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AIR TOXICS HOT SPOTS TESTING AT SOUTHERN CALIFORNIA GAS COMPANY GOLETA STATION - IC ENGINE #3

April 10 and 11, 1990

Prepared for

Southern California Gas Company
Test Center
P. O. Box 3249
Terminal Annex
Los Angeles, California 90051

Before and after data ?

June 1990

Prepared by

Pape & Steiner Environmental Services
5801 Norris Road
Bakersfield, California 93308

Report PS-90-2151/Project 5802-01

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SECTION 1

INTRODUCTION

At the request of Southern California Gas Company, Pape & Steiner Environmental Services is pleased to submit this report for AB2588 emission tests on a typical IC Engine (#3) exhaust at the Goleta Station located near Goleta, California. The purpose of these emission tests was to generate emission data required by the Santa Barbara County APCD in relation to the Air Toxics Hot Spots and Assessment Act of 1987 (AB2588).

Emission testing was done with the engine operating near its rated capacity on pipeline-quality natural gas (avg. 579 HP versus 650 HP). The inlet of the engine catalyst system was sampled to determine air toxic emissions from an uncontrolled engine. The outlet of the engine catalyst was tested to determine air toxic emissions from engines with non-selective catalysts for NO_x control.

Triplicate aldehyde tests (formaldehyde, acetaldehyde, acrolein) were performed using the CARB Method 430 technique. Benzene, naphthalene, toluene, xylene and propylene were sampled in triplicate using evacuated Summa electropolished containers. Triplicate NH_3 tests were conducted using BAAQMD Method ST-1B. Samples of the gas fired in the engine were collected and analyzed for CHNOS, moisture and Btu content. Southern California Gas personnel collected engine operating data throughout the test period.

Section 2 of this report presents the test matrix for this program.

SECTION 2

TEST MATRIX

Table 2-1 summarizes the tests performed on this program. Tests #1 and #2 were performed on April 10, 1990 and Test #3 was performed on April 11, 1990. Engine #3 was in continuous operation and did not experience any operating problems during the test period.

Section 3 of this report presents the results of these tests.

TABLE 2.1 SOUTHERN CALIFORNIA GAS IC ENGINE #3 TEST MATRIX

Date	Test Location	Test No.	Test Parameter	Test Time
04/10/90	Inlet	1	NH_3	10:15 am - 1:15 pm
			Aldehydes[a]	10:16 am - 1:16 pm
			VOC[b]	10:17 am - 1:17 pm
	Outlet	1	NH_3	10:15 am - 1:15 pm
			Aldehydes[a]	10:16 am - 1:16 pm
			VOC[b]	10:17 am - 1:17 pm
	Inlet	2	NH_3	2:00 pm - 5:00 pm
			Aldehydes[a]	2:00 pm - 5:00 pm
			VOC[b]	2:01 pm - 5:01 pm
	Outlet	2	NH_3	2:00 pm - 5:00 pm
			Aldehydes[a]	2:01 pm - 5:01 pm
			VOC[b]	2:01 pm - 5:01 pm
04/11/90	Inlet	3	NH_3	8:25 am - 11:25 am
			Aldehydes[a]	8:26 am - 11:26 am
			VOC[b]	8:27 am - 11:27 am
	Outlet	3	NH_3	8:25 am - 11:25 am
			Aldehydes[a]	8:26 am - 11:26 am
			VOC[b]	8:27 am - 11:27 am

[a]Aldehydes = Formaldehyde, Acetaldehyde, Acrolein

[b]VOC = Benzene, Toluene, Xylene, Naphthalene, Propylene

March 15, 1990

SECTION 3

TEST RESULTS

Table 3-1 summarizes the results of the tests performed at the inlet of the engine catalyst. Table 3-2 presents the results obtained at the catalyst outlet. For those compounds that were "not detected" in the sample, the minimum detection limit for that compound was used to compute the reported results. In actual fact, the emissions of these compounds is less than the reported levels.

TABLE 3-1. SUMMARY OF SOURCE EMISSION TEST DATA (60°F)

Unit Tested: Southern California Gas
Goleta Engine #3 Inlet

Date: April 10-11, 1990

Rated 650 HP

Test Number	1	2	3	AVG.
Test Condition	590 HP (90.1)	594 HP (91.4)	553 HP (85)	579 (89%)
F-Factor dscf/mm BTU	8486	8486	8486	
GAS DATA				
Gas Flowrate (dscfm)	1368	~~1434~~ 1429	~~1851~~ 1544	~~1451~~ 1447
Gas Analysis (Volume %)				
Carbon Dioxide, dry	9.80	10.80	11.90	10.83
Oxygen, dry	5.60	6.17	7.70	6.49 ?
EMISSION CONCENTRATION - ppm	0.24 %			
Benzene	0.42	0.40	0.38	0.40
Toluene	0.11	0.12	0.10	0.11
Xylenes	<0.02	<0.02	<0.02	<0.02
Propylene	<0.20	<0.15	<0.15	<0.17
Naphthalene	<0.02	<0.02	<0.02	<0.02
Formaldehyde	5.19	<0.09	1.70	<2.33
Acetaldehyde	0.06	<0.01	<0.01	<0.03
Acrolein	<0.07	<0.01	<0.01	<0.03
NH_3	0.73	0.45	0.18	0.45
EMISSION RATE - lb/hr				
Benzene	5.73E-03	5.72E-03	5.88E-03	5.78E-03
Toluene	1.50E-03	1.72E-03	1.55E-03	1.59E-03
Xylenes	<2.73E-04	3.58E-04	4.33E-04	<3.55E-04
Propylene	<2.73E-03	<2.15E-03	<2.32E-03	<2.40E-03
Naphthalene	<2.73E-04	<2.15E-04	<2.32E-04	<2.40E-04
Formaldehyde	3.37E-02	<6.13E-04	1.25E-02	<1.56E-02
Acetaldehyde	5.88E-04	<9.99E-05	<1.08E-04	<2.65E-04
Acrolein	<8.00E-04	<1.27E-04	<1.37E-04	<3.55E-04
NH_3	2.70E-03	1.73E-03	7.67E-04	1.73E-03
EMISSION FACTOR - lb/MMBtu				
Benzene	5.29E-04	4.85E-04	4.13E-04	4.76E-04
Toluene	1.63E-04	1.72E-04	1.28E-04	1.12E-04
Xylenes	<3.43E-05	4.12E-05	4.14E-05	<3.89E-05
Propylene	<1.36E-04	<9.80E-05	<8.78E-05	<1.07E-04
Naphthalene	<4.13E-05	<2.98E-05	<2.67E-05	<3.26E-05
Formaldehyde	4.76E-03	<8.58E-05	1.81E-03	<2.22E-03
Acetaldehyde	8.08E-05	<1.40E-05	<1.56E-05	<3.68E-05
Acrolein	<1.20E-04	<1.78E-05	<1.99E-05	<5.26E-05
NH_3	3.81E-04	2.44E-04	1.09E-04	2.45E-04

Jim Steiner →(

TABLE 3-2. SUMMARY OF SOURCE EMISSION TEST DATA (60°F)

Unit Tested: Southern California Gas
Goleta Engine #3 Outlet

Date: April 10-11, 1990

Test Number	1	2	3	AVG.
Test Condition	590 HP	594 HP	553 HP	
F-Factor	8486	8486	8486	
GAS DATA				
Gas Flowrate (dscfm)	1716	2092 2085	2027 2018	1945 1939
Gas Analysis (Volume %)				
Carbon Dioxide, dry	11.70	11.60	11.90	11.73
Oxygen, dry	8.70	10.80	10.80	10.10
EMISSION CONCENTRATION - ppm		0.12 (March 15, 90) NOx 2.8 ppm corrat		
Benzene	0.12	0.04	0.03	0.06
Toluene	<0.01	<0.01	0.01	<0.01
Xylenes	<0.02	<0.02	<0.02	<0.02
Propylene	<0.20	<0.15	<0.15	<0.17
Naphthalene	<0.02	<0.02	<0.02	<0.02
Formaldehyde	<0.02	<0.01	<0.01	<0.01
Acetaldehyde	ok ~~<0.01~~	<0.01	<0.01	<0.01
Acrolein	<0.01	<0.01	<0.01	<0.01
NH_3	667.75	287.23	216.12	390.37
EMISSION RATE - lb/hr				
Benzene	2.05E-03	8.56E-04	~~5.26E-04~~ 6.44 x 10^-4	1.15E-03
Toluene	<2.05E-04	<1.88E-04	~~2.22E-04~~ 3.24 x 10^-4	<2.05E-04
Xylenes	<3.42E-04	<3.13E-04	~~<3.03E-04~~ 5.06 x 10^-4	<3.20E-04
Propylene	<3.42E-03	<3.13E-03	~~<3.03E-03~~ 2.01 x 10^-3	<3.20E-03
Naphthalene	<3.42E-04	<3.13E-04	~~<3.03E-04~~ 6.12 x 10^-4	<3.20E-04
Formaldehyde	1.63E-04	<9.99E-05	<9.63E-05	<1.20E-04
Acetaldehyde	<8.37E-05	<5.83E-05	<4.24E-05	<6.15E-05
Acrolein	<1.52E-04	<1.85E-04	<1.80E-04	<1.72E-04
NH_3	3.10E+00	1.62E+00	1.18E+00	<1.97E+00
EMISSION FACTOR - lb/MMBtu				
Benzene	1.21E-04	3.41E-05	~~<.10E-05~~ 9.395 x 10^-5	.88E-05
Toluene	<1.42E-05	<8.83E-06	~~<1.08E-05~~ 4.649 x 10^-5	<1.24E-05
Xylenes	<2.73E-05	<1.70E-05	~~<1.70E-05~~ 7.366 x 10^-5	<2.04E-05
Propylene	<1.08E-04	<6.72E-05	~~<6.72E-05~~ 2.91 x 10^-4	<8.09E-05
Naphthalene	<3.29E-05	<2.05E-05	~~<2.05E-05~~ 9.88 x 10^-5	<2.46E-05
Formaldehyde	<2.30E-05	<7.91E-06	<7.91E-06	<1.29E-05
Acetaldehyde	<1.18E-05	<8.16E-06	<6.12E-06	<8.69E-06
Acrolein	<2.15E-05	<2.60E-05	<2.60E-05	<2.45E-05
NH_3	4.37E-01	2.27E-01	1.71E-01	2.78E-01

SECTION 4

SAMPLING EQUIPMENT AND PROCEDURES

This section of the report describes the Air Toxics Hot spots test equipment and procedures.

The test method for NH_3 was BAAQMD Method ST-1B since CARB does not have a method. Benzene, naphthalene, toluene, xylene, propylene and total nonmethane hydrocarbon were collected in a manner similar to CARB Method 410, but a Summa electropolished 316 stainless steel canister was used in place of a Tedlar bag. the internals of these canisters are extremely smooth and offer numerous advantages:

- Blanks are very consistent and very low (<1 ppb) compared with much higher Tedlar bag blanks
- No artifact formation (e.g., outgassing from Tedlar bag)
- Easy to use and virtually leak-free
- No sample degradation from exposure to sunlight or loss of sample due to bag seam failure

Aldehydes, including formaldehyde, acetaldehyde and acrolein, were determined using CARB Method 430. Finally, CARB Method 1-3 was used to measure O_2 and CO_2 emitted from the engine.

Since the IC engine stack was small and the number of simultaneous sampling trains was greater than the stack could accommodate, an alternative approach to sampling was proposed. The volatile organics, NH_3 and aldehyde

trains do not require isokinetic sampling. A single-point sample probe was installed in the stack for these gaseous tests. A filter was mounted at the end of the probe to remove particulates and a heated Teflon line was used to transport the cleaned exhaust gas sample to ground level. A Teflon-coated diaphragm pump pumped the exhaust gases to a manifold. The gaseous samples were collected off this manifold. The following sections describe each measurement in detail.

4.1 SAMPLING PROCEDURES FOR ALDEHYDES

4.1.1 Preparation of the Aldehyde Sampling Train

All sampling train components were cleaned in the laboratory (soap and water, tap water rinse, distilled water rinse and acetonitrile rinse) to eliminate previous contamination. The sampling train components were sealed and transported to the sampling site. The CARB Method 430 equipment and procedures used to measure aldehydes consisted of:

- A teflon probe (6 inches long)
- A Pyrex glass midget impinger train in an icebath (impinger 1 was dry; impingers 2, 3 and 4 contained 15 ml DNPH; bubbler 5 was dry; bubbler 6 contained a weighed amount of silica gel)
- An umbilical to connect the probe and sample box to the control module
- A control module containing a vacuum pump and a calibrated dry gas meter to measure the pressure, temperature and flowrate throughout the train.

The sampling train was charged using freshly prepared reagents (within 48-hours). Blanks of all reagents were retained for subsequent analysis. A blank sample train was treated in the same manner.

4.1.2 Sampling Procedures for the Aldehyde Sampling Train

Prior to a test, the sampling train was heated and leak-checked at the maximum pump vacuum to insure leakage was less than 0.002 cfm. A constant sampling rate of 0.5 to 1.0 liter per minute was used to collect the sample over a 3-hour period. All pertinent data were recorded every 5 minutes on the data sheet. The gases leaving the impinger train were maintained at <68°F. At the end of a test, a leak check was performed at the maximum pump vacuum. The probe and impinger were sealed with aluminum foil.

4.1.3 Sample Recovery Procedures for the Aldehyde Sampling Train

Sample recovery occurred at the test site. Each impinger was removed from the icebath. The probe, glass connectors and impingers 1, 2, 3, 4 and 5 were rinsed with distilled water and the rinsings were transferred to an amber glass sample bottle. All sample bottles were marked, labeled and stored on ice. A chain-of-custody log was completed and the field data sheet was labeled with the sample ID numbers. The blank sample train was recovered in the same manner. The sampling train was then recharged in preparation for the next test.

4.2 VOLATILE ORGANIC COMPOUNDS SAMPLING PROCEDURES

4.2.1 Sampling Train Preparation for Volatile Organic Compounds (VOC)

VOC includes benzene, naphthalene, toluene, xylene and propylene. The Summa electropolished stainless steel canister (6 liter) used to collect the VOC was thoroughly cleaned prior to use in the field. The container was put in an oven and heated to drive off any organic contamination. Ultra-pure nitrogen was used to purge the canister during the heating step to remove any contamination. After completing the canister cleaning, a sample of the

purge gas was collected and analyzed for hydrocarbon to determine the blank for the canister. The canister was then sealed for shipment to the field.

4.2.2 Sampling Procedures for Volatile Organic Compounds (VOC)

A 1/8-inch stainless steel probe was connected to the flow regulator on the Summa electropolished stainless steel canister. An integrated grab sample of the exhaust gases was collected at a constant sampling rate over the 3-hour test period. The canister was then sealed for shipment back to the laboratory.

4.3 AMMONIA SAMPLING PROCEDURES

4.3.1 Sample Train Preparation for NH_3 Sampling Train

All sampling train components were cleaned in the laboratory (soap and water, tap water rinse, distilled water rinse, and IPA rinse) to eliminate previous contamination. The sampling train components were sealed and transported to the sampling site. The BAAQMD Method ST-1B equipment and procedures used to measure NH_3 consisted of:

- A 6-inch Teflon sampling probe
- A Pyrex glass impinger train in an icebath (impingers 1 and 2 contained 100 ml 0.1 N HCl; bubbler 3 was dry; bubbler 4 contained a weighed amount of silica gel)
- An umbilical to connect the probe and sample box to the control module
- A control module containing a vacuum pump, a calibrated dry gas meter and a calibrated orifice meter to measure the pressure, temperature and flowrate throughout the train.

The sampling train was charged using freshly prepared reagents. Blanks of all reagents were retained for subsequent analysis.

4.3.2 Sampling Procedures for NH_3 Sampling Train

Prior to a test, the sampling train was leak-checked at 15-inches Mercury to insure leakage was less than 0.02 cfm. The probe was connected to the manifold. A constant sampling rate was calculated using an HP-41CV calculator. All pertinent data was recorded every 5 minutes on the data sheet. The gases leaving the impinger train were maintained at <68°F. At the end of the test, the sampling train was withdrawn for the final leak check. This leak check was performed at 15-inches Mercury or at the highest vacuum achieved during the test. The impinger train was sealed with aluminum foil.

4.3.3 Sample Recovery Procedures for NH_3 Sampling Train

Sample recovery occurred at the test site. Each impinger was removed from the icebath. The contents of impingers 1, 2 and 3 were transferred to a polyethylene sample bottle. Distilled water rinsings of the impinger train were transferred to this same bottle. All sample bottles were marked and labeled. A chain-of-custody log was completed and the field data sheet was also labeled with the sample ID numbers. The sampling train was then recharged in preparation for the next test.

SECTION 5

ANALYTICAL PROCEDURES

This section of the report describes the analytical procedures used to analyze the samples collected on this test program. Pacific Gas Technology conducted the fuel gas analyses. Enseco in Sacramento, California conducted the aldehyde analyses. Enseco of El Monte, California conducted the analyses of the Summa canisters. Pape & Steiner Environmental Services analyzed the NH_3 samples.

5.1 ANALYSIS OF VOLATILE ORGANIC COMPOUNDS

A sample of the VOC gases contained in the 6-liter Summa canister was metered through a mass flow controller into a cryogenically-cooled trap with a temperature control assembly (Nutech Model 320-01). After 500 ml of the sample had been trapped, a valve was switched and the trap was rapidly heated (-160°C to 120°C in 60 seconds) to purge the trap's contents onto the GC column (OV-1 capillary column, 0.53 mm X 50 m with 0.88 μm crosslinked methyl silicone coating). The individual VOCs were separated by the GC (HP Model 5890 with temperature programming and jet separator option) and measured by the mass selective detector (HP Model 5970B with HP-1000 RTE-A data system) within a preselected range of atomic mass units (amu). A library was then performed to identify the compounds eluted from the GC.

An initial calibration curve consisting of three standards was run in the linear working range of the instrument. Each day, the mass spectrometer

had to meet the tuning criteria described in Table 4 of EPA Compedium Method TO-14. After tuning, a single point check standard was analyzed. Ninety percent of the target compound concentrations had to be within +30% of the three-point calibration curve. If the check standard failed to meet this criterion, a new three-point calibration curve was run. This daily, one-point check standard was used to calculate the concentration of the samples.

