION AND CORRECTION DATA

Company : TEXACO FITZGERALD LEASE

Station : HEATER TREATER

Date : 5/30/92
Test Run : 4C
Test Condition: FIELD GAS

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
Point #	A	B	A	B	A	B	A	B	A	B
1	2.60	2.60	11.80	11.80	2.00	2.00			57.80	57.75
2	2.40	2.39	11.90	11.91	1.00	1.00			58.00	57.86
3	2.50	2.48	11.80	11.82	2.00	2.01			59.00	58.78
4	2.55	2.53	11.80	11.83	0.50	0.50			58.80	58.49
5	2.60	2.57	11.65	11.69	0.50	0.50			59.00	58.60
MEAN		2.51		11.81		1.20				58.30

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.05	0.00		0.60
Span Check	7.98	14.40	37.60		77.80
Cal. Gas	7.88	14.46	37.90		77.40
Scf	0.00254	-0.00152	-0.00158		-0.00052
Zcf	0.00000	0.01000	0.00000		0.12000

Scf, Span Drift Correction Factor = (% Drift / 10(/ # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift /(: Readings

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : TEXACO FITZGERALD LE Date : 5/28/92

Station : HEATER TREATER

Run 1A	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	7.88	14.46	37.90		77.40
Measured Span	7.86	14.40	38.40		79.20
Zero Drift	0.05	-0.10	0.10		0.20
Final, Actual Span	7.81	14.50	38.30		79.00
Percent Drift	-0.9	0.3	1.1		2.1

Run 1B	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	7.88	14.46	37.90		77.40
Measured Span	7.92	14.40	37.60		77.50
Zero Drift	0.00	0.00	0.00		0.20
Final, Actual Span	7.92	14.40	37.60		77.30
Percent Drift	0.5	-0.4	-0.8		-0.1

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

Final, Actual Span = Measured Span - Zero Drift

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

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : TEXACO FITZGERALD LE Date : 5/28/92

Station : HEATER TREATER

Run 1C	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	7.88	14.46	37.90		77.40
Measured Span	7.85	14.60	38.40		77.80
Zero Drift	0.00	0.00	0.00		0.80
Final, Actual Span	7.85	14.60	38.40		77.00
Percent Drift	-0.4	1.0	1.3		-0.5

Run 1D	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	7.88	14.46	37.90		77.40
Measured Span	7.86	14.60	38.50		77.00
Zero Drift	0.00	-0.12	-0.40		-0.60
Final, Actual Span	7.86	14.72	38.90		77.60
Percent Drift	-0.3	1.8	2.6		0.3

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

Final, Actual Span = Measured Span - Zero Drift

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

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : TEXACO FITZGERALD LE Date : 5/29/92

Station : HEATER TREATER

Run 2A	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	7.88	14.46	37.90		77.40
Measured Span	7.86	14.35	37.50		79.80
Zero Drift	0.02	-0.10	0.25		0.40
Final, Actual Span	7.84	14.45	37.25		79.40
Percent Drift	-0.5	-0.1	-1.7		2.6

Run 2B	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	7.88	14.46	37.90		77.40
Measured Span	7.86	14.42	38.20		77.80
Zero Drift	0.00	0.00	0.00		0.00
Final, Actual Span	7.86	14.42	38.20		77.80
Percent Drift	-0.3	-0.3	0.8		0.5

Run 2C	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	7.88	14.46	37.90		77.40
Measured Span	7.94	14.40	37.70		77.00
Zero Drift	0.00	0.05	0.10		0.00
Final, Actual Span	7.94	14.35	37.60		77.00
Percent Drift	0.8	-0.8	-0.8		-0.5

Final, Actual Span = Measured Span - Zero Drift

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

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : TEXACO FITZGERALD LE Date : 5/30/92

Station : HEATER TREATER

Run 4A	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	7.88	14.46	37.90		77.40
Measured Span	7.94	14.40	37.50		78.60
Zero Drift	0.04	0.00	0.00		-0.80
Final, Actual Span	7.90	14.40	37.50		79.40
Percent Drift	0.3	-0.4	-1.1		2.6

Run 4B	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	7.88	14.46	37.90		77.40
Measured Span	7.88	14.60	37.10		77.00
Zero Drift	0.04	0.00	0.00		0.00
Final, Actual Span	7.84	14.60	37.10		77.00
Percent Drift	-0.5	1.0	-2.1		-0.5

Run 4C	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	7.88	14.46	37.90		77.40
Measured Span	7.98	14.40	37.60		77.80
Zero Drift	0.00	0.05	0.00		0.60
Final, Actual Span	7.98	14.35	37.60		77.20
Percent Drift	1.3	-0.8	-0.8		-0.3

Final, Actual Span = Measured Span - Zero Drift

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

MOBIL STEAM GENERATOR TEST DATA

(JUNE 2-4, 1992)

A. CALIBRATION AND CORRECTION DATA

Company : MOBIL OIL LOST HILLS

Station : STEAM GENERATOR 401A

Date : 6/2/92
Test Run : 1A
Test Condition: NAT GAS/CASING GAS

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

Point #	%O2 A	%O2 B	%CO2 A	%CO2 B	ppm CO A	ppm CO B	ppm SO2 A	ppm SO2 B	ppm NOx A	ppm NOx B
1	1.80	1.80	14.00	14.01	-0.40	-0.39			33.00	32.31
2	1.90	1.90	13.95	13.98	-0.40	-0.37			34.60	32.52
3	1.75	1.74	14.00	14.04	-0.40	-0.35			35.00	31.54
4	1.90	1.89	13.95	14.01	-0.40	-0.33			36.60	31.75
5	1.75	1.74	13.90	13.98	-0.40	-0.31			37.00	30.79
6	1.80	1.79	14.10	14.20	-0.40	-0.29			38.20	30.62
MEAN		1.81		14.04	-0.40	-0.34				31.59

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.02	0.05	-0.12		7.20
Span Check	7.82	16.00	15.75		93.00
Cal. Gas	7.82	16.13	16.01		82.90
Scf	-0.00043	-0.00186	-0.00146		0.00583
Zcf	0.00333	0.00833	-0.02000		1.20000

Scf, Span Drift Correction Factor = (% Drift / 1[illegible] / # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift [illegible] of Readings

A. CALIBRATION AND CORRECTION DATA

Company : MOBIL OIL LOST HILLS

Station : STEAM GENERATOR 401A

Date : 6/2/92
Test Run : 1B
Test Condition: NAT GAS/CASING GAS

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
Point #	A	B	A	B	A	B	A	B	A	B
1	1.70	1.70	14.60	14.58	-0.40	-0.40				
2	1.80	1.79	14.75	14.70	-0.40	-0.40				
3	1.80	1.79	15.00	14.92	-0.40	-0.40				
4	1.85	1.83	15.10	14.98	-0.40	-0.40				
5	1.80	1.77	14.60	14.45	-0.40	-0.39				
6	1.75	1.72	14.20	14.02	-0.40	-0.39				
MEAN		1.77		14.61	-0.40	-0.40				

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.02	0.00	0.00		
Span Check	7.90	16.35	16.35		
Cal. Gas	7.82	16.13	16.01		
Scf	0.00128	0.00227	0.00354		
Zcf	0.00333	0.00000	0.00000		

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

A. CALIBRATION AND CORRECTION DATA

Company : MOBIL OIL LOST HILLS

Station : STEAM GENERATOR 401A

Date : 6/2/92
Test Run : 1C
Test Condition: NAT GAS/CASING GAS

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

Point #	%O2 A	%O2 B	%CO2 A	%CO2 B	ppm CO A	ppm CO B	ppm SO2 A	ppm SO2 B	ppm NOx A	ppm NOx B
1	1.80	1.80	13.35	13.33	-0.50	-0.50			29.00	29.17
2	1.80	1.80	13.40	13.35	-0.50	-0.50			28.20	28.70
3	1.80	1.79	13.40	13.32	-0.50	-0.50			28.80	29.64
4	1.80	1.79	13.40	13.29	-0.50	-0.49			28.00	29.17
5	1.80	1.79	13.40	13.26	-0.50	-0.49			29.00	30.50
6	1.80	1.78	13.40	13.23	-0.50	-0.49			29.00	30.83
MEAN		1.79		13.30	-0.50	-0.49				29.67

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.00	0.00		-2.40
Span Check	7.90	16.35	16.35		81.60
Cal. Gas	7.82	16.13	16.01		82.90
Scf	0.00171	0.00227	0.00354		0.00221
Zcf	0.00000	0.00000	0.00000		-0.40000

Scf, Span Drift Correction Factor = (% Drift / 1[illegible] / # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift / [illegible]

A. CALIBRATION AND CORRECTION DATA

Company : MOBIL OIL LOST HILLS

Station : STEAM GENERATOR 401A

Date : 6/2/92
Test Run : 1D
Test Condition: NAT GAS/CASING GAS

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
Point #	A	B	A	B	A	B	A	B	A	B
1	1.78	1.78	13.70	13.68	-0.50	-0.50			29.00	28.93
2	1.80	1.80	13.75	13.69	-0.50	-0.49			30.00	29.79
3	1.78	1.78	13.80	13.70	-0.50	-0.48			29.00	28.66
4	1.80	1.79	13.80	13.67	-0.50	-0.47			29.60	29.11
5	1.75	1.74	13.80	13.63	-0.50	-0.46			29.00	28.39
6	1.75	1.74	13.80	13.59	-0.50	-0.45			28.60	27.86
MEAN		1.77		13.66	-0.50	-0.47				28.79

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.00	-0.05		0.20
Span Check	7.86	16.40	16.20		84.90
Cal. Gas	7.82	16.13	16.01		82.90
Scf	0.00085	0.00279	0.00250		0.00362
Zcf	0.00000	0.00000	-0.00833		0.03333

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

A. CALIBRATION AND CORRECTION DATA

Company : MOBIL OIL LOST HILLS

Station : STEAM GENERATOR 401A

Date : 6/3/92
Test Run : 2A
Test Condition: NAT GAS/CASING GAS

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

Point #	%O2 A	%O2 B	%CO2 A	%CO2 B	ppm CO A	ppm CO B	ppm SO2 A	ppm SO2 B	ppm NOx A	ppm NOx B
1	2.35	2.35	14.10	14.13	-0.50	-0.50			34.00	33.92
2	2.30	2.30	14.05	14.13	-0.50	-0.50			34.00	33.76
3	2.30	2.30	14.00	14.13	-0.50	-0.50			34.50	34.10
4	2.30	2.30	13.90	14.08	-0.50	-0.50			35.00	34.43
5	2.30	2.30	13.80	14.03	-0.50	-0.50			35.00	34.27
6	2.30	2.31	13.60	13.88	-0.50	-0.50			35.00	34.11
MEAN		2.31		14.06	-0.50	-0.50				34.10

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.00	0.00		0.60
Span Check	7.80	15.78	16.00		84.40
Cal. Gas	7.82	16.13	16.01		82.90
Scf	-0.00043	-0.00362	-0.00010		0.00181
Zcf	0.00000	0.00000	0.00000		0.10000

Scf, Span Drift Correction Factor = (% Drift / 10 / # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift / # Readings

A. CALIBRATION AND CORRECTION DATA

Company : MOBIL OIL LOST HILLS

Station : STEAM GENERATOR 401A

Date : 6/3/92
Test Run : 2B
Test Condition: NAT GAS/CASING GAS

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

	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
Point #	A	B	A	B	A	B	A	B	A	B
1	2.20	2.20	14.10	14.09	-0.50	-0.50			34.50	34.36
2	2.25	2.25	14.15	14.13	-0.50	-0.49			35.00	34.59
3	2.30	2.30	14.20	14.17	-0.50	-0.48			35.00	34.32
4	2.30	2.30	14.20	14.16	-0.50	-0.47			35.00	34.04
5	2.30	2.29	14.20	14.15	-0.50	-0.46			35.00	33.77
6	2.36	2.35	14.20	14.14	-0.50	-0.45			36.50	34.99
MEAN		2.28		14.14	-0.50	-0.48				34.35

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.02	0.00	-0.05		1.60
Span Check	7.80	16.20	15.95		84.60
Cal. Gas	7.82	16.13	16.01		82.90
Scf	-0.00085	0.00072	-0.00010		0.00020
Zcf	0.00333	0.00000	-0.00833		0.26667

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

A. CALIBRATION AND CORRECTION DATA

Company : MOBIL OIL LOST HILLS

Station : STEAM GENERATOR 401A

Date : 6/3/92
Test Run : 2C
Test Condition: NAT GAS/CASING GAS

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

Point #	%O2 A	%O2 B	%CO2 A	%CO2 B	ppm CO A	ppm CO B	ppm SO2 A	ppm SO2 B	ppm NOx A	ppm NOx B
1	2.30	2.30	13.60	13.62	-0.50	-0.50			35.00	34.91
2	2.30	2.29	13.50	13.55	-0.50	-0.51			35.00	34.75
3	2.30	2.29	13.40	13.48	-0.50	-0.52			36.00	35.56
4	2.35	2.33	13.30	13.41	-0.50	-0.53			36.00	35.39
5	2.35	2.33	13.20	13.34	-0.50	-0.54			36.00	35.23
6	2.35	2.32	13.20	13.37	-0.50	-0.55			36.00	35.06
MEAN		2.31		13.46	-0.50	-0.53				35.15

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.05	0.00	0.05		-0.20
Span Check	7.80	15.90	15.95		85.60
Cal. Gas	7.82	16.13	16.01		82.90
Scf	-0.00149	-0.00238	-0.00115		0.00583
Zcf	0.00833	0.00000	0.00833		-0.03333

Scf, Span Drift Correction Factor = (% Drift / 1[illegible]) / # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift [illegible] of Readings
Cz, Zero Corr. Concentration [illegible]

A. CALIBRATION AND CORRECTION DATA

Company : MOBIL OIL LOST HILLS

Station : STEAM GENERATOR 401A

Date : 6/3/92
Test Run : 2D
Test Condition: NAT GAS/CASING GAS

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
Point #	A	B	A	B	A	B	A	B	A	B
1	2.30	2.30	13.60	13.61	-0.50	-0.50			34.00	33.91
2	2.30	2.29	13.60	13.62	-0.50	-0.50			34.50	34.24
3	2.25	2.24	13.60	13.63	-0.50	-0.50			35.00	34.57
4	2.30	2.28	13.50	13.54	-0.50	-0.50			35.00	34.39
5	2.30	2.27	13.40	13.45	-0.50	-0.50			35.50	34.72
6	2.25	2.22	13.38	13.44	-0.50	-0.50			35.50	34.55
MEAN		2.27		13.55	-0.50	-0.50				34.40

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.04	0.00	0.00		1.00
Span Check	7.84	16.05	16.00		84.00
Cal. Gas	7.82	16.13	16.01		82.90
Scf	-0.00043	-0.00083	-0.00010		0.00020
Zcf	0.00667	0.00000	0.00000		0.16667

