Bell Jr. High
LFG EFD

Bell Jr. High School Landfill
Surelite Flare

Data Qual. = D
checking some calcs
flare not operated
under normal conditions

No exhaust flow data
NOx & CO emissions;

November 25, 1992

TO: Michael R. Lake, Chief
Engineering Division

FROM: Dave Byrnes, Associate Toxics Engineer
Archi dela Cruz, Junior Toxics Engineer

EMISSION FACTORS FOR LANDFILL GAS FLARES

The San Diego Air Pollution Control District (District) contracted the South Coast Environmental Company (SCEC) to source test the Arizona Street and Bell Junior High School landfill gas flares. The sites were source tested for SOx, NOx, CO, TOG/ROG, particulates, and speciated toxic organic gases between March 30 and April 7, 1992.

The source test results of SCEC have been reviewed and approved by the District Monitoring and Technical Services Section (M&TS). District Toxics Engineering Section has generated the following emission factors for landfill gas flares using the M&TS approved source test reports. The emission factors are presented below in units of lbs of contaminant per million BTU.

Emission Factors for Landfill Gas Flares (lbs contaminant/mm BTU).

Contaminant	Arizona	Bell	Average	Recommended*	SCAQMD
SOx	0.0077	0.0105	0.0091	0.01	0.001
NOx	0.0825	0.0562	0.0694	0.10	0.05
CO	<0.0170	<0.0181	<0.0176	0.02	0.19
Particulates	0.0106	0.0207	0.0157	0.02	0.07
ROG**				0.06	0.42

* Recommended for permit processing.
** Inlet concentrations of 0.2 and a conservative destruction efficiency of 70% will be used for the purposes of permit processing.

ENGINEERING'S METHODOLOGY.

Both energy and mass balance were performed to verify the source test report information approved by M&TS. A carbon balance was used to determine the landfill gas flow at the inlet. A hydrogen balance was used to verify the methane content of the inlet landfill gas. Data from Arizona Run #3 and Bell Run #1 were determined to be acceptable after adjustment of the outlet stack temperatures, landfill gas inlet flow rates, and inlet methane concentrations.

An Excel spreadsheet was developed to calculate the energy at the inlet and at the outlet of the flare, the heat of combustion of the landfill gas, and the heat loss by the flare. Test results were adjusted to develop more accurate operating parameters. These operating parameters were verified by inspecting the heat loss as a percent of the total heat output.

Table 1 lists the key operating parameters that were used to produce reasonable energy balances and to determine the landfill emission factors.

Table 1. Flare Operating Parameters.

PARAMETERS	ARIZONA	BELL
Stack Temperature	2110°R	2010°R
Inlet Flow of Landfill Gas	242 cfm	316 cfm
Methane Content at Inlet	60%	55%

STACK TEMPERATURE CORRECTIONS.

It was discovered that SCEC's temperature readings may have been taken improperly and the temperature probe may have been calibrated incorrectly. At Arizona Street, M&TS noticed the SCEC did not allow the temperature probe to reach equilibrium after reinserting the probe into the next port or sampling location. M&TS corrected for this incorrect measurement technique and approved a temperature value of 1903°R. No correction was made by M&TS for the possible calibration error. The thermocouple installed in the site flare displayed an average temperature of 2110°R. A difference of 207° is observed between the two temperature probes.

Temperature readings were apparently performed properly at Bell. SCEC measured an average temperature of 1776°R. The thermocouple installed in the site flare displayed an average temperature of 2010°R. A difference of 234° is observed between the two temperature probes.

It is believed that the temperature readings from the installed thermocouples in both site flares represent the actual stack temperature. The differences between SCEC's temperature measurements and the temperature displayed by the installed thermocouples at both sites are very similar. SCEC's temperature measurements are ~200° lower than both of the thermocouples installed in each

site flare. It is believed that SCEC's temperature probe is reading ~200° less than the actual stack temperature due to a calibration error.

Engineering used the temperature readings measured by the installed thermocouples at each site in an energy balance of each system and for emission factor calculations.

LANDFILL GAS INLET FLOW RATE CORRECTIONS.

The landfill gas inlet flow meters at both sites were inaccurate. Correct landfill gas inlet flow rates were determined by performing a carbon balance using a temperature corrected exhaust flow rate and the %CO2 outlet value approved by M&TS. Arizona's flow meter read 345 cfm during the source test. The calculated flow rate was 242 cfm (the site's flow meter reads 43% higher). Bell's flow meter read 195 cfm while the calculated flow rate was 316 cfm (the site's flow meter reads 38% lower).

Engineering used the corrected inlet flow rates in an energy balance of each systems and for emission factors calculations.

LANDFILL GAS METHANE CONCENTRATION CORRECTIONS.

Arizona Street Landfill Gas Flare Source Test Report.

Run #3 of the particulates testing was the only run that was used for energy balance and emission factors calculations. Runs #1 and #2 were eliminated from the average by M&TS.

An average inlet methane content of 390,000 ppm was approved by M&TS for Arizona. This average included an unrealistic methane content of 120,000 ppm. This approved methane concentration is incorrect as demonstrated by an energy balance of the system. See spreadsheet #1. An inlet methane content of 600,000 ppm is more accurate based on both a hydrogen and energy balance of the system. See spreadsheet #2. Past inlet sampling conducted by the site supports this value. Therefore, a methane content of 600,000 ppm was used by Engineering to calculate the emission factors for Arizona Street.

Bell Junior High School Landfill Flare Source Test Report.

Run #1 of the particulates testing is believed to be the best data obtained for the energy balance and emission factor calculations. Run #2 was eliminated from the average by M&TS. Run #3 is ignored by Engineering because the percent H2O at the outlet is too high relative to the percent CO2 at the outlet. The percent of H2O at the outlet should equal the percent of CO2 at the outlet for an inlet methane content of 50%.

An average inlet methane content of 253,333 ppm was approved by M&TS for Bell. The average included an unrealistic methane content of 160,000 ppm. This approved methane concentration is incorrect as demonstrated by an energy balance on the system. See spreadsheet #3. An inlet methane content of 550,000 ppm is more accurate based on both a hydrogen and energy balance of the system. See spreadsheet #4. Therefore, a methane content of 550,000 ppm was used by Engineering to calculate the emission factors for Bell.

TOXIC AIR CONTAMINANTS.

The GC analyses of toxic air contaminants (TAC's) as approved by M&TS shows that both sites have similar compositions of TAC's. Table 2 and 3 presents the TAC's destruction efficiencies for both sites. Inlet and outlet detection limits were used when non-detectable concentrations were reported.

Table 2. Destruction Efficiency of TAC's at Arizona Street Flare.

Contaminant	Inflow Conc., lbm/hr	Outflow Conc., lbm/hr	Destruction Efficiency, %
Vinyl Chloride	0.0024	<0.00044 (ND)	>81.7
Methylene Chloride	0.0010	0.00008	91.8
Chloroform	<0.0005 (ND)	<0.00044 (ND)	>12
1,2-Dichloroethane	<0.0005 (ND)	<0.00044 (ND)	>12
1,1,1-Trichloroethane	0.0025	<0.00044 (ND)	>82.4
Benzene	0.00056	0.0003	38.2
Carbon Tetrachloride	<0.0005 (ND)	<0.00044 (ND)	>12
Trichloroethene	0.0038	<0.00044 (ND)	>88.4
1,2-Dibromoethane	<0.0005 (ND)	<0.00044 (ND)	>12
Tetrachloroethene	0.0079	<0.00044 (ND)	>94.4

Table 3. Destruction Efficiency of TAC's at Bell Jr. High Flare.

Contaminant	Inflow Conc., lbm/hr	Outflow Conc., lbm/hr	Destruction Efficiency, %
Vinyl Chloride	0.0012	<0.00028 (ND)	>76.7
Methylene Chloride	0.0029	<0.00028 (ND)	>90.5
Chloroform	<0.0004 (ND)	<0.00029 (ND)	>29.3
1,2-Dichloroethane	<0.0004 (ND)	<0.00028 (ND)	>30.0
1,1,1-Trichloroethane	0.0014	<0.00028 (ND)	> 79.7
Benzene	0.0027	0.00038	85.9
Carbon Tetrachloride	<0.0004 (ND)	<0.00027 (ND)	>32.5
Trichloroethene	0.011	<0.00027 (ND)	>97.5
1,2-Dibromoethane	<0.0004 (ND)	<0.00028 (ND)	>30.0
Tetrachloroethene	0.017	<0.00027 (ND)	>98.4

LANDFILL GAS FLARE EMISSION FACTORS.

Emission factors for SOx, NOx, CO, and particulates were calculated using M&TS approved emissions, the corrected flow rate out the stack (using installed thermocouple readings), the corrected landfill gas flow rate at the inlet (using carbon balance), and the adjusted methane content at the inlet (using energy and hydrogen balance).

M&TS reported undetectable CO in the exhaust of both stacks but did not specify a detection limit. A detection limit of 10 ppm was assumed by Engineering and was used to calculate the CO emission factors.

The approved M&TS source test report showed that all non-methane hydrocarbons (ROG) were non-detectable (ppm range) at both the inlet and the outlet sampling locations for each site. It is recommended that an inlet concentration of 0.2 lbs ROG/mm BTU based on detection limits be used to estimate the landfill ROG generation rate. Using a conservative destruction efficiency of 70%, a 0.06 lbs ROG/mm BTU emission factor is recommended for permit processing.

SUMMARY AND DISCUSSION OF RESULTS.

The recommended emission factor of NOx is relatively similar to the SCAQMD emission factor. SCAQMD emission factor for SOx is one order of magnitude less than the recommended emission factor. This is probably due to differing of sulfur content in the landfill gas or differing sampling methodology. The recommended emission factors for CO and particulates indicate more efficient combustion than the SCAQMD emission factors.

SCAQMD's emission factor for ROG is too high. With SCAQMD 's ROG emission factor, the outlet concentration of ROG would equal ~69 ppm. This value is higher than the measured ROG concentration in any of the sampled landfill gas inlets in San Diego. SCAQMD's emission factor for ROG is questionable . The recommended value based on non-detectable concentrations will be used by Engineering.

RECOMMENDATIONS.

It is recommended that these emission factors be used to calculate emissions for landfill gas flares and be used to determine a cut-off point for source testing landfill gas flares. With the recommended emission factors, landfill gas flare emissions can be estimated. Table 4 presents these estimated emissions.

Table 4. Estimated Emissions from Landfill Gas Flares.

Landfill Size, tons	Gas Gen. Rate, mm cu ft/yr	Estimated Emissions, tons/yr*				
		NOx	ROG	CO	Particulates	SOx
1,000,000	85.6	2.0	1.2	0.4	0.4	0.2
2,000,000	171.4	4.0	2.4	0.8	0.8	0.4
4,000,000	343	8.0	4.8	1.6	1.6	0.8
6,000,000	514	12.0	7.2	2.4	2.4	1.2
10,000,000	857	20.0	12.0	4.0	4.0	2.0

* Assumes an inlet methane content of 50%.

A landfill with a size of 9,000,000 tons and a continuous operating flare triggers Rule 20.2. A landfill with a size of 5,000,000 tons would require offsets per the proposed New Source Review. It is recommended that the presented emission factors be used to estimate emissions from landfills with a size of <5,000,000 tons. Source testing is recommended for landfills with a size of ≥5,000,000 tons.

TEST SUMMARY OF LANDFILL GAS THERMAL OXIDIZER

AT BELL JUNIOR HIGH SCHOOL IN SAN DIEGO

1. Narrative Summary
2. Test Summary
3. Engineering Report
4. SOx Average
   - Run #1
   - Run #2
   - Run #3
5. NOx and CO Analysis
6. Runs #1 - #4 GC Analysis
7. Particulates
8. Test Witness
   - Run #1
   - Run #2
   - Run #3

Purpose: The SDAPCD engineering division requested testing of emissions from a landfill gas thermal oxidizer located at Bell Junior High School. Data regarding emissions from this type of operation were needed for regulatory decision making. The objective of these tests was to quantify emissions of speciated organic gases, oxides of nitrogen, carbon monoxide, oxides of sulfur and particulates. An additional objective was to assess the efficiency of the thermal oxidizer in destroying incoming toxic organic compounds.

Methods: Organic gases were collected in summa polished stainless steel canisters and analyzed using gas chromatography as detailed in the attached appendix. Particulate matter and oxides of sulfur were collected and determined according to modified EPA Methods 5 and 8. Oxides of nitrogen and carbon monoxide were determined using SDAPCD Method 20. A copy of the protocol and referenced methods are contained in an appendix to this report. In general, testing was accomplished in accordance with agreed upon methodology. Individual sample runs which were determined to be substantively in error were deleted from data used in the attached summary table.

Process Description: Gases are generated from the decomposition or volatization of previously deposited waste at the landfill. A gas collection system has been installed at this site to gather these gases for processing. The collected landfill gases are oxidized in an enclosed flare. Emissions associated with this incineration are quantified in the test program discussed in this report.

Conclusions: As indicated in the attached table of summarized results, emissions of oxides of sulfur, carbon monoxide and particulate matter are quite low. Emissions of oxides of nitrogen are also fairly low as would be expected from a low heating value fuel. Emissions of hydrocarbons, including various halogenated toxic species, are also quite low.

Test Summary of Lar

Site: Bell Junior High School
620 South Briarwood Road
San Diego, CA

Test #: 92098
P.O. #: 880614
Test Date: April 7, 1992

Equipment: Landfill gas thermal oxidizer
Tested by: Russ Logan and Ted Jackman of SCEC
Site personnel: Ray Purtee
APCD engineer: Archi de la Cruz
Lab analysis by: SCEC and Performance Analytical on April 21, 1992
Report by: SCEC (Russ Logan) on May 14, 1992
Reviewed by: David N. Shina on August 4, 1992
Approved by: Judith Lake, chief of monitoring Judith M Lake 10/2/92
(This report has been reviewed and found to be representative of the testing that was performed.)