5.2 ANALYSIS OF NH_3 SAMPLES

A 50 ml aliquot of the impinger liquid was measured. The NH_3 was determined directly using a calibrated specific ion electrode. The 50 ml aliquot was placed in a 100 ml beaker with a Teflon stir bar. NH_3 ionic strength adjuster (ISA) solution was added until a blue color persisted. The electrode was rinsed with distilled water, immersed in the liquid, and allowed to reach a stable reading. A blank of the 0.1 N HCl impinger solution was treated in an identical manner.

5.3 ANALYSIS OF ALDEHYDES

Aldehydes react with DNPH by nucleophilic addition to the carbonyl radical followed by 1,2-elimination of water and the formation of the 2,4-dinitrophenylhydrazone. Acid is required to promote protonation of the carbonyl radical because DNPH is a weak nucleophile.

After organic solvent extraction, the DNPH-aldehyde derivatives were separated using reverse phase HPLC and detected with an ultraviolet (UV) adsorption detector operated at 360 nm.

Aldehydes in the sample were identified and quantified by comparison of retention times and area counts, respectively, with those of standard samples.

A blank solution of the DNPH impinger absorption solution was treated in the same manner.

5.4 FUEL

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

TABLE 5-1. FUEL ANALYSIS METHODS

LABORATORY TEST PROCEDURES FOR FUEL OILS AND FUEL GASES

Reference: EPA Title 40, Section 60.45

FUEL OIL TESTS:	
Sediment and Water, Vol. %	ASTM D4007-81
Gravity by Hydrometer (API)	ASTM D1298-80
API Gravity Corrected to 60°F	ASTM Table 5A
Gross Calorific Value (Btu/lb)	ASTM D2015-77
Ultimate Analysis (C, H, O, N, S, wt. %)	
Carbon, Hydrogen	ASTM D3178-73
Nitrogen (chemiluminescence detector)	ASTM D3431-80
Sulfur	ASTM D2622-82
Ash	ASTM D482
Oxygen	ASTM D3176-74
GASEOUS FUELS BY GAS-LIQUID CHROMATOGRAPHY:	
Gas Analysis	ASTM D1945-81
Sulfur Analysis	CPA B16
Calculation of Gross Calorific Value	ASTM D3588-81
Component Weight %, F-factor calculations	EPA 40:60.45
PROCEDURES FOR SCRUBBER LIQUOR ANALYSIS:	
Specific Gravity	ASTM D1[illegible]
Chlorides	ASTM D512-67

PACIFIC GAS TECHNOLOGY

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GAS ANALYSIS BY CHROMATOGRAPH

PAPE & STEINER ENVIRONMENTAL SERVICES
5801 Norris Road
Bakersfield, CA 93308

SAMPLED: APRIL 11, 1990
SUBMITTED: APRIL 12, 1990
REPORTED: APRIL 18, 1990

Attention: Jim Steiner

RECEIVED
APR 20 1990
Ans'd.....

LAB # 2742

Sample ID : SO CAL GAS
GOLETA
FUEL GAS

P&S ID # : 22557

ANALYZED GAS	MOLE %	WT %	CHONS WT %	
OXYGEN	ND	0.00	CARBON	74.30
NITROGEN	0.12	0.20	HYDROGEN	24.42
CARBON DIOXIDE	0.56	1.48	OXYGEN	1.08
HYDROGEN	ND	0.00	NITROGEN	0.20
CARBON MONOXIDE	ND	0.00	SULFUR	0.00
HYDROGEN SULFIDE	ND	0.00		
METHANE	98.01	94.40		
ETHANE	0.41	0.74		
PROPANE	0.34	0.90		
iso-BUTANE	0.14	0.49		
n-BUTANE	0.22	0.77		
iso-PENTANE	0.07	0.30		
n-PENTANE	0.04	0.17		
HEXANE +	0.09	0.16		

SPECIFIC GRAVITY * : 0.575

SPECIFIC VOLUME : 22.82 cu ft/lb

HYDROGEN SULFIDE (Draeger) : ppm

TOTAL * BTU/cu ft	DRY	1028	NET * BTU/cu ft	DRY	927
	WET	1010		WET	911
BTU/lb		23456	BTU/lb		21147

* CALCULATED ACCORDING TO : ASTM D-3588

SECTION 6

QUALITY ASSURANCE

6.1 MANUAL SAMPLING EQUIPMENT

A detailed record of repair and maintenance to each sampling train is kept. Preventative maintenance to each system is performed periodically to avoid complete component breakdown during a field test.

A detailed record of sampling system calibrations is also kept. Calibration data for the sampling nozzles, pitot tubes, dry gas meters and orifice meters are available for review. Results of the EPA Quality Assurance Branch biannual audits of the dry gas meter and orifice meter combinations are also logged and verify our in-house calibration data. The calibration data for the equipment used on this program can be found in the Appendix.

6.2 LAB ANALYSIS

All field samples are assigned a label and an ID number. This ID is also affixed to a chain-of-custody log and to the field data sheet to eliminate any chance of sample mixup.

Prior to analysis, all glassware is thoroughly cleaned (soap and water, tap water rinse, distilled water rinse, IPA rinse) to eliminate any contamination. The evaporating dishes used to evaporate the washings are treated the same as a sample (dried in an oven, desiccated and weighed repeatedly at 6-hour intervals until a constant weight is achieved). The

glassware used to measure volumes and make transfers and dilutions are all NBS Class A to insure accurate measurements. All weighings are carried out on a Sartorius Research Model R160P electronic semi-micro balance supported by a marble table in a separate room from the main analytical laboratory. The balance is calibrated regularly against an NBS Class S-1 weight.

All reagents used in the field and in the laboratory are ACS reagent grade and blanks of these reagents are evaluated for every set of tests. Blanks are taken in the field from the squeeze bottles and not the original container. Records are kept on these blanks to insure consistent quality of the reagents.

A quality control program consisting of duplicate analyses (to measure precision), spikes (to measure recovery efficiency) or analysis of blind standards supplied by EPA's Quality Assurance Branch (to measure accuracy) is implemented for each test program. Table 6-1 summarizes the results of the QC checks on this program.

6.3 ALDEHYDE ANALYSIS

Prior to shipping the DNPH to the test site, Enseco purified the DNPH and checked it for contamination. Enseco evaluated a method blank, spiked a control sample twice to determine percent recovery and repeatability for the analyses, and evaluated a sampling train blank. The results of the QA/QC checks appear in Appendix C.

6.4 VOC ANALYSIS

A laboratory control sample (LCS) is analyzed after the check standard. This sample consists of the target VOCs prepared in a separate canister at a concentration that differs from that of the check standard. Five compounds are used to assess control for the LCS: methylene chloride,

1,1-dichloroethene, trichloroethene, toluene and 1,1,2,2-tetrachloroethane. The percent recovery for the five control compounds must be within a window of 80-115%.

For each lot of 20 samples analyzed, a duplicate control sample (DCS) is analyzed after the LCS. The DCS is identical to the LCS in composition and source. The 80-115% recovery criterion must be met. In addition, the relative percent difference (RPD) for the LCS and DCS must be <20%.

A system blank of the HC-free air must be analyzed after the LCS and DCS. The blank results must indicate that there are no target compounds present above the minimum detection level.

The results of these checks appear in Appendix C.

TABLE 6-1. NH_3 QA/QC CHECKS

Test Location	Test No.	Test Parameter	Duplicate %	Recovery %
Inlet	1	NH_3	101.1	
	2	NH_3	100.0	97.8
Outlet	1	NH_3	100.4	
	2	NH_3	?	107.8

duplicate sample.

Test #3

APPENDIX A

PAPE & STEINER RAW DATA

Pape & Steiner Environmental Services

PLANT SoCalGas GoLETA TEST TYPE NH3 FIELD TEST DATA SHEET (Page 1 of 3)

Date 4-10-90
Test Location ENG#3
Run Number 1 INLET
Stack Diameter N/A
Operator SM
Filter No. N/A

Barometric Pressure 30.45
Static in. wg. N/A
Probe Type/Length N/A
Pitot Coefficient N/A
Meter Box No./γ 761/.9940
Nozzle No./Size STRAIGHT

Impinger Volumes/Weights			
Contents	Final	Initial	Net
0.1N. HCL		N/A	
0.1N HCL		N/A	
DRY		N/A	
S.G.		N/A	
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial	.006	15.0
Final	.002	2.0"

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	1015 0.0		1.0	405.712	N/A	N/A	N/A	58	75	71	2.0	N/A	CANISTER # A-033
	5.0		1.0	408.605				52	82	71	2.0		
	10.0		1.0	411.210				51	87	74	2.0		
	15.0		1.0	413.813				51	91	75	2.0		
	20.0		1.0	416.526				49	94	77	2.0		
	25.0		1.0	419.230				47	96	79	2.0		
	30.0		1.0	421.990				48	98	81	2.0		
	35.0		1.0	424.749				49	99	83	2.0		
	40.0		1.0	427.507				51	100	84	2.0		
	45.0		1.0	430.269				53	101	86	2.0		
	50.0		1.0	433.034				55	102	86	2.0		
	55.0		1.0	435.789				57	102	87	2.0		
	60.0		1.0	438.558				58	103	88	2.0		
									87.37				

Pape & Steiner Environmental Services

PLANT So Cal Gas Goleta TEST TYPE NH3 FIELD TEST DATA SHEET (Page 2 of 3)

Date 4-10-90
Test Location ENG #3
Run Number 1 INLET
Stack Diameter N/A
Operator SM
Filter No. N/A

Barometric Pressure 30.45
Static in. wg. N/A
Probe Type/Length N/A
Pitot Coefficient N/A
Meter Box No./γ 761/.9940
Nozzle No./Size STRAIGHT

Impinger Volumes/Weights			
Contents	Final	Initial	Net
0.1N HCL		N/A	
0.1N HCL		N/A	
DRY		N/A	
S.G.		N/A	
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial	.006	15.0"
Final	.002	2.0"

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
	65.0		1.0	441.242	N/A	N/A	N/A	57	103	88	2.0	N/A	
	70.0		1.0	443.945				58	104	89	2.0		
	75.0		1.0	446.695				54	104	90	2.0		BHW-1 22585 NH3
	80.0		1.0	449.452				53	104	90	2.0		
	85.0		1.0	452.203				52	105	91	2.0		HF-1 22579
	90.0		1.0	454.960				53	107	91	2.0		
	95.0		1.0	457.720				53	106	93	2.0		
	100.0		1.0	460.542				54	106	92	2.0		
	105.0		1.0	463.351				55	105	92	2.0		
	110.0		1.0	466.165				56	106	92	2.0		
	115.0		1.0	468.967				57	106	92	2.0		
	120.0		1.0	471.787				53	106	92	2.0		
										98.09			

Pape & Koch Environmental Services

PLANT SCAN GAS GEN TEST TYPE NH3 FIELD TEST DATA SHEET (Page 3 of 3)

Date 4-10-90
Test Location ENG #3
Run Number 1 INLET
Stack Diameter N/A
Operator SM
Filter No. N/A

Barometric Pressure 30.45
Static in. wg. N/A
Probe Type/Length N/A
Pitot Coefficient N/A
Meter Box No./γ .761 / .9940
Nozzle No./Size STRAIGHT

Impinger Volumes/Weights			
Contents	Final	Initial	Net
0.1 N HCL		N/A	
0.1 N HCL		N/A	
DRY		N/A	
S.G.		N/A	
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial	.006	15.0"
Final	.002	2.0"

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	125.0		1.0	474.567	N/A	N/A	N/A	52	106	92	2.0	N/A	
	130.0		1.0	477.370				53	106	92	2.0		
	135.0		1.0	480.201				54	106	92	2.0		
	140.0		1.0	482.962				55	106	92	2.0		
	145.0		1.0	485.775				55	105	92	2.0		
	150.0		1.0	488.927				56	105	92	2.0		
	155.0		1.0	491.348				57	105	91	2.0		
	160.0		1.0	494.145				53	105	91	2.0		
	165.0		1.0	496.920				52	106	91	2.0		
	170.0		1.0	499.687				53	107	92	2.0		
	175.0		1.0	502.862				54	108	93	2.0		
	180.0			504.568									
T/A	1315		1.0	98.856					94.	56			

Pape & Steiner Environmental Services

PLANT SoCalGas Goleta TEST TYPE NH3 FIELD TEST DATA SHEET (Page 1 of 3)

Date 4-10-90
Test Location ENG #3
Run Number 2 INLET
Stack Diameter N/A
Operator SM
Filter No. N/A

Barometric Pressure 30.38
Static in. wg. N/A
Probe Type/Length N/A
Pitot Coefficient N/A
Meter Box No./γ 761/.9940
Nozzle No./Size STRAIGHT

Impinger Volumes/Weights			
Contents	Final	Initial	Net
0.1N HCL			
0.1N HCL			
DRY			
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial	.008	15.0"
Final	.004	3.5"

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	1400 0.0		1.0	505.027	N/A	N/A	N/A	57	78	78	3.0	N/A	CANISTER # A-015
	5.0		1.0	507.769				51	86	80	3.0		BKW-2 22577 NH3
	10.0		1.0	510.510				50	92	80	3.0		
	15.0		1.0	513.230				51	96	81	3.0		AK-2 22571
	20.0		1.0	516.001				51	99	83	3.0		
	25.0		1.0	518.698				53	102	86	3.0		
	30.0		1.0	521.445				53	104	87	3.0		
	35.0		1.0	524.221				54	105	88	3.0		
	40.0		1.0	526.875				56	106	91	3.0		
	45.0		1.0	529.599				57	107	91	3.0		
	50.0		1.0	532.373				59	108	93	3.0		
	55.0		1.0	535.178				60	108	93	3.0		
	60.0		1.0	537.955				56	107	93	3.0		

Pape & Co[illegible]er Environmental Services

PLANT Solar Gas Gdetta TEST TYPE NH3 FIELD TEST DATA SHEET (Page 2 of 3)

Date 4-10-90
Test Location ENG #3
Run Number 2 INLET
Stack Diameter N/A
Operator SM
Filter No. N/A

Barometric Pressure 30.38
Static in. wg. N/A
Probe Type/Length N/A
Pitot Coefficient N/A
Meter Box No./γ 761/.9940
Nozzle No./Size STRAIGHT

Impinger Volumes/Weights			
Contents	Final	Initial	Net
0.1N HCL			
0.1N HCL			
DRY			
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial	.008	15.0"
Final	.004	3.5"

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	65.0		1.0	540.751	N/A	N/A	N/A	55	107	94	3.0	N/A	
	70.0		1.0	543.557				55	107	93	3.0		
	75.0		1.0	546.338				55	106	93	3.0		
	80.0		1.0	549.128				56	104	92	3.0		
	85.0		1.0	551.959				57	103	91	3.0		
	90.0		1.0	554.826				57	103	91	3.0		
	95.0		1.0	557.695				58	103	90	3.0		
	100.0		1.0	560.418				58	102	89	3.0		
	105.0		1.0	563.081				56	102	89	3.0		
	110.0		1.0	565.848				55	102	89	3.0		
	115.0		1.0	568.652				55	102	88	3.0		
	120.0		1.0	571.593				56	102	88	3.0		

Pape & Steiner Environmental Services

PLANT SoCalGas Goleta TEST TYPE NH3 FIELD TEST DATA SHEET (Page 3 of 3)

Date 4-10-90
Test Location ENG #3
Run Number 2 INLET
Stack Diameter N/A
Operator SM
Filter No. N/A

Barometric Pressure 30.38
Static in. wg. N/A
Probe Type/Length N/A
Pitot Coefficient N/A
Meter Box No./γ 761/.9940
Nozzle No./Size STRAIGHT

Impinger Volumes/Weights			
Contents	Final	Initial	Net
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial	.008	15.0"
Final	.004	3.5"

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	125.0		1.0	574.210	N/A	N/A	N/A	58	102	89	3.0	N/A	
	130.0		1.0	576.975				59	102	89	3.0		
	135.0		1.0	579.773				56	103	90	3.0		
	140.0		1.0	582.651				55	104	90	3.0		
	145.0		1.0	585.316				56	104	90	3.0		
	150.0		1.0	588.070				58	104	90	3.0		
	155.0		1.0	590.845				59	104	90	3.0		
	160.0		1.0	593.603				60	104	90	3.0		
	165.0		1.0	596.358				61	104	90	3.0		
	170.0		1.0	599.118				63	104	90	3.0		
	175.0		1.0	601.882				64	104	91	3.0		
	180.0			604.632									
TA	1700		1.0	99.605					95.56				

Paper Environmental Services

PLANT SoCalGas Goleta T. (YPE NH3 FIELD TEST DATA SHEET (Pag(__ of 3)

Date 4-11-90
Test Location ENG #3
Run Number 3 INLET
Stack Diameter N/A
Operator SM
Filter No. N/A

Barometric Pressure 30.31
Static in. wg. N/A
Probe Type/Length N/A
Pitot Coefficient N/A
Meter Box No./γ 261/.9940
Nozzle No./Size STRAIGHT

Impinger Volumes/Weights			
Contents	Final	Initial	Net
0.1N HCL			
0.1N HCL			
DRY			
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial	.009	15.0"
Final	.003	2.0"

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	0825 0.0		1.0	605.033	N/A	N/A	N/A	68	66	66	2.0	N/A	CANISTER # A-007
	5.0		1.0	607.659				62	74	67	2.0		RMW-3 22569 NH3
	10.0		1.0	610.352				57	79	68	2.0		
	15.0		1.0	612.967				55	84	70	2.0		22563 HC-3
	20.0		1.0	615.669				55	86	72	2.0		
	25.0		1.0	618.321				56	90	75	2.0		22557 F.G-ALL
	30.0		1.0	621.024				57	91	76	2.0		
	35.0		1.0	623.738				58	93	79	2.0		
	40.0		1.0	626.380				59	94	81	2.0		
	45.0		1.0	629.098				60	95	82	2.0		
	50.0		1.0	631.970				60	96	83	2.0		
	55.0		1.0	634.575				62	98	85	2.0		
	60.0		1.0	637.410				62	99	86	2.0		

Pape & Cer Environmental Services

PLANT SoCal Gas Goleta TEST TYPE NH3 FIELD TEST DATA SHEET (Page 2 of 3)

Date 4-11-90
Test Location ENG #3
Run Number 3 INLET
Stack Diameter N/A
Operator SM
Filter No. N/A

Barometric Pressure 30.31
Static in. wg. N/A
Probe Type/Length N/A
Pitot Coefficient N/A
Meter Box No./γ 761/.9940
Nozzle No./Size STRAIGHT

Impinger Volumes/Weights			
Contents	Final	Initial	Net
0.1N HCL			
0.1N HCL			
DRY			
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial	.009	15.0"
Final	.003	2.0"