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

A. CALIBRATION AND CORRECTION DATA

Company : MOBIL OIL LOST HILLS

Station : STEAM GENERATOR 401A

Date : 6/3/92
Test Run : 3A
Test Condition: NAT GAS/CASING GAS

Point #	%O2 A	%O2 B	%CO2 A	%CO2 B	ppm CO A	ppm CO B	ppm SO2 A	ppm SO2 B	ppm NOx A	ppm NOx B
	Concentration : Drift Uncorrected (A) / Corrected (B)									
1	2.30		13.40	13.41	-0.50	-0.50			35.00	34.91
2	2.30		13.40	13.42	-0.50	-0.50			34.00	33.74
3	2.30		13.40	13.43	-0.50	-0.50			35.00	34.57
4	2.30		13.40	13.44	-0.50	-0.50			35.00	34.39
5	2.30		13.40	13.45	-0.50	-0.50			35.00	34.22
6	2.30		13.40	13.46	-0.50	-0.50			35.00	34.05
MEAN	2.30			13.43	-0.50	-0.50				34.31

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.02	0.00	0.00		1.00
Span Check	7.84	16.05	16.00		84.00
Cal. Gas	7.82	16.13	16.01		82.90
Scf		-0.00083	-0.00010		0.00020
Zcf		0.00000	0.00000		0.16667

Scf, Span Drift Correction Factor = (% Drift / 1(/ # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift /(f Readings

A. CALIBRATION AND CORRECTION DATA

Company : MOBIL OIL LOST HILLS

Station : STEAM GENERATOR 401A

Date : 6/3/92
Test Run : 3B
Test Condition: NAT GAS/CASING GAS

Point #	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
	A	B	A	B	A	B	A	B	A	B
1	2.40	2.40	13.35	13.35	-0.50	-0.50			34.50	34.43
2	2.40	2.39	13.35	13.35	-0.50	-0.50			35.00	34.78
3	2.40	2.38	13.35	13.34	-0.50	-0.50			35.50	35.14
4	2.40	2.37	13.35	13.34	-0.50	-0.50			35.80	35.29
5	2.40	2.36	13.40	13.39	-0.50	-0.50			36.50	35.85
6	2.35	2.30	12.85	12.84	-0.50	-0.50			35.50	34.70
MEAN		2.37		13.27	-0.50	-0.50				35.03

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.05	0.00	0.00		0.70
Span Check	7.88	16.15	16.10		84.00
Cal. Gas	7.82	16.13	16.01		82.90
Scf	0.00021	0.00021	0.00094		0.00080
Zcf	0.00833	0.00000	0.00000		0.11667

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

A. CALIBRATION AND CORRECTION DATA

Company : MOBIL OIL LOST HILLS

Station : STEAM GENERATOR 401A

Date : 6/3/92
Test Run : 3C
Test Condition: NAT GAS/CASING GAS

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
Point #	A	B	A	B	A	B	A	B	A	B
1	3.42	3.42	13.00	13.00	-0.50	-0.50			36.50	36.43
2	3.40	3.39	13.00	13.00	-0.50	-0.50			36.50	36.28
3	3.40	3.38	13.10	13.09	-0.50	-0.50			36.00	35.64
4	3.38	3.36	13.20	13.19	-0.50	-0.50			36.00	35.49
5	3.38	3.35	13.20	13.19	-0.50	-0.50			36.00	35.35
6	3.30	3.27	13.20	13.19	-0.50	-0.50			35.00	34.21
MEAN		3.36		13.11	-0.50	-0.50				35.57

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.05	0.00	0.00		0.70
Span Check	7.84	16.15	16.10		84.00
Cal. Gas	7.82	16.13	16.01		82.90
Scf	-0.00064	0.00021	0.00094		0.00080
Zcf	0.00833	0.00000	0.00000		0.11667

Scf, Span Drift Correction Factor = (% Drift / 1[illegible] / # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift [illegible] of Readings

A. CALIBRATION AND CORRECTION DATA

Company : MOBIL OIL LOST HILLS

Station : STEAM GENERATOR 401A

Date : 6/3/92
Test Run : 3D
Test Condition: NAT GAS/CASING GAS

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
	A	B	A	B	A	B	A	B	A	B
Point #										
1	2.35	2.35	13.00	13.00	-0.50	-0.50			34.00	34.27
2	2.35	2.34	13.00	13.00	-0.50	-0.50			33.00	33.80
3	2.35	2.33	12.90	12.89	-0.50	-0.50			32.50	33.83
4	2.35	2.32	12.90	12.89	-0.50	-0.50			32.50	34.36
5	2.35	2.31	13.00	12.99	-0.50	-0.50			32.00	34.39
6	2.35	2.30	13.00	12.99	-0.50	-0.50			31.00	33.93
MEAN		2.32		12.96	-0.50	-0.50				34.10

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.04	0.00	0.00		-3.40
Span Check	7.92	16.15	16.05		80.00
Cal. Gas	7.82	16.13	16.01		82.90
Scf	0.00128	0.00021	0.00042		0.00101
Zcf	0.00667	0.00000	0.00000		-0.56667

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

A. CALIBRATION AND CORRECTION DATA

Company : MOBIL OIL LOST HILLS

Station : STEAM GENERATOR 401A

Date : 6/4/92
Test Run : 4A
Test Condition: NAT GAS/CASING GAS

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
Point #	A	B	A	B	A	B	A	B	A	B
1	2.30	2.30	13.00	13.01	-0.50	-0.50			34.00	33.97
2	2.30	2.29	12.90	12.93	-0.50	-0.50			34.50	34.40
3	2.30	2.29	12.80	12.84	-0.50	-0.50			34.00	33.83
4	2.30	2.29	12.80	12.86	-0.50	-0.50			34.50	34.26
5	2.30	2.28	12.80	12.88	-0.50	-0.50			34.50	34.20
6	2.30	2.28	12.80	12.90	-0.50	-0.50			34.50	34.13
MEAN		2.29		12.90	-0.50	-0.50				34.13

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.04	0.00	0.00		0.20
Span Check	7.80	16.00	16.00		83.60
Cal. Gas	7.82	16.13	16.01		82.90
Scf	-0.00128	-0.00134	-0.00010		0.00101
Zcf	0.00667	0.00000	0.00000		0.03333

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

A. CALIBRATION AND CORRECTION DATA

Company : MOBIL OIL LOST HILLS

Station : STEAM GENERATOR 401A

Date : 6/4/92
Test Run : 4B
Test Condition: NAT GAS/CASING GAS

Point #	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
	A	B	A	B	A	B	A	B	A	B
1	2.25	2.25	13.45	13.46	-0.50	-0.50			34.50	34.42
2	2.30	2.29	13.45	13.47	-0.50	-0.50			34.80	34.57
3	2.30	2.29	13.45	13.48	-0.50	-0.49			35.00	34.62
4	2.25	2.23	13.45	13.49	-0.50	-0.49			34.80	34.27
5	2.25	2.23	13.45	13.50	-0.50	-0.49			34.00	33.32
6	2.30	2.27	13.45	13.52	-0.50	-0.49			34.50	33.67
7	2.30	2.27	13.40	13.48	-0.50	-0.49			34.80	33.82
8	2.30	2.26	13.40	13.49	-0.50	-0.48			34.50	33.37
9	2.30	2.26	13.40	13.50	-0.50	-0.48			34.50	33.22
MEAN		2.26		13.49	-0.50	-0.49				33.92

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.05	0.00	-0.02		1.20
Span Check	7.86	16.00	16.00		84.50
Cal. Gas	7.82	16.13	16.01		82.90
Scf	-0.00014	-0.00090	0.00007		0.00054
Zcf	0.00556	0.00000	-0.00222		0.13333

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

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : MOBIL OIL LOST HILLS Date : 6/2/92

Station : STEAM GENERATOR 401A

Run 1A	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	NO_x (ppm)
Initial Span	7.82	16.13	16.01		82.90
Measured Span	7.82	16.00	15.75		93.00
Zero Drift	0.02	0.05	-0.12		7.20
Final, Actual Span	7.80	15.95	15.87		85.80
Percent Drift	-0.3	-1.1	-0.9		3.5

Run 1B	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	NO_x (ppm)
Initial Span	7.82	16.13	16.01		82.90
Measured Span	7.90	16.35	16.35		81.60
Zero Drift	0.02	0.00	0.00		-2.40
Final, Actual Span	7.88	16.35	16.35		84.00
Percent Drift	0.8	1.4	2.1		1.3

Run	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	NO_x (ppm)
Initial Span					
Measured Span					
Zero Drift					
Final, Actual Span					
Percent Drift					

Final, Actual Span = Measured Span - Zero Drift

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

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : MOBIL OIL LOST HILLS Date : 6/2/92

Station : STEAM GENERATOR 401A

Run 1C	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	7.82	16.13	16.01		82.90
Measured Span	7.90	16.35	16.35		81.60
Zero Drift	0.00	0.00	0.00		-2.40
Final, Actual Span	7.90	16.35	16.35		84.00
Percent Drift	1.0	1.4	2.1		1.3

Run 1D	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	7.82	16.13	16.01		82.90
Measured Span	7.86	16.40	16.20		84.90
Zero Drift	0.00	0.00	-0.05		0.20
Final, Actual Span	7.86	16.40	16.25		84.70
Percent Drift	0.5	1.7	1.5		2.2

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

Final, Actual Span = Measured Span - Zero Drift

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

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : MOBIL OIL LOST HILLS Date : 6/3/92

Station : STEAM GENERATOR 401A

Run 2A	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	7.82	16.13	16.01		82.90
Measured Span	7.80	15.78	16.00		84.40
Zero Drift	0.00	0.00	0.00		0.60
Final, Actual Span	7.80	15.78	16.00		83.80
Percent Drift	-0.3	-2.2	-0.1		1.1

Run 2B	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	7.82	16.13	16.01		82.90
Measured Span	7.80	16.20	15.95		84.60
Zero Drift	0.02	0.00	-0.05		1.60
Final, Actual Span	7.78	16.20	16.00		83.00
Percent Drift	-0.5	0.4	-0.1		0.1

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

Final, Actual Span = Measured Span - Zero Drift

Percent Drift = (Final, Actual Span - Initial Span) / Initial Span x 1

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : MOBIL OIL LOST HILLS Date : 6/3/92

Station : STEAM GENERATOR 401A

Run 2C	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	7.82	16.13	16.01		82.90
Measured Span	7.80	15.90	15.95		85.60
Zero Drift	0.05	0.00	0.05		-0.20
Final, Actual Span	7.75	15.90	15.90		85.80
Percent Drift	-0.9	-1.4	-0.7		3.5

Run 2D	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	7.82	16.13	16.01		82.90
Measured Span	7.84	16.05	16.00		84.00
Zero Drift	0.04	0.00	0.00		1.00
Final, Actual Span	7.80	16.05	16.00		83.00
Percent Drift	-0.3	-0.5	-0.1		0.1

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

Final, Actual Span = Measured Span - Zero Drift

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

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : MOBIL OIL LOST HILLS Date : 6/3/92

Station : STEAM GENERATOR 401A

Run 3A	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	7.82	16.13	16.01		82.90
Measured Span	7.84	16.05	16.00		84.00
Zero Drift	0.02	0.00	0.00		1.00
Final, Actual Span	7.82	16.05	16.00		83.00
Percent Drift	0.0	-0.5	-0.1		0.1

Run 3B	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	7.82	16.13	16.01		82.90
Measured Span	7.88	16.15	16.10		84.00
Zero Drift	0.05	0.00	0.00		0.70
Final, Actual Span	7.83	16.15	16.10		83.30
Percent Drift	0.1	0.1	0.6		0.5

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

Final, Actual Span = Measured Span - Zero Drift

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

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : MOBIL OIL LOST HILLS Date : 6/3/92

Station : STEAM GENERATOR 401A

Run 3C	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	7.82	16.13	16.01		82.90
Measured Span	7.84	16.15	16.10		84.00
Zero Drift	0.05	0.00	0.00		0.70
Final, Actual Span	7.79	16.15	16.10		83.30
Percent Drift	-0.4	0.1	0.6		0.5

Run 3D	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	7.82	16.13	16.01		82.90
Measured Span	7.92	16.15	16.05		80.00
Zero Drift	0.04	0.00	0.00		-3.40
Final, Actual Span	7.88	16.15	16.05		83.40
Percent Drift	0.8	0.1	0.2		0.6

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

Final, Actual Span = Measured Span - Zero Drift

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

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : MOBIL OIL LOST HILLS Date : 6/4/92

Station : STEAM GENERATOR 401A

Run 4A	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	7.82	16.13	16.01		82.90
Measured Span	7.80	16.00	16.00		83.60
Zero Drift	0.04	0.00	0.00		0.20
Final, Actual Span	7.76	16.00	16.00		83.40
Percent Drift	-0.8	-0.8	-0.1		0.6

Run 4B	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	7.82	16.13	16.01		82.90
Measured Span	7.86	16.00	16.00		84.50
Zero Drift	0.05	0.00	-0.02		1.20
Final, Actual Span	7.81	16.00	16.02		33.30
Percent Drift	-0.1	-0.8	0.1		0.5

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

Final, Actual Span = Measured Span - Zero Drift

Percent Drift = (Final, Actual Span - Initial Span) / Initial Span x 1

SWEPI GAS TURBINE TEST DATA

(JUNE 9-10, 1992)

A. CALIBRATION AND CORRECTION DATA

Company : SWEPI/SEKR

Station : UNIT #2

Date : 6/9/92
Test Run : 1A
Test Condition: NAT GAS

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

Point #	%O2 A	%O2 B	%CO2 A	%CO2 B	ppm CO A	ppm CO B	ppm SO2 A	ppm SO2 B	ppm NOx A	ppm NOx B
1	14.95	14.96	3.00	3.00	3.95	3.95			28.90	29.01
2	14.95	14.98	3.00	3.01	3.97	3.97			29.50	29.83
3	14.90	14.94	3.00	3.02	4.00	3.99			29.70	30.25
4	14.75	14.81	3.00	3.03	4.10	4.09			28.20	28.97
5	14.70	14.78	3.00	3.03	4.10	4.09			25.80	26.77
6	14.65	14.74	3.00	3.04	4.05	4.03			25.20	26.38
MEAN		14.87		3.02		4.02				28.53

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.05	0.00	0.00		-1.00
Span Check	15.35	9.40	15.66		81.00
Cal. Gas	15.46	9.54	15.59		82.90
Scf	-0.00172	-0.00245	0.00075		-0.00181
Zcf	0.00833	0.00000	0.00000		-0.16667

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

A. CALIBRATION AND CORRECTION DATA

Company : SWEPI/SEKR

Station : UNIT #2

Date : 6/9/92
Test Run : 1B
Test Condition: NAT GAS

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
Point #	A	B	A	B	A	B	A	B	A	B
1	14.95	14.96	2.90	2.91	3.95	3.95			26.00	
2	14.90	14.93	2.90	2.92	4.05	4.05			26.00	
3	14.88	14.93	2.90	2.94	4.08	4.09			25.80	
4	14.88	14.95	3.00	3.05	4.00	4.01			25.90	
5	14.88	14.97	3.00	3.07	4.00	4.01			26.10	
6	14.88	15.00	3.00	3.08	4.00	4.01			26.10	
MEAN		14.96		2.99		4.02			25.98	

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.00	0.00		0.00
Span Check	15.33	9.26	15.54		82.90
Cal. Gas	15.46	9.54	15.59		82.90
Scf	-0.00140	-0.00489	-0.00053		
Zcf	0.00000	0.00000	0.00000		