SOx Test Results Summary

		SO_3			SO_2			Total SOx		
Item	I	Cs	Cs(12%)	E	Cs	Cs(12%)	E	Cs	Cs(12%)	E
Units	%	gr/dscf	gr/dscf	lbs/hr	gr/dscf	gr/dscf	lbs/hr	gr/dscf	gr/dscf	lbs/hr
Value	107	0.001733	0.002787	0.0643	0.001237	0.001996	0.0459	0.002970	0.004782	0.1102

NOx and CO Test Results Summary

Gas	Test (ppm)	Limits (ppm)	Performance Exceedance/Non-exceedance
NOx	18.98	N/A	N/A
CO	ND	N/A	N/A

Particulate Test Results Summary

Item	ts	Bws	$\%O_2$	$\%CO_2$	vs	Qstd	$Cs_{(total)}$	Cs (12%, total)	E (total)	%I
Units	°F	%	%	%	ft/sec	dscfm	gr/hr	gr/dscf	lbs/hr	%
Value	1316	9.34	11.88	7.47	21.952	4337	0.0059	0.0095	0.22	105

G.C. Test Results Summary

	Avg. Inlet		Avg. Outlet			Avg. Inlet		Avg. Outlet	
	Result ppm	Det. limit ppm	Result ppm	Det. limit ppm		Result ppb	Det. limit ppb	Result ppb	Det. limit ppb
C1 as methane	253333	54	1	1.8	Vinyl chloride	357	133	ND	7.3
C2 as ethane	ND	54	ND	1.8	Methylene chloride	703	98	ND	5.4
C3 as n-propane	ND	43	ND	1.5	Chloroform	ND	69	ND	3.8
C4 as n-butane	ND	33	ND	1.1	1,2-Dichloroethane	ND	83	ND	4.5
C5 as pentane	ND	22	ND	0.7	1,1,1-Trichloroethane	210	62	ND	3.4
C6 as n-hexane	ND	22	ND	0.7	Benzene	700	106	8	5.7
C7 as n-heptane	ND	22	ND	0.7	Carbon tetrachloride	ND	53	ND	2.9
C8 as n-octane	ND	22	ND	0.7	Trichloroethene	1633	62	ND	3.4
C9 as n-nonane	ND	22	ND	0.7	1,2-Dibromoethane	ND	43	ND	2.4
>C9 as n-nonane	ND	22	ND	0.7	Tetrachloroethene	2100	50	ND	2.7

ENGINEERING SOURCE TEST REPORT
BELL JR. HIGH LANDFILL GAS FLARE

DATE:	April 10, 1992
SOURCE:	Bell Jr. High Landfill
EQUIPMENT:	Bell Jr. High Landfill Gas Flare
ENGINEER:	Archi dela Cruz

TEST PURPOSE

The purpose of this source test is to more accurately assess PM, CO, NOx, SO2, and TOG/ROG emissions which are generated at this type of source. Also, there will be an analysis of toxic emissions generated at the inlet and outlet of the landfill gas flare system. The results of this source test will be used to generate emission factors for this type of source.

BACKGROUND INFORMATION

SDAPCD M&TS personnel:	Dave Shina and Janet Cawyer
Contracted source testing company:	Russ Logan South Coast Environmental Company
Operator of flare:	Bob Hanley and Bob Hobbs County of San Diego

The source test was conducted through the course of three separate source test dates. In the initial source test (March 30, 1992), the boom that was present to lift the source technician up to the stack was not adequate enough to accommodate all of the testing equipment. There was only enough room to accommodate the equipment that would sample NOx, CO, and TOG/ROG. Testing proceeded for these contaminants on this date. Only two TOG/ROG samples were obtained since one sampling canister broke.

A second date (April 1, 1992) was scheduled to sample for PM. A scissor lift was provided by the operators of the flare to accommodate both the source test technician and the PM sampling equipment. After approximately one hour of testing, the sampling nozzle broke. The contractor was unable to put a replacement nozzle on. Testing was discontinued.

On the third date of sampling (April 7,1992), the contractor returned to sample for PM. I was unable to attend this source test. Lynn Shallenberger was my replacement for this source test.

OPERATING PARAMETERS DURING TESTING

March 30, 1992 Source Testing

The flare was not in operation upon arrival. The flare was shut down for a day prior to the source test in order to generate enough landfill gas for testing.

The auxiliary gas line was manually shut. A boom was provided to lift the source test technician up to the stack. The following parameters were observed during the NOx, CO, and TOG/ROG source test.

Starting time of sampling:	12:00 pm
Ending time of sampling:	2:55 pm
Average landfill gas flowrate:	195 cfm
Natural gas usage:	0 cfm
Average flare temperature:	1547 F
Flare operating set temperature	1550 F
Average landfill gas O_2 content:	0.4%

April 7, 1992 Source Testing

Only PM was tested on this source test. Lynn Shallenberger was the engineer present for this source test. The following parameters were obtained from her source test data.

Starting time of sampling:	10:29 am
Ending time of sampling:	3:59 pm
Average landfill gas flowrate:	195 cfm
Natural gas usage:	0 cfm
Average flare temperature:	1549 F
Flare operating set temperature	1550 F
Average landfill gas O_2 content:	0.47%

DISCUSSION AND CONCLUSION

The flare was not operated under typical conditions during testing. The flare usually operates for two hours per day (as reported by Bob Hanley). To conduct the source test, the flare had to operate 40 minutes to one hour for each sampling. Though operating times were extended for the source test, it is believed that the gas that was burned is representative of the typical landfill gas extracted for combustion in the flare because of the relatively minor increase in the landfill gas O_2 content.

The landfill gas flare system appeared to be in good operating condition. There were no visible emissions during the source test. There were no noticeable operational testing changes observed throughout the testing. The flare operated under permit conditions.

Landfill Flare Source Test Data
Bell Jr. High Landfill (NO_x, CO, TOG/ROG)

BACKGROUND DATA:

existing cumulative flow = 17311.74 ($1000 ft^3$) ending cum. flow 17349.45 ($1000 f$

operating set temperature = 1550°F

warm up time 11:39 to 11:45

O_2% content = 0.045%

no visible emissions on start-up

flowrate = 185 scfm

	low cutoff (175) LANDFILL GAS BURNED, cfm	low cutoff (1500) TEMPERATURE	O_2 CONTENT	
2:00	200	1519	0.35%	meter read as percent
2:10	200	1529	0.36%	
2:20	199	1549	"	
:30	197	1572	"	
:40	198	1550	"	
:50	197	1549	"	
:00	196	1557	0.35%	
:10	195	1544	0.38%	
20	195	1542	0.4%	
:30	193	1545	0.4	
:40	192	1546	0.4	
:	192	1547	0.4	
:00	191	1559	0.4	
:10	191	1552	0.4	
:20	191	1553	0.42	

Bell Jr. High

TIME	LANDFILL GAS BURNED, cfm	TEMPERATURE	O_2 CONTENT, %
2:30	192	1544	0.45 %
2:40	193	1550	0.45
2:50	193	1554	0.45
2:55	193	1559	0.45

Landfill Source Test Data (PM Tests)
Bell Jr. High Flare

Initial flow meter reading = 17349.45 x 1000 scf (standard ft^3)
Initial O_2 content = 0.55%
Start-up time = 2:50 ending time = 2:57 to reach 1550°F
↳ to reach 1550°F
0 visible emissions on start-up
Temp. fluctuates from ~1500 to ~1590°F for first minutes

TIME	LAND FILL GAS BURNED, cfm	TEMP., °F	O_2 CONTENT
:05	201	1516	0.55%
-	201	1569	0.55
:20	201	1554	0.55
:30	199	1539	0.55
40	198	1563	0.55
broke nozzle (3:45)			
:10	195	1553	0.5

↳ shut down flare. Having difficulty putting on new nozzle.
Test bombed.

Lynn Shallenberger

1/6 12

Full Jr. High Flow PM Test

[illegible] will [illegible] 2 cycles can be taken [illegible]

[illegible]

Initial flowmeter reading: 1375.38

Initial O_2 [illegible]: 0.4 %

start up time: 1114

1115 F [illegible]: 7:20

[illegible] Upon arrival [illegible] Initial flow reading [illegible]

[illegible] highest on the manometer read 2.

[illegible] nozzle broke [illegible] end of test

[illegible] Final reading: 1385?.60

TIME	[illegible]	[illegible]	[illegible]
[illegible]:7	195	1553	.38
[illegible]:15	195	1543	.4

[illegible] Hose shipped with. Final [illegible]

[illegible]:15	175	1548	.39
[illegible]:24	196	1551	.4
11:05	196	1552	.4
11:15	198	1544	.4
11:24	197	1549	.4
11:35	197	1547	.4

1360?.39 Final reading

nn Shallenberger

1-~-92

Bell Jr. High Flare PM Tests

Bob
Russ
TED
Dave
Lynn

initial flowmeter reading : 18603.94

initial O_2 Content : .41

startup time : 12:10

1550° F at : 12:20

problems? no VE's

apex tip moving gauge broke. Didn't affect test

18605.77

TE	CFM	TEMP, °F	O_2 content
12:22	200	1542	.41
12:27	201	1543	.41
12:32	202	1544	.41
12:38	200	1548	.41
12:47	200	1544	.45
12:52	200	1541	.46
12:57	200	1552	.45
1:06	200	1546	.48
1:11	199	1549	.48

~~Inlet & outlet TOG & ROG sample taken at:~~

1:11 probe broke during port change. Can't continue test.

2 of 8

...n Shallenberger

7-4 92

Bell Jr. High Flare PM Tests

...nitial flowmeter reading: 18617.55 x1000 cf

...nitial O_2 Content: .5

...tartup time: 2:08

550°F at: 2:18

...roblems? monitor lazy after startup no VE's

water about 4ft. test delayed.

...tart of test flowmeter reading: 18624.99 x1000 cf

	CFM	TEMP °F	O_2 content
2:49	197	1551	.5
2:00	194	1550	.5
2:10	194	1546	.5
2:20	194	1548	.54
2:30	193	1547	.55
3:40	193	1553	.55
3:50	194	1544	.58
3:55	194	1553	.58
3:51	194	1547	.59

...let & outlet TOG & ROG sample taken at: 2:55. Strong methane smell during draw 356 off

...nding flowmeter reading: 18638.54 ...000 cf

COMPANY: BELL JR. HIGH
DATE: 4-7-92
UNIT: FLARE
REPORT #:T1482-2

RUN #3
@ 68'F
EPA METHOD 5/8

PARTICULATE RESULTS:	net mg	gr/dscf	gr/scf	gr/dscf @ 12% CO2	lbs/hr
Probe & Nozzle:	0.33	0.000171	0.000154	0.000298	0.01
Filter:	0.1	0.000052	0.000046	0.000090	0
Condensables:	13.804	0.007184	0.006448	0.012494	0.28
Total:	14.234	0.007408	0.006649	0.012883	0.29

N BaCl = 0.00971

SULFATE RESULTS:	Vol aliq	Vt	gr/dscf	gr/scf	gr/dscf @ 12% CO2	lbs/hr
Probe & Nozzle:	16.5	0.1	0.000404	0.000362	0.000703	0.02
Filter:	10	0	0	0	0	0
Condensables:	20.3	0.24	0.001194	0.001071	0.002076	0.05
Total:			0.001598	0.001434	0.002780	0.07

ADDITIONAL DATA:

TIME start	TIME finish	%O2	%CO2	%H2O	Vm(std)	SDCFM
1445	1555	12.33	6.9	10.24	29.59	4497

Concentration(SO2) = [K*Normality*V-titrant*(V-solution/V-aliquot)]/Vm-(std)

CALCULATIONS:

SCELLANEOUS DATA

	SDAPCD	SCEC	
N = Normality =	0.00971	0.00971	equiv/liter
Vmstd =	29.59	29.59	dscf
Qstd =	4478	4497	dscfm
%CO2 =	6.9	6.9	%
15.43 grains = 1 gram	15.43	15.4	grains/gram
7000grains=1lb, 60min=1hr; 60min/hr/7000grains/lb=	0.00857	0.00857	lbs-min/grs-hr

SO2:

MW =	64.06	not done	g/mole
# equiv/mole vs. BaCl2 =	2	not done	equiv/mole
K =	32.03	not done	grams/equiv

FRONT HALF

Volume of the titrant = Vt	0.2	not done	ml
Volume of the solution = Vsoln =	250	not done	ml
Volume of the aliquot = Valiquot =	10	not done	ml
Conc(SO2,front) = [K*N*Vt*(Vsoln/Valiquot)]/Vm(std) =	0.0000526	not done	grams/dscf
Cs(SO2,front) = 15.43*Conc(SO2,front) =	0.0008109	not done	grains/dscf
Cs(SO2,12%,front) = Cs(SO2,front)*(12/%CO2) =	0.0014103	not done	grains/dscf
E (SO2,front) = 0.00857*Qstd*Cs(SO2,front) =	0.0311	not done	lbs/hr

FILTER

Volume of the titrant = Vt	0	not done	ml
Volume of the solution = Vsoln =	250	not done	ml
Volume of the aliquot = Valiquot =	10	not done	ml
Conc(SO2,filter) = [K*N*Vt*(Vsoln/Valiquot)]/Vm(std) =	0.0000000	not done	grams/dscf
Cs(SO2,filter) = 15.43*Conc(SO2,filter) =	0.0000000	not done	grains/dscf
Cs(SO2,12%,filter) = Cs(SO2,filter)*(12/%CO2) =	0.0000000	not done	grains/dscf
E (SO2,filter) = 0.00857*Qstd*Cs(SO2,filter) =	0.0000	not done	lbs/hr

BACK HALF

Volume of the titrant = Vt	0.1	not done	ml
Volume of the solution = Vsoln =	250	not done	ml
Volume of the aliquot = Valiquot =	10	not done	ml
Conc(SO2,back) = [K*N*Vt*(Vsoln/Valiquot)]/Vm(std) =	0.0000263	not done	grams/dscf
Cs(SO2,back) = 15.43*Conc(SO2,back) =	0.0004054	not done	grains/dscf
Cs(SO2,12%,back) = Cs(SO2,back)*(12/%CO2) =	0.0007051	not done	grains/dscf
E (SO2,back) = 0.00857*Qstd*Cs(SO2,back) =	0.0156	not done	lbs/hr

TOTAL SO2

Conc(SO2,total) = ΣConc(SO2,location)	0.0000788	not done	grams/dscf
Cs(SO2,total) = ΣCs(SO2,location) =	0.0012163	not done	grains/dscf
Cs(SO2,12%,total) = ΣCs(SO2,12%,location) =	0.0021154	not done	grains/dscf
E (SO2,total) = ΣE(SO2,location) =	0.0467	not done	lbs/hr

COMMENTS:

SCEC did not calculate the contribution due to SO2; so, the District will use the values generated by the District's spreadsheet.