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	65.0		1.0	640.070	N/A	N/A	N/A	63	99	86	2.0	N/A	
	70.0		1.0	642.964				63	100	88	2.0		
	75.0		1.0	645.564				63	100	88	2.0		
	80.0		1.0	648.321				63	100	89	2.0		
	85.0		1.0	651.067				64	101	89	2.0		
	90.0		1.0	653.819				63	101	89	2.0		
	95.0		1.0	656.610				64	101	89	2.0		
	100.0		1.0	659.320				64	101	89	2.0		
	105.0		1.0	662.075				66	102	90	2.0		
	110.0		1.0	664.832				66	102	90	2.0		
	115.0		1.0	667.574				65	101	90	2.0		
	120.0		1.0	670.331				66	100	89	2.0		
									~~100~~				

Pape & Steiner Environmental Services

PLANT SoCalGas Goleta TEST TYPE NH3 FIELD TEST DATA SHEET (Page 3 of 3)

Date 4-11-90
Test Location ENG #3
Run Number 3 INLET
Stack Diameter N/A
Operator SM
Filter No. N/A

Barometric Pressure 30.31
Static in. wg. N/A
Probe Type/Length N/A
Pitot Coefficient N/A
Meter Box No./γ 761/.9940
Nozzle No./Size STRAIGHT

Impinger Volumes/Weights			
Contents	Final	Initial	Net
0.1N HCL			
0.1N HCL			
DRY			
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial	.009	15.0"
Final	.003	2.0"

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	125.0		1.0	673.071	N/A	N/A	N/A	66	100	89	2.0	N/A	
	130.0		1.0	675.885				64	101	89	2.0		
	135.0		1.0	678.568				64	101	89	2.0		
	140.0		1.0	681.341				65	102	90	2.0		
	145.0		1.0	684.062				64	103	91	2.0		
	150.0		1.0	686.809				61	103	91	2.0		
	155.0		1.0	689.592				60	104	92	2.0		
	160.0		1.0	692.292				62	104	92	2.0		
	165.0		1.0	695.076				63	104	93	2.0		
	170.0		1.0	697.825				64	104	93	2.0		
	175.0		1.0	700.641				65	104	93	2.0		
	180.0			703.341									
TA	1125			98.308					90.84				

Pape[illegible]er Environmental Services

PLANT SoCal Gas Goleta T (TYPE CARB M-430 FIELD TEST DATA SHEET (Pa[illegible] 1 of 3)

Date 4-16-90
Test Location ENG#3
Run Number 1 INLET
Stack Diameter N/A
Operator SM
Filter No. N/A

Barometric Pressure 30.45
Static in. wg. N/A
Probe Type/Length N/A
Pitot Coefficient N/A
Meter Box No./γ Pbet/.9978
Nozzle No./Size STRAIGHT

Impinger Volumes/Weights			
Contents	Final	Initial	Net
DRY		N/A	
DNPH		15.0ML	
DNPH		15.0ML	
DNPH		15.0ML	
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial	.0010	MAX
Final	.00[illegible]	MAX

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	1016 0.0			687.085	N/A	N/A	N/A	60	73	73		N/A	
	5.0			687.137				53	74	73			
	10.0			687.149				50	75	73			
	15.0			687.156				50	76	74			
	20.0			687.235				52	78	74			
	25.0			687.344				50	79	75			
	30.0			687.441				49	81	75			
	35.0			687.535				51	81	75			
	40.0			687.642				53	82	75			
	45.0			687.727				54	83	77			
	50.0			687.787				55	86	77			
	55.0			687.867				55	86	77			
	60.0			687.918				56	86	78			

Pape & Associates Environmental Services

PLANT SoCalGas Goleta TEST TYPE CARB M-430 FIELD TEST DATA SHEET (Page 2 of 3)

Date 4-10-90
Test Location Eng. #3
Run Number 1 INLET
Stack Diameter N/A
Operator SM
Filter No. N/A

Barometric Pressure 30.45
Static in. wg. N/A
Probe Type/Length N/A
Pitot Coefficient N/A
Meter Box No./γ Port/.9978
Nozzle No./Size STRAIGHT

Impinger Volumes/Weights			
Contents	Final	Initial	Net
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial	.0010	MAX
Final	.0005	MAX

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	65.0			688.097	N/A	N/A	N/A	56	89	82		N/A	
	70.0			688.277				57	89	81			BHW-1 22583 DNPH
	75.0			688.378				53	89	81			ORG-1 22581
	80.0			688.456				51	93	81			
	85.0			688.527				51	94	86			22559 BLANK-ALL
	90.0			688.720				52	92	87			
	95.0			688.905				52	91	86			
	100.0			689.096				52	93	85			
	105.0			689.283				53	93	86			
	110.0			689.443				55	97	90			
	115.0			689.618				57	98	93			
	120.0			689.773				52	97	93			

Pape & Steiner Environmental Services

PLANT SoCal Gas Goleta TEST TYPE CARB M-430 FIELD TEST DATA SHEET (Page 3 of 3)

Date 4-10-90
Test Location ENG #3
Run Number 1 INLET
Stack Diameter N/A
Operator SM
Filter No. N/A

Barometric Pressure 30.45
Static in. wg. N/A
Probe Type/Length N/A
Pitot Coefficient N/A
Meter Box No./γ Ref/.9978
Nozzle No./Size STRAIGHT

Impinger Volumes/Weights			
Contents	Final	Initial	Net
DRY		~~[illegible]~~	
DNPH		15.0 ML	
DNPH		15.0 ML	
DNPH		15.0 ML	
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial	.0010	MAX
Final	.0005	MAX

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
	125.0			689.932	N/A	N/A	N/A	53	97	92		N/A	
	130.0			690.098				53	98	94			
	135.0			690.263				54	96	91			
	140.0			690.401				55	96	93			
	145.0			690.591				55	93	89			
	150.0			690.715				56	91	89			
	155.0			690.925				57	91	91			
	160.0			691.107				56	93	92			
	165.0			691.269				54	93	92			
	170.0			691.432				54	94	93			
	175.0			691.601				55	96	95			
	180.0			691.734									
	1316 T/A			4.649					86	51			

Pape & Steiner Environmental Services

PLANT So. Cal Gas Co. TEST TYPE CARB M-430 FIELD TEST DATA SHEET (Page 1 of 3)

Date 4-10-90
Test Location ENG #3
Run Number 2 INLET
Stack Diameter N/A
Operator SM
Filter No. N/A

Barometric Pressure 30.38
Static in. wg. N/A
Probe Type/Length N/A
Pitot Coefficient N/A
Meter Box No./γ PORT/.9978
Nozzle No./Size STRAIGHT

Impinger Volumes/Weights			
Contents	Final	Initial	Net
DRY			
DNPH		15.0ML	
DNPH		15.0ML	
ANPH		15.0ML	
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial	.0005	MAX
Final	.0010	MAX

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	1400 0.0			692.029	N/A	N/A	N/A	56	79	79		N/A	
	5.0			692.215				50	88	86			22575
	10.0			692.395				49	89	85			22573
	15.0			692.565				50	92	87			
	20.0			692.748				50	93	87			
	25.0			692.898				51	95	87			
	30.0			693.051				52	96	89			
	35.0			693.156				53	93	92			
	40.0			693.235				55	91	90			
	45.0			693.285				56	89	88			
	50.0			693.363				57	88	87			
	55.0			693.414				58	87	84			
	60.0			693.483				53	86	82			

Pape & Steiner Environmental Services

PLANT SoCalGas Goleta TEST TYPE CARB M-430 FIELD TEST DATA SHEET (Page 2 of 3)

Date 4-10-90
Test Location ENG #3
Run Number 2 INLET
Stack Diameter N/A
Operator SM
Filter No. N/A

Barometric Pressure 30.38
Static in. wg. N/A
Probe Type/Length N/A
Pitot Coefficient N/A
Meter Box No./γ 1.9978
Nozzle No./Size STRAIGHT

Impinger Volumes/Weights			
Contents	Final	Initial	Net
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial	.0005	MAX
Final	.0010	MAX

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	65.0			693.527	N/A	N/A	N/A	53	86	82		N/A	
	70.0			693.598				54	86	80			
	75.0			693.650				54	83	77			
	80.0			693.705				56	83	77			
	85.0			693.768				56	82	76			
	90.0			693.818				57	82	77			
	95.0			693.875				57	81	76			
	100.0			693.927				58	81	76			
	105.0			694.004				54	82	76			
	110.0			694.078				54	82	76			
	115.0			694.154				55	82	76			
	120.0			694.228				56	81	75			

Pape & Steiner Environmental Services

PLANT SoCal Gas Goleta TEST TYPE CARB-M-430 FIELD TEST DATA SHEET (Page 3 of 3)

Date 4-10-90
Test Location Eng #3
Run Number 2 INLET
Stack Diameter N/A
Operator SM
Filter No. N/A

Barometric Pressure 30.38
Static in. wg. N/A
Probe Type/Length N/A
Pitot Coefficient N/A
Meter Box No./γ Port/.9978
Nozzle No./Size STRAIGHT

Impinger Volumes/Weights			
Contents	Final	Initial	Net
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial	.0005	MAX
Final	.0010	MAX

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	125.0			694.286	N/A	N/A	N/A	57	83	76		N/A	
	130.0			694.368				56	84	77			
	135.0			694.428				55	84	78			
	140.0			694.508				55	84	78			
	145.0			694.552				57	84	78			
	150.0			694.625				58	84	78			
	155.0			694.675				58	84	77			
	160.0			694.746				59	84	76			
	165.0			694.790				60	83	78			
	170.0			694.934				61	84	76			
	175.0			695.055				63	84	78			
	180.0			695.177									
TA	1700			3.148					83.00				

Pape & Steiner Environmental Services

PLANT So Cal Gas Goleta TEST TYPE CARB M-430 FIELD TEST DATA SHEET (Page 1 of 3)

Date 4-11-90
Test Location ENG #3
Run Number 3 INLET
Stack Diameter N/A
Operator SM
Filter No. N/A

Barometric Pressure 30.31
Static in. wg. N/A
Probe Type/Length N/A
Pitot Coefficient N/A
Meter Box No./γ PBET/.9978
Nozzle No./Size STRAIGHT

Impinger Volumes/Weights			
Contents	Final	Initial	Net
DRY			
DNPH			
DNPH			
DNPH			
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial	.0015	MAX
Final	.0010	MAX

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	0826 0.0			695.405	N/A	N/A	N/A	65	84	77		N/A	
	5.0			695.542				57	90	72			22567 DNPH-3
	10.0			695.625				52	91	70			
	15.0			695.703				50	73	70			22565
	20.0			695.817				50	74	70			
	25.0			695.918				51	75	70			
	30.0			696.026				52	75	70			
	35.0			696.128				53	76	69			
	40.0			696.214				54	78	71			
	45.0			696.290				54	79	71			
	50.0			696.373				55	81	72			
	55.0			696.521				57	81	72			
	60.0			696.648				54	81	73			

Pape & Steiner Environmental Services

PLANT SoCalGasGoleta TEST TYPE CARB-M-430 FIELD TEST DATA SHEET (Page 2 of 3)

Date 4-11-90
Test Location ENG #3
Run Number 3 INLET
Stack Diameter N/A
Operator SM
Filter No. N/A

Barometric Pressure 30.31
Static in. wg. N/A
Probe Type/Length N/A
Pitot Coefficient N/A
Meter Box No./γ PORT/.9990
Nozzle No./Size STRAIGHT

Impinger Volumes/Weights			
Contents	Final	Initial	Net
DRY			
DNPH			
DNPH			
DNPH			
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial	.0015	MAX
Final	.0010	MAX

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	65.0			696.775	N/A	N/A	N/A	54	82	73		N/A	
	70.0			696.887				55	82	72			
	75.0			697.003				56	81	74			
	80.0			697.109				56	82	74			
	85.0			697.196				56	83	74			
	90.0			697.285				57	83	74			
	95.0			697.388				58	83	74			
	100.0			697.470				60	83	74			
	105.0			697.547				61	83	75			
	110.0			697.595				61	83	75			
	115.0			697.680				62	81	76			
	120.0			697.778				63	81	78			

Pape & Steiner Environmental Services

PLANT SoCal Gas Goleta TEST TYPE CARB-M-430 FIELD TEST DATA SHEET (Page 3 of 3)

Date 4-11-90
Test Location Eng #3
Run Number 3 INLET
Stack Diameter N/A
Operator SM
Filter No. N/A

Barometric Pressure 30.31
Static in. wg. N/A
Probe Type/Length N/A
Pitot Coefficient N/A
Meter Box No./γ Pot/.9978
Nozzle No./Size STRAIGHT

Impinger Volumes/Weights			
Contents	Final	Initial	Net
DRY			
DNPH			
DNPH			
DNPH			
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial	.0015	MAX
Final	.0010	MAX

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	125.0			697.870	N/A	N/A	N/A	59	82	75		N/A	
	130.0			697.949				59	83	75			
	135.0			698.031				60	83	75			
	140.0			698.121				61	84	76			
	145.0			698.193				62	85	78			
	150.0			698.271				60	85	78			
	155.0			698.345				60	85	78			
	160.0			698.410				61	84	79			
	165.0			698.475				62	84	78			
	170.0			698.554				63	87	80			
	175.0			698.631				65	90	81			
	180.0			698.684									
TR	1126			3.279					76.21				

Pape & Steiner Environmental Services

PLANT So. Cal. Gas Goleta TEST TYPE NH3 FIELD TEST DATA SHEET (Page 1 of 3)

Date 4-10-90
Test Location Eng # 3
Run Number 1 Outlet
Stack Diameter N/A
Operator CR
Filter No. N/A

Barometric Pressure 30.45
Static in. wg. N/A
Probe Type/Length
Pitot Coefficient N/A
Meter Box No./γ 711/1.0022
Nozzle No./Size N/A

Impinger Volumes/Weights			
Contents	Final	Initial	Net
0.1 N HCl			
0.1 N HCl			
DRY			
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial	0.008	15.0
Final	0.004	5.0

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	1015	N/A	1.0	809.310	N/A	N/A	N/A	64	70	70	1.0	N/A	
	5		1.0	812.310				62	70	70	1.0		Canister #A-005
	10		1.0	815.305				61	83	80	1.0		
	15		1.0	817.415				60	93	84	1.0		BHW-1 22584 NH3
	20		1.0	820.570				58	96	86	1.0		
	25		1.0	823.280				58	97	89	1.0		ORG-1 22580
	30		1.0	828.850				57	98	90	1.0		
	35		1.0	828.495				57	99	92	1.0		M.E.-4 22578
	40		1.0	831.370				57	100	92	1.0		
	45		1.0	834.420				57	100	93	1.0		NH3-BK-ALC 22561
	50		1.0	837.510				56	101	93	1.0		
	55		1.0	840.420				56	102	94	1.0		BLK-ALC 22560
	60			842.940									

Pape & Steiner Environmental Services

PLANT So. Cal Gas Goleta TEST TYPE NH3 FIELD TEST DATA SHEET (Page 2 of 3)

Date 4-10-90
Test Location Eng # 3
Run Number 1 Outlet
Stack Diameter N/A
Operator CR
Filter No. N/A

Barometric Pressure 30.45
Static in. wg. N/A
Probe Type/Length
Pitot Coefficient N/A
Meter Box No./γ 711/1.0022
Nozzle No./Size N/A

Impinger Volumes/Weights			
Contents	Final	Initial	Net
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial		
Final		

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	60	N/A		842.940	N/A	N/A	N/A	56	102	94	1.0	N/A	
	65			846.005				57	102	96	1.0		
	70			848.710				57	103	96	1.0		
	75			851.395				58	104	97	1.0		
	80			854.375				57	104	97	1.0		
	85			857.410				57	104	98	1.0		
	90			860.030				58	106	99	1.0		
	95			863.175				58	106	99	1.0		
	100			865.860				58	106	100	1.0		
	105			868.570				57	106	100	1.0		
	110			871.390				57	106	100	1.0		
	115			874.150				57	106	100	1.0		
	120			876.945									

Pape & Steiner Environmental Services

PLANT So. Cal Gas Goleta TEST TYPE NH3 FIELD TEST DATA SHEET (Page 3 of 3)

Date 4-10-90
Test Location Eng #3
Run Number 1 Outlet
Stack Diameter N/A
Operator CR
Filter No. N/A

Barometric Pressure 30.45
Static in. wg. N/A
Probe Type/Length
Pitot Coefficient N/A
Meter Box No./γ 711/1.0022
Nozzle No./Size N/A

Impinger Volumes/Weights			
Contents	Final	Initial	Net
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial		
Final		

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	120	N/A	1.0	876.945	N/A	N/A	N/A	56	106	100	1.0	N/A	
	125		1.0	879.110				56	105	100	1.0		
	130		1.0	882.870				57	105	100	1.0		
	135		1.0	885.590				57	105	100	1.0		
	140		1.0	888.880				58	105	100	1.0		
	145		1.0	891.300				58	105	100	1.0		
	150		1.0	894.240				58	104	99	1.0		
	155		1.0	897.150				57	104	99	1.0		
	160		1.0	899.890				57	104	99	1.0		
	165		1.0	903.270				57	104	99	1.0		
	170		1.0	906.005				57	104	99	1.0		
	175		1.0	908.510				58	105	99	1.0		
	1315 180			911.259									
TA	1315		1.0	101.949					97.54				

Pape & Steiner Environmental Services

PLANT So. Cal Gas Goleta TEST TYPE NH3 FIELD TEST DATA SHEET (Page 1 of 3)

Date 4-10-90
Test Location Eng #3
Run Number 2 Outlet
Stack Diameter N/A
Operator CR
Filter No. N/A

Barometric Pressure 30.38
Static in. wg. N/A
Probe Type/Length
Pitot Coefficient N/A
Meter Box No./ 8711 / 1.0022
Nozzle No./Size N/A

Impinger Volumes/Weights			
Contents	Final	Initial	Net
0.1 N HCl			
0.1 N HCl			
DRY			
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial	0.010	15
Final	0.008	5.0

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	1400	N/A	1.0	911.617	N/A	N/A	N/A	65	89	88	1.0	N/A	Canister # A-062
	5		1.0	914.470				63	89	85	1.0		
	10		1.0	917.290				60	93	88	1.0		22576
	15		1.0	920.270				60	95	87	1.0		
	20		1.0	923.110				59	98	89	1.0		22572
	25		1.0	925.840				59	100	90	1.0		22570
	30		1.0	928.710				58	102	93	1.0		
	35		1.0	931.550				58	102	94	1.0		
	40		1.0	934.460				58	105	95	1.0		
	45		1.0	937.160				57	107	98	1.0		
	50		1.0	940.755				57	107	98	1.0		
	55		1.0	943.105				57	107	99	1.0		
	60								1194	1104			