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

A. CALIBRATION AND CORRECTION DATA

Company : SWEPI/SEKR
Station : UNIT #2

Date : 6/9/92
Test Run : 1C
Test Condition: NAT GAS

Point #	%O2 A	%O2 B	%CO2 A	%CO2 B	ppm CO A	ppm CO B	ppm SO2 A	ppm SO2 B	ppm NOx A	ppm NOx B
1	14.88	14.88	2.90	2.89	4.10	4.10			25.50	25.23
2	14.83	14.83	2.90	2.88	4.10	4.10			25.70	24.90
3	14.83	14.83	2.85	2.82	4.05	4.06			25.70	24.37
4	14.80	14.81	2.80	2.76	4.08	4.09			25.50	23.65
5	14.80	14.81	2.80	2.75	4.10	4.11			25.60	23.23
6	14.77	14.78	2.85	2.79	4.08	4.10			25.70	22.81
MEAN		14.82		2.82		4.09				24.03

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

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.02	0.02	0.00		2.80
Span Check	15.45	9.70	15.52		87.00
Cal. Gas	15.46	9.54	15.59		82.90
Scf	-0.00032	0.00245	-0.00075		0.00261
Zcf	0.00333	0.00333	0.00000		0.46667

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

A. CALIBRATION AND CORRECTION DATA

Company : SWEPI/SEKR

Station : UNIT #2

Date : 6/9/92
Test Run : 1D
Test Condition: NAT GAS

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
Point #	A	B	A	B	A	B	A	B	A	B
1	14.80	14.80	2.90	2.89	4.20	4.20			26.50	26.23
2	14.90	14.90	2.90	2.88	4.15	4.15			27.00	26.20
3	14.90	14.90	2.92	2.89	4.20	4.21			27.60	26.26
4	14.90	14.91	2.95	2.91	4.15	4.16			28.00	26.13
5	14.90	14.91	3.00	2.95	4.20	4.21			28.50	26.09
6	14.90	14.91	3.00	2.94	4.15	4.17			29.00	26.06
MEAN		14.89		2.91		4.18				26.16

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.02	0.02	0.00		2.80
Span Check	15.45	9.70	15.52		87.00
Cal. Gas	15.46	9.54	15.59		82.90
Scf	-0.00032	0.00245	-0.00075		0.00261
Zcf	0.00333	0.00333	0.00000		0.46667

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

A. CALIBRATION AND CORRECTION DATA

Company : SWEPI/SEKR

Station : UNIT #2

Date : 6/9/92
Test Run : 1E
Test Condition: NAT GAS

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
Point #	A	B	A	B	A	B	A	B	A	B
1	14.90	14.90	2.98	2.98	4.20	4.20			25.80	25.67
2	14.90	14.91	2.98	2.98	4.20	4.21			26.00	25.60
3	14.90	14.92	2.98	2.97	4.10	4.11			26.20	25.53
4	14.85	14.88	2.98	2.97	4.10	4.11			26.50	25.56
5	14.80	14.84	2.95	2.94	4.10	4.12			26.20	24.99
6	14.80	14.85	2.95	2.93	4.05	4.07			27.00	25.52
MEAN		14.88		2.96		4.14				25.48

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.15	0.00	0.00		1.40
Span Check	15.40	9.60	15.50		85.00
Cal. Gas	15.46	9.54	15.59		82.90
Scf	-0.00226	0.00105	-0.00096		0.00141
Zcf	0.02500	0.00000	0.00000		0.23333

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

A. CALIBRATION AND CORRECTION DATA

Company : SWEPI/SEKR

Station : UNIT #2

Date : 6/9/92
Test Run : 1F
Test Condition: NAT GAS

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
Point #	A	B	A	B	A	B	A	B	A	B
1	14.78	14.79	2.90	2.90	3.95	3.95			25.50	25.39
2	14.78	14.80	3.00	3.01	4.00	4.01			26.00	25.66
3	14.78	14.81	3.00	3.01	4.05	4.06			26.20	25.63
4	14.80	14.85	3.05	3.06	4.00	4.02			26.60	25.81
MEAN		14.81		2.99		4.01				25.62

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.10	0.02	0.00		1.00
Span Check	15.40	9.45	15.50		83.60
Cal. Gas	15.46	9.54	15.59		82.90
Scf	-0.00259	-0.00288	-0.00144		-0.00090
Zcf	0.02500	0.00500	0.00000		0.25000

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

A. CALIBRATION AND CORRECTION DATA

Company : SWEPI/SEKR

Station : UNIT #2

Date : 6/10/92
Test Run : 2A
Test Condition: NAT GAS

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
Point #	A	B	A	B	A	B	A	B	A	B
1	14.87	14.87	2.75	2.77	4.00	4.00			27.50	27.53
2	14.90	14.89	2.70	2.77	4.00	3.99			27.50	27.58
3	14.95	14.93	2.68	2.80	4.00	3.99			27.20	27.34
4	14.97	14.95	2.64	2.81	4.00	3.98			27.10	27.29
5	15.00	14.97	2.62	2.84	4.00	3.98			27.00	27.25
6	15.00	14.96	2.60	2.87	3.98	3.95			27.20	27.50
MEAN		14.93		2.81		3.98				27.42

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.05	-0.10	0.04		-0.20
Span Check	15.50	8.80	15.60		82.30
Cal. Gas	15.46	9.54	15.59		82.90
Scf	-0.00011	-0.01118	-0.00032		-0.00080
Zcf	0.00833	-0.01667	0.00667		-0.03333

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

A. CALIBRATION AND CORRECTION DATA

Company : SWEPI/SEKR

Station : UNIT #2

Date : 6/10/92
Test Run : 2B
Test Condition: NAT GAS

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
Point #	A	B	A	B	A	B	A	B	A	B
1	14.82	14.80	2.76	2.76	4.05	4.05			27.70	27.60
2	14.82	14.76	2.72	2.73	4.00	4.00			27.40	27.10
3	14.85	14.75	2.68	2.70	3.97	3.97			27.80	27.30
4	14.85	14.72	2.70	2.73	3.95	3.95			27.90	27.20
5	14.85	14.68	2.75	2.79	3.95	3.96			28.00	27.10
6	14.85	14.64	2.80	2.85	3.95	3.96			28.00	26.90
MEAN		14.72		2.76		3.98				27.20

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.05	0.00	0.00		1.00
Span Check	15.70	9.34	15.56		84.50
Cal. Gas	15.46	9.54	15.59		82.90
Scf	0.00205	-0.00349	-0.00032		0.00121
Zcf	0.00833	0.00000	0.00000		0.16667

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

A. CALIBRATION AND CORRECTION DATA

Company : SWEPI/SEKR

Station : UNIT #2

Date : 6/10/92
Test Run : 2C
Test Condition: NAT GAS

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
	A	B	A	B	A	B	A	B	A	B
Point #										
1	14.87	14.87	2.93	2.92	4.00	4.00			27.00	26.97
2	14.87	14.87	2.95	2.93	3.98	3.98			26.90	26.80
3	14.87	14.87	2.95	2.92	4.20	4.20			27.30	27.12
4	14.87	14.87	2.95	2.91	4.30	4.30			27.30	27.06
5	14.87	14.88	2.95	2.90	4.20	4.20			27.10	26.79
6	14.83	14.84	2.95	2.89	4.20	4.20			27.30	26.92
MEAN		14.87		2.91		4.14				26.94

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.05	0.00	0.04		0.09
Span Check	15.45	9.76	15.50		84.00
Cal. Gas	15.46	9.54	15.59		82.90
Scf	-0.00065	0.00384	-0.00139		0.00203
Zcf	0.00833	0.00000	0.00667		0.01500

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

A. CALIBRATION AND CORRECTION DATA

Company : SWEPI/SEKR

Station : UNIT #2

Date : 6/10/92
Test Run : 2D
Test Condition: NAT GAS

Point #	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
	A	B	A	B	A	B	A	B	A	B
1	14.77	14.76	2.85	2.86	4.05	4.01			26.00	26.09
2	14.75	14.73	2.80	2.82	4.10	3.98			26.00	26.26
3	14.82	14.79	2.80	2.83	4.05	3.86			26.00	26.44
MEAN		14.76		2.84		3.95				26.26

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.00	0.00		0.02
Span Check	15.50	9.40	16.50		81.20
Cal. Gas	15.46	9.54	15.59		82.90
Scf	0.00086	-0.00489	0.01946		-0.00692
Zcf	0.00000	0.00000	0.00000		0.00667

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

A. CALIBRATION AND CORRECTION DATA

Company : SWEPI/SEKR

Station : UNIT #2

Date : 6/10/92
Test Run : 4A
Test Condition: NAT GAS

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
Point #	A	B	A	B	A	B	A	B	A	B
1	14.95	14.95	2.80	2.79	3.95	3.95			26.50	26.40
2	14.90	14.91	2.80	2.78	3.90	3.91			27.00	26.69
3	14.85	14.87	2.80	2.76	3.95	3.97			27.00	26.49
4	14.85	14.88	2.80	2.75	3.90	3.92			27.50	26.78
5	14.85	14.89	2.85	2.78	3.95	3.98			27.20	26.28
6	14.85	14.90	2.90	2.82	3.90	3.93			27.60	26.47
MEAN		14.90		2.78		3.94				26.52

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.02	-0.02		1.20
Span Check	15.40	9.80	15.50		84.20
Cal. Gas	15.46	9.54	15.59		82.90
Scf	-0.00065	0.00419	-0.00075		0.00020
Zcf	0.00000	0.00333	-0.00333		0.20000

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

A. CALIBRATION AND CORRECTION DATA

Company : SWEPI/SEKR

Station : UNIT #2

Date : 6/10/92
Test Run : 4B
Test Condition: NAT GAS

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
Point #	A	B	A	B	A	B	A	B	A	B
1	14.75	14.77	2.95	2.95	3.90	3.90			28.00	27.82
2	14.75	14.80	3.00	2.99	3.90	3.91			28.20	27.66
3	14.75	14.83	3.00	2.99	3.90	3.91			28.00	27.10
4	14.75	14.87	3.00	2.99	3.85	3.86			28.50	27.24
5	14.70	14.85	3.00	2.98	3.80	3.82			28.80	27.17
6	14.70	14.89	3.00	2.98	3.80	3.82			29.20	27.21
MEAN		14.83		2.98		3.87				27.37

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.05	0.00		2.20
Span Check	15.25	9.50	15.50		85.00
Cal. Gas	15.46	9.54	15.59		82.90
Scf	-0.00226	-0.00157	-0.00096		-0.00020
Zcf	0.00000	0.00833	0.00000		0.36667

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

A. CALIBRATION AND CORRECTION DATA

Company : SWEPI/SEKR

Station : UNIT #2

Date : 6/10/92
Test Run : 4C
Test Condition: NAT GAS

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
Point #	A	B	A	B	A	B	A	B	A	B
1	14.95	14.95	2.80	2.80	3.80	3.80			27.00	26.92
2	14.90	14.90	2.80	2.80	3.90	3.90			27.00	26.76
3	14.90	14.89	2.85	2.84	3.85	3.85			26.60	26.20
4	14.90	14.89	2.85	2.84	3.80	3.80			26.20	25.63
5	14.90	14.89	2.88	2.87	3.80	3.80			26.00	25.27
6	14.90	14.88	2.88	2.86	3.80	3.80			25.60	24.71
MEAN		14.90		2.83		3.82				25.92

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	-0.02	-0.02	0.00		1.00
Span Check	15.48	9.65	15.60		83.80
Cal. Gas	15.46	9.54	15.59		82.90
Scf	0.00043	0.00227	0.00011		-0.00020
Zcf	-0.00333	-0.00333	0.00000		0.16667

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

A. CALIBRATION AND CORRECTION DATA

Company : SWEPI/SEKR

Station : UNIT #2

Date : 6/10/92
Test Run : 4D
Test Condition: NAT GAS

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
Point #	A	B	A	B	A	B	A	B	A	B
1	14.90	14.90	2.80	2.80	3.80	3.80			27.00	26.97
2	14.90	14.89	2.80	2.80	3.90	3.90			27.00	26.92
3	14.90	14.88	2.85	2.85	3.85	3.85			26.60	26.46
4	14.90	14.88	2.85	2.84	3.80	3.80			26.20	26.00
5	14.90	14.87	2.88	2.87	3.80	3.80			26.00	25.74
6	14.90	14.86	2.88	2.87	3.80	3.80			25.60	25.27
MEAN		14.88		2.84		3.82				26.23

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.00	0.00		1.00
Span Check	15.50	9.58	15.60		81.80
Cal. Gas	15.46	9.54	15.59		82.90
Scf	0.00043	0.00070	0.00011		-0.00422
Zcf	0.00000	0.00000	0.00000		0.16667

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

A. CALIBRATION AND CORRECTION DATA

Company : SWEPI/SEKR

Station : UNIT #2

Date : 6/10/92
Test Run : 4E
Test Condition: NAT GAS

	Concentration : Drift Uncorrected (A) / Corrected (B)									
	%O2		%CO2		ppm CO		ppm SO2		ppm NOx	
Point #	A	B	A	B	A	B	A	B	A	B
1	14.90	14.90	2.85	2.85	3.85	3.85			26.50	26.67
2	14.85	14.85	2.85	2.85	3.85	3.85			26.00	26.50
3	14.88	14.87	2.85	2.84	3.85	3.85			25.80	26.63
4	14.85	14.84	2.88	2.87	3.85	3.85			25.50	26.66
5	14.85	14.84	2.90	2.89	3.85	3.85			25.50	27.00
6	14.90	14.88	2.90	2.88	3.85	3.85			25.20	27.03
MEAN		14.86		2.86		3.85				26.75

	%O2	%CO2	ppm CO	ppm SO2	ppm NOx
Zero Check	0.00	0.00	0.00		-1.80
Span Check	15.48	9.60	15.60		80.50
Cal. Gas	15.46	9.54	15.59		82.90
Scf	0.00022	0.00105	0.00011		-0.00121
Zcf	0.00000	0.00000	0.00000		-0.30000

Scf, Span Drift Correction Factor = (% Drift / 10[illegible] / # of Readings
Zcf, Zero Drift Correction Factor = Zero Drift / [illegible] Readings

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : SWEPI/SEKR Date : 6/9/92

Station : UNIT #2

Run 1A	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	NOx (ppm)
Initial Span	15.46	9.54	15.59		82.90
Measured Span	15.35	9.40	15.66		81.00
Zero Drift	0.05	0.00	0.00		-1.00
Final, Actual Span	15.30	9.40	15.66		82.00
Percent Drift	-1.0	-1.5	0.4		-1.1

Run 1B	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	NOx (ppm)
Initial Span	15.46	9.54	15.59		82.90
Measured Span	15.33	9.26	15.54		82.90
Zero Drift	0.00	0.00	0.00		0.00
Final, Actual Span	15.33	9.26	15.54		82.90
Percent Drift	-0.8	-2.9	-0.3		0.0

Run 1C	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	NOx (ppm)
Initial Span	15.46	9.54	15.59		82.90
Measured Span	15.45	9.70	15.52		87.00
Zero Drift	0.02	0.02	0.00		2.80
Final, Actual Span	15.43	9.68	15.52		84.20
Percent Drift	-0.2	1.5	-0.4		1.6

Final, Actual Span = Measured Span - Zero Drift

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

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : SWEPI/SEKR Date : 6/9/92

Station : UNIT #2

Run 1D	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	15.46	9.54	15.59		82.90
Measured Span	15.45	9.70	15.52		87.00
Zero Drift	0.02	0.02	0.00		2.80
Final, Actual Span	15.43	9.68	15.52		84.20
Percent Drift	-0.2	1.5	-0.4		1.6