Concentration(H2SO4) = [K*Normality*V-titrant*(V-solution/V-aliquot)]/Vm-(std)

CALCULATIONS:

	SDAPCD	SCEC	
SCELLANEOUS DATA			
N = Normality =	0.00971	0.00971	equiv/liter
Vmstd =	29.59	29.59	dscf
Qstd =	4478	4497	dscfm
%CO2 =	6.9	6.9	%
15.43 grains = 1 gram	15.43	15.4	grains/gram
7000grains=1lb, 60min=1hr; 60min/hr/7000grains/lb=	0.00857	0.00857	lbs-min/grs-hr
SO3 as H2SO4:			
MW =	98.08	** 97	g/mole
# equiv/mole vs. BaCl2 =	2	2	equiv/mole
K =	49.04	48.5	grams/equiv
FRONT HALF			
Volume of the titrant = Vt	0.1	0.1	ml
Volume of the solution = Vsoln =	165	165	ml
Volume of the aliquot = Valiquot =	10	10	ml
Conc(H2SO4,front) = [K*N*Vt*(Vsoln/Valiquot)]/Vm(std) =	0.0000266	0.0000263	grams/dscf
Cs(H2SO4,front) = 15.43*Conc(H2SO4,front) =	0.0004097	0.0004044	grains/dscf
Cs(H2SO4,12%,front) = Cs(front)*(12/%CO2) =	0.0007125	0.0007033	grains/dscf
E (H2SO4,front) = 0.00857*Qstd*Cs(H2SO4,front) =	0.0157	0.0156	lbs/hr
FILTER			
Volume of the titrant = Vt	0	0	ml
Volume of the solution = Vsoln =	100	100	ml
Volume of the aliquot = Valiquot =	10	10	ml
Conc(H2SO4,filter) = [K*N*Vt*(Vsoln/Valiquot)]/Vm(std	0.0000000	0.0000000	grams/dscf
Cs(H2SO4,filter) = 15.43*Conc(H2SO4,filter) =	0.0000000	0.0000000	grains/dscf
Cs(H2SO4,12%,filter) = Cs(filter)*(12/%CO2) =	0.0000000	0.0000000	grains/dscf
E (H2SO4,filter) = 0.00857*Qstd*Cs(H2SO4,filter) =	0.0000	0.0000	lbs/hr
BACK HALF			
Volume of the titrant = Vt	0.24	0.24	ml
Volume of the solution = Vsoln =	203	203	ml
Volume of the aliquot = Valiquot =	10	10	ml
Conc(H2SO4,back) = [K*N*Vt*(Vsoln/Valiquot)]/Vm(std) =	0.0000784	0.0000775	grams/dscf
Cs(H2SO4,back) = 15.43*Conc(H2SO4,back) =	0.0012098	0.0011941	grains/dscf
Cs(H2SO4,12%,back) = Cs(H2SO4,back)*(12/%CO2) =	0.0021039	0.0020767	grains/dscf
E (H2SO4,back) = 0.00857*Qstd*Cs(H2SO4,back) =	0.0464	0.0460	lbs/hr
TOTAL SO3			
Conc(H2SO4,total) = ∑Conc(H2SO4,location)	0.0001050	0.0001038	grams/dscf
Cs(H2SO4,total) = ∑Cs(H2SO4,location) =	0.0016195	0.0015985	grains/dscf
Cs(H2SO4,12%,total) =∑Cs(H2SO4,12%,location) =	0.0028165	0.0027800	grains/dscf
E (H2SO4,total) = ∑E(H2SO4,location) =	0.0621	0.0616	lbs/hr

COMMENTS:

** SCEC used an incorrect molecular weight for H2SO4, and this gave incorrect values for all the subsequent numbers that SCEC generated in their final report.

The District will use the numbers generated by the District's spreadsheet, because these values are correct.

Test Witness - Run #3 (SOx)

TEST RESULTS SUMMARY:

		SO3			SO2			Total SOx		
ITEM	I	Cs	Cs(12%)	E	Cs	Cs(12%)	E	Cs	Cs(12%)	E
UNITS	%	gr/dscf	gr/dscf	lbs/hr	gr/dscf	gr/dscf	lbs/hr	gr/dscf	gr/dscf	lbs/hr
VALUE	104	0.001619	0.002816	0.062	0.001216	0.002115	0.047	0.002836	0.004932	0.109

TEST PARAMETERS:

PROCEDURES:

The procedures and equipment utilized in these tests are based on EPA NSPS guidelines and from the EPA CFR 40, Standards Method 8. The sampling utilized a front-end filter (fig. 1).

CALCULATIONS:

All calculations are based on the EPA CFR 40, July 1, 1991, Parts 53-60, Appendix A, Method 8.

SAMPLING:

The test consisted of sampling at 8 traverse points, 4 from 1 sampling port (fig.2) and 2 from 2 sample ports, collected from 84 inches below the stack (fig.3). It was done this way because the stack thermocouple interfered with the last 2 points on the second and third traverse. All field data, SCEC's as well as the District's, were transferred to the computer printout. All calculations were done by computer.

ANALYSES:

Gas: A CEM analysis was performed by SCEC.

SOx: All procedures follow EPA guidelines, except where noted in this report.

EQUIPMENT:

All testing and analysis equipment was calibrated according to EPA guidelines and performed by SCEC.

OVERVIEW OF THE TEST

SAMPLING: Passed

LABORATORY: Passed

The data from this test is acceptable and will be used in the overall test average.

COMPANY: BELL JR. HIGH
DATE: 4-7-92
UNIT: FLARE
REPORT #:T1482-2

RUN #2
@ 68'F
EPA METHOD 5/8

PARTICULATE RESULTS:	net mg	gr/dscf	gr/scf	gr/dscf @ 12% CO2	lbs/hr
Probe & Nozzle:	0	0	0	0	0
Filter:	1.2	0.000975	0.000868	0.001567	0.03
Condensables:	14.52	0.011806	0.010510	0.018965	0.39
Total:	15.72	0.012781	0.011379	0.020533	0.42

N BaCl = 0.00971

SULFATE RESULTS:	Vol aliq	Vt	gr/dscf	gr/scf	gr/dscf @ 12% CO2	lbs/hr
Probe & Nozzle:	13	0.05	0.000248	0.000221	0.000399	0.01
Filter:	10	0	0	0	0	0
Condensables:	22	0.1	0.000842	0.000749	0.001353	0.03
Total:			0.001091	0.000971	0.001753	0.04

ADDITIONAL DATA:

TIME start	TIME finish	%O2	%CO2	%H2O	Vm(std)	SDCFM
1220	1302	12.11	7.47	10.97	18.94	3834

Concentration(SO2) = [K*Normality*V-titrant*(V-solution/V-aliquot)]/Vm-(std)

CALCULATIONS:

SCELLANEOUS DATA

	SDAPCD	SCEC	
N = Normality =	0.00971	0.00971	equiv/liter
Vmstd =	18.94	18.94	dscf
Qstd =	3831	3834	dscfm
%CO2 =	7.47	7.47	%
15.43 grains = 1 gram	15.43	15.4	grains/gram
7000grains=1lb, 60min=1hr; 60min/hr/7000grains/lb=	0.00857	0.00857	lbs-min/grs-hr

SO2:

MW =	64.06	not done	g/mole
# equiv/mole vs. BaCl2 =	2	not done	equiv/mole
K =	32.03	not done	grams/equiv

FRONT HALF

Volume of the titrant = Vt	0.05	not done	ml
Volume of the solution = Vsoln =	130	not done	ml
Volume of the aliquot = Valiquot =	10	not done	ml
Conc(SO2,front) = [K*N*Vt*(Vsoln/Valiquot)]/Vm(std) =	0.0000107	not done	grams/dscf
Cs(SO2,front) = 15.43*Conc(SO2,front) =	0.0001647	not done	grains/dscf
Cs(SO2,12%,front) = Cs(SO2,front)*(12/%CO2) =	0.0002646	not done	grains/dscf
E (SO2,front) = 0.00857*Qstd*Cs(SO2,front) =	0.0054	not done	lbs/hr

FILTER

Volume of the titrant = Vt	0	not done	ml
Volume of the solution = Vsoln =	100	not done	ml
Volume of the aliquot = Valiquot =	10	not done	ml
Conc(SO2,filter) = [K*N*Vt*(Vsoln/Valiquot)]/Vm(std) =	0.0000000	not done	grams/dscf
Cs(SO2,filter) = 15.43*Conc(SO2,filter) =	0.0000000	not done	grains/dscf
Cs(SO2,12%,filter) = Cs(SO2,filter)*(12/%CO2) =	0.0000000	not done	grains/dscf
E (SO2,filter) = 0.00857*Qstd*Cs(SO2,filter) =	0.0000	not done	lbs/hr

BACK HALF

Volume of the titrant = Vt	0.1	not done	ml
Volume of the solution = Vsoln =	22	not done	ml
Volume of the aliquot = Valiquot =	10	not done	ml
Conc(SO2,back) = [K*N*Vt*(Vsoln/Valiquot)]/Vm(std) =	0.0000036	not done	grams/dscf
Cs(SO2,back) = 15.43*Conc(SO2,back) =	0.0000557	not done	grains/dscf
Cs(SO2,12%,back) = Cs(SO2,back)*(12/%CO2) =	0.0000895	not done	grains/dscf
E (SO2,back) = 0.00857*Qstd*Cs(SO2,back) =	0.0018	not done	lbs/hr

TOTAL SO2

Conc(SO2,total) = ΣConc(SO2,location)	0.0000143	not done	grams/dscf
Correction for non-isokinetic conditions			
Conc(SO2,total) = ΣConc(SO2,location)*(I/100)	0.0000169	not done	grams/dscf
Cs(SO2,total) = ΣCs(SO2,location) =	0.0002204	not done	grains/dscf
Correction for non-isokinetic conditions			
Cs(SO2,total) = ΣCs(SO2,location)*(I/100)=	0.0002601	not done	grains/dscf
Cs(SO2,12%,total) =ΣCs(SO2,12%,location) =	0.0003541	not done	grains/dscf
Correction for non-isokinetic conditions			
Cs(SO2,12%,total) = ΣCs(SO2,12%,location)*(1/100) =	0.0004179	not done	grains/dscf
E (SO2,total) = ΣE(SO2,location) =	0.0085	not done	lbs/hr
Correction for non-isokinetic conditions			
E (SO2,total) = ΣE(SO2,location) *(I/100)=	0.0101	not done	lbs/hr

COMMENTS:

SCEC did not calculate the contribution due to SO2; so, the District will use the values generated by the District's spreadsheet.

Concentration(H2SO4) = [K*Normality*V-titrant*(V-solution/V-aliquot)]/Vm-(std)

CALCULATIONS:

MISCELLANEOUS DATA

	SDAPCD	SCEC	
N = Normality =	0.00971	0.00971	equiv/liter
Vmstd =	18.94	18.94	dscf
Qstd =	3831	3834	dscfm
%CO2 =	7.47	7.47	%
15.43 grains = 1 gram	15.43	15.4	grains/gram
7000grains=1lb, 60min=1hr; 60min/hr/7000grains/lb=	0.00857	0.00857	lbs-min/grs-hr

SO3 as H2SO4:

MW =	98.08	** 97	g/mole
# equiv/mole vs. BaCl2 =	2	2	equiv/mole
K =	49.04	48.5	grams/equiv

FRONT HALF

Volume of the titrant = Vt	0.05	0.05	ml
Volume of the solution = Vsoln =	130	130	ml
Volume of the aliquot = Valiquot =	10	10	ml
Conc(H2SO4,front) = [K*N*Vt*(Vsoln/Valiquot)]/Vm(std) =	0.0000163	0.0000162	grams/dscf
Cs(H2SO4,front) = 15.43*Conc(H2SO4,front) =	0.0002522	0.0002489	grains/dscf
Cs(H2SO4,12%,front) = Cs(front)*(12/%CO2) =	0.0004051	0.0003998	grains/dscf
E (H2SO4,front) = 0.00857*Qstd*Cs(H2SO4,front) =	0.0083	0.0082	lbs/hr

FILTER

Volume of the titrant = Vt	0	0	ml
Volume of the solution = Vsoln =	100	100	ml
Volume of the aliquot = Valiquot =	10	10	ml
Conc(H2SO4,filter) = [K*N*Vt*(Vsoln/Valiquot)]/Vm(std	0.0000000	0.0000000	grams/dscf
Cs(H2SO4,filter) = 15.43*Conc(H2SO4,filter) =	0.0000000	0.0000000	grains/dscf
Cs(H2SO4,12%,filter) = Cs(filter)*(12/%CO2) =	0.0000000	0.0000000	grains/dscf
E (H2SO4,filter) = 0.00857*Qstd*Cs(H2SO4,filter) =	0.0000	0.0000	lbs/hr

BACK HALF

Volume of the titrant = Vt	0.1	0.1	ml
Volume of the solution = Vsoln =	220	220	ml
Volume of the aliquot = Valiquot =	10	10	ml
Conc(H2SO4,back) = [K*N*Vt*(Vsoln/Valiquot)]/Vm(std) =	0.0000553	0.0000547	grams/dscf
Cs(H2SO4,back) = 15.43*Conc(H2SO4,back) =	0.0008535	0.0008424	grains/dscf
Cs(H2SO4,12%,back) = Cs(H2SO4,back)*(12/%CO2) =	0.0013710	0.0013533	grains/dscf
E (H2SO4,back) = 0.00857*Qstd*Cs(H2SO4,back) =	0.0280	0.0277	lbs/hr

TOTAL SO3

Conc(H2SO4,total) = ΣConc(H2SO4,location)	0.0000717	0.0000709	grams/dscf
Correction for non-isokinetic conditions			
Conc(H2SO4,total) = ΣConc(H2SO4,location)*(I/100)	0.0000846	0.0000836	grams/dscf
Cs(H2SO4,total) = ΣCs(H2SO4,location) =	0.0011056	0.0010913	grains/dscf
Correction for non-isokinetic conditions			
Cs(H2SO4,total) = ΣCs(H2SO4,location)*(I/100)=	0.0013046	0.0012877	grains/dscf
Cs(H2SO4,12%,total) =ΣCs(H2SO4,12%,location) =	0.0017761	0.0017531	grains/dscf
Correction for non-isokinetic conditions			
Cs(H2SO4,12%,total) = ΣCs(H2SO4,12%,location)*(1/100) =	0.0020958	0.0020687	grains/dscf
E (H2SO4,total) = ΣE(H2SO4,location) =	0.0363	0.0358	lbs/hr
Correction for non-isokinetic conditions			
E (H2SO4,total) = ΣE(H2SO4,location) *(I/100)=	0.0428	0.0423	lbs/hr

COMMENTS:

** SCEC used an incorrect molecular weight for H2SO4, and this gave incorrect values for all the subsequent numbers that SCEC generated in their final report.
The District will use the numbers generated by the District's spreadsheet, because these values are correct.