Pape & Steiner Environmental Services

PLANT Sp. Cal Gas Goleta TEST TYPE NH3 FIELD TEST DATA SHEET (Page 2 of 3)

Date 4-10-90
Test Location Eng # 3
Run Number 2 Outlet
Stack Diameter N/A
Operator CR
Filter No. N/A

Barometric Pressure 30.38
Static in. wg. N/A
Probe Type/Length
Pitot Coefficient N/A
Meter Box No./γ 711/1.0022
Nozzle No./Size N/A

Impinger Volumes/Weights			
Contents	Final	Initial	Net
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial		
Final		

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	60	N/A	1.0	945.780	N/A	N/A	N/A	58	107	99		N/A	
	65		1.0	948.810				58	105	99			
	70		1.0	951.615				57	105	99			
	75		1.0	954.360				56	105	98			
	80		1.0	957.190				56	103	97			
	85		1.0	960.110				56	102	97			
	90		1.0	962.795				55	102	97			
	95		1.0	965.650				55	101	95			
	100		1.0	968.390				55	101	95			
	105		1.0	971.485				55	101	95			
	110		1.0	974.390				55	100	94			
	115		1.0	977.210				55	100	94			
	120			979.950					1232				

Pape & Steiner Environmental Services

PLANT So Cal Gas Goleta TEST TYPE NH3 FIELD TEST DATA SHEET (Page 3 of 3)

Date 4-10-90
Test Location Eng #3
Run Number 2 Outlet
Stack Diameter N/A
Operator CR
Filter No. N/A

Barometric Pressure 30.38
Static in. wg. N/A
Probe Type/Length
Pitot Coefficient N/A
Meter Box No./γ 711/1.0022
Nozzle No./Size N/A

Impinger Volumes/Weights			
Contents	Final	Initial	Net
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial		
Final		

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
	120	N/A	1.0	979.950	N/A	N/A	N/A	55	101	94	1.0	N/A	
	125		1.0	983.005				54	101	95	1.0		
	130		1.0	985.495				54	102	96	1.0		
	135		1.0	988.610				55	102	95	1.0		
	140		1.0	991.870				55	102	95	1.0		Spot check
	145		1.0	994.210				55	104	96	1.0		
	150		1.0	997.150				55	104	96	1.0		
	155		1.0	999.940				54	105	97	1.0		
	160		1.0	002.335				54	105	97	1.0		
	165		1.0	005.605				53	105	97	1.0		
	170		1.0	008.410				52	106	98	1.0		
	175		1.0	011.305				52	106	98	1.0		
	180			013.809					1243	1154			
TA	1700		1.0	102.192					98.42				

Pape & Steiner Environmental Services

PLANT So. Cal Gas Goleta TEST TYPE NH3 FIELD TEST DATA SHEET (Page 1 of 3)

Date 4-11-90
Test Location Eng # 3
Run Number 3 Outlet
Stack Diameter N/A
Operator CR
Filter No. N/A

Barometric Pressure 30.31
Static in. wg. N/A
Probe Type/Length
Pitot Coefficient N/A
Meter Box No./γ 711/1.0022
Nozzle No./Size N/A

Impinger Volumes/Weights			
Contents	Final	Initial	Net
0.1 N HCl			
0.1 N HCl			
DRY			
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial	0.009	15.0
Final	0.005	5.0

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
	0825	N/A	1.0	014.408	N/A	N/A	N/A	61	70	68	1.0	N/A	Canister #A-049
	5		1.0	017.240				59	75	69	1.0		
	10		1.0	019.950				57	77	68	1.0		BNW-3 22568 NH3
	15		1.0	022.660				56	83	71	1.0		
	20		1.0	025.340				55	87	74	1.0		CCA-3 22564
	25		1.0	028.080				56	89	78	1.0		
	30		1.0	030.800				56	91	80	1.0		
	35		1.0	033.520				59	93	82	1.0		
	40		1.0	036.250				60	96	85	1.0		
	45		1.0	039.030				58	97	86	1.0		
	50		1.0	041.860				57	98	88	1.0		
	55		1.0	044.660				56	99	89	1.0		
	60			047.210									

Pape & Steinter Environmental Services

PLANT SD Cal Gas Goleta TEST TYPE NH3 FIELD TEST DATA SHEET (Page 2 of 3)

Date 4-11-90
Test Location Eng #3
Run Number 3 Outlet
Stack Diameter N/A
Operator CR
Filter No. N/A

Barometric Pressure 30.31
Static in. wg. N/A
Probe Type/Length
Pitot Coefficient N/A
Meter Box No./ γ 711/1.0022
Nozzle No./Size N/A

Impinger Volumes/Weights			
Contents	Final	Initial	Net
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial		
Final		

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	60	N/A	1.0	047.210	N/A	N/A	N/A	58	103	92	1.0	N/A	
	65		1.0	050.440				58	104	93	1.0		
	70		1.0	053.990				59	102	94	1.0		
	75		1.0	056.100				59	103	95	1.0		
	80		1.0	058.945				57	104	95	1.0		
	85		1.0	061.850				57	105	96	1.0		
	90		1.0	064.675				56	104	96	1.0		
	95		1.0	067.805				56	106	97	1.0		
	100		1.0	070.070				56	106	97	1.0		
	105		1.0	073.320				58	107	97	1.0		
	110		1.0	076.350				58	106	98	1.0		
	115		1.0	079.095				58	106	98	1.0		
	120			082.015									

Pape & Steiner Environmental Services

PLANT So Cal Gas Goleta TEST TYPE NH3 FIELD TEST DATA SHEET (Page 3 of 3)

Date 4-11-90
Test Location Eng #3
Run Number 3 Outlet
Stack Diameter N/A
Operator CR
Filter No. N/A

Barometric Pressure 30.31
Static in. wg. N/A
Probe Type/Length
Pitot Coefficient N/A
Meter Box No./γ 711/1.0022
Nozzle No./Size N/A

Impinger Volumes/Weights			
Contents	Final	Initial	Net
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial		
Final		

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft³	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	√ΔP	Comments
	120	N/A	1.0	082.015	N/A	N/A	N/A	58	107	98	1.0	N/A	
	125		1.0	084.910				58	107	98	1.0		
	130		1.0	087.785				59	107	98	1.0		
	135		1.0	090.670				57	107	98	1.0		
	140		1.0	093.565				56	106	98	1.0		
	145		1.0	096.505				56	107	98	1.0		
	150		1.0	099.295				58	107	99	1.0		
	155		1.0	102.175				58	108	99	1.0		
	160		1.0	105.050				59	108	99	1.0		
	165		1.0	108.900				58	109	100	1.0		
	170		1.0	110.790				59	109	101	1.0		
	175		1.0	113.665				60	110	103	1.0		
	180			116.517									
TA	1125			102.109					95.53				

Pape & Steiner Environmental Services

PLANT So. Cal Gas Goleta TEST TYPE Carb 430 FIELD TEST DATA SHEET (Page 1 of 3)

Date 4-10-90
Test Location Eng # 3
Run Number 1 Outlet
Stack Diameter N/A
Operator CR
Filter No. N/A

Barometric Pressure 30.45
Static in. wg. N/A
Probe Type/Length
Pitot Coefficient N/A
Meter Box No./γ port 1.9976
Nozzle No./Size N/A

Impinger Volumes/Weights			
Contents	Final	Initial	Net
DRY			
DNPH			
DNPH			
DNPH			
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial	0.001	MAX
Final	0.002	MAX

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	1016	N/A		961.662	N/A	N/A	N/A	65	71	71	MAX	N/A	
	5			961.792				61	71	71			BMW 22582 DNPH -1
	10			961.859				60	71	71			
	15			961.920				59	71	71			22558 Blank Acc
	20			961.975				59	72	71			
	25			962.042				58	73	72			
	30			962.105				58	74	74			
	35			962.153				58	74	74			
	40			962.205				58	75	75			
	45			962.263				57	75	75			
	50			962.297				57	76	76			
	55			962.345				57	77	77			
	60			962.394									

Pape & Stellter Environmental Services

PLANT So. Cal Gas Goleta TEST TYPE CARB 430 FIELD TEST DATA SHEET (Page 2 of 3)

Date 4-10-90
Test Location Eng #3
Run Number 1 Outlet
Stack Diameter N/A
Operator CR
Filter No. N/A

Barometric Pressure 30.45
Static in. wg. N/A
Probe Type/Length
Pitot Coefficient N/A
Meter Box No./γ Port/.9976
Nozzle No./Size

Impinger Volumes/Weights			
Contents	Final	Initial	Net
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial		
Final		

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	60	N/A		962.394	N/A	N/A	N/A	57	77	76	MAX	N/A	
	65			962.427				57	77	76			
	70			962.463				57	78	77			
	75			962.544				57	79	78			
	80			962.625				58	79	78			
	85			962.710				58	80	79			
	90			962.790				59	80	79			
	95			962.883				59	79	78			
	100			962.958				58	79	78			
	105			963.075				58	79	78			
	110			963.135				58	79	78			
	115			963.200				58	79	78			
	120			963.300									

Pape & Steiner Environmental Services

PLANT So. Cal Gas Goleta TEST TYPE CARB 430 FIELD TEST DATA SHEET (Page 3 of 3)

Date 4-10-90
Test Location Eng # 3
Run Number 1 Outlet
Stack Diameter N/A
Operator CR
Filter No. N/A

Barometric Pressure 30.45
Static in. wg. N/A
Probe Type/Length
Pitot Coefficient N/A
Meter Box No./γ Port/.9976
Nozzle No./Size N/A

Impinger Volumes/Weights			
Contents	Final	Initial	Net
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial		
Final		

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	120	N/A		963.300	N/A	N/A	N/A	58	79	78	MAX	N/A	
	125			963.390				58	79	78			
	130			963.465				57	78	77			
	135			963.550				56	78	77			
	140			963.640				56	78	77			
	145			963.735				57	78	77			
	150			963.810				57	78	77			
	155			963.917				56	78	77			
	160			964.008				56	79	77			
	165			964.095				57	79	77			
	170			964.170				58	80	79			
	175			964.260				58	80	79			
	1316 180			964.338									
TA	1316			2.676					76.53				

Pape & Steiner Environmental Services

PLANT So Cal Gas Goleta TEST TYPE CARB 430 FIELD TEST DATA SHEET (Page 1 of 3)

Date 4-10-90
Test Location Eng # 3
Run Number 2 Outlet
Stack Diameter N/A
Operator CR
Filter No. N/A

Barometric Pressure 30.38
Static in. wg. N/A
Probe Type/Length
Pitot Coefficient N/A
Meter Box No./γ Port 1.9976
Nozzle No./Size N/A

Impinger Volumes/Weights			
Contents	Final	Initial	Net
DRY			
DNPH			
DNPH			
DNPH			
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial	0.0015	MAX
Final	0.0010	MAX

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	1401	N/A		964.520	N/A	N/A	N/A	63	78	78		N/A	
	5			964.600				61	78	77			
	10			964.690				60	78	77			Run-2 22574
	15			964.792				58	79	78			
	20			964.903				58	79	78			
	25			965.002				57	79	78			
	30			965.285				57	79	78			
	35			965.545				57	79	78			
	40			965.710				58	80	79			
	45			965.850				58	80	79			
	50			966.034				57	80	79			
	55			966.160				58	81	80			
	60												

Pape & Steiner Environmental Services

PLANT So. Cal Gas Goleta TEST TYPE CARB 430 FIELD TEST DATA SHEET (Page 2 of 3

Date 4-10-90
Test Location Eng # 3
Run Number 2 Outlet
Stack Diameter N/A
Operator CR
Filter No. N/A

Barometric Pressure 30.38
Static in. wg. N/A
Probe Type/Length
Pitot Coefficient N/A
Meter Box No./γ Port./.9976
Nozzle No./Size N/A

Impinger Volumes/Weights			
Contents	Final	Initial	Net
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial		
Final		

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	60	N/A		966.325	N/A	N/A	N/A	57	81	80		N/A	
	65			966.468				57	81	80			
	70			966.625				56	81	80			
	75			966.773				56	80	79			
	80			966.915				56	79	78			
	85			967.072				55	78	77			
	90			967.215				55	78	77			
	95			967.340				55	77	75			
	100			967.505				55	77	75			
	105			967.650				55	76	74			
	110			967.800				55	77	74			
	115			967.948				55	78	75			
	120			968.105									

Paper Weiner Environmental Services

PLANT So. Cal Gas Goleta TYPE CARB 430 FIELD TEST DATA SHEET (1 of 3 of 3

Date 4-10-90
Test Location Eng # 3
Run Number 2 Outlet
Stack Diameter N/A
Operator CL
Filter No. N/A

Barometric Pressure 30.38
Static in. wg. N/A
Probe Type/Length
Pitot Coefficient N/A
Meter Box No./γ Port /.9976
Nozzle No./Size N/A

Impinger Volumes/Weights			
Contents	Final	Initial	Net
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO
Leak Rate		cfm	"Hg
Initial			
Final			

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	120	N/A		968.105	N/A	N/A	N/A	56	78	75		N/A	
	125			968.255				56	78	75			
	130			968.412				56	79	75			
	135			968.548				57	80	76			
	140			968.705				57	80	76			
	145			968.837				57	80	76			
	150			968.990				57	80	76			
	155			969.135				56	79	77			
	160			969.260				56	78	76			
	165			969.418				56	78	76			
	170			969.560				57	78	76			
	175			969.703				57	78	76			
	180			969.868									
TA	1701			5.348					77.94				

Pape & Steiner Environmental Services

PLANT So Cal Gas Goleta TEST TYPE CARB 430 FIELD TEST DATA SHEET (Page 1 of 3)

Date 4-11-90
Test Location Eng # 3
Run Number 3 Outlet
Stack Diameter N/A
Operator CR
Filter No. N/A

Barometric Pressure 30.31
Static in. wg. N/A
Probe Type/Length
Pitot Coefficient N/A
Meter Box No./γ Port./.9976
Nozzle No./Size N/A

Impinger Volumes/Weights			
Contents	Final	Initial	Net
DRY			
DNPH			
DNPH			
DNPH			
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial	0.0015	MAX
Final	0.0010	MAX

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	0826	N/A		970.068	N/A	N/A	N/A	62	62	62		N/A	
	5			970.281				60	64	64			
	10			970.465				60	64	64			22566 DNPH-3
	15			970.662				58	65	64			
	20			970.822				58	66	65			
	25			970.990				58	68	66			
	30			971.153				57	69	67			
	35			971.303				57	70	68			
	40			971.460				57	71	69			
	45			971.623				56	72	70			
	50			971.778				56	74	72			
	55			971.925				56	75	73			
	60												

Paper Steiner Environmental Services

PLANT So Cal Gas Goleta (T TYPE CARB 430 FIELD TEST DATA SHEET (P 2 of 3

Date 4-11-90
Test Location Eng # 3
Run Number 3 Outlet
Stack Diameter N/A
Operator CR
Filter No. N/A

Barometric Pressure 30.31
Static in. wg. N/A
Probe Type/Length
Pitot Coefficient N/A
Meter Box No./γ Port /.9976
Nozzle No./Size N/A

Impinger Volumes/Weights			
Contents	Final	Initial	Net
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO

Leak Rate	cfm	"Hg
Initial		
Final		

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	60	N/A		972.085	N/A	N/A	N/A	58	75	74		N/A	
	65			972.241				58	74	73			
	70			972.391				57	74	73			
	75			972.543				57	74	73			
	80			972.692				58	74	73			
	85			972.845				57	74	73			
	90			973.005				57	74	73			
	95			973.160				56	74	72			
	100			973.305				57	74	72			
	105			973.455				57	74	72			
	110			973.578				58	74	72			
	115			973.710				58	74	72			
	120			973.875									

Paper Steiner Environmental Services

PLANT So Cal Gas Goleta T TYPE CARB 430 FIELD TEST DATA SHEET 3 of 3

Date 4-11-90
Test Location Eng # 3
Run Number 3 Outlet
Stack Diameter N/A
Operator CR
Filter No. N/A

Barometric Pressure 30.31
Static in. wg. N/A
Probe Type/Length
Pitot Coefficient N/A
Meter Box No./γ Port/.9976
Nozzle No./Size N/A

Impinger Volumes/Weights			
Contents	Final	Initial	Net
S.G.			
		Total	

Gas Composition			
Time	CO_2	O_2	CO
Leak Rate		cfm	"Hg
Initial			
Final			

Sample Point	Time	ΔP in wg	ΔH in wg	Gas Meter Volume Ft^3	Temperature °F Stack	Probe	Oven	Imp.	Gas Meter In	Out	Pump Vacuum in. Hg	$\sqrt{\Delta P}$	Comments
	120	N/A		973.875	N/A	N/A	N/A	59	73	72		N/A	
	125			974.030				58	73	72			
	130			974.175				57	73	72			
	135			974.305				57	74	73			
	140			974.488				59	75	73			
	145			974.648				59	78	77			
	150			974.793				59	78	76			
	155			974.935				58	77	76			
	160			975.093				58	77	76			
	165			975.185				58	77	76			
	170			975.392				57	76	75			
	175			975.553				57	76	75			
	180			975.716									
TA	1126			5.648					72.01				

Pape & Steiner Environmental Services

SAMPLE HANDLING/LOG-IN

Date 4-10-90 Test Location So CAL GAS Goleta

	Sample Type	Volume	Comments
1.	22585 NH3 (Meth) BHW (Sample) 1 (Test) Inlet		
2.	22584 NH3 (Meth) BHW (Sample) 1 (Test)		
3.	22583 430 (Meth) BHW (Sample) 1 (Test) Inlet		
4.	22582 430 (Meth) BHW (Sample) 1 (Test)		
5.	22581 410 (Meth) ORG (Sample) 1 (Test)		
6.	22580 410 (Meth) ORG (Sample) 1 (Test)		
7.	22579 G.C (Meth) H.C (Sample) 1 (Test) Inlet		
8.	22578 G.C (Meth) H.C (Sample) 1 (Test) Inlet		
9.	22577 NH3 (Meth) BHW (Sample) 2 (Test)		
10.	22576 NH3 (Meth) BHW (Sample) 2 (Test)		
11.	22575 430 (Meth) DNPH (Sample) 2 (Test)	✓ inlet	
12.	22574 430 (Meth) DNPH (Sample) 2 (Test)	✓ outlet	

CHAIN OF CUSTODY

Scott R Miller

L.W.