Run 1E	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	15.46	9.54	15.59		82.90
Measured Span	15.40	9.60	15.50		85.00
Zero Drift	0.15	0.00	0.00		1.40
Final, Actual Span	15.25	9.60	15.50		83.60
Percent Drift	-1.4	0.6	-0.6		0.8

Run 1F	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	15.46	9.54	15.59		82.90
Measured Span	15.40	9.45	15.50		83.60
Zero Drift	0.10	0.02	0.00		1.00
Final, Actual Span	15.30	9.43	15.50		82.60
Percent Drift	-1.0	-1.2	-0.6		-0.4

Final, Actual Span = Measured Span - Zero Drift

Percent Drift = (Final, Actual Span - Initial Span) / Initial Span x 1(

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : SWEPI/SEKR Date : 6/10/92

Station : UNIT #2

2A Run	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	15.46	9.54	15.59		82.90
Measured Span	15.50	8.80	15.60		82.30
Zero Drift	0.05	-0.10	0.04		-0.20
Final, Actual Span	15.45	8.90	15.56		82.50
Percent Drift	-0.1	-6.7	-0.2		-0.5

2B Run	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	15.46	9.54	15.59		82.90
Measured Span	15.70	9.34	15.56		84.50
Zero Drift	0.05	0.00	0.00		1.00
Final, Actual Span	15.65	9.34	15.56		83.50
Percent Drift	1.2	-2.1	-0.2		0.7

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

Final, Actual Span = Measured Span - Zero Drift

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

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : SWEPI/SEKR Date : 6/10/92

Station : UNIT #2

Run 2C	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	15.46	9.54	15.59		82.90
Measured Span	15.45	9.76	15.50		84.00
Zero Drift	0.05	0.00	0.04		0.09
Final, Actual Span	15.40	9.76	15.46		83.91
Percent Drift	-0.4	2.3	-0.8		1.2

Run 2D	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	15.46	9.54	15.59		82.90
Measured Span	15.50	9.40	16.50		81.20
Zero Drift	0.00	0.00	0.00		0.02
Final, Actual Span	15.50	9.40	16.50		81.18
Percent Drift	0.3	-1.5	5.8		-2.1

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

Final, Actual Span = Measured Span - Zero Drift

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

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : SWEPI/SEKR   Date : 6/10/92

Station : UNIT #2

Run 4A	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	15.46	9.54	15.59		82.90
Measured Span	15.40	9.80	15.50		84.20
Zero Drift	0.00	0.02	-0.02		1.20
Final, Actual Span	15.40	9.78	15.52		83.00
Percent Drift	-0.4	2.5	-0.4		0.1

Run 4B	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	15.46	9.54	15.59		82.90
Measured Span	15.25	9.50	15.50		85.00
Zero Drift	0.00	0.05	0.00		2.20
Final, Actual Span	15.25	9.45	15.50		82.80
Percent Drift	-1.4	-0.9	-0.6		-0.1

Run 4C	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	15.46	9.54	15.59		82.90
Measured Span	15.48	9.65	15.60		83.80
Zero Drift	-0.02	-0.02	0.00		1.00
Final, Actual Span	15.50	9.67	15.60		82.80
Percent Drift	0.3	1.4	0.1		-0.1

Final, Actual Span = Measured Span - Zero Drift

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

B. ZERO AND SPAN DRIFT PERCENT CALCULATIONS

Company : SWEPI/SEKR　　Date : 6/10/92

Station : UNIT #2

4D Run	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	15.46	9.54	15.59		82.90
Measured Span	15.50	9.58	15.60		81.80
Zero Drift	0.00	0.00	0.00		1.00
Final, Actual Span	15.50	9.58	15.60		80.80
Percent Drift	0.3	0.4	0.1		-2.5

4E Run	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
Initial Span	15.46	9.54	15.59		82.90
Measured Span	15.48	9.60	15.60		80.50
Zero Drift	0.00	0.00	0.00		-1.80
Final, Actual Span	15.48	9.60	15.60		82.30
Percent Drift	0.1	0.6	0.1		-0.7

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

Final, Actual Span = Measured Span - Zero Drift

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

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

REPORT OF ANALYSIS
EPA PROTOCOL GAS MIXTURES

STEI01

TO:

SUE POWERS
STEINER ENVRIONMENTAL CORP.
4930 BOYLAN STREET
BAKERSFIELD, CA 93308

DATE : 12/13/91

CUSTOMER ORDER NUMBER: SP-2750-90 R.43

PAGE 1

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COMPONENT	CONCENTRATION(v/v)	REFERENCE STANDARD	ANALYZER MAKE,MODEL,S/N,DETECTION	EXPIRATION DATE	REPLICATE ANALYSIS DATA	
CYLINDER NO.:	CC12545					
Nitric Oxide	77.4 ± 0.8 ppm		Monitor Labs Model 8440		12/04/91	12/13/91
NO_x	77.4 ppm	GMIS	S/N 136	06/13/93	77.2 ppm	77.4 ppm
Nitrogen,O2-Free Balance		Cylinder #	Continuous		77.4 ppm	77.3 ppm
		CC88868	Chemiluminescence		77.3 ppm	77.7 ppm
Cylinder Pressure: 2000 psig		@ 102.5 ppm	Last Cal Date: 11/25/91		Mean: 77.3 ppm	77.5 ppm
CYLINDER NO.:	CC98696					
Nitric Oxide	78.5 ± 0.8 ppm		Monitor Labs Model 8440		12/04/91	12/13/91
NO_x	78.5 ppm	GMIS	S/N 136	06/13/93	78.3 ppm	78.5 ppm
Nitrogen,O2-Free Balance		Cylinder #	Continuous		78.6 ppm	78.7 ppm
		CC88868	Chemiluminescence		78.1 ppm	78.2 ppm
Cylinder Pressure: 2000 psig		@ 102.5 ppm	Last Cal Date: 11/25/91		Mean: 78.4 ppm	78.5 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: B.E. Gross   Approved: J.T. Marrin

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

STEIØ1

TO:

DATE : Ø5/21/92

SUE POWERS
STEINER ENVIRONMENTAL, INC.
493Ø BOYLAN STREET
BAKERSFIELD, CA 933Ø8-

CUSTOMER ORDER NUMBER: SP-275Ø-9Ø R.59

PAGE 1

COMPONENT	CONCENTRATION (v/v)	REFERENCE STANDARD	ANALYZER MAKE, MODEL, S/N, DETECTION	EXPIRATION DATE	REPLICATE ANALYSIS DA	
CYLINDER NO.: CC88868						
			Monitor Labs Model 844Ø		Ø5/Ø8/92	Ø5/21
Nitric Oxide	82.4 ± Ø.8 ppm	GMIS	S/N 136	11/21/93	82.5 ppm	82.5
NOx	82.4 ppm	Cylinder #	Continuous		82.3 ppm	82.4
Nitrogen, O2-Free	Balance	CC1Ø6651	Chemiluminescence		82.5 ppm	82.4
Cylinder Pressure: 2ØØØ psig		@ 98.9 ppm	Last Cal Date: Ø3/Ø5/92		Mean: 82.4 ppm	82.4
CYLINDER NO.: CC987Ø3						
			Monitor Labs Model 844Ø		Ø5/Ø8/92	Ø5
Nitric Oxide	82.9 ± Ø.8 ppm	GMIS	S/N 136	11/21/93	83.Ø ppm	82.7 p
NOx	82.9 ppm	Cylinder #	Continuous		82.9 ppm	83.1 p
Nitrogen, O2-Free	Balance	CC1Ø6651	Chemiluminescence		82.8 ppm	82.9 p
Cylinder Pressure: 2ØØØ psig		@ 98.9 ppm	Last Cal Date: Ø3/Ø5/92		Mean: 82.9 ppm	82.9 p
CYLINDER NO.: CC98696						
			Monitor Labs Model 844Ø		Ø5/Ø8/92	Ø5/21/
Nitric Oxide	83.2 ± Ø.8 ppm	GMIS	S/N 136	11/21/93	83.2 ppm	83.2 p
NOx	83.2 ppm	Cylinder #	Continuous		83.Ø ppm	83.1 p
Nitrogen, O2-Free	Balance	CC1Ø6651	Chemiluminescence		83.3 ppm	82.9 p
Cylinder Pressure: 2ØØØ psig		@ 98.9 ppm	Last Cal Date: Ø3/Ø5/92		Mean: 83.2 ppm	83.1 p

ppm = umole/mole   % = mole-%

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

STEIØ1

TO: Sue Powers
Steiner Environmental Inc.
4930 Boylan Street
Bakersfield, CA 93308

DATE: 18 November 1991

CUSTOMER ORDER NUMBER: SP-2750-90 Rel. 46/Reanalysis

CYLINDER NUMBER CC83869

COMPONENT	CONCENTRATION (v/v)
Carbon Monoxide	37.9 ± 0.4 ppm
Carbon Dioxide	14.46 ± 0.14 Mole-%
Oxygen	3.76 ± 0.04 Mole-%
Nitrogen	Balance

Cylinder Pressure: 1600 psig

(The Carbon Monoxide analysis is traceable to the National Institute of Standards)
(and Technology, SRM 2614a, Cylinder number CAL3308.)

(The Carbon Dioxide analysis is traceable to the National Institute of Standards)
(and Technology, SRM 1675b, Cylinder Number CAL2823.)

(The Oxygen analysis is traceable to the National Institute of Standards and)
(Technology, SRM 2658, Cylinder number CAL2677.)

ANALYST M.S. Calhoun

APPROVED J.T. Marrin

SMF-01

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

REPORT OF ANALYSIS
NIST TRACEABLE GAS MIXTURES

STEI01
TO:
SUE POWERS
STEINER ENVIRONMENTAL, INC.
4930 BOYLAN STREET
BAKERSFIELD, CA 93308-

DATE: 05/22/92

CUSTOMER ORDER NUMBER: SP-2750-90REL59

PAGE 1

CYLINDER NUMBER	COMPONENT	CONCENTRATION(v/v)	NIST TRACEABLE REFERENCE STANDARD
CC98685	Carbon Monoxide	24.59 ± 0.25 ppm	SRM 2614a
	Carbon Dioxide	9.54 ± 0.10 %	SRM 1675b
	Oxygen	15.46 ± 0.15 %	SRM 2659
	Nitrogen	Balance	
CC12645	Nitrogen Dioxide	7.86 ± 0.16 ppm	SRM 2627
	Nitrogen	Balance	

ppm = umole/mole   % = mole-%

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

Analyst: 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: SP 2750-90 R.27

CYLINDER NUMBER	COMPONENT	CONCENTRATION(v/v)	NIST TRACEABLE REFERENCE STANDARD
CC12568	Carbon Monoxide	15.01 ± 0.30 ppm	SRM 2613a
	Carbon Dioxide	4.84 ± 0.05 %	SRM 1674b
	Oxygen	15.85 ± 0.16 %	SRM 2659
	Nitrogen	Balance	
CC12421	Carbon Monoxide	15.28 ± 0.31 ppm	SRM 2613a
	Carbon Dioxide	4.85 ± 0.05 %	SRM 1674b
	Oxygen	15.63 ± 0.16 %	SRM 2659
	Nitrogen	Balance	
CC60303	Carbon Monoxide	135.6 ± 1.4 ppm	SRM 2636
	Carbon Dioxide	14.64 ± 0.15 %	SRM 1675b
	Oxygen	7.88 ± 0.08 %	SRM 2658a
	Nitrogen	Balance	

ppm = umole/mole   % = mole-%

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

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

REPORT OF ANALYSIS
NIST TRACEABLE GAS MIXTURES

STEI01

TO: DATE: 06/12/91

SUE POWERS
STEINER ENVIRONMENTAL
4930 BOYLAN
BAKERSFIELD, CA 93308

CUSTOMER ORDER NUMBER: SP-2750-90REL24 PAGE 1

CYLINDER NUMBER	COMPONENT	CONCENTRATION(v/v)	NIST TRACEABLE REFERENCE STANDARD
CC12974	Carbon Monoxide	16.01 ± 0.32 ppm	SRM 2613a
	Carbon Dioxide	5.05 ± 0.05 %	SRM 1674b
	Oxygen	14.83 ± 0.15 %	SRM 2659
	Nitrogen	Balance	

---

ppm = umole/mole % = mole-%

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

Analyst: M.S. Calhoun Approved: J.T. Marrin

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

STANDARD CALIBRATION GASES IN ALUMINUM CYLINDERS

3/20/92

REPORT OF ANALYSIS

CUSTOMER ORDER NUMBER: SP-2750-90REL53

CYLINDER NUMBER	COMPONENT	CONCENTRATION(v/v)	NIST TRACEABLE REFERENCE STANDARD
CC106741	Carbon Monoxide	79.6 ± 0.8 ppm	SRM 1679c
	Carbon Dioxide	7.51 ± 0.08 %	SRM 1674b
	Oxygen	4.08 ± 0.04 %	SRM 2658a
	Nitrogen	Balance	
CC73017	Carbon Monoxide	80.3 ± 0.8 ppm	SRM 1679c
	Carbon Dioxide	16.13 ± 0.16 %	SRM 1675b
	Oxygen	7.82 ± 0.08 %	SRM 2658a
	Nitrogen	Balance	

ppm = umole/mole   % = mole-%

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

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

REPORT OF ANALYSIS
NIST TRACEABLE GAS MIXTURES

STEI01

TO: DATE: 10/25/91

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

CUSTOMER ORDER NUMBER: SP-2750-90REL39 PAGE 1

CYLINDER NUMBER	COMPONENT	CONCENTRATION(v/v)	NIST TRACEABLE REFERENCE STANDARD
CC12707	Carbon Monoxide	426 ± 4 ppm	SRM 1680b
	Carbon Dioxide	14.95 ± 0.15 %	SRM 1675b
	Oxygen	7.34 ± 0.07 %	SRM 2658a
	Nitrogen	Balance	
CC37858	Carbon Monoxide	15.59 ± 0.31 ppm	SRM 2613a
	Carbon Dioxide	7.68 ± 0.08 %	SRM 1674b
	Oxygen	3.68 ± 0.04 %	SRM 2658a
	Nitrogen	Balance	
CC81151	Carbon Monoxide	79.8 ± 0.8 ppm	SRM 1679c
	Carbon Dioxide	15.98 ± 0.16 %	SRM 1675b
	Oxygen	7.74 ± 0.08 %	SRM 2658a
	Nitrogen	Balance	

ppm = umole/mole % = mole-%

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

Analyst: M.S. Calhoun Approved: J.T. Marrin

APPENDIX E

SAMPLING LOCATIONS

SAMPLING TRAVERSE POINT LOCATIONS

Site ID: Texaco, Cymric Field, Fitzgerald Lease

Test Location: Fitzgerald Heater Treater

Stack diameter: 24 inches

The sampling ports were located:

- 108 inches (4.5 diameters) downstream of a flow disturbance

- 42 inches (1.75 diameters) upstream of a flow disturbance (top of stack).