TEST RESULTS SUMMARY:

		SO3			SO2			Total SOx		
ITEM	I	Cs	Cs(12%)	E	Cs	Cs(12%)	E	Cs	Cs(12%)	E
UNITS	%	gr/dscf	gr/dscf	lbs/hr	gr/dscf	gr/dscf	lbs/hr	gr/dscf	gr/dscf	lbs/hr
VALUE	118	0.001106	0.001776	0.0363	0.000220	0.000354	0.0085	0.001326	0.002130	0.0448

TEST PARAMETERS:

OVERVIEW OF THE TEST

SAMPLING: Failed

LABORATORY: Passed

The sampling data from this test is unacceptable and will not be used in the overall test average.

COMPANY: BELL JR. HIGH
DATE: 4-7-92
UNIT: FLARE
REPORT #:T1482-2

RUN #1
@ 68'F
EPA METHOD 5/8

PARTICULATE RESULTS:	net mg	gr/dscf	gr/scf	gr/dscf @ 12% CO2	lbs/hr
Probe & Nozzle:	10.38	0.005581	0.005114	0.008330	0.2
Filter:	0.6	0.000322	0.000295	0.000481	0.01
Condensables:	1.173333	0.000630	0.000578	0.000941	0.02
Total:	12.15333	0.006534	0.005988	0.009753	0.23

N $BaCl_2$ = 0.00971

SULFATE RESULTS:	Vol aliq	Vt	gr/dscf	gr/scf	gr/dscf @ 12% CO2	lbs/hr
Probe & Nozzle:	25	0.2	0.001266	0.001160	0.001889	0.05
Filter:	10	0	0	0	0	0
Condensables:	22	0.1	0.000557	0.000510	0.000831	0.02
Total:			0.001823	0.001670	0.002721	0.07

ADDITIONAL DATA:

TIME start	TIME finish	%O2	%CO2	%H2O	Vm(std)	SDCFM
1030	1130	11.43	8.04	8.36	28.64	4174

Avg. of 3 runs: exhaust flow rate $= \frac{4174 + 3874 + 4497}{3} = 4,168$

Concentration(SO2) = [K*Normality*V-titrant*(V-solution/V-aliquot)]/Vm-(std)

`LCULATIONS:

	SDAPCD	SCEC	
MISCELLANEOUS DATA			
N = Normality =	0.00971	0.00971	equiv/liter
Vmstd =	28.64	28.64	dscf
Qstd =	4192	4174	dscfm
%CO2 =	8.04	8.04	%
15.43 grains = 1 gram	15.43	15.4	grains/gram
7000grains=1lb, 60min=1hr; 60min/hr/7000grains/lb=	0.00857	0.00857	lbs-min/grs-hr
SO2:			
MW =	64.06	not done	g/mole
# equiv/mole vs. BaCl2 =	2	not done	equiv/mole
K =	32.03	not done	grams/equiv
FRONT HALF			
Volume of the titrant = Vt	0.2	not done	ml
Volume of the solution = Vsoln =	250	not done	ml
Volume of the aliquot = Valiquot =	10	not done	ml
Conc(SO2,front) = [K*N*Vt*(Vsoln/Valiquot)]/Vm(std) =	0.0000543	not done	grams/dscf
Cs(SO2,front) = 15.43*Conc(SO2,front) =	0.0008378	not done	grains/dscf
Cs(SO2,12%,front) = Cs(SO2,front)*(12/%CO2) =	0.0012504	not done	grains/dscf
E (SO2,front) = 0.00857*Qstd*Cs(SO2,front) =	0.0301	not done	lbs/hr
FILTER			
Volume of the titrant = Vt	0	not done	ml
Volume of the solution = Vsoln =	250	not done	ml
Volume of the aliquot = Valiquot =	10	not done	ml
Conc(SO2,filter) = [K*N*Vt*(Vsoln/Valiquot)]/Vm(std) =	0.0000000	not done	grams/dscf
Cs(SO2,filter) = 15.43*Conc(SO2,filter) =	0.0000000	not done	grains/dscf
Cs(SO2,12%,filter) = Cs(SO2,filter)*(12/%CO2) =	0.0000000	not done	grains/dscf
E (SO2,filter) = 0.00857*Qstd*Cs(SO2,filter) =	0.0000	not done	lbs/hr
BACK HALF			
Volume of the titrant = Vt	0.1	not done	ml
Volume of the solution = Vsoln =	250	not done	ml
Volume of the aliquot = Valiquot =	10	not done	ml
Conc(SO2,back) = [K*N*Vt*(Vsoln/Valiquot)]/Vm(std) =	0.0000271	not done	grams/dscf
Cs(SO2,back) = 15.43*Conc(SO2,back) =	0.0004189	not done	grains/dscf
Cs(SO2,12%,back) = Cs(SO2,back)*(12/%CO2) =	0.0006252	not done	grains/dscf
E (SO2,back) = 0.00857*Qstd*Cs(SO2,back) =	0.0150	not done	lbs/hr
TOTAL SO2			
Conc(SO2,total) = ΣConc(SO2,location)	0.0000814	not done	grams/dscf
Cs(SO2,total) = ΣCs(SO2,location) =	0.0012567	not done	grains/dscf
Cs(SO2,12%,total) =ΣCs(SO2,12%,location) =	0.0018757	not done	grains/dscf
E (SO2,total) = ΣE(SO2,location) =	0.0451	not done	lbs/hr

COMMENTS:

- SCEC did not calculate the contribution due to SO2; so, the District will use the values generated by the District's spreadsheet.

Concentration(H2SO4) = [K*Normality*V-titrant*(V-solution/V-aliquot)]/Vm-(std)

CALCULATIONS:

	SDAPCD	SCEC	
MISCELLANEOUS DATA			
N = Normality =	0.00971	0.00971	equiv/liter
Vmstd =	28.64	28.64	dscf
Qstd =	4192	4174	dscfm
%CO2 =	8.04	8.04	%
15.43 grains = 1 gram	15.43	15.4	grains/gram
7000grains=1lb, 60min=1hr; 60min/hr/7000grains/lb=	0.00857	0.00857	lbs-min/grs-hr
SO3 as H2SO4:			
MW =	98.08	** 97	g/mole
# equiv/mole vs. BaCl2 =	2	2	equiv/mole
K =	49.04	48.5	grams/equiv
FRONT HALF			
Volume of the titrant = Vt	0.2	0.2	ml
Volume of the solution = Vsoln =	250	250	ml
Volume of the aliquot = Valiquot =	10	10	ml
Conc(H2SO4,front) = [K*N*Vt*(Vsoln/Valiquot)]/Vm(std) =	0.0000831	0.0000822	grams/dscf
Cs(H2SO4,front) = 15.43*Conc(H2SO4,front) =	0.0012827	0.0012661	grains/dscf
Cs(H2SO4,12%,front) = Cs(front)*(12/%CO2) =	0.0019145	0.0018897	grains/dscf
E (H2SO4,front) = 0.00857*Qstd*Cs(H2SO4,front) =	0.0461	0.0455	lbs/hr
FILTER			
Volume of the titrant = Vt	0	0	ml
Volume of the solution = Vsoln =	100	100	ml
Volume of the aliquot = Valiquot =	10	10	ml
Conc(H2SO4,filter) = [K*N*Vt*(Vsoln/Valiquot)]/Vm(std	0.0000000	0.0000000	grams/dscf
Cs(H2SO4,filter) = 15.43*Conc(H2SO4,filter) =	0.0000000	0.0000000	grains/dscf
Cs(H2SO4,12%,filter) = Cs(filter)*(12/%CO2) =	0.0000000	0.0000000	grains/dscf
E (H2SO4,filter) = 0.00857*Qstd*Cs(H2SO4,filter) =	0.0000	0.0000	lbs/hr
BACK HALF			
Volume of the titrant = Vt	0.1	0.1	ml
Volume of the solution = Vsoln =	220	220	ml
Volume of the aliquot = Valiquot =	10	10	ml
Conc(H2SO4,back) = [K*N*Vt*(Vsoln/Valiquot)]/Vm(std) =	0.0000366	0.0000362	grams/dscf
Cs(H2SO4,back) = 15.43*Conc(H2SO4,back) =	0.0005644	0.0005571	grains/dscf
Cs(H2SO4,12%,back) = Cs(H2SO4,back)*(12/%CO2) =	0.0008424	0.0008315	grains/dscf
E (H2SO4,back) = 0.00857*Qstd*Cs(H2SO4,back) =	0.0203	0.0200	lbs/hr
TOTAL SO3			
Conc(H2SO4,total) = ΣConc(H2SO4,location)	0.0001197	0.0001184	grams/dscf
Cs(H2SO4,total) = ΣCs(H2SO4,location) =	0.0018471	0.0018232	grains/dscf
Cs(H2SO4,12%,total) =ΣCs(H2SO4,12%,location) =	0.0027569	0.0027212	grains/dscf
E (H2SO4,total) = ΣE(H2SO4,location) =	0.0664	0.0655	lbs/hr

COMMENTS:

** SCEC used an incorrect molecular weight for H2SO4, and this gave incorrect values for all the subsequent numbers that SCEC generated in their final report.

The District will use the numbers generated by the District's spreadsheet, because these values are correct.

Test Witness - Run #1 (SOx)

TEST RESULTS SUMMARY:

		SO3			SO2			Total SOx		
ITEM	I	Cs	Cs(12%)	E	Cs	Cs(12%)	E	Cs	Cs(12%)	E
UNITS	%	gr/dscf	gr/dscf	lbs/hr	gr/dscf	gr/dscf	lbs/hr	gr/dscf	gr/dscf	lbs/hr
VALUE	109	0.001847	0.002757	0.0664	0.001257	0.001876	0.0451	0.003104	0.004633	0.1115

TEST PARAMETERS:

OVERVIEW OF THE TEST

SAMPLING: Passed

LABORATORY: Passed

The data from this test is acceptable and will be used in the overall test average.

COMPANY: BELL JR. HIGH
DATE: 4-7-92
UNIT: FLARE
REPORT #:T1482-2

RUN #1
@ 68'F
EPA METHOD 5/8

PARTICULATE RESULTS:	net mg	gr/dscf	gr/scf	gr/dscf @ 12% CO2	lbs/hr
Probe & Nozzle:	10.38	0.005581	0.005114	0.008330	0.2
Filter:	0.6	0.000322	0.000295	0.000481	0.01
Condensables:	1.173333	0.000630	0.000578	0.000941	0.02
Total:	12.15333	0.006534	0.005988	0.009753	0.23

$N\ BaCl_2 = 0.00971$

SULFATE RESULTS:	Vol aliq	Vt	gr/dscf	gr/scf	gr/dscf @ 12% CO2	lbs/hr
Probe & Nozzle:	25	0.2	0.001266	0.001160	0.001889	0.05
Filter:	10	0	0	0	0	0
Condensables:	22	0.1	0.000557	0.000510	0.000831	0.02
Total:			0.001823	0.001670	0.002721	0.07

ADDITIONAL DATA:

TIME start	TIME finish	%O2	%CO2	%H2O	Vm(std)	SDCFM
1030	1130	11.43	8.04	8.36	28.64	4174

Concentration(SO2) = [K*Normality*V-titrant*(V-solution/V-aliquot)]/Vm-(std)

CALCULATIONS:

	SDAPCD	SCEC	
MISCELLANEOUS DATA			
N = Normality =	0.00971	0.00971	equiv/liter
Vmstd =	28.64	28.64	dscf
Qstd =	4192	4174	dscfm
%CO2 =	8.04	8.04	%
15.43 grains = 1 gram	15.43	15.4	grains/gram
7000grains=1lb, 60min=1hr; 60min/hr/7000grains/lb=	0.00857	0.00857	lbs-min/grs-hr
SO2:			
MW =	64.06	not done	g/mole
# equiv/mole vs. BaCl2 =	2	not done	equiv/mole
K =	32.03	not done	grams/equiv
FRONT HALF			
Volume of the titrant = Vt	0.2	not done	ml
Volume of the solution = Vsoln =	250	not done	ml
Volume of the aliquot = Valiquot =	10	not done	ml
Conc(SO2,front) = [K*N*Vt*(Vsoln/Valiquot)]/Vm(std) =	0.0000543	not done	grams/dscf
Cs(SO2,front) = 15.43*Conc(SO2,front) =	0.0008378	not done	grains/dscf
Cs(SO2,12%,front) = Cs(SO2,front)*(12/%CO2) =	0.0012504	not done	grains/dscf
E (SO2,front) = 0.00857*Qstd*Cs(SO2,front) =	0.0301	not done	lbs/hr
FILTER			
Volume of the titrant = Vt	0	not done	ml
Volume of the solution = Vsoln =	250	not done	ml
Volume of the aliquot = Valiquot =	10	not done	ml
Conc(SO2,filter) = [K*N*Vt*(Vsoln/Valiquot)]/Vm(std) =	0.0000000	not done	grams/dscf
Cs(SO2,filter) = 15.43*Conc(SO2,filter) =	0.0000000	not done	grains/dscf
Cs(SO2,12%,filter) = Cs(SO2,filter)*(12/%CO2) =	0.0000000	not done	grains/dscf
E (SO2,filter) = 0.00857*Qstd*Cs(SO2,filter) =	0.0000	not done	lbs/hr
BACK HALF			
Volume of the titrant = Vt	0.1	not done	ml
Volume of the solution = Vsoln =	250	not done	ml
Volume of the aliquot = Valiquot =	10	not done	ml
Conc(SO2,back) = [K*N*Vt*(Vsoln/Valiquot)]/Vm(std) =	0.0000271	not done	grams/dscf
Cs(SO2,back) = 15.43*Conc(SO2,back) =	0.0004189	not done	grains/dscf
Cs(SO2,12%,back) = Cs(SO2,back)*(12/%CO2) =	0.0006252	not done	grains/dscf
E (SO2,back) = 0.00857*Qstd*Cs(SO2,back) =	0.0150	not done	lbs/hr
TOTAL SO2			
Conc(SO2,total) = ΣConc(SO2,location)	0.0000814	not done	grams/dscf
Cs(SO2,total) = ΣCs(SO2,location) =	0.0012567	not done	grains/dscf
Cs(SO2,12%,total) = ΣCs(SO2,12%,location) =	0.0018757	not done	grains/dscf
E (SO2,total) = ΣE(SO2,location) =	0.0451	not done	lbs/hr

COMMENTS:

SCEC did not calculate the contribution due to SO2; so, the District will use the values generated by the District's spreadsheet.