Pape & Steiner Environmental Services

SAMPLE HANDLING/LOG-IN

Date 4-10-11-90 Test Location So Cal Gas Goleta

	Sample Type	Volume	Comments
1.	22573 410 (Meth) ORG (Sample) 2 (Test)		
2.	22572 410 (Meth) ORG (Sample) 2 (Test)		
3.	22571 G.C. (Meth) H.C. (Sample) 2 (Test) Inlet		
4.	22570 G.C. (Meth) HC. (Sample) 2 (Test)		
5.	22569 NH3 (Meth) BHW (Sample) 3 (Test) Inlet		
6.	22568 NH3 (Meth) BHW (Sample) 3 (Test)		
7.	22567 430 (Meth) DNPH (Sample) 3 (Test) Inlet		
8.	22566 430 (Meth) DNPH (Sample) 3 (Test) ~~Inlet~~ outlet		
9.	22565 410 (Meth) ORG (Sample) 3 (Test) Inlet		
10.	22564 410 (Meth) ORG (Sample) 3 (Test)		
11.	22563 G.C. (Meth) H.C. (Sample) 3 (Test)		
12.	22562 G.C. (Meth) H.C. (Sample) 3 (Test)		

CHAIN OF CUSTODY

Scott R Miller

L.W.

Pape & Steiner Environmental Services

SAMPLE HANDLING/LOG-IN

Date 4-10-11-90 Test Location So Cal Gas Goleta

	Sample Type	Volume	Comments
1.	22561 NH3 (Meth) Blank (Sample) All (Test)		
2.	22560 ___ (Meth) Blank (Sample) All (Test)		
3.	22559 430 (Meth) Blank (Sample) All (Test) ✓		
4.	22558 430 (Meth) Blank (Sample) All (Test) ✓		
5.	22557 ___ (Meth) F.G. (Sample) All (Test)		
6.			
7.			
8.			
9.			
10.			
11.			
12.			

CHAIN OF CUSTODY

Scott R Muller

L.W.

A N A L Y T I C A L R E P O R T

SAMPLE TYPE :NH3
SAMPLE COMPONENT :.1N HCL
REQUESTED BY :So Cal Gas,Goleta, INLET, 4/10-11/90
ANALYTICAL METHOD :ISE METER

DATE : 4/18/90
ANALYST : LW & IM

	Test No.	Sample Volume (L)	ppm N	mg NH3	PERCENT
	1	0.675	1.750	1.40 ✓	101.1 DUP
	2	0.770	1.16	0.86	97.8 REC AND
	3	0.470	0.658	0.35	100.0 DUP
	Blank	0.100	0.038	0.00	

A N A L Y T I C A L R E P O R T

SAMPLE TYPE :NH3 DATE :
SAMPLE COMPONENT :.1 N HCL ANALYST : 4/18/90
REQUESTED BY :So Cal Gas,Goleta, Outlet, 4/10-11/90
ANALYTICAL METHOD :ISE METER

DILUTION	Test No.	Sample Volume (L)	ppm N	mg NH3	PERCENT
1/10	1	0.480	227.500 X 10 =	1325.5	100.4 DUP
	2	0.480	977	569.30	107.8 REC
	3	0.520	680	429.25	
	Blank	0.100	0.038	0.00	

FUEL / FLOWRATE CALCULATIONS

PLANT ..... SO CAL GAS
SOURCE ..... GOLETA ENG #3 INLET Temp. Std.: 60
DATE ..... APRIL 10,1990 Press. Std: 29.92

FUEL FLOWRATE DATA :

	RUN 1	RUN 2	RUN 3
Barometric Press., in.Hg..	30.45	30.38	30.31
Brake Horsepower	590.00	594.00	553.00
Fuel Flow, scfh			
Oxygen, %	5.60	6.17	7.70
Fuel Flow, acfh	6452.00	6602.00	6239.00
Fuel Press, psig	1.01	1.01	1.00
" " psia	15.97	15.93	15.89
Fuel Temp, dF	69.00	76.50	62.80

FUEL ANALYSIS DATA :

	RUN 1	RUN 2	RUN 3
Btu/scf, Gross Cal. Value:	1028.00	1028.00	1028.00
Btu/lb, Gross Cal. Value :	23456.00	23456.00	23456.00
Hydrogen, Wt.% :	24.42	24.42	24.42
Carbon, Wt.% :	74.30	74.30	74.30
Sulfur, Wt.% :	0.00	0.00	0.00
Nitrogen, Wt.% :	0.20	0.20	0.20
Oxygen, Wt.% :	1.08	1.08	1.08

CALCULATIONS :

	RUN 1	RUN 2	RUN 3	AVERAGE
F-Factor,dscf/MMBtu :	8,485.54	8,485.54	8,485.54	8,485.54
Fuel Rate, scfh :	6890.47	~~6952~~.10 6937.13	~~6737~~.79 6708.75	~~6860~~.12 6848.45
Heat Rate, MMBtu/hr :	7.083	~~7.147~~ 7.125	~~6.926~~ 6.897	~~7.052~~ 7.035
~~Flue~~ Inlet gas flowrate, dscfm :	1368.44	1~~434~~.10 1429.74	1~~551~~.00 1544.40	1~~451~~.18 1447.53

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

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

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

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

FUEL / FLOWRATE CALCULATIONS

PLANT ..... SO CAL GAS
SOURCE ..... GOLETA ENG #3 OUTLET Temp. Std.: 60
DATE ..... APR 10,11,1990 Press. Std: 29.92

FUEL FLOWRATE DATA :

	RUN 1	RUN 2	RUN 3
Barometric Press., in.Hg..	30.45	30.38	30.31
Brake Horsepower	590.00	594.00	553.00
Fuel Flow, scfh			
Oxygen, %	8.70	10.80	10.80
Fuel Flow, acfh	6452.00	6602.00	6239.00
Fuel Press, psig	1.01	1.01	1.00
" " psia	15.97	15.93	15.89
Fuel Temp, dF	69.00	76.50	62.80

FUEL ANALYSIS DATA :

	RUN 1	RUN 2	RUN 3
Btu/scf, Gross Cal. Value:	1028.00	1028.00	1028.00
Btu/lb, Gross Cal. Value :	23456.00	23456.00	23456.00
Hydrogen, Wt.% :	24.42	24.42	24.42
Carbon, Wt.% :	74.30	74.30	74.30
Sulfur, Wt.% :	0.00	0.00	0.00
Nitrogen, Wt.% :	0.20	0.20	0.20
Oxygen, Wt.% :	1.08	1.08	1.08

ok from fuel sample

CALCULATIONS :

	RUN 1	RUN 2	RUN 3	AVERAGE
F-Factor,dscf/MMBtu :	8,485.54	8,485.54	8,485.54	8,485.54
Fuel Rate, scfh :	6890.47	6952.10 6937.13	6737.79 6708.75	6860.12 6845.45
Heat Rate, MMBtu/hr :	7.083	7.147 7.125	6.926 6.897	7.052 7.035
Flue gas flowrate, dscfm :	1716.16	2091.52 2085.15	2027.05 2018.43	1944.91 1939.91

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

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

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

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

NH3 CALCULATIONS

COMPANY NAME : SO CAL GAS
SOURCE : GOLETA ENG #3 INLET
DATE : APR 10,11,1990
O2 CORRECTION: 15 %

FILE NAME : SCG-GOLI
TEMP.STD. : 60

	Run 1	Run 2	Run 3
Tm, dF	94.56	95.56	90.84
Y, meter fac.	0.9940	0.9940	0.9940
Vm, cu.ft. ..	98.856	99.605	98.308
Pb, in.Hg. ..	30.45	30.38	30.31
dH, in.H2O ..	1.00	1.00	1.00
O2, percent .	5.60	6.17	7.70
Qs(std),dscfm	1,368	1,434	1,551

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

	Run 1	Run 2	Run 3	
Vm(std)	93.9977	94.3226	93.6763	dscf

LABORATORY ANALYSIS :

	Run 1	Run 2	Run 3
mg NH3	1.40	0.86	0.35

* MW of Ammonia (NH3) = 17.08

EMISSION CALCULATIONS :

ppm NH3 = 1.60864 x (Temp.Std. + 460) x (mg NH3) / (MW x Vm,std)

ppm NH3 @ corrected O2% = ppm NH3 x [20.9 - O2 correction /
(20.9 - %O2 measured)

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

	Run 1	Run 2	Run 3
ppm NH3	0.73	0.45	0.18
ppm NH3 @ corrected O2%	0.28	0.18	0.08
lb/hr NH3	2.70E-03	1.73E-03	7.67E-04

CH2O CALCULATIONS

COMPANY NAME : SO CAL GAS
SOURCE : GOLETA ENG #3 INLET
DATE : 08/00/88
O2 CORRECTION: 15 % TEMP.STD. 60 dF

	Run 1	Run 2	Run 3
Tm, dF	86.51	83.00	76.21
Y, meter fac.	0.9978	0.9978	0.9978
Vm, cu.ft. ..	4.649	3.148	3.279
Pb, in.Hg. ..	30.45	30.38	30.31
dH, in.H2O ..	0.00	0.00	0.00
O2, percent .	5.60	6.17	7.70
Qs(std),dscfm	1,368	~~1,434~~ 1429	1,551

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

	Run 1	Run 2	Run 3	
Vm(std)	4.4919	3.0543	3.2142	dscf

LABORATORY ANALYSIS :

	Run 1	Run 2	Run 3
mg CH2O	0.8363	<0.0100	0.1963

* MW of CH2O 30.03

EMISSION CALCULATIONS :

ppm CH2O = 1.60864 x (Temp.Std. + 460) x (mg CH2O) / (MW x Vm,std)

ppm CH2O @ corrected O2% = ppm CH2O x [20.9 - O2 correction /
(20.9 - %O2 measured)

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

	Run 1	Run 2	Run 3
ppm CH2O	5.19	<0.09	1.70
ppm CH2O @ 15.0 %O2 ...	2.00	<0.04	0.76
lb/hr CH2O	3.37E-02	6.13E-04	1.25E-02

CH3CHO CALCULATIONS

COMPANY NAME : SO CAL GAS
SOURCE : GOLETA ENG #3 INLET
DATE : APR 10,11,1990
O2 CORRECTION: 15 % TEMP.STD. : 60 dF

	Run 1	Run 2	Run 3
Tm, dF	86.51	83.00	76.21
Y, meter fac.	0.9978	0.9978	0.9978
Vm, cu.ft. ..	4.649	3.148	3.279
Pb, in.Hg. ..	30.45	30.38	30.31
dH, in.H2O ..	0.00	0.00	0.00
O2, percent .	5.60	6.17	7.70
Qs(std),dscfm	1,368	1,434	1,551

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

	Run 1	Run 2	Run 3	
Vm(std)	4.4919	3.0543	3.2142	dscf

LABORATORY ANALYSIS :

	Run 1	Run 2	Run 3
mg CH3CHO	0.0146	<0.0100	<0.0100

* MW of CH3CHO 44.05

EMISSION CALCULATIONS :

ppm CH3CHO = 1.60864 x (Temp.Std. + 460) x (mg CH3CHO) / (MW x Vm,std)

ppm CH3CHO @ corrected O2% = ppm CH3CHO x [20.9 - O2 correction /
(20.9 - %O2 measured)

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

	Run 1	Run 2	Run 3
ppm CH3CHO	0.06	<0.01	<0.01
ppm CH3CHO @ 15.0 %O2 ..	0.024	<0.002	<0.003
lb/hr CH3CHO	5.88E-04	9.99E-05	1.08E-04

C3H4O CALCULATIONS

COMPANY NAME : SO CAL GAS
SOURCE : GOLETA ENG #3 INLET
DATE : APR 10,11,1990
O2 CORRECTION: 15 % TEMP.STD. : 60 dF

	Run 1	Run 2	Run 3
Tm, dF	86.51	83.00	76.21
Y, meter fac.	0.9978	0.9978	0.9978
Vm, cu.ft. ..	4.649	3.148	3.279
Pb, in.Hg. ..	30.45	30.38	30.31
dH, in.H2O ..	0.00	0.00	0.00
O2, percent .	5.60	6.17	7.70
Qs(std),dscfm	1,368	1,434	1,551

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

	Run 1	Run 2	Run 3	
Vm(std)	4.4919	3.0543	3.2142	dscf

LABORATORY ANALYSIS :

	Run 1	Run 2	Run 3
mg C3H4O	<0.0200	<0.0020	<0.0020

* MW of C3H4O 56.06

EMISSION CALCULATIONS :

ppm C3H4O = 1.60864 x (Temp.Std. + 460) x (mg C3H4O) / (MW x Vm,std)

ppm C3H4O @ corrected O2% = ppm C3H4O x [20.9 - O2 correction /
(20.9 - %O2 measured)

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

	Run 1	Run 2	Run 3
ppm C3H4O	<0.07	<0.01	<0.01
ppm C3H4O @ 15.0 %O2 ...	<0.026	<0.004	<0.004
lb/hr C3H4O	8.00E-04	1.27E-04	1.37E-04

NH3 CALCULATIONS

COMPANY NAME : SO CAL GAS
SOURCE : GOLETA ENG #3 OUTLET
DATE : APR 10,11,1990
O2 CORRECTION: 15 %

FILE NAME :

TEMP.STD. : 60

	Run 1	Run 2	Run 3
Tm, dF	97.54	98.42	95.53
Y, meter fac.	1.0022	1.0022	1.0022
Vm, cu.ft. ..	101.949	102.192	102.109
Pb, in.Hg. ..	30.45	30.38	30.31
dH, in.H2O ..	1.00	1.00	1.00
O2, percent .	8.70	10.80	10.80
Qs(std),dscfm	1,716	2,092	2,027

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

	Run 1	Run 2	Run 3	
Vm(std)	97.2160	97.0710	97.2727	dscf

LABORATORY ANALYSIS :

	Run 1	Run 2	Run 3
mg NH3	1325.50	569.30	429.25

* MW of Ammonia (NH3) = 17.08

EMISSION CALCULATIONS :

ppm NH3 = 1.60864 x (Temp.Std. + 460) x (mg NH3) / (MW x Vm,std)

ppm NH3 @ corrected O2% = ppm NH3 x [20.9 - O2 correction /
(20.9 - %O2 measured)

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

	Run 1	Run 2	Run 3
ppm NH3	667.75	287.23	216.12
ppm NH3 @ corrected O2%	322.93	167.79	126.25
lb/hr NH3	3.10E+00	1.62E+00	1.18E+00

CH2O CALCULATIONS

COMPANY NAME : SO CAL GAS
SOURCE : GOLETA ENG #3 OUTLET
DATE : APR 10,11,1990
O2 CORRECTION: 15 % TEMP.STD. : 60 dF

	Run 1	Run 2	Run 3
Tm, dF	76.53	77.94	72.01
Y, meter fac.	0.9976	0.9976	0.9976
Vm, cu.ft. ..	2.676	5.348	5.648
Pb, in.Hg. ..	30.45	30.38	30.31
dH, in.H2O ..	0.00	0.00	0.00
O2, percent .	8.70	10.80	10.80
Qs(std),dscfm	1,716	2,092	2,027

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

	Run 1	Run 2	Run 3	
Vm(std)	2.6332	5.2365	5.5790	dscf

LABORATORY ANALYSIS :

	Run 1	Run 2	Run 3
mg CH2O	<0.0015	<0.0015	<0.0015

* MW of CH2O 30.03

EMISSION CALCULATIONS :

ppm CH2O = 1.60864 x (Temp.Std. + 460) x (mg CH2O) / (MW x Vm,std)

ppm CH2O @ corrected O2% = ppm CH2O x [20.9 - O2 correction /
(20.9 - %O2 measured)

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

	Run 1	Run 2	Run 3
ppm CH2O	<0.02	<0.01	<0.01
ppm CH2O @ 15.0 %O2	<0.008	<0.005	<0.004
lb/hr CH2O	1.63E-04	9.99E-05	9.63E-05

CH3CHO CALCULATIONS

COMPANY NAME : SO CAL GAS
SOURCE : GOLETA ENG #3 OUTLET
DATE : APR 10,11,1990
O2 CORRECTION: 15 % TEMP.STD. : 60 dF

	Run 1	Run 2	Run 3
Tm, dF	76.53	77.94	72.01
Y, meter fac.	0.9976	0.9976	0.9976
Vm, cu.ft. ..	2.676	5.348	5.648
Pb, in.Hg. ..	30.45	30.38	30.31
dH, in.H2O ..	0.00	0.00	0.00
O2, percent .	8.70	10.80	10.80
Qs(std),dscfm	1,716	2,092	2,027

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

	Run 1	Run 2	Run 3	
Vm(std)	2.6332	5.2365	5.5790	dscf

LABORATORY ANALYSIS :

	Run 1	Run 2	Run 3
mg CH3CHO	<0.0010	<0.0010	<0.0010

* MW of CH3CHO 44.05

EMISSION CALCULATIONS :

ppm CH3CHO = 1.60864 x (Temp.Std. + 460) x (mg CH3CHO) / (MW x Vm,std)

ppm CH3CHO @ corrected O2% = ppm CH3CHO x [20.9 - O2 correction /
(20.9 - %O2 measured)

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

	Run 1	Run 2	Run 3
ppm CH3CHO	<0.007	<0.004	<0.003
ppm CH3CHO @ 15.0 %O2 ..	<0.003	<0.002	<0.002
lb/hr CH3CHO	8.37E-05	5.83E-05	4.24E-05

C3H4O CALCULATIONS

COMPANY NAME : SO CAL GAS
SOURCE : GOLETA ENG #3 OUTLET
DATE : APR 10,11,1990
O2 CORRECTION: 15 %

TEMP.STD. : 60 dF

	Run 1	Run 2	Run 3
Tm, dF	76.53	77.94	72.01
Y, meter fac.	0.9976	0.9976	0.9976
Vm, cu.ft. ..	2.676	5.348	5.648
Pb, in.Hg. ..	30.45	30.38	30.31
dH, in.H2O ..	0.00	0.00	0.00
O2, percent .	8.70	10.80	10.80
Qs(std),dscfm	1,716	~~2,092~~ 2015	2,027

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

	Run 1	Run 2	Run 3	
Vm(std)	2.6332	5.2365	5.5790	dscf

LABORATORY ANALYSIS :

	Run 1	Run 2	Run 3
mg C3H4O	<0.0020	<0.0020	<0.0020

* MW of C3H4O 56.06

EMISSION CALCULATIONS :

ppm C3H4O = 1.60864 x (Temp.Std. + 460) x (mg C3H4O) / (MW x Vm,std)

ppm C3H4O @ corrected O2% = ppm C3H4O x [20.9 - O2 correction /
(20.9 - %O2 measured)

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

	Run 1	Run 2	Run 3
ppm C3H4O	<0.01	~~<0.01~~ <0.006	<0.01
ppm C3H4O @ 15.0 %O2 ...	<0.005	<0.003	<0.003
lb/hr C3H4O	1.52E-04	1.85E-04	1.80E-04

ANALYTICAL SUMMARY

Company : SOUTHERN CAL. GAS
Source/Unit : GOLETA ENGINE #3 INLET
Test Method : CARB METHOD 410, VOC AIR CANISTER
Date : 10-Apr-90

Compound	MW	Sample Concentration ppb			Detection Limit ppb		
		Run 1	2	3	1	2	3
Benzene	78.113	420	400	380	12	9	9
Toluene	92.1402	110	120	100	12	9	9
Total Xylenes	106.167	ND	25	28	20	15	15
Propylene	42.080	ND	ND	ND	200	150	150
Naphthalene	128.0626	ND	ND	ND	20	15	15

EMISSION CALCULATIONS

Company : SOUTHERN CAL. GAS
Source/Unit : GOLETA ENGINE #3 INLET
Test Method : CARB METHOD 410, VOC AIR CANISTER
Date : 10-Apr-90

Compound	lb/hr Run 1	Run 2	Run 3	Average
Benzene	5.73E-03	5.72E-03	5.88E-03	5.78E-03
Toluene	1.50E-03	1.72E-03	1.55E-03	1.59E-03
Total Xylenes	<2.73E-04	3.58E-04	4.33E-04	3.55E-04
Propylene	<2.73E-03	<2.15E-03	<2.32E-03	<2.40E-03
Naphthalene	<2.73E-04	<2.15E-04	<2.32E-04	<2.40E-04

lb/hr = 0.00008223 x Qs(std) x 64.062 x (ppb / 1000) / [T(std) + 460]

check?