A total of twenty-four traverse points (i.e., 12 points per diameter) were sampled at the sampling port locations. The points were located as follows:

Point	Percent of Stack Diameter	Distance From the Inside of the Stack Wall (inches)
1	2.1	0.50
2	6.7	1.61
3	11.8	2.83
4	17.7	4.25
5	25.0	6.00
6	35.6	8.54
7	64.4	15.46
8	75.0	18.00
9	82.3	19.75
10	88.2	21.17
11	93.3	22.39
12	97.9	23.50

RADIAN
CORPORATION

Velocity and Cyclonic Flow Traverse Data Sheet

PLANT Texaco
DATE 5/27/92
LOCATION Heater Treater
STACK I.D. 24"
BAROMETRIC PRESSURE in. Hg 29.27
STACK GAUGE PRESSURE in. H2O -0.05
OPERATORS TM/SF

5:30 PM

TRAVERSE POINT NUMBER	VELOCITY HEAD (ΔP_s), in. H_2O	STACK TEMPERATURE (T_s), °F	θ (°)
D-1	0.010	226+	0°
-2	0.002	240+	
-3	0.002	295+	0°
-4	0.002	280+	
-5	0.003	293	0°
-6	0.003	312+	
-7	0.005	371+	0°
-8	~~390~~ 0.005	398+	
-9	0.005	425	0°
-10	0.004	433	
-11	0.004	445	0°
-12	0.003	450	
AVERAGE			

SCHEMATIC OF TRAVERSE POINT LAYOUT

TRAVERSE POINT NUMBER	VELOCITY HEAD (ΔP_s), in. H_2O	STACK TEMPERATURE (T_s), °F	θ (°)
A-1	0.006	470	0°
-2	0.008	495	
-3	0.005	495	0°
-4	0.004	498	0°
-5	0.005	497	
-6	0.008	501	0°
-7	0.007	500	
-8	0.006	492	0°
-9	0.004	495	
-10	0.004	490	0°
-11	0.002	480	
-12	0.003	475	0°
AVERAGE			0°

TM 5/27/92

SAMPLING TRAVERSE POINT LOCATIONS

Site ID: Mobil, Lost Hills Oil Field

Test Location: 401A, Steam Generator

Stack diameter: 35 inches

The sampling ports were located:

- 192 inches (5.49 diameters) downstream of a flow disturbance
- 48 inches (1.37 diameters) upstream of a flow disturbance (top of stack).

A total of twenty traverse points (i.e., 10 points per diameter) were sampled at the sampling port locations. The points were located as follows:

Point Number	Percent of Stack Diameter	Distance From the Inside of the Stack Wall (inches)
1	2.6	1.00
2	8.2	2.87
3	14.6	5.11
4	22.6	7.91
5	34.2	11.97
6	65.8	23.03
7	77.4	27.09
8	85.4	29.89
9	91.8	32.13
10	97.4	34.00

RADIAN
CORPORATION

and Cyclonic Flow

Velocity Traverse Data Sheet

PLANT Mobil
DATE 6/1/92
LOCATION Stm Gen 401A
STACK I.D. 35"
BAROMETRIC PRESSURE in. Hg —
STACK GAUGE PRESSURE in. H_2O —
OPERATORS SF/RH

	TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F	Cyclonic
IN	A-8	0.30	258	
	-7	0.30	259	Ø
	-6	0.30	260	Ø
	-5	0.25	261	Ø
	-4	0.25	262	Ø
	-3	0.30	263	Ø
	-2	0.25	233	Ø
OUT	-1	0.20	152	Ø
IN	B-8	0.30	258	Ø
	-7	0.30	259	Ø
	-6	0.30	260	Ø
	-5	0.30	260	Ø
	-4	0.30	260	Ø
	-3	0.30	261	Ø
	-2	0.25	259	Ø
OUT	-1	0.20	190	Ø
	AVERAGE			0°

SCHEMATIC OF TRAVERSE POINT LAYOUT

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
AVERAGE		

SAMPLING TRAVERSE POINT LOCATIONS

Site ID: SWEPI, Southeast Kern River

Test Location: Gas Turbine #2

Stack diameter: 46.25 inches

The sampling ports were located:

- 120 inches (2.59 diameters) downstream of a flow disturbance

- 84 inches (1.82 diameters) upstream of a flow disturbance (top of stack).

A total of twenty-four traverse points (i.e., 12 points per diameter) were sampled at the sampling port locations. The points were located as follows:

Point Number	Percent of Stack Diameter	Distance From the Inside of the Stack Wall (inches)
1	2.1	1.00
2	6.7	3.10
3	11.8	5.46
4	17.7	8.19
5	25.0	11.56
6	35.6	16.47
7	64.4	29.79
8	75.0	34.69
9	82.3	38.06
10	88.2	40.79
11	93.3	43.15
12	97.9	45.25

RADIAN
CORPORATION

Velocity and Cyclonic Flow Traverse Data Sheet

PLANT SWEPI
DATE 6/5/92
LOCATION Unit #2 Exhaust
STACK I.D. 46.25"
BAROMETRIC PRESSURE in. Hg 29.50
STACK GAUGE PRESSURE, in. H_2O -0.25
OPERATORS SF/ML

~12:45-13[00]

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F	$\theta°$
B-1	0.58	234	5
3	0.60	283	0
5	0.62	293	0
7	0.92	295	5
9	1.10	294	0
11	0.73	266	5
AVERAGE			

Pt 1 wall side
12 port side

SCHEMATIC OF TRAVERSE POINT LAYOUT

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F	$\theta°$
A-1	0.95	~~108~~	0
-3	0.84	295	5
-5	0.78	296	5
-7	0.68	296	~~0~~ 5
-9	0.60	295	0
-11	0.58	291	0
AVERAGE			

Avg $\theta = 2.5°$

SF 6/5/92

APPENDIX F

PROJECT PERSONNEL

PROJECT PERSONNEL

WSPA

Mike Emanuel - Environmental Representative
Elvin Bounds (SWEPI) - Technical Advisor

Texaco Exploration and Production

Karen Lew - Regulator Compliance
Jim Oblak - Environmental Technician

Mobil Exploration and Producing U.S., Inc.

Mark Poe - Environmental Specialist
Susan Arnold - Environmental Specialist

SWEPI

Elvin Bounds - Technical Advisor
Ken Kirkpatrick - Senior Environmental Technician

Radian Corporation

Jeff Hicks - Program Manager
Mark Ludwiczak - Project Director
Larry Edwards - Peer Reviewer
Judy Nottoli - Peer Reviewer
Kim Worl - Staff Scientist
Stuart Freeman - Research Assistant
Rich Howell - Research Assistant
Lisa LaFe - Laboratory Task Leader
Kate Hall - Health and Safety Officer
Kathi Kuhlman - Project Secretary

Steiner Environmental

Vernon McKnight - CEM Operator
Wayne Branson - Laboratory Analyst

Alta Analytical Laboratory

Robert Mitzel - Laboratory Director

Air Toxics, Ltd.

Linda Freeman - President

Pacific Gas Technology

Wayne Hausauer - Analyst

ON-SITE REPRESENTATIVES OF THE
SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT

Name	Date	Site
Barbara Rycerski	5/27	Texaco
Suzanne Forrest		
Frank Repepi	5/28	Texaco
Kari Fuqua		
Leland Villalvazo		
Luis Paredes	6/2	Mobil
Kari Fuqua	6/3	Mobil
Barbara Rycerski	6/4	Mobil
Luis Paredes	6/10	SWEPI
Leland Villalvazo		

APPENDIX G

PROJECT COMMUNICATIONS

WSPA
Western States Petroleum Association

January 22, 1992

RECEIVED
JAN 27 199
Ans'd...........

Radian Corporation
10395 Old Placerville Road
Sacramento, CA 95827

Attn: Mr. Bill Oliver

Dear Mr. Oliver:

Western States Petroleum Association (WSPA) is a trade association representing the full spectrum of companies which explore, produce, refine, transport, and market petroleum and petroleum products in the six western states.

WSPA is requesting proposals from contractors experienced in air toxics source testing associated with the submittal of Toxic Emission Inventory Reports to various air pollution control agencies as required under AB2588.

WSPA invites Radian Corporation to submit a bid proposal to carry out the Air Toxics (AB2588) Pooled Source Testing Program as outlined in the enclosed Request For Proposal (RFP). Bid proposals should be developed in accordance with the RFP and must be submitted no later than 12:00 p.m. February 10, 1992. Please submit proposals (include one unbound copy) to: Mr. Michael Emanuel, Western States Petroleum Association, 901 Tower Way, Suite 300, Bakersfield, California, 93309.

Should you have any questions regarding the specifications of the program, please feel free to contact me or Mike Emanuel at this office.

Sincerely,

Catherine H. Reheis

Catherine H. Reheis
Senior Coordinator
Upstream & San Joaquin Valley
Issues

Enclosures

WSPA AB2588 POOLED SOURCE TESTING
REQUEST FOR PROPOSAL

I. INTRODUCTION

Western States Petroleum Association (WSPA) is a trade association representing the full spectrum of companies which explore, produce, refine, transport, and market petroleum and petroleum products in the six western states. WSPA is requesting proposals from contractors experienced in air toxics source testing associated with the submittal of Toxic Emissions Inventory Reports (TEIR) to various air pollution control agencies as required under AB2588.

II. OBJECTIVE

The objective is to quantify the emissions and establish emission factors for certain listed substances from a number of equipment sources for incorporation into TEIR as required under AB2588. The test results will be used to estimate emissions from pools of other similar units and will also contribute to a data base of emission factors and emission rates for use in risk assessment and submittal of TEIR. Due to the rigorous accuracy requirements for compliance with AB2588 and the **need to avoid repeat testing, quality assurance is of utmost importance!**

III. SCOPE OF TESTING

The scope of pooled source testing, including equipment type and description, substances to be tested, and test methods to be utilized, is outlined in Table One.

<u>Proposal Element</u>: For each substance listed for testing, contractors should indicate their limits of detection in the specified column in Table One (show in both concentration and lbs/MMBTU). Because of the necessity for accurate risk assessment, **low detect limits are important** for those substances which drive risk values. WSPA has provided a summary sheet of detect limits which have been achieved in previous pooled source testing efforts.

Additional pertinent information, such as the detailed design and operating parameters called for in the WSPA Pooled Source Testing Protocol Guidance Manual (enclosed), will be provided upon selection of contractor. This guidance manual is further discussed in section IV.

IV. PROTOCOL

Due to the rigorous accuracy requirements for compliance with AB2588 and the need to avoid repeat testing, WSPA has developed a guidance manual for the preparation of WSPA pooled source testing protocols. Use of the guidance document will help establish uniformity in testing and result in quality data that can be applied to pools of similar equipment.

Following the bid award, the protocol and the final report developed by the contractor should follow the guidance document as appropriate. The guidance document has been included with this request for proposal so that bidding companies will clearly understand the requirements of the testing. In the guidance document, Appendix A is the standard protocol guidance format with three additional appendices (B,C, and D) specific to equipment types.

Please take this guidance document into account in the preparation of bid proposals.

V. QUALITY ASSURANCE

<u>Proposal Element</u>: Contractors should provide a description of their Quality Assurance Program Plan including accuracy of source test results and analytical results. (Please review enclosed guidance manual to ensure consistency with WSPA protocol).

VI. PROPOSED SCHEDULE

Because of the need to comply with the demanding reporting requirements of AB2588, the proposed time schedule is ambitious. In discussions with local air district staff, it appears they are willing to assist in expediting testing, such as accelerating protocol review, and may be flexible with the final submittal deadline date.

January 22, 1992:	RFP's Distribution
February 10, 1992:	**Proposals Due by 12:00 p.m. (Include an unbound copy)**

Submit proposals to:

Mr. Michael Emanuel
Environmental Representative
Western States Petroleum Association
901 Tower Way, Suite 300
Bakersfield, California 93309

February 14, 1992:	Selection and Notification of Bid Award
March 6, 1992:	Protocol Due (SEE PROTOCOL SECTION)
March, 1992:	Protocol Review By Appropriate Agencies
April 1, 1992:	Begin Testing
May 15, 1992:	**Draft Report Due** Submit fifteen (15) copies to WSPA (same as above).
May 29, 1992:	**Final Report Due** Submit thirty (30) copies to WSPA (same as above).

3 weeks

Proposal Element: Please provide a testing time schedule in your proposal.

VII. COST BASIS

Proposal Element: Bid proposals should be submitted on a time and materials not [redacted] Please provide the costs within the bid proposals in the following manner:

1. For each equipment type, provide the following cost breakdown:

   a) Protocol Development
   b) Quality Assurance
   c) Testing
   d) Analysis
   e) Report Development
   f) Others

2. a) Attendance at four meetings,two to be held at WSPA in Bakersfield, one in Fresno with the San Joaquin Valley Unified Air District, and one in Sacramento with the Air Resources Board.

   b) Bimonthly status updates with WSPA contract coordinator shall be necessary along with weekly contact, indicating such items as tasks completed, tasks remaining, target completion dates, and expenditures to date.

3. Total cost for entire program. (One protocol with subsections for specific equipment types as outlined in the guidance document).

Contracts may be awarded on an equipment type basis or on the entirety of the program based on contractor experience and expertise.

VIII.QUALIFICATIONS

<u>Proposal Element:</u>

1. Indicate previous contractor experience in air toxics testing.

2. Provide project organization and resumes of project personnel.

3. Specify which laboratories or other subcontractors will perform which analyses. It is essential that analytical labs are familiar with and strictly adhere to the required test methods.

IX. OTHER

<u>Proposal Element:</u> Provide any out of scope recommendations based on contractor experience (i.e. additional testing, test methods, detect limits, appropriateness of time schedule, means of expediting program, etc).

TABLE 1
WSPA POOLED SOURCE TESTING
FOR 1991

UIPMENT TYPE	COMPANY AND LOCATION	APPLICATION OR FUNCTION	FUEL TYPE	BURNER TYPE	EMISSION CONTROL DEVICE	FIRING RATE MMBTU PER HOUR	CARB TEST METHODS	SUBSTANCES TO BE TESTED FOR	DETECTION LIMIT CONCEN-TRATION	DETECTION LIMIT POUNDS PER MILLION BTU
S TURBINE	SWEPI KERN RIVER	COGEN-ERATION	PIPELINE NATURAL GAS	NOT APPLI-CABLE	SCR WITH AMMONIA INJECTION AND CARBON MONOXIDE CATALYST	200	100 410A 422 430 429	CO_2, NO_x, O_2, CO & THC BTXE Propylene & Total Hydrocarbon Formaldehyde, Acetaldehyde, Acrolein Speciated PAH's		
HEATER REATER OR OILER	MOBIL - LOST HILLS OR SWEPI - KERN RIVER	OIL DEHYDRATION OR PROCESS STEAM GENERATION	PIPELINE NATURAL GAS	CONVEN-TIONAL	NONE	5 TO 20	100 429 410A 422 430 15	CO_2, NO_x, O_2, CO & THC Speciated PAH's BTXE Propylene & Total Hydrocarbon Formaldehyde, Acetaldehyde and Acrolein Hydrogen Sulfide	Detection Limit < 0.3ppm	

TABLE 1
WSPA POOLED SOURCE TESTING
FOR 1991

UIPMENT TYPE	COMPANY AND LOCATION	APPLICATION OR FUNCTION	FUEL TYPE	BURNER TYPE	EMISSION CONTROL DEVICE	FIRING RATE MMBTU PER HOUR	CARB TEST METHODS	SUBSTANCES TO BE TESTED FOR	DETECTION LIMIT	
									CONCEN-TRATION	POUNDS PER MILLION BTU
ENGINE IESEL)	TO BE DETER-MINED	TO BE DETER-MINED	DIESEL FUEL	NOT APPLI-CABLE	NONE	100 TO 500 HP	100	CO2, NOx, O2, CO & THC		
							429	Speciated PAH's		
							410A	BTXE		
							422	Propylene & Total Hydrocarbon		
							430	Formaldehyde, Acetaldehyde and Acrolein		
							15	Hydrogen Sulfide	Detection Limit < 0.3ppm	
							422.102	1,3-Butadiene		
TEAM NERATOR	SANTA FE NORTH MIDWAY SUNSET	STEAM INJECTION FOR TEOR	CRUDE OIL	CONVEN-TIONAL	SO2 SCRUBBER	60	100	CO2, NOx, O2, CO & THC		
							429	Speciated PAH's		

Evaluation of Detect Limits for a 50 MMBtu/Hr Steam Generator
operating at 80% - 350,400 MMBtu/Yr - 40.0 MMBtu/Hr Ave. - 62.5 MMBtu/Hr Max.