Concentration(H2SO4) = [K*Normality*V-titrant*(V-solution/V-aliquot)]/Vm-(std)

CALCULATIONS:

MISCELLANEOUS DATA

	SDAPCD	SCEC	
N = Normality =	0.00971	0.00971	equiv/liter
Vmstd =	28.64	28.64	dscf
Qstd =	4192	4174	dscfm
%CO2 =	8.04	8.04	%
15.43 grains = 1 gram	15.43	15.4	grains/gram
7000grains=1lb, 60min=1hr; 60min/hr/7000grains/lb=	0.00857	0.00857	lbs-min/grs-hr

SO3 as H2SO4:

MW =	98.08	** 97	g/mole
# equiv/mole vs. BaCl2 =	2	2	equiv/mole
K =	49.04	48.5	grams/equiv

FRONT HALF

Volume of the titrant = Vt	0.2	0.2	ml
Volume of the solution = Vsoln =	250	250	ml
Volume of the aliquot = Valiquot =	10	10	ml
Conc(H2SO4,front) = [K*N*Vt*(Vsoln/Valiquot)]/Vm(std) =	0.0000831	0.0000822	grams/dscf
Cs(H2SO4,front) = 15.43*Conc(H2SO4,front) =	0.0012827	0.0012661	grains/dscf
Cs(H2SO4,12%,front) = Cs(front)*(12/%CO2) =	0.0019145	0.0018897	grains/dscf
E (H2SO4,front) = 0.00857*Qstd*Cs(H2SO4,front) =	0.0461	0.0455	lbs/hr

FILTER

Volume of the titrant = Vt	0	0	ml
Volume of the solution = Vsoln =	100	100	ml
Volume of the aliquot = Valiquot =	10	10	ml
Conc(H2SO4,filter) = [K*N*Vt*(Vsoln/Valiquot)]/Vm(std	0.0000000	0.0000000	grams/dscf
Cs(H2SO4,filter) = 15.43*Conc(H2SO4,filter) =	0.0000000	0.0000000	grains/dscf
Cs(H2SO4,12%,filter) = Cs(filter)*(12/%CO2) =	0.0000000	0.0000000	grains/dscf
E (H2SO4,filter) = 0.00857*Qstd*Cs(H2SO4,filter) =	0.0000	0.0000	lbs/hr

BACK HALF

Volume of the titrant = Vt	0.1	0.1	ml
Volume of the solution = Vsoln =	220	220	ml
Volume of the aliquot = Valiquot =	10	10	ml
Conc(H2SO4,back) = [K*N*Vt*(Vsoln/Valiquot)]/Vm(std) =	0.0000366	0.0000362	grams/dscf
Cs(H2SO4,back) = 15.43*Conc(H2SO4,back) =	0.0005644	0.0005571	grains/dscf
Cs(H2SO4,12%,back) = Cs(H2SO4,back)*(12/%CO2) =	0.0008424	0.0008315	grains/dscf
E (H2SO4,back) = 0.00857*Qstd*Cs(H2SO4,back) =	0.0203	0.0200	lbs/hr

TOTAL SO3

Conc(H2SO4,total) = ΣConc(H2SO4,location)	0.0001197	0.0001184	grams/dscf
Cs(H2SO4,total) = ΣCs(H2SO4,location) =	0.0018471	0.0018232	grains/dscf
Cs(H2SO4,12%,total) = ΣCs(H2SO4,12%,location) =	0.0027569	0.0027212	grains/dscf
E (H2SO4,total) = ΣE(H2SO4,location) =	0.0664	0.0655	lbs/hr

COMMENTS:

** SCEC used an incorrect molecular weight for H2SO4, and this gave incorrect values for all the subsequent numbers that SCEC generated in their final report.

The District will use the numbers generated by the District's spreadsheet, because these values are correct.

Test Witness - Run #1 (SOx)

TEST RESULTS SUMMARY:

		SO3			SO2			Total SOx		
ITEM	I	Cs	Cs(12%)	E	Cs	Cs(12%)	E	Cs	Cs(12%)	E
UNITS	%	gr/dscf	gr/dscf	lbs/hr	gr/dscf	gr/dscf	lbs/hr	gr/dscf	gr/dscf	lbs/hr
VALUE	109	0.001847	0.002757	0.0664	0.001257	0.001876	0.0451	0.003104	0.004633	0.1115

TEST PARAMETERS:

OVERVIEW OF THE TEST

SAMPLING: Passed

LABORATORY: Passed

The data from this test is acceptable and will be used in the overall test average.

SOURCE TEST OF OXIDES OF SULFUR EMISSIONS TO THE ATMOSPHERE

Test Witness - Average (SOx)

TEST RESULTS SUMMARY:

		SO3			SO2			Total SOx		
ITEM	I	Cs	Cs(12%)	E	Cs	Cs(12%)	E	Cs	Cs(12%)	E
UNITS	%	gr/dscf	gr/dscf	lbs/hr	gr/dscf	gr/dscf	lbs/hr	gr/dscf	gr/dscf	lbs/hr
VALUE	107	0.001733	0.002787	0.0643	0.001237	0.001996	0.0459	**0.002970**	**0.004782**	**0.1102**

TEST PARAMETERS:

PROCEDURES:

The procedures and equipment utilized in these tests are based on EPA NSPS guidelines and from the EPA CFR 40, Standards Method 8. The sampling utilized a front-end filter (fig. 1).

CALCULATIONS:

All calculations are based on the EPA CFR 40, July 1, 1991, Parts 53-60, Appendix A, Method 8.

SAMPLING:

The test consisted of sampling at 8 traverse points, 4 from 1 sampling port (fig.2) and 2 from 2 sample ports, collected from 84 inches below the stack (fig.3). It was done this way, because the stack thermocouple interfered with the last 2 points on the second and third traverse. All field data, SCEC's as well as the District's, were transferred to the computer printout. All calculations were done by computer.

ANALYSES:

Gas: A CEM analysis was performed by SCEC.

SOx: All procedures follow EPA guidelines, except where noted in this report.

EQUIPMENT:

All testing and analysis equipment was calibrated according to EPA guidelines and performed by SCEC.

OVERVIEW OF THE TEST:

	RUN #1	RUN #2	RUN #3
SAMPLING:	Passed	Failed	Passed
LABORATORY:	Passed	Passed	Passed

Run #2 was eliminated from the overall test average because QA criteria were not met. (See the laboratory sheet of the particulate report for an in depth explanation.)

Concentration(H2SO4) = [K*Normality*V-titrant*(V-solution/V-aliquot)]/Vm-(std)

Concentration(SO2) = [K*Normality*V-titrant*(V-solution/V-aliquot)]/Vm-(std)

K=MW/#equiv/mole

CALCULATIONS:

	SDAPCD RUN1	SDAPCD RUN 2	SDAPCD RUN 3	SDAPCD **AVG	
TOTAL SO3					
Conc(H2SO4,total) = ΣConc(H2SO4,location) =	0.0001197	0.0000846	0.0001050	0.0001124	grams/dscf
Cs(H2SO4,total) = ΣCs(H2SO4,location) =	**0.0018471**	**0.0013046**	**0.0016195**	**0.0017333**	**grains/dscf**
Cs(H2SO4,12%,total) =ΣCs(H2SO4,12%,location) =	0.0027569	0.0020958	0.0028165	0.0027867	grains/dscf
E (H2SO4,total) = ΣE(H2SO4,location) =	**0.0664**	**0.0428**	**0.0621**	**0.0643**	**lbs/hr**
TOTAL SO2					
Conc(SO2,total) = ΣConc(SO2,location) =	0.0000814	0.0000169	0.0000788	0.0000801	grams/dscf
Cs(SO2,total) = ΣCs(SO2,location) =	**0.0012567**	**0.0002601**	**0.0012163**	**0.0012365**	**grains/dscf**
Cs(SO2,12%,total) =ΣCs(SO2,12%,location) =	0.0018757	0.0004179	0.0021154	0.0019956	grains/dscf
E (SO2,total) = ΣE(SO2,location) =	**0.0451**	**0.0101**	**0.0467**	**0.0459**	**lbs/hr**
TOTAL SOx					
Conc(SOx,total) = Conc(H2SO4,total)+Conc(SO2,total) =	0.0002011	0.0001015	0.0001838	0.00019245	grams/dscf
Cs(SOx,total) = Cs(H2SO4,total)+Cs(SO2,total) =	**0.0031038**	**0.0015647**	**0.00283583**	**0.00296982**	**grains/dscf**
Cs(SO2,12%,total) = Cs(H2SO4,12%,total)+Cs(SO2,12%,total) =	0.0046326	0.0025137	0.0049319	0.00478225	grains/dscf
E(SOx,total) = E(H2SO4,total)+E(SO2,total) =	**0.1115**	**0.0529**	**0.1088**	**0.11015**	**lbs/hr**

** Run #2 is eliminated from the overall test average

Performance Analytical Inc.
Environmental Testing and Consulting

20954 Osborne Stre
Canoga Park, Calif. 91304
Phone 818 709-1139
Fax 818 709-2915

Chain of Custody Record
Analytical Services Request

Client/Project Name	Address/Phone	ANALYSES	PAI Project No.
S.D.A.P.C.D. SCEC Job # T-1483			4081
Project Location: BELL JR. HIGH School	Client Project No.: T-1483		
Contact: Mike Wong	Sampler (Signature):	P.O. No.	

Sample Identification No.	Date	Time	Lab Sample No.	Type of Sample	Hydrocarbons	Chlorides		Pi	Pf		Expected Turnaround Time	Remarks
INLET #1	4-7-92	2:50	9201624	AIR	✓	✓		-04	+2.1			# 91
OUTLET #1	4-7-92	2:55	9201625	AIR	✓	✓		-53	+1.9			# 9
												F.C. # 923
												917

Relinquished by: (Signature)	Date 4/8/92	Time	Received by: (Signature)	Date 4/9/92	Time 11:30.
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Disposal Method					
Disposed by: (Signature)	Date	Time			

White Copy : Accompanies Samples

Yellow Copy : Sampler

Performance Analytical Inc.
Environmental Testing and Consulting

PERFORMANCE ANALYTICAL INC.

RESULTS OF ANALYSIS

Client: San Diego Air Pollution Control District

Client Sample ID: N/A

PAI Sample ID: PAI Method Blank

Test Code: GC/MS EPA TO-14
Analyst: Chris Parnell
Instrument ID: Finnigan 4500C/Tekmar 5010
Verified by: Michael Tuday

Matrix: Summa Canister
Date Received: N/A
Date Analyzed: 04/14/92
Volume Analyzed: 1.00 Liter

CAS #	COMPOUND	RESULT (UG/M^3)	DETECTION LIMIT (UG/M^3)	RESULT (PPB)	DETECTION LIMIT (PPB)
75-01-4	VINYL CHLORIDE	ND	5.0	ND	2.0
75-09-2	METHYLENE CHLORIDE	ND	5.0	ND	1.5
67-66-3	CHLOROFORM	ND	5.0	ND	1.0
107-06-2	1,2-DICHLOROETHANE	ND	5.0	ND	1.2
71-55-6	1,1,1-TRICHLOROETHANE	ND	5.0	ND	0.93
71-43-2	BENZENE	ND	5.0	ND	1.6
56-23-5	CARBON TETRACHLORIDE	ND	5.0	ND	0.80
79-01-6	TRICHLOROETHENE	ND	5.0	ND	0.94
106-93-4	1,2-DIBROMOETHANE	ND	5.0	ND	0.65
127-18-4	TETRACHLOROETHENE	ND	5.0	ND	0.75

ND = Not Detected TR = Trace Level - Below Indicated Detection Limit

Performance Analytical Inc.
Environmental Testing and Consulting

PERFORMANCE ANALYTICAL INC.

RESULTS OF ANALYSIS

Client: San Diego Air Pollution Control District

Client Sample ID: Inlet #1 (04/07/92) (2:50)
PAI Sample ID: 9201624

Test Code: EPA 18
Analyst: Ku-Jih Chen
Instrument ID: HP5890/FID #4
Verified by: Michael Tuday

Matrix: Summa Canister
Date Received: 04/09/92
Date Analyzed: 04/10/92
Volume Analyzed: 0.050 ml
P_i = -0.4 P_f = +2.1 DF= 1.17

COMPOUND	RESULT (PPM)	DETECTION LIMIT (PPM)
C1 as Methane	190000	25
C2 as Ethane	ND	25
C3 as n-Propane	ND	20
C4 as n-Butane	ND	15
C5 as Pentane	ND	10
C6 as n-Hexane	ND	10
C7 as n-Heptane	ND	10
C8 as n-Octane	ND	10
C9 as n-Nonane	ND	10
> C9 as n-Nonane	ND	10

ND = Not Detected TR = Trace Level - Below Indicated Detection Limit

20954 Osborne Street, Canoga Park, CA 91304 • Phone 818 [illegible] • Fax 818 [illegible]

Performance Analytical Inc.
Environmental Testing and Consulting

PERFORMANCE ANALYTICAL INC.