.00008223 (64.062) $\frac{420}{1000}$ x $\frac{1}{520}$ x 1368.4 x 60

EMISSION CALCULATIONS

Company : SOUTHERN CAL. GAS
Source/Unit : GOLETA ENGINE #3 INLET
Test Method : CARB METHOD 410, VOC AIR CANISTER
Date : 10-Apr-90

Compound	lb/MMBtu Run 1	Run 2	Run 3	Average
Benzene	5.29E-04	4.85E-04	4.13E-04	4.76E-04
Toluene	1.63E-04	1.72E-04	1.28E-04	1.12E-04
Total Xylenes	< 3.43E-05	4.12E-05	4.14E-05	3.89E-05
Propylene	< 1.36E-04	<9.80E-05	< 8.78E-05	<1.07E-04
Naphthalene	< 4.13E-05	<2.98E-05	< 2.67E-05	<3.26E-05

lb/MMBtu = F-Factor x MW x 0.00000137 / [T(Std) + 460] x
[20.9 / (20.9- %O2)] x (ppb / 1000)

ANALYTICAL SUMMARY

Company : SOUTHERN CAL. GAS
Source/Unit : GOLETA ENGINE #3 OUTLET
Test Method : CARB METHOD 410, VOC AIR CANISTER
Date : 10-Apr-90

		Sample Concentration ppb			Detection Limit ppb		
Compound	MW	Run 1	2	3	1	2	3
Benzene	78.113	120	41	26	12	9	9
Toluene	92.1402	ND	ND	11	12	9	9
Total Xylenes	106.167	ND	ND	ND	20	15	15
Propylene	42.080	ND	ND	ND	200	150	150
Naphthalene	128.0626	ND	ND	ND	20	15	15

EMISSION CALCULATIONS

Company : SOUTHERN CAL. GAS
Source/Unit : GOLETA ENGINE #3 OUTLET
Test Method : CARB METHOD 410, VOC AIR CANISTER
Date : 10-Apr-90

	lb/hr			
Compound	Run 1	Run 2	Run 3	Average
Benzene	2.05E-03	8.56E-04	~~5.26E-04~~ 6.48×10^{-4}	1.15E-03
Toluene	<2.05E-04	<1.88E-04	~~2.22E-04~~ 3.24×10^{-4}	2.05E-04
Total Xylenes	<3.42E-04	<3.13E-04	~~<3.03E-04~~ 5.08×10^{-5}	<3.20E-04
Propylene	<3.42E-03	<3.13E-03	~~<3.03E-03~~ 2.01×10^{-4}	<3.20E-03
Naphthalene	<3.42E-04	<3.13E-04	~~<3.03E-04~~ 6.13×10^{-4}	<3.20E-04

Q_{s_s} = 2018

lb/hr = 0.00008223 x Qs(std) x ~~64.062~~ MW x (ppb / 1000) / [T(std) + 460]

2018 (NEW)

26 ppb

EMISSION CALCULATIONS

Company : SOUTHERN CAL. GAS
Source/Unit : GOLETA ENGINE #3 OUTLET
Test Method : CARB METHOD 410, VOC AIR CANISTER
Date : 10-Apr-90

	lb/MMBtu			
Compound	Run 1	Run 2	Run 3	Average
Benzene	1.21E-04	3.41E-05	~~2.16E-05~~ 9.395E-05	5.88E-05
Toluene	< 1.42E-05	<8.83E-06	~~1.08E-05~~ 4.69E-05	1.24E-05
Total Xylenes	< 2.73E-05	<1.70E-05	< ~~1.70E-05~~ 7.39E-05	<2.04E-05
Propylene	< 1.08E-04	<6.72E-05	< ~~6.72E-05~~ 2.91E-05	<8.09E-05
Naphthalene	< 3.29E-05	<2.05E-05	< ~~2.05E-05~~ 8.88E-05	<2.46E-05

lb/MMBtu = F-Factor x MW x 0.00000137 / [T(Std) - 460] x
[20.9 / (20.9- %O2)] x (ppb / 1000)

APPENDIX B

SO CAL GAS OPERATING DATA

I. C. ENGINE COMPLIANCE DATA CHECK LIST

Date: 4-10-90

Client: So. Cal Gas Co.

Engine Test Location: Before + After catalytic converter

Plant: Goleta, Ca.

Unit #: IC Eng. # 3

Manufacturer: Ingersoll-Rand

Model #:

Catalyst Type:

Fuel Flow: 6452

Fuel Flow Units: ACFH

Fuel Gas Pressure: 1.01

Fuel Gas Pressure Units: PSI

Fuel Gas Temp. (°F): 69

Wet Bulb (°F): 67

Dry Bulb (°F): 77

RH (%): 60

Barometric Pressure ("Hg): 30.45

HP (Rated): 650

HP (Actual): 590

KW (Rated):

KW (Actual):

OTHER NOTES

Run 1 1015 - 1315

I. C. ENGINE COMPLIANCE DATA CHECK LIST

Date: 4-10-90

Client: So. Cal. Gas Co

Engine Test Location: Before + After NOX Catalytic Converter

Plant: Goleta, CA

Unit #: IC Engine # 3

Manufacturer: Ingersoll-Rand

Model #:

Catalyst Type:

Fuel Flow: 6602

Fuel Flow Units: ACFH

Fuel Gas Pressure: 1.01

Fuel Gas Pressure Units: PSI

Fuel Gas Temp. (°F): 76.5

Wet Bulb (°F): 64

Dry Bulb (°F): 73

RH (%): 63

Barometric Pressure ("Hg): 30.38

HP (Rated): 650

HP (Actual): 594

KW (Rated):

KW (Actual):

OTHER NOTES

Run 2 1400-1700

I. C. ENGINE COMPLIANCE DATA CHECK LIST

Date: 4-11-90

Client: So. Cal. Gas

Engine Test Location: Before + After NOx catalytic converter

Plant: Goleta, Ca.

Unit #: Eng # 3

Manufacturer: Ingersoll-Rand

Model #:

Catalyst Type:

Fuel Flow: 6239

Fuel Flow Units: ACFH

Fuel Gas Pressure: 1.0

Fuel Gas Pressure Units: PSI

Fuel Gas Temp. (°F): 62.8

Wet Bulb (°F): 65

Dry Bulb (°F): 74

RH (%): 63

Barometric Pressure ("Hg): 30.31

HP (Rated): 650

HP (Actual): 553

KW (Rated):

KW (Actual):

OTHER NOTES

Run 3 0825-1125

APPENDIX C

ENSECO ANALYSIS DATA

Enseco

May 15, 1990
Lab ID: 052416

RECEIVED MAY 18 1990

Jim Steiner
Pape & Steiner Environmental Services
5801 Norris Road
Bakersfield, California 93308

Dear Mr. Steiner:

Enclosed is the report for the eight aqueous samples for your So. Cal Gas Goleta Project, under Purchase Order Number SP-2679, which were received at Enseco-Cal Lab on 13 April 1990.

The report consists of the following sections:

I Sample Description
II Analysis Request
III Quality Control Report
IV Analysis Results

If you have any questions, please feel free to call.

Sincerely,

Timothy m. Cleary

Timothy m. Cleary
Program Administrator

sf

2544 Industrial Boulevard
West Sacramento, California 95691
916/372-1393 Facsimile: 916/372-1059

I Sample Description

See the attached Sample Description Information.

The samples were received under chain-of-custody.

II Analysis Request

The following analytical test was requested.

Lab ID	Analysis Description
052416-1 thru 8	Formaldehyde

III Quality Control

A. Project Specific QC. No project specific QC (i.e., spikes and/or duplicates) was requested.

B. Method Blank Results. A method blank is a laboratory-generated sample which assesses the degree to which laboratory operations and procedures cause false-positive analytical results for your samples.

No target parameters were detected in the method blank associated with your samples at the reporting limit levels noted on the Method Blank Report.

C. Laboratory Control Samples - The LCS Program

Duplicate Control Samples. A DCS is a well-characterized matrix (blank water, sand or celite) which is spiked with certain target parameters and analyzed at approximately 10% of the sample load in order to establish method-specific control limits. The DCS results associated with your samples are on the attached Duplicate Control Sample Report.

Accuracy is measured by Percent Recovery as in:

$$\% \text{ recovery} = \frac{\text{(measured concentration)}}{\text{(actual concentration)}} \times 100$$

Precision is measured using duplicate tests by Relative Percent Difference (RPD) as in:

$$\text{RPD} = \frac{\text{(\% recovery test 1 - \% recovery test 2)}}{\text{(\% recovery test 1 + \% recovery test 2)/2}} \times 100$$

Control limits for accuracy (percent recovery) are based on the average, historical percent recovery +/-3 standard deviation units. Control limits for precision (relative percent difference) range from 0 (identical duplicate DCS results) to the average, historical relative percent difference + 3 standard deviation units. In cases where there is not enough historical data, EPA limits or advisory limits are set, with the approval of the Quality Assurance department.

IV Analysis Results

Test methods may include minor modifications of published EPA Methods such as reporting limits or parameter lists. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e., no correction is made for moisture content, unless the method requires or the client requests that such correction be made.

Results are on the attached data sheets.

SAMPLE DESCRIPTION INFORMATION
for
Pape & Steiner Environmental Services

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
052416-0001-SA	22582	AQUEOUS	10 APR 90		13 APR 90
052416-0002-SA	22574	AQUEOUS	10 APR 90		13 APR 90
052416-0003-SA	22566	AQUEOUS	10 APR 90		13 APR 90
052416-0004-SA	22558	AQUEOUS	10 APR 90		13 APR 90
052416-0005-SA	22583	AQUEOUS	10 APR 90		13 APR 90
052416-0006-SA	22575	AQUEOUS	10 APR 90		13 APR 90
052416-0007-SA	22567	AQUEOUS	10 APR 90		13 APR 90
052416-0008-SA	22559	AQUEOUS	10 APR 90		13 APR 90

QC LOT ASSIGNMENT REPORT
PLC Analysis Area

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
052416-0001-SA	GAS	FORM-G	17 APR 90-A	17 APR 90-A
052416-0002-SA	GAS	FORM-G	17 APR 90-A	17 APR 90-A
052416-0003-SA	GAS	FORM-G	17 APR 90-A	17 APR 90-A
052416-0004-SA	GAS	FORM-G	17 APR 90-A	17 APR 90-A
052416-0005-SA	GAS	FORM-G	17 APR 90-A	17 APR 90-A
052416-0006-SA	GAS	FORM-G	17 APR 90-A	17 APR 90-A
052416-0007-SA	GAS	FORM-G	17 APR 90-A	17 APR 90-A
052416-0008-SA	GAS	FORM-G	17 APR 90-A	17 APR 90-A

METHOD BLANK REPORT
HPLC Analysis Area

Analyte	Result	Units	Reporting Limit
Test: FORM-CARB-G			
Matrix: AQUEOUS			
QC Lot: 17 APR 90-A QC Run: 17 APR 90-A			
Formaldehyde	ND	ug/sample	0.40
Acetaldehyde	ND	ug/sample	0.40
Acrolein	ND	ug/sample	0.40

DUPLICATE CONTROL SAMPLE REPORT
HPLC Analysis Area

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: FORM-G								
Matrix: GAS								
QC Lot: 17 APR 90-A								
Concentration Units: ug								
Formaldehyde	2.0	2.62	3.30	2.96	148	60-140	23	40

Calculations are performed before rounding to avoid round-off errors in calculated results.

Enseco
A CORNING COMPANY

Formaldehyde by CARB 430

CARB 430

#3 Engine outlet #1

Client Name: Pape & Steiner Environmental Services
Client ID: 22582
Lab ID: 052416-0001-SA Enseco ID: 145460
Matrix: AQUEOUS Sampled: 10 APR 90 Received: 13 APR 90
Authorized: 17 APR 90 Prepared: 17 APR 90 Analyzed: 24 APR 90

Parameter	Result	Units	Reporting Limit	
Formaldehyde	ND	MG/sample	0.0015	hB
Acetaldehyde	ND	MG/sample	0.0010	G
Acrolein	ND	MG/sample	0.0020	G

Note h : Reporting limit changed due to high background in the preparation blank.

Note B . Compound is also detected in the blank.

Note G : Reporting Limit raised due to matrix interference.

ND = Not detected
NA = Not applicable

Reported By: Claire Hanamoto Approved By: Lisa Stafford

The cover letter is an integral part of this report.
Rev 230787

Enseco
A CORNING Company

Formaldehyde by CARB 430

CARB 430

Eng #3
outlet #2

Client Name: Pape & Steiner Environmental Services
Client ID: 22574
Lab ID: 052416-0002-SA Enseco ID: 145462
Matrix: AQUEOUS Sampled: 10 APR 90 Received: 13 APR 90
Authorized: 17 APR 90 Prepared: 17 APR 90 Analyzed: 24 APR 90

Parameter	Result	Units	Reporting Limit	
Formaldehyde	0.0033	MG/sample	0.0015	oB
Acetaldehyde	ND	MG/sample	0.0010	Q
Acrolein	ND	MG/sample	0.0020	Q

Note o : Reporting Limit raised due to high level of analyte present in sample.

Note B : Compound is also detected in the blank.

Note Q : Reporting Limit raised due to high level of another analyte in the sample.

ND = Not detected
NA = Not applicable

Reported By: Claire Hanamoto Approved By: Lisa Stafford

The cover letter is an integral part of this report.
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Enseco
A CORNING Company

Formaldehyde by CARB 430

CARB 430

Eng #3
outlet #3

Client Name: Pape & Steiner Environmental Services
Client ID: 22566 #3
Lab ID: 052416-0003-SA Enseco ID: 145463
Matrix: AQUEOUS Sampled: 10 APR 90 Received: 13 APR 90
Authorized: 17 APR 90 Prepared: 17 APR 90 Analyzed: 24 APR 90

Parameter	Result	Units	Reporting Limit	
Formaldehyde	0.0027	MG/sample	0.0015	oB
Acetaldehyde	ND	MG/sample	0.0010	Q
Acrolein	ND	MG/sample	0.0020	Q

Note o : Reporting Limit raised due to high level of analyte present in sample.

Note B : Compound is also detected in the blank.

Note Q : Reporting Limit raised due to high level of another analyte in the sample.

ND = Not detected
NA = Not applicable

Reported By: Claire Hanamoto Approved By: Lisa Stafford

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Enseco
A CORNING Company

Formaldehyde by CARB 430

CARB 430

Client Name: Pape & Steiner Environmental Services
Client ID: 22558 TAT I
Lab ID: 052416-0004-SA Enseco ID: 145464
Matrix: AQUEOUS Sampled: 10 APR 90 Received: 13 APR 90
Authorized: 17 APR 90 Prepared: 17 APR 90 Analyzed: 24 APR 90

Parameter	Result	Units	Reporting Limit	
Formaldehyde	0.0070	MG/sample	0.0015	oB
Acetaldehyde	ND	MG/sample	0.0010	Q
Acrolein	ND	MG/sample	0.0020	Q

BLANK

Note o : Reporting Limit raised due to high level of analyte present in sample.

Note B : Compound is also detected in the blank.

Note Q : Reporting Limit raised due to high level of another analyte in the sample.

ND = Not detected
NA = Not applicable

Reported By: Claire Hanamoto Approved By: Lisa Stafford

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Enseco
A CORNING Company

Formaldehyde by CARB 430

CARB 430

Eng #3
Alt #1

Client Name: Pape & Steiner Environmental Services
Client ID: 22583
Lab ID: 052416-0005-SA Enseco ID: 145465
Matrix: AQUEOUS Sampled: 10 APR 90 Received: 13 APR 90
Authorized: 17 APR 90 Prepared: 17 APR 90 Analyzed: 24 APR 90

Parameter	Result	Units	Reporting Limit	
Formaldehyde	0.84	MG/sample	0.010	oB
Acetaldehyde	0.016	MG/sample	0.010	o
Acrolein	ND	MG/sample	0.020	Q

Note o : Reporting Limit raised due to high level of analyte present in sample.

Note B : Compound is also detected in the blank.

Note Q : Reporting Limit raised due to high level of another analyte in the sample.