SUBSTANCE	CANCER UNIT RISK	CHRONIC EXPOSURE LEVEL	ACUTE EXPOSURE LEVEL	DETECT LIMIT ppb or ug/m3	DETECT LIMIT Lb/MMBtu	EMISSION RATE Lbs/Yr	CANCER SCORE	CHRONIC SCORE	ACUTE SCORE
Benzene	5.3E-05	71		1	2.2E-06	0.77	6.9E-02	1.9E-04	0.0E+00
Toluene		200		1	2.6E-06	0.91	0.0E+00	7.0E-05	0.0E+00
Xylene		300		1	2.9E-06	1.03	0.0E+00	5.9E-05	0.0E+00
Propylene				10	4.9E-06	17.2	0.0E+00	0.0E+00	0.0E+00
Formaldehyde	1.3E-05	3.6	370	12	1.1E-05	3.85	8.5E-02	1.0E-02	2.0E-03
Acetaldehyde	2.2E-06	40		12	2.5E-05	8.76	3.3E-02	3.0E-03	0.0E+00
Acrolein		0.1		3	7.9E-06	2.77	0.0E+00	4.7E-01	0.0E+00
H2S		42	42	300	2.9E-04	101.6	0.0E+00	4.1E-02	6.5E-01
PAH's							1.1E-01	0.0E+00	0.0E+00
Naphthalene				0.012	8.1E-09	0.0028	0.0E+00	0.0E+00	0.0E+00
Acenaphthylene	0.0017			0.012	8.1E-09	0.0028	8.1E-03	0.0E+00	0.0E+00
Acenaphthene	0.0017			0.012	8.1E-09	0.0028	8.1E-03	0.0E+00	0.0E+00
Fluorene	0.0017			0.012	8.1E-09	0.0028	8.1E-03	0.0E+00	0.0E+00
Anthracene	0.0017			0.012	8.1E-09	0.0028	8.1E-03	0.0E+00	0.0E+00
Fluoranthene	0.0017			0.012	8.1E-09	0.0028	8.1E-03	0.0E+00	0.0E+00
Pyrene	0.0017			0.012	8.1E-09	0.0028	8.1E-03	0.0E+00	0.0E+00
Benz(a)anthracene	0.0017			0.012	8.1E-09	0.0028	8.1E-03	0.0E+00	0.0E+00
Chrysene	0.0017			0.012	8.1E-09	0.0028	8.1E-03	0.0E+00	0.0E+00
Benzo(b+k)fluoranthene	0.0017			0.012	8.1E-09	0.0028	8.1E-03	0.0E+00	0.0E+00
Benzo(a)pyrene	0.0017			0.012	8.1E-09	0.0028	8.1E-03	0.0E+00	0.0E+00
Indeno(1,2,3-cd)pyrene	0.0017			0.012	8.1E-09	0.0028	8.1E-03	0.0E+00	0.0E+00
Dibenzo(a,h)anthracene	0.0017			0.012	8.1E-09	0.0028	8.1E-03	0.0E+00	0.0E+00
Benzo(g,h,i)perylene	0.0017			0.012	8.1E-09	0.0028	8.1E-03	0.0E+00	0.0E+00

ppb

ug/m^3

3-hour test

RADIAN
CORPORATION

CONTACT REPORT

DATE March 30, 1992 ORIGINATOR LO Edwards

CONTACT BY: TELEPHONE ☑ MEETING ☐ OTHER ______

NAME, TITLE & ORGANIZATION Frank Receppi (sp?) at Kern County APCD SJVUAPCD
ADDRESS & TELEPHONE NUMBER (805) 861-3682 I called Weese, but he was out. 3/2
PURPOSE OR SUBJECT (Give project number if appropriate) Inquire about status of several proposed methods for upcoming WSPA project

SUMMARY

1) Until CARB comes up with a written protocol for canisters, SJVUAPCD won't accept the method because there is no agreed upon QC (spikes, blanks). It's their policy and they mean to stick to it. TEDCAR it is.

2) H_2S in exhaust gas streams? They recognize method 11 (or BAAQMD Method ST-28) isn't validated for long sampling periods (≥ 2 hrs...) -- and they don't have an alternative to recommend. "You're welcome to propose anything and we'll rule on it." He seemed to be hinting the TEDCAR bag method for H_2S would fly — but he wouldn't come out and say it!

3) We (or WSPA) can send a copy of proposed test plan straight to CARB and cover with letter of explanation; highlight expected points of controversy to expedite review. Sent

ACTION [illegible] Kim Worl (Radian) WSPA (Mike Emanuel)

DISTRIBUTION: Either to George Lew or William Luscutoff. Note in letter it's a pooled program.

9-86-21364

RADIAN
CORPORATION

10395 Old Placerville Road
Sacramento, CA 95827
(916) 362-5332

April 2, 1992

Michael A. Emanuel
Environmental Representative
Western States Petroleum Association
901 Tower Way, Suite 300
Bakersfield, CA 93309-1585

Subject: AB2588 Pooled Source Emission Test Protocol

Dear Mike:

Enclosed please find five bound copies and one unbound copy of the Source Testing Protocol for the above-referenced project. Revisions indicated by WSPA, as we received them on March 26, have been incorporated. In addition to these modifications, we have revised the protocol as follows:

- A revised H_2S testing procedure has been proposed for the steam generator exhaust to address concerns related to detection limits, stability, and interferences associated with CARB Method 11. H_2S levels in the fuel gas will be determined using Method 11.

- CARB Method 410A has been proposed for determining emissions of benzene, toluene, ethyl benzene, and xylene (BTEX). This procedure is similar to EPA Method TO-14 (as originally proposed in the protocol), except for the use of tedlar bags rather than evacuated cannisters for sample collection.

Please review the document to ensure that the revisions are accurate and complete and forward copies to the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD), the California Air Resources Board (CARB), and WSPA-member companies.

Please feel free to call either Larry Edwards, or me at (916) 362-5332 if you have any questions.

Sincerely,

Mark Ludwiczak
Project Director

cc: Jeff Hicks (Radian)

WSPA
Western States Petroleum Association

April 3, 1992

Mr. William Weese
Mr. Steve Arita
Kern Zone, SJVUAPCD
2700 "M" Street, Suite 275
Bakersfield, California 93301

Mr. Roger Isom
Fresno Zone, SJVUAPCD
P.O. Box 11867
Fresno, California 93775

Gentlemen:

Western States Petroleum Association (WSPA) is submitting an air toxics pooled source testing protocol to the Kern and Fresno Zones of the San Joaquin Valley Unified Air Pollution Control District and respectfully requests your review and approval. This protocol, developed by Radian Corporation, outlines WSPA's testing plans for three natural gas-fired combustion units: a steam generator, a heater treater and a turbine.

- **GAS-FIRED COMBUSTION UNITS TESTING**

Mobil Exploration and Production is providing the steam generator that will be tested. Mobil, because of pre-planned field activities, has requested that testing take place either prior to or subsequent to May. Therefore, in order to begin testing at the Mobil site the week of April 27, we would need District approval of at least the steam generator portion of the test plan by April 20, 1992.

It should be noted that the protocol contains the following deviations from CARB approved methods:

- CARB Method 410A is proposed for propylene, toluene, total xylene and ethyl benzene. The method as written only includes benzene as a target analyte. Because there appears to be no method for the listed substances and because this deviation entails a simple extension of the gas chromatograph, this modification is proposed and has apparently been approved previously.

- CARB Method 430 is proposed for acrolein. The method as written only specifically addresses formaldehyde and acetaldehyde as target analytes. This modification entails a simple extension of the high performance liquid chromatograph.

- A modification in the substances used for rinsate solutions is proposed for CARB Method 429 for PAH's. Hexane will be used instead of toluene as suggested in a letter from CARB to the Kern Zone of the SJVUAPCD dated January 30, 1992 in

?01 Tower Way, Suite 300 • Bakersfield, California 93309-1585 • (805) 321-0884

reference to a June 1991 source test of Shell Western Exploration and Production Incorporated.

- CARB Method 11 is intended for use in analyzing fuel gas for hydrogen sulfide and is not validated for long sampling periods. In order to sample for longer periods to obtain lower limits of detection, use of tedlar bags and laboratory analysis by GC/FPD is proposed.

Other than the exceptions noted above, all testing on all sources will be in accordance with CARB approved methods.

In order to facilitate protocol review, WSPA has also sent a copy of the protocol to George Lew at the Air Resources Board (CARB). WSPA requests that the Kern or Fresno Zone of the SJVUAPCD officially request that CARB simultaneously review the protocol document in order that every attempt can be made to meet the AB2588 deadlines.

- **OTHER TESTING**

As you are aware, WSPA also plans to test a diesel-fired internal combustion engine. The protocol for that test will be submitted separately. WSPA expects to have it completed and sent to you within two weeks.

Given the existing time constraints under the AB2588 program, any attention you can give this matter would be greatly appreciated. If you have questions regarding the protocol, please feel free to call Dr. Larry Edwards of Radian Corporation at (916) 362-2318 or Mr. Mike Emanuel at this office.

Sincerely,

Catherine H. Reheis

Catherine H. Reheis
Senior Coordinator
Upstream & San Joaquin Valley Issues

Enclosure
ME/sa

cc: Larry Edwards - Radian Corporation
Mark Boese - SJVUAPCD
George Lew - CARB (with enclosure)
Mike Wang - WSPA

MEMORANDUM

To: Mike Emanuel (WSPA), Elvin Bounds (SWEPI)

From: Mark Ludwiczak

cc: Larry Edwards, Jeff Hicks

Date: April 25, 1992

Subject: Pooled Source Test Protocol Review

===

I talked with Steve Arrita of SJVUAPCD on Friday about the test protocol. He said he is not yet completed his review but is making progress and they are working on a letter summarizing their review comments. To date, his major comments were as you indicated on Tuesday - (1) They want to see pre-test calculations for PAH, formaldehyde (we'll provide); and (2) questions about the representativeness of the sources proposed for testing (WSPA will address). He mentioned a couple of minor sampling procedures/equipment specs which need to be clarified (we can address). He was not very positive about using the alternative H2S procedure (bag sample/GC-FPD analysis), he feels it is probably a better method than Method 11 and trusts that we have the technical rationale for wanting to use it, but the time and effort involved in getting a non-reference method approved is probably not worth it. This process could take 6 to 8 weeks. Asked us to re-consider Method 11 (or BAAQMD Method ST-28), which is similar. He said he would talk to his sampling expert about our concerns (detection limit, stability, interferences). I will look at Method ST-28 to see if this approach helps from a detection limit stand-point.

I have prepared the itemized cost increase letter that we discussed on Tuesday (4/21), but the ultimate H2S testing strategy may impact costs slightly, so I think we should wait to get it resolved to avoid another 'revised cost estimate' letter. What do you think?

Steve also said that they will be coordinating their review comments with the Fresno zone so and they will respond with one letter. They will forward a copy to CARB (for a 'courtesy' review) after they are done. It is their policy that CARB will not review the document unless requested by the district.

As far as schedule goes, Steve says mid-May (i.e., the week of the 11th) is doubtful; The week of May 18 sounds like a more reasonable target. We'll proceed with scheduling based on that. I will be out of the office until Wed. (4/29) afternoon. Larry will be in and he can contact me if necessary.

RESOURCE MANAGEMENT AGENCY

MAY 06 1992

RANDALL L. ABBOTT
DIRECTOR

DAVID PRICE III
ASSISTANT DIRECTOR

Air Pollution Control District
WILLIAM J. RODDY, APCO

Environmental Health Services Department
STEVE McCALLEY, REHS, DIRECTOR

Planning & Development Services Department
TED JAMES, AICP, DIRECTOR

AIR POLLUTION CONTROL DISTRICT

May 6, 1992

Catherine H. Reheis
Western States Petroleum Association
901 Tower Way, Suite 300
Bakersfield, CA 93309-1585

SUBJECT: Pooled Source Test Protocol
Air Toxics "Hot Spots" Information and Assessment Act, AB 2588

Regarding: Western States Petroleum Association

Dear Ms. Reheis:

The Kern and Fresno Zones of the SJUVAPCD has reviewed the Source Test Protocol submitted by the Western States Petroleum Association (WSPA). We are unable to approve the Protocol as it is presented.

Please address the following deficiencies and concerns:

1. **Steam Generator Testing:**

   A. Substantially Similar Determination:

   WSPA has proposed performing source testing on a 62.5MMBtu/hr steam generator that utilizes a combination of flue gas recirculation (FGR) and a Lo-No_x burner. The District requires sufficient documentation substantiating the similarity of the equipment proposed for testing to equipment of equal or lesser capacity operated without state-of-the-art emission control equipment.

B. Testing Capacity:

Please provide sufficient documentation substantiating the applicability of the 80% load rate proposed for the test.

2. Gas Turbine Testing:

Please provide the District with sufficient information to show substantial similarity between a gas turbine unit at the high end (20 megawatt) of the proposed pooled equipment range and the 4 megawatt gas turbine unit proposed for testing.

3. Source Test Methods:

A. Hydrogen Sulfide Testing:

The District requires the use of either EPA Method 11 or BAAQMD Method ST-28 when testing for Hydrogen Sulfide in gaseous samples. Please submit, for District review, a protocol for one of the approved methods.

B. Formaldehyde/Acetaldehyde/Acrolein Testing:

1. Steam Generator:

Formaldehyde, acetaldehyde, and acrolein are substances listed in Appendix C-I for natural gas fired combustion equipment. Table 4-1 of the protocol indicates that the steam generator is not scheduled to be tested for the substances. The District requires that the steam generator source testing include these listed substances.

2. Pre-Test Calculation:

The District requires that all pre-test calculations for CARB Method 430 be completed and presented for review no less than 24 hours prior to actual source testing. Section 3 of CARB Method 430 clearly indicates the pre-test protocol requirements. The calculations should be completed for each classification of equipment to be tested using CARB Method 430.

DRAFT

3. Matrix Spikes:

CARB Method 430 (section 10.1.2) requires matrix spikes as part of the quality assurance/quality control procedure. The protocol does not address the use of matrix spikes.