RESULTS OF ANALYSIS

Client: San Diego Air Pollution Control District

Client Sample ID: N/A

PAI Sample ID: PAI Method Blank

Test Code: EPA 18
Analyst: Ku-Jih Chen
Instrument ID: HP5890/FID #4
Verified by: Michael Tuday

Matrix: Summa Canister
Date Received: N/A
Date Analyzed: 04/10/92
Volume Analyzed: 2.5 ml

COMPOUND	RESULT (PPM)	DETECTION LIMIT (PPM)
C1 as Methane	ND	0.50
C2 as Ethane	ND	0.50
C3 as n-Propane	ND	0.40
C4 as n-Butane	ND	0.30
C5 as Pentane	ND	0.20
C6 as n-Hexane	ND	0.20
C7 as n-Heptane	ND	0.20
C8 as n-Octane	ND	0.20
C9 as n-Nonane	ND	0.20
> C9 as n-Nonane	ND	0.20

ND = Not Detected TR = Trace Level - Below Indicated Detection Limit

Performance Analytical Inc.
Environmental Testing and Consulting

Bell

LABORATORY REPORT

Client:	SAN DIEGO AIR POLLUTION CONTROL DISTRICT	Date of Report:	04/27/92
Address:	9150 Chesapeake Drive	Date Received:	04/09/92
	San Diego, CA 92123	PAI Project No:	4081
Contact:	Ms. Judy Lake	Purchase Order:	Verbal
Client Project:	Bell Jr. High School #T-1483		

Two (2) Stainless Steel "SUMMA" Polished Canisters labeled: "Inlet #1" and "Outlet #1"

The samples were received at the laboratory under chain of custody on April 9, 1992. The samples were received intact. The dates of analysis are indicated on the data sheets.

C1 through >C9 Hydrocarbon Analysis

The samples were analyzed for C_1 through $> C_9$ Hydrocarbons by direct injection GC/FID. The analytical system consisted of a Hewlett-Packard model 5890A gas chromatograph equipped with a flame ionization detector. Separation was achieved using a Restek Rt_x-1 megabore column, 60 meters long by 0.53 mm I.D., with a 5.0 um film thickness.

A four point standard calibration was performed using a certified gas standard mix (Scott Speciality Gases) prior to analysis of the field samples.

Volatile Organic Compound Analysis

The samples were also analyzed by combined gas chromatography/mass spectrometry (GC/MS) for ten Volatile Organic Compounds. The analyses were performed according to the methodology outlined in EPA Method TO-14 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, EPA 600/4-84-041, U.S. Environmental Protection Agency, Research Triangle Park, NC, April, 1984 and May, 1988. The analyses were performed by gas chromatography/ mass spectrometry, utilizing a direct cryogenic trapping technique. The analytical system used was comprised of a Finnigan Model 4500C GC/MS/DS interfaced to a Tekmar 5010 Automatic Desorber. A thick film (5 micron) crossbonded 100% Dimethyl polysiloxane megabore column (RT_x-1, Restek Corporation, Bellefonte, PA) was used to achieve chromatographic separation.

Data Release Authorization:

Ku-jih Chen
Principal Chemist

Reviewed and Approved:

Michael Tuday
Laboratory Director

20954 Osborne Street, Canoga Park, CA 91304 • Phone: 818-700-1310 • Fax: 818-700-1015

Performance Analytical Inc.
Environmental Testing and Consulting

20954 Osborne Street
Canoga Park, California 91304
Phone 818 709-1139
Fax 818 709-2915

Chain of Custody Record
Analytical Services Request

Client/Project Name: S.D.AP.C.D. c/o S.C.E.C.
Address/Phone: (714) 282-8240
PAI Project No.: 4060
Project Location: BELL JR. HIGH School
Client Project No.:
Contact: Russ Logan
Sampler (Signature): [signature]
P.O. No.:

Sample Identification No.	Date	Time	Lab Sample No.	Type of Sample	CALDERON'S	ROG'S				Expected Turnaround Time	Remarks
INLET #1	3-31-92		9201457	R.O.C.	X	X	00	112			See Mike Tuozy
" #2	"		9201458	"	X	X	000	80			re: conversation
" #3	"		9201459	"	X	X	00	103			w/ Judy Lake
OUTLET #1	"		9201460	"	X	X					
" #2	"		9201461	"	X	X					unlabeled 00047
" #3 - Broken	"		9201462	"	X	X	000	29			
							00	123			

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[signature]	7		[signature]	4/2/92	10:30
[signature]					

Disposal Method:

Disposed by: (Signature) | Date | Time

White Copy : Accompanies Samples
Yellow Copy : Sampler

Performance Analytical Inc.
Environmental Testing and Consulting

PERFORMANCE ANALYTICAL INC.

RESULTS OF ANALYSIS

Client: San Diego Air Pollution Control District

Client Sample ID: Inlet #3 (03/31/92)

PAI Sample ID: 9201459 (Laboratory Duplicate)

Test Code: EPA 18
Analyst: Ku-Jih Chen
Instrument ID: HP5890/FID #4
Verified by: Michael Tuday

Matrix: Summa Canister
Date Received: 04/02/92
Date Analyzed: 04/10/92
Volume Analyzed: 0.050 ml
P_i = -9.1 P_f = +4.0 DF= 3.34

COMPOUND	RESULT (PPM)	DETECTION LIMIT (PPM)
C1 as Methane	160000	75
C2 as Ethane	ND	75
C3 as n-Propane	ND	60
C4 as n-Butane	ND	45
C5 as Pentane	ND	30
C6 as n-Hexane	ND	30
C7 as n-Heptane	ND	30
C8 as n-Octane	ND	30
C9 as n-Nonane	ND	30
> C9 as n-Nonane	ND	30

ND = Not Detected TR = Trace Level - Below Indicated Detection Limit

Performance Analytical Inc.
Environmental Testing and Consulting

PERFORMANCE ANALYTICAL INC.

RESULTS OF ANALYSIS

Client: San Diego Air Pollution Control District

Client Sample ID: N/A

PAI Sample ID: PAI Method Blank

Test Code: EPA 18
Analyst: Ku-Jih Chen
Instrument ID: HP5890/FID #4
Verified by: Michael Tuday

Matrix: Summa Canister
Date Received: N/A
Date Analyzed: 04/10/92
Volume Analyzed: 2.5 ml

COMPOUND	RESULT (PPM)	DETECTION LIMIT (PPM)
C1 as Methane	ND	0.50
C2 as Ethane	ND	0.50
C3 as n-Propane	ND	0.40
C4 as n-Butane	ND	0.30
C5 as Pentane	ND	0.20
C6 as n-Hexane	ND	0.20
C7 as n-Heptane	ND	0.20
C8 as n-Octane	ND	0.20
C9 as n-Nonane	ND	0.20
> C9 as n-Nonane	ND	0.20

ND = Not Detected TR = Trace Level - Below Indicated Detection Limit

20934 Osborne Street, Canoga Park, CA 91304 • Phone (818) 700-8225 • Fax (818) 700-8226

Performance Analytical Inc.
Environmental Testing and Consulting

C1 through >C9 Hydrocarbon Analysis

The samples were analyzed for C_1 through $> C_9$ Hydrocarbons by direct injection GC/FID. The analytical system consisted of a Hewlett-Packard model 5890A gas chromatograph equipped with a flame ionization detector. Separation was achieved using a Restek Rt_x-1 megabore column, 60 meters long by 0.53 mm I.D., with a 5.0 um film thickness.

A four point standard calibration was performed using a certified gas standard mix (Scott Speciality Gases) prior to analysis of the field samples.

Volatile Organic Compound Analysis

The samples were also analyzed by combined gas chromatography/mass spectrometry (GC/MS) for ten Volatile Organic Compounds. The analyses were performed according to the methodology outlined in EPA Method TO-14 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, EPA 600/4-84-041, U.S. Environmental Protection Agency, Research Triangle Park, NC, April, 1984 and May, 1988. The analyses were performed by gas chromatography/ mass spectrometry, utilizing a direct cryogenic trapping technique. The analytical system used was comprised of a Finnigan Model 4500C GC/MS/DS interfaced to a Tekmar 5010 Automatic Desorber. A thick film (5 micron) crossbonded 100% Dimethyl polysiloxane megabore column (RT_x-1, Restek Corporation, Bellefonte, PA) was used to achieve chromatographic separation.

The results of the analyses are included on the attached data sheets.

Performance Analytical Inc.
Environmental Testing and Consulting

LABORATORY REPORT

Client: SAN DIEGO AIR POLLUTION CONTROL DISTRICT

Address: 9150 Chesapeake Drive
San Diego, CA 92123

Contact: Ms. Judy Lake

Client Project: Arizona Street & Bell Jr. High School

Date of Report: 04/21/92

Date Received: 04/02/92

PAI Project No: 4060,4061

Purchase Order: Verbal

Twelve (12) Stainless Steel "SUMMA" Polished Canisters labeled:

"Inlet #1 (03/30/92)"	"Inlet #2 (03/30/92)"	"Inlet #3 (03/30/92)"
"Outlet #1 (03/30/92)"	"Outlet #2 (03/30/92)"	"Outlet #3 (03/30/92)"
"Inlet #1 (03/31/92)"	"Inlet #2 (03/31/92)"	"Inlet #3 (03/31/92)"
"Outlet #1 (03/31/92)"	"Outlet #2 (03/31/92)"	"Outlet #3 (Q3/31/92)"

The samples were received at the laboratory under chain of custody on April 2, 1992. he samples were received intact. The dates of analysis are indicated on the data sheets.

Twelve (12) six-liter passivated canisters were sent directly to the field sampler along with variable-constant differential low volume flow controllers. At the request of the sampler the flow controllers were calibrated to take one-hour time integrated samples. The majority of the canisters received by the laboratory were significantly undersampled. Ten of twelve canisters submitted to the laboratory were received under a unusually high vacuum. Canisters are evacuated to -14.0 psig at the laboratory prior to being sent out into the field. After time integrated sampling is completed, canisters returned to the laboratory generally have vacuum readings ranging from -2.5 psig to -0.5 psig. The ten canisters had vacuum readings of -12.5 psig to -8.9 psig, corresponding to sample volumes of 0.9 to 2.4 liters in a 6-liter container. In order to draw aliquots out of the canisters, the samples had to be pressurized with Nitrogen prior to laboratory analysis. The dilution factor due to the Nitrogen pressurization ranged from 3.22 to 8.50, thereby resulting in detection limits that are significantly higher than would otherwise be detected.

Data Release Authorization:

Ku-jih Chen
Principal Chemist

Reviewed and Approved:

Michael Tuday
Laboratory Director

Performance Analytical Inc.
Environmental Testing and Consulting

PERFORMANCE ANALYTICAL INC.

RESULTS OF ANALYSIS

Client: San Diego Air Pollution Control District

Client Sample ID: Outlet #1 (04/07/92) (2:55)

PAI Sample ID: 9201625

Test Code: GC/MS EPA TO-14
Analyst: Chris Parnell
Instrument ID: Finnigan 4500C/Tekmar 5010
Verified by: Michael Tuday

Matrix: Summa Canister
Date Received: 04/09/92
Date Analyzed: 04/14/92
Volume Analyzed: 0.0050 Liter
P_i = -5.3 P_f = +1.9 DF= 1.77
P_i = -0.6 P_f = +0.8 DF= 1.10

CAS #	COMPOUND	RESULT (MG/M^3)	DETECTION LIMIT (MG/M^3)	RESULT (PPM)	DETECTION LIMIT (PPM)
75-01-4	VINYL CHLORIDE	ND	2.0	ND	0.79
75-09-2	METHYLENE CHLORIDE	ND	2.0	ND	0.58
67-66-3	CHLOROFORM	ND	2.0	ND	0.41
107-06-2	1,2-DICHLOROETHANE	ND	2.0	ND	0.50
71-55-6	1,1,1-TRICHLOROETHANE	ND	2.0	ND	0.37
71-43-2	BENZENE	ND	2.0	ND	0.63
56-23-5	CARBON TETRACHLORIDE	ND	2.0	ND	0.32
79-01-6	TRICHLOROETHENE	ND	2.0	ND	0.38
106-93-4	1,2-DIBROMOETHANE	ND	2.0	ND	0.26
127-18-4	TETRACHLOROETHENE	ND	2.0	ND	0.30

ND = Not Detected .TR = Trace Level - Below Indicated Detection Limit

Performance Analytical Inc.
Environmental Testing and Consulting

PERFORMANCE ANALYTICAL INC.

RESULTS OF ANALYSIS

Client: San Diego Air Pollution Control District

Client Sample ID: Inlet #1 (04/07/92) (2:50)

PAI Sample ID: 9201624

Test Code: GC/MS EPA TO-14
Analyst: Chris Parnell
Instrument ID: Finnigan 4500C/Tekmar 5010
Verified by: Michael Tuday

Matrix: Summa Canister
Date Received: 04/09/92
Date Analyzed: 04/14/92
Volume Analyzed: 0.0050 Liter
P_i = -0.4 P_f = +2.1 DF= 1.17

CAS #	COMPOUND	RESULT (MG/M^3)	DETECTION LIMIT (MG/M^3)	RESULT (PPM)	DETECTION LIMIT (PPM)
75-01-4	VINYL CHLORIDE	ND	1.0	ND	0.39
75-09-2	METHYLENE CHLORIDE	1.8	1.0	0.54	0.29
67-66-3	CHLOROFORM	ND	1.0	ND	0.21
107-06-2	1,2-DICHLOROETHANE	ND	1.0	ND	0.25
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.0	ND	0.19
71-43-2	BENZENE	2.2	1.0	0.68	0.31
56-23-5	CARBON TETRACHLORIDE	ND	1.0	ND	0.16
79-01-6	TRICHLOROETHENE	7.8	1.0	1.5	0.19
106-93-4	1,2-DIBROMOETHANE	ND	1.0	ND	0.13
127-18-4	TETRACHLOROETHENE	12	1.0	1.8	0.15

ND = Not Detected TR = Trace Level - Below Indicated Detection Limit

Performance Analytical Inc.
Environmental Testing and Consulting

PERFORMANCE ANALYTICAL INC.