ND = Not detected
NA = Not applicable

Reported By: Claire Hanamoto Approved By: Lisa Stafford

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Enseco
A CORNING Company

Formaldehyde by CARB 430

CARB 430

Eng #3
inlet #2

Client Name: Pape & Steiner Environmental Services
Client ID: 22575
Lab ID: 052416-0006-SA Enseco ID: 145466
Matrix: AQUEOUS Sampled: 10 APR 90 Received: 13 APR 90
Authorized: 17 APR 90 Prepared: 17 APR 90 Analyzed: 24 APR 90

Parameter	Result	Units	Reporting Limit	
Formaldehyde	ND	MG/sample	0.010	j
Acetaldehyde	ND	MG/sample	0.0010	
Acrolein	ND	MG/sample	0.0020	

Note j : All Reporting Limits for this sample raised due to matrix interferences.

ND = Not detected
NA = Not applicable

Reported By: Claire Hanamoto Approved By: Lisa Stafford

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Enseco
A CORNING Company

Formaldehyde by CARB 430

CARB 430

Eng #3
Inlet #3

Client Name: Pape & Steiner Environmental Services
Client ID: 22567
Lab ID: 052416-0007-SA Enseco ID: 145467
Matrix: AQUEOUS Sampled: 10 APR 90 Received: 13 APR 90
Authorized: 17 APR 90 Prepared: 17 APR 90 Analyzed: 24 APR 90

Parameter	Result	Units	Reporting Limit	
Formaldehyde	0.20	MG/sample	0.010	oB
Acetaldehyde	0.0014	MG/sample	0.0010	o
Acrolein	ND	MG/sample	0.0020	Q

Note o : Reporting Limit raised due to high level of analyte present in sample.

Note B : Compound is also detected in the blank.

Note Q : Reporting Limit raised due to high level of another analyte in the sample.

ND = Not detected
NA = Not applicable

Reported By: Claire Hanamoto Approved By: Lisa Stafford

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Enseco
A CORNING Company

Formaldehyde by CARB 430

CARB 430

Blank

Client Name: Pape & Steiner Environmental Services
Client ID: 22559
Lab ID: 052416-0008-SA Enseco ID: 145468
Matrix: AQUEOUS Sampled: 10 APR 90 Received: 13 APR 90
Authorized: 17 APR 90 Prepared: 17 APR 90 Analyzed: 25 APR 90

Parameter	Result	Units	Reporting Limit	
Formaldehyde	0.0037	MG/sample	0.0015	oB
Acetaldehyde	0.0014	MG/sample	0.0010	o
Acrolein	ND	MG/sample	0.0020	Q

Note o : Reporting Limit raised due to high level of analyte present in sample.

Note B : Compound is also detected in the blank.

Note Q : Reporting Limit raised due to high level of another analyte in the sample.

ND = Not detected
NA = Not applicable

Reported By: Claire Hanamoto Approved By: Lisa Stafford

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Enseco - Air Toxics Laboratory
9537 Telstar Avenue, Suite 118 • El Monte, CA 91731
(818) 442-8400 • FAX: (818) 442-3758

May 1, 1990

PAPE & STEINER
5801 Norris Rd.
Bakersfield, CA 93308
ATTN: MR. JIM STEINER

ANALYSIS NO.: A9010603-001
ANALYSES: Volatile Organics by GCMS - EPA T014
DATE SAMPLED: 4/11/90
DATE SAMPLE REC'D: 4/13/90

PROJECT: SO. CALIFORNIA GAS - GOLETA

Enclosed with this letter is the report on the chemical and physical analyses on the sample from ANALYSIS NO: A9010603-001 shown above.

The sample was received by ENSECO Air Toxics Laboratory, intact and with the chain-of-custody record attached.

Please note that ND means not detected at the detection limit expressed.

Marita M. Lorenzo
REVIEWED

APPROVED

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LABORATORY REPORT

PAPE & STEINER
5801 Norris Rd.
Bakersfield, CA 93308
ATTN: MR. JIM STEINER

Sample ID: Prescreen of Can A-007

ANALYSIS NO.: A9010603
ANALYSES: Volatile Organics by GCMS - Prescreening
DATE SAMPLED: NA
DATE SAMPLE REC'D: NA
DATE ANALYZED: 4/05/90
SAMPLE TYPE: Air
QC BATCH NO.: MS201-9004051

Volatile Organics by GCMS

Parameter	Results ppb (vol/vol)	Detection Limits
Benzene	ND	2
Toluene	ND	2
Total Xylenes	ND	2.5
Propylene	ND	25
Napthalene	ND	2.5

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LABORATORY REPORT

PAPE & STEINER
5801 Norris Rd.
Bakersfield, CA 93308
ATTN: MR. JIM STEINER

Sample ID: Prescreen of Can A-007

ANALYSIS NO.: A9010603
ANALYSES: Volatile Organics by GCMS - Prescreening
DATE SAMPLED: NA
DATE SAMPLE REC'D: NA
DATE ANALYZED: 4/05/90
SAMPLE TYPE: Air
QC BATCH NO.: MS201-9004051

QC SUMMARY
Volatile Organics by GCMS

Compounds	Laboratory Control Sample % Recovery	Duplicate Control Sample % Recovery	RPD
Methylene Chloride	107	107	0
1,1 Dichloroethene	105	106	1
Trichloroethene	104	103	1
Toluene	100	102	2
1,1,2,2-Tetrachlorethane	103	108	5
Limits	80 - 115	80 - 115	20

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Enseco

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May 15, 1990

PAPE & STEINER
5801 Norris Rd.
Bakersfield, CA 93308
ATTN: MR. JIM STEINER

ANALYSIS NO.: A9010606-001
ANALYSES: Volatile Organics by GCMS - EPA TO14
DATE SAMPLED: 4/11/90
DATE SAMPLE REC'D: 4/13/90

PROJECT: SO. CALIFORNIA GAS - GOLETA

Enclosed with this letter is the report on the chemical and physical analyses on the sample from ANALYSIS NO: A9010606-001 shown above.

The sample was received by ENSECO Air Toxics Laboratory, intact and with the chain-of-custody record attached.

Please note that ND means not detected at the detection limit expressed.

Marita M. Lounzo
REVIEWED

APPROVED

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LABORATORY REPORT

PAPE & STEINER	ANALYSIS NO.: A9010606
5801 Norris Rd.	ANALYSES: Volatile Organics by GCMS - Prescreening
Bakersfield, CA 93308	DATE SAMPLED: NA
ATTN: MR. JIM STEINER	DATE SAMPLE REC'D: NA
	DATE ANALYZED: 4/05/90
	SAMPLE TYPE: Air
Sample ID: Prescreen of Can A-049	QC BATCH NO.: MS201-9004051

Volatile Organics by GCMS

Parameter	Results ppb (vol/vol)	Detection Limits
Benzene	ND	2
Toluene	ND	2
Total Xylenes	ND	2.5
Propylene	ND	25
Napthalene	ND	2.5

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LABORATORY REPORT

PAPE & STEINER
5801 Norris Rd.
Bakersfield, CA 93308
ATTN: MR. JIM STEINER

Sample ID: Prescreen of Can A-049

ANALYSIS NO.: A9010606
ANALYSES: Volatile Organics by GCMS - Prescreening
DATE SAMPLED: NA
DATE SAMPLE REC'D: NA
DATE ANALYZED: 4/05/90
SAMPLE TYPE: Air
QC BATCH NO.: MS201-9004051

QC SUMMARY
Volatile Organics by GCMS

Compounds	Laboratory Control Sample % Recovery	Duplicate Control Sample % Recovery	RPD
Methylene Chloride	107	107	0
1,1 Dichloroethene	105	106	1
Trichloroethene	104	103	1
Toluene	100	102	2
1,1,2,2-Tetrachlorethane	103	108	5
Limits	80 - 115	80 - 115	20

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May 1, 1990

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PAPE & STEINER
5801 Norris Rd.
Bakersfield, CA 93308
ATTN: MR. JIM STEINER

ANALYSIS NO.: A9010604-001
ANALYSES: Volatile Organics by GCMS - EPA TO14
DATE SAMPLED: 4/10/90
DATE SAMPLE REC'D: 4/13/90

PROJECT: SO. CALIFORNIA GAS - GOLETA

Enclosed with this letter is the report on the chemical and physical analyses on the sample from ANALYSIS NO: A9010604-001 shown above.

The sample was received by ENSECO Air Toxics Laboratory, intact and with the chain-of-custody record attached.

Please note that ND means note detected at the detection limit expressed.

Marita M. Lewis
REVIEWED

APPROVED

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LABORATORY REPORT

PAPE & STEINER
5801 Norris Rd.
Bakersfield, CA 93308
ATTN: MR. JIM STEINER

Sample ID: Prescreen of Can A-015

ANALYSIS NO.: A9010604
ANALYSES: Volatile Organics by GCMS - Prescreening
DATE SAMPLED: NA
DATE SAMPLE REC'D: NA
DATE ANALYZED: 4/09/90
SAMPLE TYPE: Air
QC BATCH NO.: MS101-9004091

Volatile Organics by GCMS

Parameter	Results ppb (vol/vol)	Detection Limits
Benzene	ND	2
Toluene	ND	2
Total Xylenes	ND	2.5
Propylene	ND	25
Napthalene	ND	2.5

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LABORATORY REPORT

PAPE & STEINER
5801 Norris Rd.
Bakersfield, CA 93308
ATTN: MR. JIM STEINER

Sample ID: Prescreen of Can A-015

ANALYSIS NO.: A9010604
ANALYSES: Volatile Organics by GCMS - Prescreening
DATE SAMPLED: NA
DATE SAMPLE REC'D: NA
DATE ANALYZED: 4/09/90
SAMPLE TYPE: Air
QC BATCH NO.: MS101-9004091

QC SUMMARY
Volatile Organics by GCMS

Compounds	Laboratory Control Sample % Recovery	Duplicate Control Sample % Recovery	RPD
Methylene Chloride	101	107	6
1,1 Dichloroethene	106	110	5
Trichloroethene	102	107	4
Toluene	107	109	2
1,1,2,2-Tetrachlorethane	109	112	3
Limits	80 - 115	80 - 115	20

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May 15, 1990

PAPE & STEINER
5801 Norris Rd.
Bakersfield, CA 93308
ATTN: MR. JIM STEINER

ANALYSIS NO.: A9010605-001
ANALYSES: Volatile Organics by GCMS - EPA T014
DATE SAMPLED: 4/10/90
DATE SAMPLE REC'D: 4/13/90

PROJECT: SO. CALIFORNIA GAS - GOLETA

Enclosed with this letter is the report on the chemical and physical analyses on the sample from ANALYSIS NO: A9010605-001 shown above.

The sample was received by ENSECO Air Toxics Laboratory, intact and with the chain-of-custody record attached.

Please note that ND means not detected at the detection limit expressed.

Marita M. Lerenzo
REVIEWED

APPROVED

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LABORATORY REPORT

PAPE & STEINER
5801 Norris Rd.
Bakersfield, CA 93308
ATTN: MR. JIM STEINER

Sample ID: Prescreen of Can A-033

ANALYSIS NO.: A9010605
ANALYSES: Volatile Organics by GCMS - Prescreening
DATE SAMPLED: NA
DATE SAMPLE REC'D: NA
DATE ANALYZED: 4/05/90
SAMPLE TYPE: Air
QC BATCH NO.: MS201-9004051

Volatile Organics by GCMS

Parameter	Results ppb (vol/vol)	Detection Limits
Benzene	ND	2
Toluene	ND	2
Total Xylenes	ND	2.5
Propylene	ND	25
Napthalene	ND	2.5

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LABORATORY REPORT

PAPE & STEINER
5801 Norris Rd.
Bakersfield, CA 93308
ATTN: MR. JIM STEINER

Sample ID: Prescreen of Can A-033

ANALYSIS NO.: A9010605
ANALYSES: Volatile Organics by GCMS - Prescreening
DATE SAMPLED: NA
DATE SAMPLE REC'D: NA
DATE ANALYZED: 4/05/90
SAMPLE TYPE: Air
QC BATCH NO.: MS201-9004051

QC SUMMARY
Volatile Organics by GCMS

Compounds	Laboratory Control Sample % Recovery	Duplicate Control Sample % Recovery	RPD
Methylene Chloride	107	107	0
1,1 Dichloroethene	105	106	1
Trichloroethene	104	103	1
Toluene	100	102	2
1,1,2,2-Tetrachlorethane	103	108	5
Limits	80 - 115	80 - 115	20

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May 15, 1990

PAPE & STEINER
5801 Norris Rd.
Bakersfield, CA 93308
ATTN: MR. JIM STEINER

ANALYSIS NO.: A9010607-001
ANALYSES: Volatile Organics by GCMS - EPA T014
DATE SAMPLED: 4/10/90
DATE SAMPLE REC'D: 4/13/90

PROJECT: SO. CALIFORNIA GAS - GOLETA

Enclosed with this letter is the report on the chemical and physical analyses on the sample from ANALYSIS NO: A9010607-001 shown above.

The sample was received by ENSECO Air Toxics Laboratory, intact and with the chain-of-custody record attached.

Please note that ND means not detected at the detection limit expressed.

Marita M. Lourgo
REVIEWED

Steve D. Ahrie
APPROVED

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LABORATORY REPORT

PAPE & STEINER
5801 Norris Rd.
Bakersfield, CA 93308
ATTN: MR. JIM STEINER

Sample ID: Prescreen of Can A-062

ANALYSIS NO.: A9010607
ANALYSES: Volatile Organics by GCMS - Prescreening
DATE SAMPLED: NA
DATE SAMPLE REC'D: NA
DATE ANALYZED: 4/05/90
SAMPLE TYPE: Air
QC BATCH NO.: MS201-9004051

Volatile Organics by GCMS

Parameter	Results ppb (vol/vol)	Detection Limits
Benzene	ND	2
Toluene	ND	2
Total Xylenes	ND	2.5
Propylene	ND	25
Napthalene	ND	2.5

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LABORATORY REPORT

PAPE & STEINER
5801 Norris Rd.
Bakersfield, CA 93308
ATTN: MR. JIM STEINER

Sample ID: Prescreen of Can A-062

ANALYSIS NO.: A9010607
ANALYSES: Volatile Organics by GCMS - Prescreening
DATE SAMPLED: NA
DATE SAMPLE REC'D: NA
DATE ANALYZED: 4/05/90
SAMPLE TYPE: Air
QC BATCH NO.: MS201-9004051

QC SUMMARY
Volatile Organics by GCMS

Compounds	Laboratory Control Sample % Recovery	Duplicate Control Sample % Recovery	RPD
Methylene Chloride	107	107	0
1,1 Dichloroethene	105	106	1
Trichloroethene	104	103	1
Toluene	100	102	2
1,1,2,2-Tetrachlorethane	103	108	5
Limits	80 - 115	80 - 115	20

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May 15, 1990

PAPE & STEINER
5801 Norris Rd.
Bakersfield, CA 93308
ATTN: MR. JIM STEINER

ANALYSIS NO.: A9010608-001
ANALYSES: Volatile Organics by GCMS - EPA TO14
DATE SAMPLED: 4/10/90
DATE SAMPLE REC'D: 4/13/90

PROJECT: SO. CALIFORNIA GAS - GOLETA

Enclosed with this letter is the report on the chemical and physical analyses on the sample from ANALYSIS NO: A9010608-001 shown above.

The sample was received by ENSECO Air Toxics Laboratory, intact and with the chain-of-custody record attached.

Please note that ND means note detected at the detection limit expressed.

Marita M Lavergne
REVIEWED

APPROVED

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9537 Telstar Avenue, Suite 118 • El Monte, CA 91731
(818) 442-8400 • FAX: (818) 442-3758

LABORATORY REPORT

PAPE & STEINER
5801 Norris Rd.
Bakersfield, CA 93308
ATTN: MR. JIM STEINER

Sample ID: Prescreen of Can A-005

ANALYSIS NO.: A9010608
ANALYSES: Volatile Organics by GCMS - Prescreening
DATE SAMPLED: NA
DATE SAMPLE REC'D: NA
DATE ANALYZED: 4/02/90
SAMPLE TYPE: Air
QC BATCH NO.: MS101-9004021

Volatile Organics by GCMS

Parameter	Results ppb (vol/vol)	Detection Limits
Benzene	ND	2
Toluene	ND	2
Total Xylenes	ND	2.5
Propylene	ND	25
Napthalene	ND	2.5

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LABORATORY REPORT

PAPE & STEINER
5801 Norris Rd.
Bakersfield, CA 93308
ATTN: MR. JIM STEINER

Sample ID: Prescreen of Can A-005

ANALYSIS NO.: A9010608
ANALYSES: Volatile Organics by GCMS - Prescreening
DATE SAMPLED: NA
DATE SAMPLE REC'D: NA
DATE ANALYZED: 4/02/90
SAMPLE TYPE: Air
QC BATCH NO.: MS101-9004021

QC SUMMARY
Volatile Organics by GCMS

Compounds	Laboratory Control Sample % Recovery	Duplicate Control Sample % Recovery	RPD
Methylene Chloride	101	98	3
1,1 Dichloroethene	100	98	1
Trichloroethene	105	102	2
Toluene	99	96	3
1,1,2,2-Tetrachlorethane	98	98	0
Limits	80 - 115	80 - 115	20

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LABORATORY REPORT

PAPE & STEINER
5801 Norris Rd.
Bakersfield, CA 93308
ATTN: MR. JIM STEINER

Sample ID: A-033 Test 1 Inlet

ANALYSIS NO.: A9010605-001
ANALYSES: Volatile Organics by GCMS - EPA TO14
DATE SAMPLED: 4/10/90
DATE SAMPLE REC'D: 4/13/90
DATE ANALYZED: 4/20/90
SAMPLE TYPE: Air
QC BATCH NO.: MS101-9004201

Volatile Organics by GCMS

Parameter	Results ppb (vol/vol)	Detection Limits
Benzene	420	12
Toluene	110	12
Total Xylenes	ND	20
Propylene	ND	200
Napthalene	ND	20

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LABORATORY REPORT

PAPE & STEINER
5801 Norris Rd.
Bakersfield, CA 93308
ATTN: MR. JIM STEINER

ANALYSIS NO.: A9010605
ANALYSES: Volatile Organics by GCMS - EPA T014
DATE SAMPLED: 4/10/90
DATE SAMPLE REC'D: 4/13/90
DATE ANALYZED: 4/20/90
SAMPLE TYPE: Air
QC BATCH NO.: MS101-9004201

QC SUMMARY
Volatile Organics by GCMS
EPA TO14

Compounds	Laboratory Control Sample % Recovery	Duplicate Control Sample % Recovery	RPD
Methylene Chloride	86	87	2
1,1 Dichloroethene	98	98	1
Trichloroethene	92	92	0
Toluene	92	93	1
1,1,2,2-Tetrachlorethane	96	88	9
Limits	80 - 115	80 - 115	20

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☐ 9537 Telstar Ave., Unit 118, El Monte, CA 91731, (818) 442-8400
☐ Mobile Labs, (800) ENSECO-8

CHAIN OF CUSTODY RECORD

Date 4/11/90 Page 1 of 1

Lab Number A9010605-00

CLIENT: Pape & Steiner Env. Services
ADDRESS: 5801 Norris Rd
Bakersfield CA 93308
PROJECT NAME: SoCalGas - Goleta
CONTRACT / PURCHASE ORDER / QUOTE #:

PROJECT MANAGER: Jim Steiner
PHONE NUMBER: 805-3938442
SITE CONTACT:

ANALYSES

Sample No. / Identification	Date	Time	Lab Sample Number	SAMPLE TYPE LIQ.	AIR	SOLID	No. of Containers	Benzene	Toluene	Xylene	Naphthalene	Propylene			Sample Condition/ REMARKS
A-033 Test 1 Inlet	4/10	10:15	22581		✓		1	✓	✓	✓	✓	✓			

SAMPLERS: (Signature) Jim Steiner

Relinquished by: (Signature)

Received by: (Signature) — Date — Time

Relinquished by: (Signature) — Date — Time

Received by: (Signature) — Date — Time

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Relinquished by: (Signature) — Date — Time

Received for Laboratory by: Ruth Wong

Date RECEIVED	Time	Date ACCEPTED	Time
4/13/90	9:30 am		

Method of Shipment:

Special Instructions:

SAMPLE DISPOSITION:
1. Storage time requested: _____ days
(Samples will be stored for 30 days without additional charges; thereafter storage charges will be billed at the published rates.)
2. Sample to be returned to client: Y N
(Enseco will dispose of unreturned samples at no extra charge. Disposal will be by incineration wherever possible; otherwise, as appropriate, according to legal requirements.)