A. PAH Testing:

1. Filter Identification:

The protocol test method does not identify the type of heated filter to be used. CARB Method 429 specifically requires the use of a Teflon coated glass fiber filter without organic binders or, a Teflon membrane filter.

2. Pre-test Calculations:

The District requires that all pre-test calculations be completed and presented for review prior to approval of the source test protocol. Please refer to page 429-6 of CARB Method 429 for the required pre-test calculations.

3. Equipment Clarification:

Figure 4-2 of the protocol indicates an "SS brush" will be used in the sample recovery process. CARB Method 429 specifies that an inert bristle brush with a stainless steel wire handle be used in sample recovery.

4. IC Engine Protocol Review:

Please refer to the attached I.C. Engine letter.

The District may find it necessary to request additional information and perform an on-site inspection prior to approving your Source Test Protocol.

Should you have any questions, please call Mr. Steve Arita or myself at (805) 861-3682.

Sincerely,

DRAFT

WILLIAM J. RODDY
Assistant APCO (SJVUAPCD)

William H. Weese

William H. Weese
Supervisor Technical Services
Compliance Division

WW/sf

cc: Mike Emanuel - WSPA
Mark Boese - Deputy APCO (SJVUAPCD)

RADIAN CORPORATION

"Air Toxics AB 2588 Pooled Source Testing -- Final Test Protocol"
Prepared for Western States Petroleum Association (WSPA)
Dated April 2, 1992

ADDENDUM

Prepared by Radian Corporation
May 13, 1992

copy

1. **Refer to Section 4.4.5**

Radian will measure H_2S in the exhaust stack of the Steam Generator using CARB Method 11. The protocol given in the method will be followed except that the sampling time will be increased to achieve lower detection limits. Radian proposes to conduct the sampling for two hours and, according to documentation in the method, will be able to detect H_2S down to 0.5 parts per million, by volume (ppmv). Each sample will be analyzed within a few hours (no more than four hours after the completion of sampling) by Steiner Environmental in their Bakersfield laboratory

2. **Refer to Table 4-1**

The Mobil Steam Generator will be tested for formaldehyde, acetaldehyde and acrolein using CARB Method 430 (see Section 4.4.4 for a brief description of the method). Three sequential runs will be carried out.

3. **Refer to Table 4-2**

The expected detection limit for the application of CARB Method 430 (for formaldehyde and acetaldehyde) is calculated as follows (following Section 3.3 in Method 430):

$$\text{Sample Volume (cubic meters)} = (A) * (100/B) * (100/C) * (1/D)$$

Where: A = Analytical MDL in ng per sample,
B = Percent of the sample extracted (%),
C = Percent sample recovery (based on historical data) (%),
D = Target concentration (ng/dscm).

For formaldehyde, A = 500 ng per sample (MDL), B = 100%, C = 87%, (Air Toxics, Ltd) and sampling will take place for one hour at a rate of 1 liter per minute for a total sample volume of 60 liters or 0.060 cubic meters.

$$0.060 = (500) * (100/100) * (100/87) * (1/D)$$

D_{form} = 9,580 ng/dscm (or 9.58 μg/dscm), the expected detection limit.

For acetaldehyde, all parameters are the same except for C = 91%. For acetaldehyde, the expected detection limit is then:

D_{acet} = 9,160 ng/dscm (or 9.16 μg/dscm)

4. **Refer to Table 5-4**

Steve & Boyd

Radian's Method 430 does not include a field spike; inconsistent recoveries have been reported. However, a matrix spike is performed in the laboratory on one of the sample solutions. A laboratory spike is also analyzed with the set to obtain another measure of percent recovery. The matrix and laboratory spikes are what has been recommended by the analytical laboratory, Air Toxics, Ltd. of Rancho Cordova. They are in contact with CARB and keep current on CARB recommendations.

5. **Refer to Section 4.4.2**

Radian will (and has) used teflon coated glass fiber filters (without organic binders) for the heated filter in the CARB Method 429 sampling train.

6. **Refer to Table 4-2**

The expected detection limit for the application of CARB Method 429 (for PAH determination) is calculated as follows (following Section 2.1 Method 429):

Sample Volume (cubic meters) = (A) * (100/B) * (100/C) * (1/D)

Where: A = Analytical MDL in ng per sample,
B = Percent of the sample extracted (%),
C = Percent sample recovery (based on historical data) (%),
D = Target concentration (ng/dscm).

For any PAH compound, A = 5 ng per sample (MDL), B = 100%, C = 100%, and sampling will take place for four hours at a rate of at least 0.5 cubic feet per minute (0.0142 cubic meters per minute) for a total sample volume of (240 minutes) x (0.0142 cubic meters per minute) = 3.4 cubic meters.

$$3.4 = (5) * (100/100) * (100/100) * (1/D)$$

D_{PAH} = 1.47 ng/dscm is the expected detection limit.

7. **Refer to Figure 4-2**

In the third column from the left, entry No. 2, the SS brush referred to is a brush with nylon (inert) bristles and a stainless steel handle and core. It is intended to conform with the requirements of CARB Method 429.

WSPA

Western States Petroleum Association

May 22, 1992

Catherine H. Reheis
Senior Coordinator
Upstream & San Joaquin Valley Issues

Mr. William Weese
Mr. Steve Arita
Kern Zone, SJVUAPCD
2700 "M" Street, Suite 275
Bakersfield, California 93301

RE: Air Toxics Pooled Source Testing, Gas-Fired Combustion Equipment

Gentlemen:

Western States Petroleum Association (WSPA) is responding to the Kern and Fresno Zone letter dated May 6, 1992 addressing deficiencies with WSPA's proposed protocol to conduct air toxics pooled source testing on gas-fired combustion equipment.

WSPA would like to address the following issues related to representativeness of equipment:

<u>Testing Steam Generator at Representative Load</u>

WSPA has provided fuel use data and steam generator operating information to substantiate the proper representative load at which to test the steam generator. WSPA had originally proposed to test at 80% load. After further analysis, it appears that, on average, steam generators are fired below 80% load. Therefore, WSPA agrees to test the steam generator at 75% load, which appears more representative of the pooled source population.

<u>Testing an FGR Equipped Steam Generator</u>

It is our understanding that there is not data available comparing emissions from FGR versus non-FGR equipped steam generators. However, in the absence of such data, the emissions of total hydrocarbons and/or carbon monoxide may serve as an indicator of the relative toxics from the two types. All of the toxics of concern are products of incomplete combustion. The attached test data compares criteria pollutant emissions on the same gas-fired steam generator with and without FGR. As the data indicate, while FGR does significantly reduce NO_x, there is no significant difference in emissions of unburned hydrocarbons or of carbon monoxide.

Based on combustion chemistry considerations, it has been argued that FGR should result in <u>less complete combustion</u> compared to non-FGR comparable equipment. This would result in higher hydrocarbon and/or carbon monoxide emissions and likewise higher toxic emissions for FGR. Therefore, WSPA feels that toxics emission factors from a steam generator equipped with FGR will be on the conservative side. That is, they would be the same or higher than toxic emission factors for non-FGR units.

In addition, the fraction of steam generators with FGR will most probably increase with the implementation of NO_x control measures being suggested in the implementation plan of the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) Air Quality Attainment Plan.

It is expected that as air toxics data is gradually collected and compiled, this information can be compared and analyzed for trends and relationships among parameters, such as NO_x controls, firing rates, and toxic emissions.

<u>Gas Turbine Representativeness</u>

WSPA has proposed testing a 4 megawatt gas turbine. An accounting of WSPA members shows that about 80% of the population of gas turbines 25 megawatts or less fall in the 4 megawatt and below range. Approximately 31 of 37 units accounted for were 4 megawatts or less. Therefore, WSPA proposes to test the 4 megawatt gas turbine as it appears most representative of the pooled source population.

As we indicated during our meeting with the Kern Zone on May 20, 1992, WSPA's consultant, Radian Corporation, has addressed most of the technical deficiency issues related to sampling (attached). As discussed during our meeting when Radian Corporation was on conference call, Radian will address Kern's remaining concerns related to the acceptability of CARB Method 11, pre-test calculations for CARB Method 430, and matrix spikes for CARB Method 430.

It appears that Radian and the Kern Zone will not encounter any difficulties reaching understanding on these remaining issues and expect to have these resolved by the end of this week. Therefore, WSPA plans to have Radian set up its equipment Tuesday, May 26, 1992 at Texaco's Cymric Field in order to begin testing a heater treater the following day. Testing of the steam generator and gas turbine is scheduled to take place the following week. WSPA requests that Kern Zone witness this testing.

If you have any questions, please do not hesitate to call me or Mike Emanuel at this office, or Mr. Elvin Bounds of SWEPI at (805) 326-5988.

Sincerely,

Catherine H. Reheis

** TOTAL PAGE.004 **

Enclosures
ME/sa

cc: Larry Edwards - Radian Corporation
Roger Isom - Fresno Zone, SJVUAPCD
Mark Boese - SJVUAPCD
Mike Wang - WSPA

RADIAN
CORPORATION

May 22, 1992

10389 Old Placerville Road
Sacramento, CA 95827
(916) 362-5332

William H. Weese
Supervisor Technical Services
San Joaquin Unified Valley Air Pollution Control District (SJVUAPCD)
Compliance Division, Kern Zone
2700 "M" Street, Suite 275
Bakersfield, CA 93301

Subject: Pooled Source Test Protocol
Air Toxics "Hot Spots" Information and Assessment Act, AB2588
Western States Petroleum Association (WSPA)

Dear Mr. Weese:

Attached please find a copy of California Air Resources Board (CARB) Method 11 for the determination of hydrogen sulfide (H_2S) content of fuel gas streams in petroleum refineries. As you will note this method is identical to the Environmental Protection Agency (EPA) Method 11. In our addendum to the above-referenced protocol, we have proposed using CARB Method 11 for the testing of the steam generator at the Mobil facility near Lost Hills, California. Note that this method will be used for testing both the fuel gas and the steam generator exhaust gas.

On page 2 (Section 4) of the Addendum to the Test Protocol (dated May 13, 1992), we stated that, "Radian's Method 430 does not include a field spike". To clarify, we will be using CARB Method 430 during the WSPA testing (i.e., Radian does not have a Method 430). We will incorporate (at minimum) all of the QA/QC procedures, as specified in the method. Note that the method does not specify that a field spike sample be collected and analyzed with the samples (refer to the attached Method 430 excerpts). However, Air Toxics, Ltd., the laboratory that will be performing the sample analyses, routinely provides a 'trip spike' sample (and a 'trip blank' sample) with the DNPH reagent. The trip spike sample consists of a known quantity of the formaldehyde/acetaldehyde compounds added to the DNPH reagent and sealed in a sample bottle. The trip spike sample accompanies the reagent (and samples) with the shipment to and from the job-site; it is analyzed with the other samples. Although Method 430 does not require that a trip spike be prepared and analyzed, it serves as an indicator of analyte stability. It has therefore been included in the test program for quality assurance/quality control purposes. Recovery percentages for trip spike samples typically range from 85 to 115 percent.

We have attached blank sample concentration data based on laboratory records of recent Method 430 analyses, as provided by Air Toxics, Ltd. Note that these quantities are considered very low (i.e., near the analytical detection limits) and blank contamination has not been a problem in the past. It is expected that the data will comply with the requirements of Section 4.2.2; that is, the ratio of the sample to blank quantities will either be greater than 5, or a reporting limit (RL) of 5 times the blank quantity will be utilized

Testing of the heater treater exhaust stack at the Texaco/Fitzgerald Lease site (in the Cymric Field is scheduled to begin on Wednesday, May 27. Our proposed sampling schedule is presented below; we have also attached a map to the Texaco facility.

Day, Date	Time	Test Activity
Tuesday, 5/26/92	1300-1800	Equipment set-up and test preparation Preliminary stack gas measurements (flow, temperature, moisture)
Wednesday, 5/27/92	0800-2000*	Conduct PAH and CEM Test 1
	1300-1700	Conduct BTEX/propylene Tests 1 - 3
Thursday, 5/28/92	0800-2000*	Conduct PAH and CEM Test 2
	0800-1300	Conduct Aldehyde Tests 1 - 3
	1300-1500	Ship Aldehyde and BTEX samples to Air Toxics,
	1600-1700	Collect Fuel Sample
Friday, 5/29/92	0800-2000	Conduct PAH and CEM Test 3
	0800-2000	Collect PAH Field Blank Sample
Saturday, 5/30/92	0800-2000	Contingency and/or equipment pack-up Ship PAH samples to Alta Laboratory

As noted in the test protocol, this source operates intermittently on demand (i.e., approximately 30 minutes per hour) and therefore, it is expected that the tests will be interrupted several times. It is not known how long it will take to conduct the three hour tests (i.e., for PAH emission testing), but it is estimated that it may require as long as 10 to 12 hours, depending upon heater treater operating conditions during the testing. We have allotted one day (i.e., 12 hours) per PAH sample. The aldehyde and BTEX/propylene sampling durations are significantly less (i.e., 30 to 60 minutes).

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Detailed schedules for the testing of the other sources in the pooled testing program will be forwarded to you by May 28, 1992. Testing has been tentatively scheduled for the weeks of June 1 - 5 and 8 - 12. Please feel free to call either Larry Edwards or me at (916) 362-5332 if you have any questions.

Sincerely,

Mark Ludwiczak
Project Director

cc: Mark Boese (SJVUAPCD, Fresno zone)
Mike Emanuel (WSPA)
Elvin Bounds (SWEPI)
Karen Lew (Texaco)
Jeff Hicks (Radian)
Larry Edwards (Radian)
Judy Nottoli (Radian)

ATTACHMENT A: CARB METHOD 11

State of California
Air Resources Board

Method 11

Determination of Hydrogen Sulfide Content
of Fuel Gas Streams in Petroleum Refineries

Adopted: June 29, 1983

Note: The average response factor may be used in place of a calibration curve if linear response has been documented. One or more daily calibration standards may be used to verify the working calibration curve or response factor. For such verification use intermediate concentration standards near the anticipated levels of the analyte but at least 10 times the detection limit. Use the response for the daily calibration standard to calculate a response factor (RF) according to Section 11.1. The daily RF for the analyte should not vary from the predicted RF by more than 10%. If greater variability is observed, recalibrate or develop a new calibration curve from fresh standards.

9 .2 Step 5: Check the calibration of the instrument for each run (20 or fewer samples) by analyzing a laboratory spike (Section 10.2.1.2).

WARNING: All calibration results shall be calculated and reported as nanograms of aldehyde per area count. This avoids confusion about whether results are based on aldehyde or hydrazone mass.

10 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

10 .1 Sampling QA/QC

10 .1 .1 Field Blanks

For each source tested, three impinger and sample line field blanks shall be taken. A field blank shall consist of an impinger and sample line which is as similar to a sampling impinger as is practically feasible. With the sole exception that the field blanks will not have sample gas pulled through them, the field blanks shall have all of the same procedures performed on them as are performed on the samples from the beginning of Sampling Procedure (Section 8.1) through to the end of Analytical Procedure (Section 8.4).

Note: The reporting requirements for this method specify field blank corrected values. The average of the field blank values for analysis of formaldehyde and acetaldehyde is subtracted from each corresponding sample value. Such values must be clearly identified as field blank corrected. In addition, the field blank values must be clearly identified and reported separately.