RESULTS OF ANALYSIS

Client: San Diego Air Pollution Control District

Client Sample ID: Outlet #1 (04/07/92) (2:55)
PAI Sample ID: 9201625

Test Code: EPA 18
Analyst: Ku-Jih Chen
Instrument ID: HP5890/FID #4
Verified by: Michael Tuday

Matrix: Summa Canister
Date Received: 04/09/92
Date Analyzed: 04/10/92
Volume Analyzed: 2.5 ml
P_i = -5.3 P_f = +1.9 DF= 1.77

COMPOUND	RESULT (PPM)	DETECTION LIMIT (PPM)
C1 as Methane	43	1.0
C2 as Ethane	ND	1.0
C3 as n-Propane	ND	0.80
C4 as n-Butane	ND	0.60
C5 as Pentane	540	0.40
C6 as n-Hexane	ND	0.40
C7 as n-Heptane	ND	0.40
C8 as n-Octane	ND	0.40
C9 as n-Nonane	ND	0.40
> C9 as n-Nonane	ND	0.40

ND = Not Detected TR = Trace Level - Below Indicated Detection Limit

Performance Analytical Inc.
Environmental Testing and Consulting

PERFORMANCE ANALYTICAL INC.

RESULTS OF ANALYSIS

Client: San Diego Air Pollution Control District

Client Sample ID: Inlet #1 (04/07/92) (2:50)

PAI Sample ID: 9201624 (Laboratory Duplicate)

Test Code: EPA 18
Analyst: Ku-Jih Chen
Instrument ID: HP5890/FID #4
Verified by: Michael Tuday

Matrix: Summa Canister
Date Received: 04/09/92
Date Analyzed: 04/10/92
Volume Analyzed: 0.050 ml
P_i = -0.4 P_f = +2.1 DF= 1.17

COMPOUND	RESULT (PPM)	DETECTION LIMIT (PPM)
C1 as Methane	190000	25
C2 as Ethane	ND	25
C3 as n-Propane	ND	20
C4 as n-Butane	ND	15
C5 as Pentane	ND	10
C6 as n-Hexane	ND	10
C7 as n-Heptane	ND	10
C8 as n-Octane	ND	10
C9 as n-Nonane	ND	10
> C9 as n-Nonane	ND	10

ND = Not Detected TR = Trace Level - Below Indicated Detection Limit

20954 Osborne Street, Canoga Park, CA 91304 • Phone 818 700-1130 • Fax 818 700-1015

Performance Analytical Inc.
Environmental Testing and Consulting

PERFORMANCE ANALYTICAL INC.

RESULTS OF ANALYSIS

Client: San Diego Air Pollution Control District

Client Sample ID: Outlet #3 (03/31/92)

PAI Sample ID: 9201462

Test Code: GC/MS EPA TO-14
Analyst: Kathleen Aguilera
Instrument ID: Finnigan 4500C/Tekmar 5010
Verified by: Michael Tuday

Matrix: Summa Canister
Date Received: 04/02/92
Date Analyzed: 04/07/92
Volume Analyzed: 1.00 Liter
P_i = -11.1 P_f = +4.0 DF= 5.19

CAS #	COMPOUND	RESULT (UG/M^3)	DETECTION LIMIT (UG/M^3)	RESULT (PPB)	DETECTION LIMIT (PPB)
75-01-4	VINYL CHLORIDE	ND	25	ND	9.9
75-09-2	METHYLENE CHLORIDE	ND	25	ND	7.3
67-66-3	CHLOROFORM	ND	25	ND	5.2
107-06-2	1,2-DICHLOROETHANE	ND	25	ND	6.2
71-55-6	1,1,1-TRICHLOROETHANE	ND	25	ND	4.6
71-43-2	BENZENE	54	25	17	7.8
56-23-5	CARBON TETRACHLORIDE	ND	25	ND	4.0
79-01-6	TRICHLOROETHENE	ND	25	ND	4.7
106-93-4	1,2-DIBROMOETHANE	ND	25	ND	3.3
127-18-4	TETRACHLOROETHENE	520	25	77	3.7

ND = Not Detected TR = Trace Level - Below Indicated Detection Limit

Performance Analytical Inc.
Environmental Testing and Consulting

Sample "Outlet #1" contained 1500 ppm of Acetone. Acetone is not a target compound. The presence of Acetone is most likely attributable to the cleaning or rinsing of sampling equipment by the field sampler The presence of Acetone interferes with the analysis of speciated VOCs by GC/MS. Due to the high concentration of Acetone the sample had to be analyzed at a smaller volume resulting in an elevated detection limit. Also, the Acetone artifact gave a 540 ppm false positive for Pentane for the EPA Method 18 GC/FID analysis.

The results of the analyses are included on the attached data sheets.

OLET / Outlet #1 for 4/11/02 is FULETOutlet#4

20954 Osborne Street, Canoga Park, CA 91304 • Phone 818 709-1139 • Fax 818 709-2915

Performance Analytical Inc.
Environmental Testing and Consulting

PERFORMANCE ANALYTICAL INC.

RESULTS OF ANALYSIS

Client: San Diego Air Pollution Control District

Client Sample ID: Outlet #3 (03/31/92)
PAI Sample ID: 9201462 fall 92 et #3

Test Code: EPA 18
Analyst: Ku-Jih Chen
Instrument ID: HP5890/FID #4
Verified by: Michael Tuday

Matrix: Summa Canister
Date Received: 04/02/92
Date Analyzed: 04/10/92
Volume Analyzed: 2.5 ml
P_i = -11.1 P_f = +4.0 DF= 5.19

COMPOUND	RESULT (PPM)	DETECTION LIMIT (PPM)
C1 as Methane	ND	2.5
C2 as Ethane	ND	2.5
C3 as n-Propane	ND	2.0
C4 as n-Butane	ND	1.5
C5 as Pentane	ND	1.0
C6 as n-Hexane	ND	1.0
C7 as n-Heptane	ND	1.0
C8 as n-Octane	ND	1.0
C9 as n-Nonane	ND	1.0
> C9 as n-Nonane	ND	1.0

ND = Not Detected TR = Trace Level - Below Indicated Detection Limit

Performance Analytical Inc.
Environmental Testing and Consulting

PERFORMANCE ANALYTICAL INC.

RESULTS OF ANALYSIS

Client: San Diego Air Pollution Control District

Client Sample ID: Inlet #3 (03/31/92)

PAI Sample ID: 9201459

Test Code: GC/MS EPA TO-14
Analyst: Chris Parnell
Instrument ID: Finnigan 4500C/Tekmar 5010
Verified by: Michael Tuday

Matrix: Summa Canister
Date Received: 04/02/92
Date Analyzed: 04/08/92
Volume Analyzed: 0.050 Liter
P_i = -9.1 P_f = +4.0 DF= 3.34

CAS #	COMPOUND	RESULT (UG/M^3)	DETECTION LIMIT (UG/M^3)	RESULT (PPB)	DETECTION LIMIT (PPB)
75-01-4	VINYL CHLORIDE	750	300	300	120
75-09-2	METHYLENE CHLORIDE	2400	300	690	87
67-66-3	CHLOROFORM	ND	300	ND	62
107-06-2	1,2-DICHLOROETHANE	ND	300	ND	75
71-55-6	1,1,1-TRICHLOROETHANE	1200	300	230	56
71-43-2	BENZENE	2300	300	740	94
56-23-5	CARBON TETRACHLORIDE	ND	300	ND	48
79-01-6	TRICHLOROETHENE	9200	300	1700	56
106-93-4	1,2-DIBROMOETHANE	ND	300	ND	39
127-18-4	TETRACHLOROETHENE	15000	300	2300	45

ND = Not Detected TR = Trace Level - Below Indicated Detection Limit

Performance Analytical Inc.
Environmental Testing and Consulting

PERFORMANCE ANALYTICAL INC.

RESULTS OF ANALYSIS

Client: San Diego Air Pollution Control District

Client Sample ID: Inlet #3 (03/31/92)

PAI Sample ID: 9201459 Bell Inlet #3

Test Code: EPA 18
Analyst: Ku-Jih Chen
Instrument ID: HP5890/FID #4
Verified by: Michael Tuday

Matrix: Summa Canister
Date Received: 04/02/92
Date Analyzed: 04/10/92
Volume Analyzed: 0.050 ml
P_i = -9.1 P_f = +4.0 DF= 3.34

COMPOUND	RESULT (PPM)	DETECTION LIMIT (PPM)
C1 as Methane	160000	75
C2 as Ethane	ND	75
C3 as n-Propane	ND	60
C4 as n-Butane	ND	45
C5 as Pentane	ND	30
C6 as n-Hexane	ND	30
C7 as n-Heptane	ND	30
C8 as n-Octane	ND	30
C9 as n-Nonane	ND	30
> C9 as n-Nonane	ND	30

ND = Not Detected TR = Trace Level - Below Indicated Detection Limit

Performance Analytical Inc.
Environmental Testing and Consulting

PERFORMANCE ANALYTICAL INC.

RESULTS OF ANALYSIS

Client: San Diego Air Pollution Control District

Client Sample ID: Inlet #2 (03/31/92)

PAI Sample ID: 9201458

Test Code: GC/MS EPA TO-14
Analyst: Chris Parnell
Instrument ID: Finnigan 4500C/Tekmar 5010
Verified by: Michael Tuday

Matrix: Summa Canister
Date Received: 04/02/92
Date Analyzed: 04/08/92
Volume Analyzed: 0.050 Liter
P_i = -8.9 P_f = +4.0 DF= 3.22

CAS #	COMPOUND	RESULT (UG/M^3)	DETECTION LIMIT (UG/M^3)	RESULT (PPB)	DETECTION LIMIT (PPB)
75-01-4	VINYL CHLORIDE	1100	300	430	120
75-09-2	METHYLENE CHLORIDE	2500	300	740	87
67-66-3	CHLOROFORM	ND	300	ND	62
107-06-2	1,2-DICHLOROETHANE	ND	300	ND	75
71-55-6	1,1,1-TRICHLOROETHANE	780	300	140	56
71-43-2	BENZENE	2200	300	680	94
56-23-5	CARBON TETRACHLORIDE	ND	300	ND	48
79-01-6	TRICHLOROETHENE	8300	300	1600	56
106-93-4	1,2-DIBROMOETHANE	ND	300	ND	39
127-18-4	TETRACHLOROETHENE	12000	300	1900	45

ND = Not Detected TR = Trace Level - Below Indicated Detection Limit

Performance Analytical Inc.
Environmental Testing and Consulting

PERFORMANCE ANALYTICAL INC.

RESULTS OF ANALYSIS

Client: San Diego Air Pollution Control District

Client Sample ID: Outlet #2 (03/31/92)

PAI Sample ID: 9201461

Test Code: GC/MS EPA TO-14
Analyst: Kathleen Aguilera
Instrument ID: Finnigan 4500C/Tekmar 5010
Verified by: Michael Tuday

Matrix: Summa Canister
Date Received: 04/02/92
Date Analyzed: 04/07/92
Volume Analyzed: 1.00 Liter
P_i = -10.7 P_f = +4.0 DF= 4.68

CAS #	COMPOUND	RESULT (UG/M^3)	DETECTION LIMIT (UG/M^3)	RESULT (PPB)	DETECTION LIMIT (PPB)
75-01-4	VINYL CHLORIDE	ND	25	ND	9.9
75-09-2	METHYLENE CHLORIDE	ND	25	ND	7.3
67-66-3	CHLOROFORM	ND	25	ND	5.2
107-06-2	1,2-DICHLOROETHANE	ND	25	ND	6.2
71-55-6	1,1,1-TRICHLOROETHANE	ND	25	ND	4.6
71-43-2	BENZENE	15 TR	25	4.7 TR	7.8
56-23-5	CARBON TETRACHLORIDE	ND	25	ND	4.0
79-01-6	TRICHLOROETHENE	ND	25	ND	4.7
106-93-4	1,2-DIBROMOETHANE	ND	25	ND	3.3
127-18-4	TETRACHLOROETHENE	150	25	22	3.7

ND = Not Detected TR = Trace Level - Below Indicated Detection Limit

Performance Analytical Inc.
Environmental Testing and Consulting

PERFORMANCE ANALYTICAL INC.

RESULTS OF ANALYSIS

Client: San Diego Air Pollution Control District

Client Sample ID: Inlet #2 (03/31/92)
PAI Sample ID: 9201458 92' Inlet #2

Test Code: EPA 18
Analyst: Ku-Jih Chen
Instrument ID: HP5890/FID #4
Verified by: Michael Tuday

Matrix: Summa Canister
Date Received: 04/02/92
Date Analyzed: 04/10/92
Volume Analyzed: 0.10 ml
P_i = -8.9 P_f = +4.0 DF= 3.22

COMPOUND	RESULT (PPM)	DETECTION LIMIT (PPM)
C1 as Methane	370000	38
C2 as Ethane	ND	38
C3 as n-Propane	ND	30
C4 as n-Butane	ND	23
C5 as Pentane	ND	15
C6 as n-Hexane	ND	15
C7 as n-Heptane	ND	15
C8 as n-Octane	ND	15
C9 as n-Nonane	ND	15
> C9 as n-Nonane	ND	15

ND = Not Detected TR = Trace Level - Below Indicated Detection Limit

Performance Analytical Inc.
Environmental Testing and Consulting

PERFORMANCE ANALYTICAL INC.

RESULTS OF ANALYSIS

Client: San Diego Air Pollution Control District

Client Sample ID: Outlet #2 (03/31/92)

PAI Sample ID: 9201461

Blk Outlet #2

Test Code: EPA 18
Analyst: Ku-Jih Chen
Instrument ID: HP5890/FID #4
Verified by: Michael Tuday

Matrix: Summa Canister
Date Received: 04/02/92
Date Analyzed: 04/10/92
Volume Analyzed: 2.5 ml
P_i = -10.7 P_f = +4.0 DF= 4.68

COMPOUND	RESULT (PPM)	DETECTION LIMIT (PPM)
C1 as Methane	ND	2.5
C2 as Ethane	ND	2.5
C3 as n-Propane	ND	2.0
C4 as n-Butane	ND	1.5
C5 as Pentane	ND	1.0
C6 as n-Hexane	ND	1.0
C7 as n-Heptane	ND	1.0
C8 as n-Octane	ND	1.0
C9 as n-Nonane	ND	1.0
> C9 as n-Nonane	ND	1.0

ND = Not Detected TR = Trace Level - Below Indicated Detection Limit

Performance Analytical Inc.
Environmental Testing and Consulting

PERFORMANCE ANALYTICAL INC.