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LABORATORY REPORT

PAPE & STEINER
5801 Norris Rd.
Bakersfield, CA 93308
ATTN: MR. JIM STEINER

ANALYSIS NO.: A9010604-001
ANALYSES: Volatile Organics by GCMS - EPA TO14
DATE SAMPLED: 4/10/90
DATE SAMPLE REC'D: 4/13/90
DATE ANALYZED: 4/18/90
SAMPLE TYPE: Air
QC BATCH NO.: MS101-9004181

Sample ID: A-015 Test 2 Inlet

Volatile Organics by GCMS - EPA T014

Parameter	Results ppb (vol/vol)	Detection Limits
Benzene	400	9
Toluene	120	9
Total Xylenes	25	15
Propylene	ND	150
Naphthalene	ND	15

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LABORATORY REPORT

PAPE & STEINER
5801 Norris Rd.
Bakersfield, CA 93308
ATTN: MR. JIM STEINER

ANALYSIS NO.: A9010604-001
ANALYSES: Volatile Organics by GCMS - EPA T014
DATE SAMPLED: 4/10/90
DATE SAMPLE REC'D: 4/13/90
DATE ANALYZED: 4/18/90
SAMPLE TYPE: Air
QC BATCH NO.: MS101-9004181

QC SUMMARY
Volatile Organics by GCMS
EPA T014

Compounds	Laboratory Control Sample % Recovery	Duplicate Control Sample % Recovery	RPD
Methylene Chloride	98	95	3
1,1 Dichloroethene	104	104	0
Trichloroethene	97	90	8
Toluene	99	94	5
1,1,2,2-Tetrachlorethane	102	94	8
Limits	80 - 115	80 - 115	20

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☐ Mobile Labs. (800) ENSECO-8

CHAIN OF CUSTODY RECORD

Date 4/11/90 Page 1 of 1
Lab Number A9010604-r

CLIENT: Pape + Steiner Env. Services
ADDRESS: 5801 Morris Rd
Bakersfield CA 93308
PROJECT NAME: SoCal Gas - Goleta
CONTRACT / PURCHASE ORDER / QUOTE #:

PROJECT MANAGER: Jim Steiner
PHONE NUMBER: 805-3938442
SITE CONTACT:

ANALYSES

Sample No. / Identification	Date	Time	Lab Sample Number	SAMPLE TYPE LIQ.	AIR	SOLID	No. of Containers	Benzene	Toluene	Xylene	Naphthalene	Propylene			Sample Condition/ REMARKS
A-015 Test 2 Inlet	4/10	2:00	22573		✓		1	✓	✓	✓	✓	✓			

SAMPLERS: (Signature) Jim Steiner
Relinquished by: (Signature)
Received by: (Signature) Date Time
Received by: (Signature) Date Time

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Relinquished by: (Signature) Date Time
Received for Laboratory by: Lue Wong
Date RECEIVED Time: 4/13/90 9:30 am
Date ACCEPTED Time:

Method of Shipment:

Special Instructions:

SAMPLE DISPOSITION:
1. Storage time requested: _____ days
(Samples will be stored for 30 days without additional charges; thereafter storage charges will be billed at the published rates.)
2. Sample to be returned to client: Y N
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LABORATORY REPORT

PAPE & STEINER
5801 Norris Rd.
Bakersfield, CA 93308
ATTN: MR. JIM STEINER

Sample ID: A-007 Test 3 Inlet

ANALYSIS NO.: A9010603-001
ANALYSES: Volatile Organics by GCMS - EPA TO14
DATE SAMPLED: 4/11/90
DATE SAMPLE REC'D: 4/13/90
DATE ANALYZED: 4/18/90
SAMPLE TYPE: Air
QC BATCH NO.: MS101-9004181

Volatile Organics by GCMS

Parameter	Results ppb (vol/vol)	Detection Limits
Benzene	380	9
Toluene	100	9
Total Xylenes	28	15
Propylene	ND	150
Napthalene	ND	15

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LABORATORY REPORT

PAPE & STEINER
5801 Norris Rd.
Bakersfield, CA 93308
ATTN: MR. JIM STEINER

ANALYSIS NO.: A9010603
ANALYSES: Volatile Organics by GCMS - EPA T014
DATE SAMPLED: 4/11/90
DATE SAMPLE REC'D: 4/13/90
DATE ANALYZED: 4/18/90
SAMPLE TYPE: Air
QC BATCH NO.: MS101-9004181

QC SUMMARY
Volatile Organics by GCMS
EPA TO14

Compounds	Laboratory Control Sample % Recovery	Duplicate Control Sample % Recovery	RPD
Methylene Chloride	98	95	3
1,1 Dichloroethene	104	104	0
Trichloroethene	97	90	8
Toluene	99	94	5
1,1,2,2-Tetrachlorethane	102	94	8
Limits	80 - 115	80 - 115	20

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☐ 9537 Telstar Ave., Unit 118, El Monte, CA 91731, (818) 442-8400
☐ Mobile Labs, (800) ENSECO-8

CHAIN OF CUSTODY RECORD

Date 4/11/90 Page 1(1
Lab Number A4010603-001

CLIENT: Pape & Steiner Env. Services
ADDRESS: 5801 Norris Rd
Bakersfield CA 93308
PROJECT NAME: SoCalGas - Goleta
CONTRACT / PURCHASE ORDER / QUOTE #:

PROJECT MANAGER: Jim Steiner
PHONE NUMBER: 805-3938442
SITE CONTACT:

ANALYSES

Sample No. / Identification	Date	Time	Lab Sample Number	SAMPLE TYPE LIQ.	AIR	SOLID	No. of Containers	Benzene	Toluene	Xylene	Naptha lene	Propylene			Sample Condition/ REMARKS
A-007 Test 3 Inlet	4/11	8:25	22565		✓		1	✓	✓	✓	✓	✓			

SAMPLERS (Signature): Jim Steiner
Relinquished by: (Signature)
Received by: (Signature) Date Time
Received by: (Signature) Date Time

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Relinquished by: (Signature) Date Time
Received for Laboratory by: Luie Wing
Date RECEIVED Time: 4/13/90 9:30 am
Date ACCEPTED Time:

Method of Shipment:
Special Instructions:

SAMPLE DISPOSITION:
1. Storage time requested: _____ days
(Samples will be stored for 30 days without additional charges; thereafter storage charges will be billed at the published rates.)
2. Sample to be returned to client: Y N
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LABORATORY REPORT

PAPE & STEINER
5801 Norris Rd.
Bakersfield, CA 93308
ATTN: MR. JIM STEINER

ANALYSIS NO.: A9010608-001
ANALYSES: Volatile Organics by GCMS - EPA TO14
DATE SAMPLED: 4/10/90
DATE SAMPLE REC'D: 4/13/90
DATE ANALYZED: 4/20/90
SAMPLE TYPE: Air
QC BATCH NO.: MS101-9004201

Sample ID: A-005 Test 1 Outlet

Volatile Organics by GCMS - EPA T014

Parameter	Results ppb (vol/vol)	Detection Limits
Benzene	120	12
Toluene	ND	12
Total Xylenes	ND	20
Propylene	ND	200
Naphthalene	ND	20

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LABORATORY REPORT

PAPE & STEINER
5801 Norris Rd.
Bakersfield, CA 93308
ATTN: MR. JIM STEINER

ANALYSIS NO.: A9010608
ANALYSES: Volatile Organics by GCMS - EPA T014
DATE SAMPLED: 4/10/90
DATE SAMPLE REC'D: 4/13/90
DATE ANALYZED: 4/20/90
SAMPLE TYPE: Air
QC BATCH NO.: MS101-9004201

QC SUMMARY
Volatile Organics by GCMS
EPA T014

Compounds	Laboratory Control Sample % Recovery	Duplicate Control Sample % Recovery	RPD
Methylene Chloride	86	87	2
1,1 Dichloroethene	98	98	1
Trichloroethene	92	92	0
Toluene	92	93	1
1,1,2,2-Tetrachlorethane	96	88	9
Limits	80 - 115	80 - 115	20

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☐ Mobile Labs, (800) ENSECO-8

CHAIN OF CUSTODY RECORD

Date 4/11/90 Page 1 (1

Lab Number A9010608-10

CLIENT Pape & Steiner Env Services
ADDRESS 5801 Norris Rd
Bakersfield CA 93308
PROJECT NAME
So Cal Gas - Goleta
CONTRACT / PURCHASE ORDER / QUOTE #

PROJECT MANAGER
Jim Steiner
PHONE NUMBER
805 - 3938442
SITE CONTACT

ANALYSES

Sample No. / Identification	Date	Time	Lab Sample Number	SAMPLE TYPE LIQ.	AIR	SOLID	No. of Containers	Benzene	Toluene	Xylene	Napthalene	Propylene			Sample Condition/ REMARKS
A-005 Test, Outlet	4/10	10:15	22580		✓		1	✓	✓	✓	✓	✓			

SAMPLERS: (Signature) Jim Steiner

Relinquished by: (Signature)

Received by: (Signature) Date Time

Received by: (Signature) Date Time

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Relinquished by: (Signature) Date Time

Received for Laboratory by: Lulu Wong

Date RECEIVED Time: 4/13/90 9:30 am

Date ACCEPTED Time

Method of Shipment:

Special Instructions:

SAMPLE DISPOSITION:
1. Storage time requested:_____days
(Samples will be stored for 30 days without additional charges; thereafter storage charges will be billed at the published rates.)
2. Sample to be returned to client: Y N
(Enseco will dispose of unreturned samples at no extra charge. Disposal will be by incineration wherever possible; otherwise, as appropriate, according to legal requirements.)

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LABORATORY REPORT

PAPE & STEINER
5801 Norris Rd.
Bakersfield, CA 93308
ATTN: MR. JIM STEINER

Sample ID: A-062 Test 2 Outlet

ANALYSIS NO.: A9010607-001
ANALYSES: Volatile Organics by GCMS - EPA TO14
DATE SAMPLED: 4/10/90
DATE SAMPLE REC'D: 4/13/90
DATE ANALYZED: 4/20/90
SAMPLE TYPE: Air
QC BATCH NO.: MS101-9004201

Volatile Organics by GCMS
EPA TO14

Parameter	Results ppb (vol/vol)	Detection Limits
Benzene	41	9
Toluene	ND	9
Total Xylenes	ND	15
Propylene	ND	150
Napthalene	ND	15

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LABORATORY REPORT

PAPE & STEINER
5801 Norris Rd.
Bakersfield, CA 93308
ATTN: MR. JIM STEINER

ANALYSIS NO.: A9010607
ANALYSES: Volatile Organics by GCMS - EPA T014
DATE SAMPLED: 4/10/90
DATE SAMPLE REC'D: 4/13/90
DATE ANALYZED: 4/20/90
SAMPLE TYPE: Air
QC BATCH NO.: MS101-9004201

QC SUMMARY
Volatile Organics by GCMS
EPA T014

Compounds	Laboratory Control Sample % Recovery	Duplicate Control Sample % Recovery	RPD
Methylene Chloride	86	87	2
1,1 Dichloroethene	98	98	1
Trichloroethene	92	92	0
Toluene	92	93	1
1,1,2,2-Tetrachlorethane	96	88	9
Limits	80 - 115	80 - 115	20

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CHAIN OF CUSTODY RECORD

Date 4/11/90 Page 1 of 1
Lab Number A9010607-[illegible]

CLIENT: Pape & Steiner Env Services
ADDRESS: 5801 Norris Rd
Bakersfield CA 93308
PROJECT NAME: So Cal Gas - Goleta
CONTRACT / PURCHASE ORDER / QUOTE #:

PROJECT MANAGER:
PHONE NUMBER:
SITE CONTACT:

ANALYSES

Sample No. / Identification	Date	Time	Lab Sample Number	SAMPLE TYPE LIQ.	AIR	SOLID	No. of Containers	Benzene	Toluene	Xylene	Napthalene	Propylene			Sample Condition/ REMARKS
A-062 Test 2 Outlet	4/10	2:00	22572		✓		1	✓	✓	✓	✓	✓			

SAMPLERS: (Signature) Jim Steiner
Relinquished by: (Signature)
Received by: (Signature) Date Time
Received by: (Signature) Date Time

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Relinquished by: (Signature) Date Time
Received for Laboratory by: Lillie Wong
Date RECEIVED Time: 4/13/90 9:30 am
Date ACCEPTED Time:

Method of Shipment:
Special Instructions:

SAMPLE DISPOSITION:
1. Storage time requested: _____ days
(Samples will be stored for 30 days without additional charges; thereafter storage charges will be billed at the published rates.)
2. Sample to be returned to client: Y N
(Enseco will dispose of unreturned samples at no extra charge. Disposal will be by incineration wherever possible; otherwise, as appropriate, according to legal requirements.)

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LABORATORY REPORT

PAPE & STEINER
5801 Norris Rd.
Bakersfield, CA 93308
ATTN: MR. JIM STEINER

ANALYSIS NO.: A9010606-001
ANALYSES: Volatile Organics by GCMS - EPA TO14
DATE SAMPLED: 4/11/90
DATE SAMPLE REC'D: 4/13/90
DATE ANALYZED: 4/20/90
SAMPLE TYPE: Air
QC BATCH NO.: MS101-9004201

Sample ID: A-049 Test 3 Outlet

Volatile Organics by GCMS - EPA T014

Parameter	Results ppb (vol/vol)	Detection Limits
Benzene	26	9
Toluene	11	9
Total Xylenes	ND	15
Propylene	ND	150
Naphthalene	ND	15

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Enseco - Air Toxics Laboratory
9537 Telstar Avenue, Suite 118 • El Monte, CA 91731
(818) 442-8400 • FAX: (818) 442-3758

LABORATORY REPORT

PAPE & STEINER
5801 Norris Rd.
Bakersfield, CA 93308
ATTN: MR. JIM STEINER

ANALYSIS NO.: A9010606
ANALYSES: Volatile Organics by GCMS - EPA T014
DATE SAMPLED: 4/11/90
DATE SAMPLE REC'D: 4/13/90
DATE ANALYZED: 4/20/90
SAMPLE TYPE: Air
QC BATCH NO.: MS101-9004201

QC SUMMARY
Volatile Organics by GCMS
EPA T014

Compounds	Laboratory Control Sample % Recovery	Duplicate Control Sample % Recovery	RPD
Methylene Chloride	86	87	2
1,1 Dichloroethene	98	98	1
Trichloroethene	92	92	0
Toluene	92	93	1
1,1,2,2-Tetrachlorethane	96	88	9
Limits	80 - 115	80 - 115	20

The Report Cover Letter is an integral part of this report.
This report pertains only to the samples investigated and does not necessarily apply to other apparently identical or similar materials. This report is submitted for the exclusive use of the client to whom it is addressed. Any reproduction of this report or use of this Laboratory's name for advertising or publicity purposes without authorization is prohibited

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CHAIN OF CUSTODY RECORD

Date 4/11/90 Page 1 / 1

Lab Number A9010606-001

CLIENT: Pape + Steiner Env. Services
ADDRESS: 5801 Norris Rd
Bakersfield CA 93308
PROJECT NAME: SoCal Gas - Goleta
CONTRACT / PURCHASE ORDER / QUOTE #

PROJECT MANAGER: Jim Steiner
PHONE NUMBER: 805-3938442
SITE CONTACT

ANALYSES

Sample No. / Identification	Date	Time	Lab Sample Number	SAMPLE TYPE LIQ.	AIR	SOLID	No. of Containers	Benzene	Toluene	Xylene	Naphthalene	Propylene			Sample Condition/ REMARKS
A-049 Test 3 Outlet	4/11	8:25	22564		✓		1	✓	✓	✓	✓	✓			

SAMPLERS: (Signature) Jim Steiner

Relinquished by: (Signature)

Received by: (Signature) Date Time

Received by: (Signature) Date Time

The delivery of samples and the signature on this chain of custody form constitutes authorization to perform the analyses specified above under the Enseco Terms and Conditions, unless a contract or purchase order has been executed and is cited above.

Relinquished by: (Signature) Date Time

Received for Laboratory by: Lue Wong

Date	RECEIVED	Time	Date	ACCEPTED	Time
4/13/90	9:30 am				

Method of Shipment:

Special Instructions:

SAMPLE DISPOSITION:
1. Storage time requested: _____ days
(Samples will be stored for 30 days without additional charges; thereafter storage charges will be billed at the published rates.)
2. Sample to be returned to client: Y N
(Enseco will dispose of unreturned samples at no extra charge. Disposal will be by incineration wherever possible; otherwise, as appropriate, according to legal requirements.)

DISTRIBUTION: White with report, Yellow to Enseco, Pink to Courier, Gold to Sample Control