10 .1 .2 Matrix Spikes

For each source tested, the contents of the first impinger from one of the three or more serial sample runs shall be split into two equal portions after sample recovery but before extraction. One split shall be spiked with a known quantity of formaldehyde and acetaldehyde. Each known quantity shall be the amount corresponding to the target concentration chosen by the data user to calculate the emissions sample volume, based on the volume of the split.

Note: The percent recovery of the matrix spike is a reporting requirement of this method. The matrix spike result is required to guide the data user in the interpretation of the test results.

10 .2 Analytical

Each laboratory that uses this method is required to operate a formal quality control program. The minimum requirements of this program consist of an initial demonstration of laboratory capability, and the ongoing analysis of laboratory spikes (Section 10.2.1.2) as a continuing check on performance.

The laboratory must maintain permanent performance records to document the quality of data that are generated. The laboratory must compare the results of their ongoing data quality checks with established performance criteria to determine if the analytical results are acceptable.

In recognition of the rapid advances occuring in HPLC the analyst is permitted options to improve separations. Such modifications are subject to approval by the Executive Officer. The analyst must also produce data to demonstrate that the options do not interfere with adequate detection of the target source concentration chosen by the data user.

10 .2 .1 Contamination Checks

Before processing any field samples, the analyst must demonstrate, through analysis of a reagent blank and at least four laboratory spikes, that interferences from the analytical system, glassware, and reagents are under control. Each day, and after each set of 20 or more samples is extracted and analyzed, and if there is a change in reagents, a reagent blank and a laboratory spike must be analyzed as a safeguard against chronic laboratory contamination.

10 .2 .1 .1 Reagent Blank

The analyst must run a reagent blank on DNPH impinger solution along with each set of samples (20 or fewer). Reagent blanks shall have all of the same procedures performed on them as are performed on the samples from the beginning of Sample Recovery (Section 8.2) through to the end of Analytical Procedure (Section 8.4). The exposure to air and other sources of contamination for a reagent blank shall be kept to a practical minimum in a manner consistent with good laboratory practice.

10 .2 .1 .2 Laboratory Spikes

On a continuing basis, the laboratory must spike, with standard stock hydrazone solution, at least one 10 mL blank of DNPH impinger solution per analytical batch of 20 or fewer samples to assess the accuracy of the analytical procedure. Laboratory spikes shall have all of the same procedures performed on them as are performed on the samples from the beginning of Sample Recovery (Section 8.2) through to the end of Analytical Procedure (Section 8.4). The aldehyde concentrations of the hydrazone spike shall correspond to the target concentration chosen by the data user. Calculate the percent recovery of the spikes according to Section 11.5.

WARNING: When the percent recovery of a laboratory spike is outside the warning limits (Section 10.4.3), the analyst shall iteratively perform new laboratory spikes and until a laboratory spike is within the warning limits. If unsuccessful, the analyst shall recalibrate and run a new laboratory spike iteratively until the laboratory spike is within the warning limits; this is mandatory if any laboratory spike recovery exceeds the control limits. In the case of such recalibration, the analyst must reanalyze all samples back to the time of the previously successful laboratory spike.

10 .3 Quality Control (QC) Samples

10 .3 .1 Before Contracting for Laboratory Services

As an initial demonstration of acceptable performance, the laboratory must document the ability to generate acceptable laboratory accuracy and precision with this method, using at least four quality control (QC) samples. QC samples are recovered, extracted, and analyzed using the same procedures as for field samples.

To establish the ability to generate acceptable accuracy and precision, the analyst must perform the following steps:

Step 1: Prepare at least four 10mL QC samples by the procedures for laboratory spikes (Section 10.2.1.2).

Step 2: Prepare the QC samples according to the recovery and extraction steps for field samples.

Step 3: Analyze the QC samples.

Step 4: Calculate the average percent recovery ($\bar{R}$) and the standard deviation of the four recoveries according to Section 11.5.

Step 5: Compare s_R and $\bar{R}$ with the performance criteria provided by the data user for accuracy and precision. If $\bar{R}$ and s_R meet the performance criteria, the system is acceptable for the purpose of calculating a planned sample volume (PSV) as required by Section 3.3. Otherwise, the analyst must locate and correct the source of the problem and repeat the process beginning with Step 1.

10 .3 .2 After Contracting for Laboratory Services

Laboratory spikes performed according to Section 10.2.1.2 (which are within the warning limits given in Section 10.4.3) shall be statistically combined with earlier QC sample results to yield a new $\bar{R}$ and s_R according to Section 11.5.

Even if, by active default, the data user specifies no accuracy or precision criteria, $\bar{R}$ is still required, based on all QC samples and laboratory spikes, for final adjustment of aldehyde mass analyses in Section 11.

10 .4 Accuracy and Precision Limits of Analysis

10 .4 .1 Accuracy

Accuracy is represented by $\bar{R}$ which is the positive or negative bias of recovery, extraction, and analysis.

10 .4 .2 Precision

Precision of response to replicate HPLC injections must be ±10%RSD or less, day to day, for calibration standards. Precision of retention times must be ±10%RSD or less, day to day, for calibration standards. Precision of retention times must be ±2%RSD on a given day.

Note: $\%RSD = (s \div R) \times 100\%$

10 .4 .3 Warning and Control Limits

Calculate upper and lower control limits for method performance as follows:

Upper Warning Limit (UCL) = $\bar{R} + 2\ s_{\bar{R}}$
Lower Warning Limit (LCL) = $\bar{R} - 2\ s_{\bar{R}}$

Upper Control Limit (UCL) = $\bar{R} + 3\ s_{\bar{R}}$
Lower Control Limit (LCL) = $\bar{R} - 3\ s_{\bar{R}}$

Where: $\bar{R}$ and $s_{\bar{R}}$ are as calculated using the equations in Section 11.5. The UCL and LCL shall be used to construct control charts which permanently record trends in laboratory performance.

10 .5 Standard Operating Procedures (SOPs)

Testers must generate SOPs describing the following activities in their laboratory:

(1) assembly, calibration, and operation of the sampling system, with make and model of equipment used;

(2) preparation, purification, storage, and handling of sampling reagent and samples;

(3) assembly, calibration, and operation of the HPLC system, with make and model of equipment used; and

(4) all aspects of data recording and processing, including lists of computer hardware and software used.

ATTACHMENT C: CARB 430 LABORATORY BLANKS

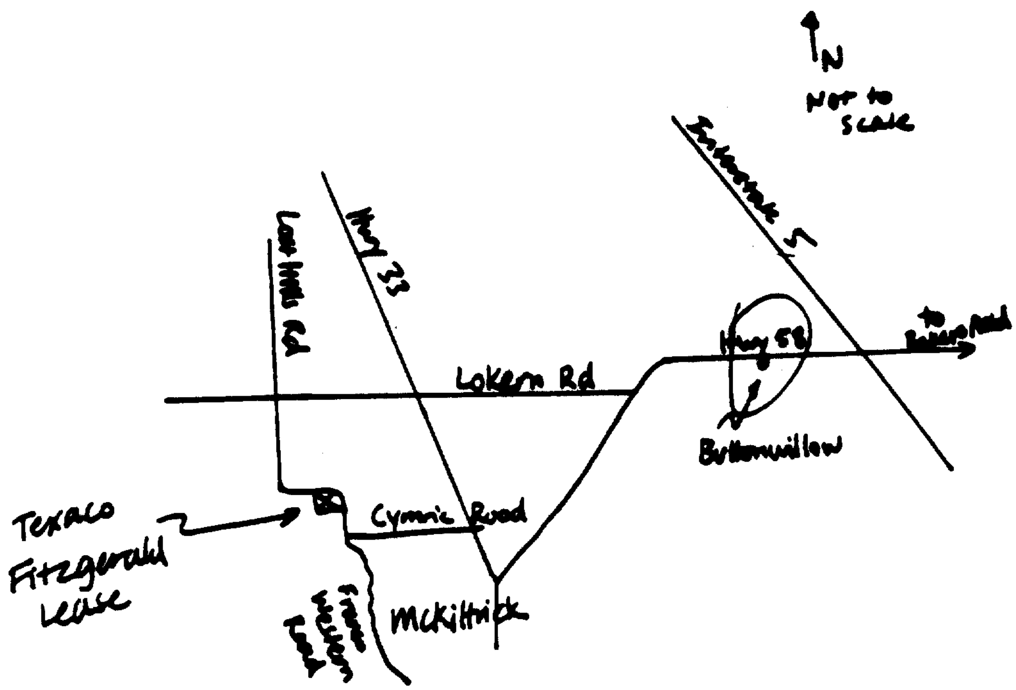
CARB 430 LABORATORY BLANKS
(Not to be confused with DNPH reagent blanks)

Work Order Number	Date	Formaldehyde µG	Acetaldehyde µG
9204086	4/27/92	0.15	NA
		0.18	NA
9204096B	4/28/92	0.12	NA
9204085A	4/28/92	0.21	0
9204085B	4/28/92	0.24	0
9204085C	4/29/92	0.21	0
9204102A	5/1/92	0.15	0
		0.16	0
9204102B	5/1/92	0.11	0
9204103A	5/5/92	0.16	0.19
9204103B	5/5/92	0.21	0.11
		0.16	0.19
9205057	5/19/92	0.23	0.43
		0.33	0.29
9205060A	5/20/92	0.37	0
	Average =	0.20	0.10

**Laboratory Blank is an aliquote of the batch of DNPH shipped to the field. The aliquote is stored in a 4'C refrigerator until the field samples return, extracted and analyzed with the field samples.

ATTACHMENT D:

MAP TO THE TEXACO/FITZGERALD LEASE
CYMRIC FIELD SITE



Fresno
Kern
Kings
Madera

San Joaquin Valley
Unified Air Pollution Control District

Merced
San Joaquin
Stanislaus
Tulare

May 28, 1992

Mr. Mike Emanuel
Western States Petroleum Association (WSPA)
901 Tower Way, Suite 300
Bakersfield, CA 93309-1585

Subject: Toxic Emission Inventory Plan (TEIP) Air Toxics Hot Spots Information and Assessment Act, AB2588

Regarding: WSPA Pooled Source Test

Dear Mr. Emanuel:

In a conversation with Mr. Mark Ludwickzak of RADIAN Corporation on May 27, 1992, it has been determined that a problem was encountered in the preparation of the 2,4-dinitrophenyl-hydrazine (DNPH) solution. The laboratory that prepares the DNPH solution, Air Toxics Ltd., stated that they did not perform the pre-test reagent blanks as required in the method. These reagent blanks are required to meet the pre-test protocol requirements and to ensure that sampling is performed to meet the requirements of the data user (the District).

The District will allow an alternative procedure to be performed for this specific test only. The alternative proposed is to use previous reagent blank data for the pre-test calculations in order to determine sampling rates and times. The test will be conducted using these values. After all analysis are completed, actual field blank values will be compared to the reagent blank values used in the pre-test calculations. If there is a significant discrepancy between these values, the test must be repeated. Testing to be conducted in the future, including testing scheduled during the week of June 1, 1992, must conform to the requirements as presented in CARB Method 430.

David L. Crow • Executive Director / APCO
P.O. Box 1312 • Fresno, California 93715 • 2314 Mariposa Street #100 • (209) 488-3330 • FAX (209) 488-3134

Should you have any questions, please call Mr. Frank Ripepi or myself at (805) 861-3682.

Sincerely

DAVID L. CROW
EXECUTIVE DIRECTOR/APCO

MARK BOESE
~~DEPUTY APCO~~

William Weese
District Manager, Toxic Assessment

WW/fr

Naphthalene
Contamination

May 29, 1992

William Weese
Supervisor Technical Services
San Joaquin Unified Valley Air Pollution Control District (SJUVAPCD)
Compliance Division, Kern Zone
2700 "M" Street, Suite 275
Bakersfield, CA 93301

Subject: Pooled Source Test Protocol
Air Toxics "Hot Spots" Information and Assessment Act, AB2588
Western States Petroleum Association (WSPA)

Dear Mr. Weese:

As I discussed with Mr. Frank Repepi of SJUVAPCD yesterday, we have scheduled testing of the steam generator at the Mobil/Lost Hills facility for Tuesday and Wednesday, June 2 and 3, respectively. Thursday (June 4) will be used for contingency purposes. A more detailed schedule of the testing activities is presented below:

Day - Date - Time	Activity
Monday - 6/1/92 - 0900-1700	Equipment Set-up; Preliminary Measurements
Tuesday - 6/2/92 - 0900-1400	PAH Test #1; CEM and H_2S Test #1
- 1500-1900	PAH Field Blank; BTEX, Propylene + CEM (3 Tests); H_2S Field Blank
Wednesday - 6/3/92 - 0830-1300	PAH + CEM and H_2S Test #2 Aldehydes (2 Tests)

Day - Date - Time	Activity
~~Thursd~~ Wednesday - 6/3/92 - 1400 - 1830	PAH + CEM and H_2S Test #3
	Aldehydes Test #3
	Aldehydes Field Blank
	Fuel Sampling
Thursday - 6/4/92 - 0800 - 1700	Contingency
	De-mobilization

As you indicated in your letter of May 28, 1992 to Mike Emanuel of WSPA, the preparation and pre-qualification of the DNPH reagent will be performed in accordance with CARB Method 43c Results of these analyses will not be available until Tuesday, Jun 2, and therefore, the aldehyde testing may be delayed, depending upon the results of reagent/field blank analyses.

Testing of the gas turbine at the SWEPI Southeast Kern River facility has been tentatively scheduled for the week of June 8-12. We will notify you of the specific dates and times next week.

Please feel free to contact me if you have any questions. I c be reached (periodically) ~~at~~ in the field on a cellular phone (#916-425-6489).

Sincerely,

Mark Rodriguez

[illegible]

June 8, 1992

William Weese
Supervisor Technical Services
San Joaquin Unified Valley Air Pollution Control District (SJUVAPCD)
Compliance Division, Kern Zone
2700 "M" Street, Suite 275
Bakersfield, CA 93301

Subject: Pooled Source Test Protocol
Air Toxics "Hot Spots" Information and Assessment Act, AB2588
Western States Petroleum Association (WSPA)

Dear Mr. Weese:

As I discussed with Barbara Rycaski of SJUVAPCD last week, we have scheduled testing of the gas turbine at the SWEPI / Southeast Kern River facility in Bakersfield for Tuesday and Wednesday, June 9 and 10, 1992, respectively; ~~June~~ Thursday (June 11) will be used for contingency purposes. A more detailed schedule of the testing activities is presented below:

Day - Date - Time	Testing Activity
Tuesday - 6/9/92 - 0800 - 1100	Equipment Set-up
- 1100 - 1600	PAH + CEM Test #1 Aldehydes Tests #1 and 2
Wednesday - 6/10/92 - 0800 - 1300	PAH + CEM Test #2 Aldehydes Test #3, Field Blank
1400 - 1900	PAH + CEM Test #3, Field Blank BTEX Tests #1-3

Day-Date-Time	Testing Activity
Wednesday-6/10/92-1500-1600	Fuel Sampling
Thursday-6/11/92-	Contingency
	De-mobilization

Please feel free to contact me if you have any question
I can be reached in the field at (916) 425-6489.

Sincerely,

Mark Ludwiczak

Mark Ludwiczak, Project Director
Radian Corporation

CC: Mike Emanuel, WSPA
Elvin Bands, SWEPI
Jeff Hicks, Radian
Larry Edwards, Radian