RESULTS OF ANALYSIS

Client: San Diego Air Pollution Control District

Client Sample ID: Outlet #1 (03/31/92)

PAI Sample ID: 9201460

Test Code: GC/MS EPA TO-14
Analyst: Kathleen Aguilera
Instrument ID: Finnigan 4500C/Tekmar 5010
Verified by: Michael Tuday

Matrix: Summa Canister
Date Received: 04/02/92
Date Analyzed: 04/07/92
Volume Analyzed: 1.00 Liter
P_i = -0.5 P_f = +4.0 DF= 1.32

CAS #	COMPOUND	RESULT (UG/M^3)	DETECTION LIMIT (UG/M^3)	RESULT (PPB)	DETECTION LIMIT (PPB)
75-01-4	VINYL CHLORIDE	ND	5.0	ND	2.0
75-09-2	METHYLENE CHLORIDE	ND	5.0	ND	1.5
67-66-3	CHLOROFORM	ND	5.0	ND	1.0
107-06-2	1,2-DICHLOROETHANE	ND	5.0	ND	1.2
71-55-6	1,1,1-TRICHLOROETHANE	ND	5.0	ND	0.93
71-43-2	BENZENE	5.2	5.0	1.6	1.6
56-23-5	CARBON TETRACHLORIDE	ND	5.0	ND	0.80
79-01-6	TRICHLOROETHENE	ND	5.0	ND	0.94
106-93-4	1,2-DIBROMOETHANE	ND	5.0	ND	0.65
127-18-4	TETRACHLOROETHENE	44	5.0	6.5	0.75

ND = Not Detected TR = Trace Level - Below Indicated Detection Limit

20954 Osborne Street, Canoga Park, CA 91304 • Phone 818 709-1139 • Fax 818 709-2915

Performance Analytical Inc.
Environmental Testing and Consulting

PERFORMANCE ANALYTICAL INC.

RESULTS OF ANALYSIS

Client: San Diego Air Pollution Control District

Client Sample ID: Outlet #1 (03/31/92)

PAI Sample ID: 9201460

Be: Outlet #1

Test Code: EPA 18
Analyst: Ku-Jih Chen
Instrument ID: HP5890/FID #4
Verified by: Michael Tuday

Matrix: Summa Canister
Date Received: 04/02/92
Date Analyzed: 04/10/92
Volume Analyzed: 2.5 ml
P_i = -0.5 P_f = +4.0 DF= 1.32

COMPOUND	RESULT (PPM)	DETECTION LIMIT (PPM)
C1 as Methane	4.0	0.50
C2 as Ethane	ND	0.50
C3 as n-Propane	ND	0.40
C4 as n-Butane	ND	0.30
C5 as Pentane	ND	0.20
C6 as n-Hexane	ND	0.20
C7 as n-Heptane	ND	0.20
C8 as n-Octane	ND	0.20
C9 as n-Nonane	ND	0.20
> C9 as n-Nonane	ND	0.20

ND = Not Detected TR = Trace Level - Below Indicated Detection Limit

20954 Osborne Street, Canoga Park, CA 91304 • Phone 818 709-1139 • Fax 818 709-1915

Performance Analytical Inc.
Environmental Testing and Consulting

PERFORMANCE ANALYTICAL INC.

RESULTS OF ANALYSIS

Client: San Diego Air Pollution Control District

Client Sample ID: Inlet #1 (03/31/92)

PAI Sample ID: 9201457

Test Code: GC/MS EPA TO-14
Analyst: Chris Parnell
Instrument ID: Finnigan 4500C/Tekmar 5010
Verified by: Michael Tuday

Matrix: Summa Canister
Date Received: 04/02/92
Date Analyzed: 04/08/92
Volume Analyzed: 0.050 Liter
P_i = -10.2 P_f = +4.0 DF= 4.16

CAS #	COMPOUND	RESULT (UG/M^3)	DETECTION LIMIT (UG/M^3)	RESULT (PPB)	DETECTION LIMIT (PPB)
75-01-4	VINYL CHLORIDE	860	400	340	160
75-09-2	METHYLENE CHLORIDE	2300	400	680	120
67-66-3	CHLOROFORM	ND	400	ND	83
107-06-2	1,2-DICHLOROETHANE	ND	400	ND	100
71-55-6	1,1,1-TRICHLOROETHANE	1400	400	260	74
71-43-2	BENZENE	2200	400	680	130
56-23-5	CARBON TETRACHLORIDE	ND	400	ND	64
79-01-6	TRICHLOROETHENE	8500	400	1600	75
106-93-4	1,2-DIBROMOETHANE	ND	400	ND	52
127-18-4	TETRACHLOROETHENE	14000	400	2100	60

ND = Not Detected TR = Trace Level - Below Indicated Detection Limit

20954 Osborne Street, Canoga Park, CA 91304 • Phone 818 709-1139 • Fax 818 709-2915

GAS CHROMATOGRAPHY RESULTS

Performance Analytical Inc.
Environmental Testing and Consulting

PERFORMANCE ANALYTICAL INC.

RESULTS OF ANALYSIS

Client: San Diego Air Pollution Control District

Client Sample ID: Inlet #1 (03/31/92)

PAI Sample ID: 9201457 Cell Inlet #1

Test Code: EPA 18
Analyst: Ku-Jih Chen
Instrument ID: HP5890/FID #4
Verified by: Michael Tuday

Matrix: Summa Canister
Date Received: 04/02/92
Date Analyzed: 04/10/92
Volume Analyzed: 0.10 ml
P_i = -10.2 P_f = +4.0 DF= 4.16

COMPOUND	RESULT (PPM)	DETECTION LIMIT (PPM)
C1 as Methane	230000	50
C2 as Ethane	ND	50
C3 as n-Propane	ND	40
C4 as n-Butane	ND	30
C5 as Pentane	ND	20
C6 as n-Hexane	ND	20
C7 as n-Heptane	ND	20
C8 as n-Octane	ND	20
C9 as n-Nonane.	ND	20
> C9 as n-Nonane	ND	20

ND = Not Detected TR = Trace Level - Below Indicated Detection Limit

20954 Osborne Street, Canoga Park, CA 91304 • Phone 818 700-1130 • Fax 818 700-1015

Test Witness - Runs #1 - 4 GC Analysis

TEST PARAMETERS:

PROCEDURES:

procedures and equipment utilized in these tests are based on EPA NSPS guidelines and from the EPA 40 CFR PART 60, Method 18.

CALCULATIONS:

All calculations are based on the EPA 40 CFR, July 1, 1991, Part 60, Method 18.

GAS SAMPLING:

All samples were collected by SCEC. Their procedures are as follows:
A pressurized container was placed at the gas inlet BEFORE the flare. The container was opened after the flare reached a steady state. Once at a steady state, the container drew in the landfill gas for 25 minutes. After 25 minutes, the container was shut off, labeled, and shipped to Performance Analytical Inc. The outlet monitoring was run concurrently and parallel to the Method 20 sampling train. The pressurized container was opened and allowed to draw in the outlet gas for 25 minutes. The container was then shut off, labeled and shipped to Performance Analytical Inc.

ANALYSES:

All analyses were performed by Performance Analytical Inc.

EQUIPMENT:

All G.C. testing and analysis equipment was calibrated according to EPA guidelines and performed by Performance Analytical Inc.

OVERVIEW OF THE TEST:

RUN #1:	*INLET:* Accepted	**RUN #3:**	*INLET:* Accepted
	OUTLET: Accepted		*OUTLET:* Accepted
RUN #2:	*INLET:* Accepted	**RUN #4:**	*INLET:* Not Accepted
	OUTLET: Accepted		*OUTLET:* Not Accepted

	INLET #1		OUTLET #1	
	RESULT (PPM)	DET. LIMIT (PPM)	RESULT (PPM)	DET. LIMIT (PPM)
C1 as Methane	230000	50	4.0	0.5
C2 as Ethane	ND	30	ND	0.3
C3 as n-Propane	ND	40	ND	0.4
C4 as n-Butane	ND	30	ND	0.3
C5 as Pentane	ND	20	ND	0.2
C6 as n-Hexane	ND	20	ND	0.2
C7 as n-Heptane	ND	20	ND	0.2
C8 as n-Octane	ND	20	ND	0.2
C9 as n-Nonane	ND	20	ND	0.2
> C9 as n-Nonane	ND	20	ND	0.2
	RESULT (PPB)	DET. LIMIT (PPB)	RESULT (PPB)	DET. LIMIT (PPB)
Vinyl Chloride	340	160	ND	2.0
Methylene Chloride	660	120	ND	1.5
Chloroform	ND	83	ND	1.0
1,2-Dichloroethane	ND	100	ND	1.2
1,1,1-Trichloroethane	260	74	ND	0.9
Benzene	660	130	1.6	1.6
Carbon Tetrachloride	ND	64	ND	0.8
Trichloroethene	1600	75	ND	0.9
1,2-Dibromoethane	ND	52	ND	0.7
Tetrachloroethene	2100	60	ND	0.8

	INLET #2		OUTLET #2	
	RESULT (PPM)	DET. LIMIT (PPM)	RESULT (PPM)	DET. LIMIT (PPM)
C1 as Methane	370000	38	ND	2.5
C2 as Ethane	ND	38	ND	2.5
C3 as n-Propane	ND	30	ND	2.0
C4 as n-Butane	ND	23	ND	1.5
C5 as Pentane	ND	15	ND	1.0
C6 as n-Hexane	ND	15	ND	1.0
C7 as n-Heptane	ND	15	ND	1.0
C8 as n-Octane	ND	15	ND	1.0
C9 as n-Nonane	ND	15	ND	1.0
> C9 as n-Nonane	ND	15	ND	1.0
	RESULT (PPB)	DET. LIMIT (PPB)	RESULT (PPB)	DET. LIMIT (PPB)
Vinyl Chloride	430	120	ND	9.9
Methylene Chloride	740	87	ND	7.2
Chloroform	ND	62	ND	5.2
1,2-Dichloroethane	ND	75	ND	6.2
1,1,1-Trichloroethane	140	56	ND	4.6
Benzene	880	94	4.7 TR	7.8
Carbon Tetrachloride	ND	48	ND	4.0
Trichloroethene	1600	56	ND	4.7
1,2-Dibromoethane	ND	39	ND	3.3
Tetrachloroethene	1900	45	22	3.7

	INLET #3		OUTLET #3	
	RESULT (PPM)	DET. LIMIT (PPM)	RESULT (PPM)	DET. LIMIT (PPM)
C1 as Methane	160000	75	ND	2.5
C2 as Ethane	ND	75	ND	2.5
C3 as n-Propane	ND	60	ND	2.0
C4 as n-Butane	ND	45	ND	1.5
C5 as Pentane	ND	30	ND	1.0
C6 as n-Hexane	ND	30	ND	1.0
C7 as n-Heptane	ND	30	ND	1.0
C8 as n-Octane	ND	30	ND	1.0
C9 as n-Nonane	ND	30	ND	1.0
> C9 as n-Nonane	ND	30	ND	1.0
	RESULT (PPB)	DET. LIMIT (PPB)	RESULT (PPB)	DET. LIMIT (PPB)
Vinyl Chloride	300	120	ND	9.9
Methylene Chloride	690	87	ND	7.3
Chloroform	ND	62	ND	5.2
1,2-Dichloroethane	ND	75	ND	6.2
1,1,1-Trichloroethane	230	56	ND	4.6
Benzene	740	94	17	7.8
Carbon Tetrachloride	ND	48	ND	4.0
Trichloroethene	1700	56	ND	4.7
1,2-Dibromoethane	ND	39	ND	3.3
Tetrachloroethene	2300	45	77	3.7

	AVERAGE INLET		AVERAGE OUTLET	
	RESULT (PPM)	DET. LIMIT (PPM)	RESULT (PPM)	DET. LIMIT (PPM)
C1 as Methane	253333	54	1	1.8
C2 as Ethane	ND	54	ND	1.8
C3 as n-Propane	ND	43	ND	1.5
C4 as n-Butane	ND	33	ND	1.1
C5 as Pentane	ND	22	ND	0.7
C6 as n-Hexane	ND	22	ND	0.7
C7 as n-Heptane	ND	22	ND	0.7
C8 as n-Octane	ND	22	ND	0.7
C9 as n-Nonane	ND	22	ND	0.7
> C9 as n-Nonane	ND	22	ND	0.7
	RESULT (PPB)	DET. LIMIT (PPB)	RESULT (PPB)	DET. LIMIT (PPB)
Vinyl Chloride	357	133	ND	7.3
Methylene Chloride	703	90	ND	6.4
Chloroform	ND	69	ND	3.8
1,2-Dichloroethane	ND	83	ND	5.8
1,1,1-Trichloroethane	210	62	ND	3.4
Benzene	700	106	4	8.7
Carbon Tetrachloride	ND	53	ND	2.9
Trichloroethene	1633	62	ND	3.4
1,2-Dibromoethane	ND	43	ND	2.4
Tetrachloroethene	2160	50	ND	2.7

LEGEND

ND= Not Detected

TR= Trace Level (below the indicated detection limit)

SAMPLE HISTORY

SAMPLES 1-3 INLET & OUTLET

Samples 1-3 INLET and OUTLET were taken on 3/31/92, received on 4/2/92, analyzed on 4/10/92.

SAMPLE 4 INLET & OUTLET

Sample 4 INLET and OUTLET was taken on 4/7/92, received on 4/9/92, analyzed 4/14/92

The G.C. detection limits for Run #4 were set too high; consequently, the values obtained were useless for our purposes. Because of this, it was decided to omit Run #4, INLET & OUTLET, from the average.

COMPANY: BELL JR. HIGH
DATE: 4-7-92
UNIT: FLARE
REPORT #: T1482-2

RUN #1
@ 68'F
EPA METHOD 5/8

PARTICULATE RESULTS:	net mg	gr/dscf	gr/scf	gr/dscf @ 12% CO2	lbs/hr
Probe & Nozzle:	10.38	0.005581	0.005114	0.008330	0.2
Filter:	0.6	0.000322	0.000295	0.000481	0.01
Condensables:	1.173333	0.000630	0.000578	0.000941	0.02
Total:	12.15333	0.006534	0.005988	0.009753	0.23

N BaCl = 0.00971

SULFATE RESULTS:	Vol aliq	Vt	gr/dscf	gr/scf	gr/dscf @ 12% CO2	lbs/hr
Probe & Nozzle:	(1) 25	(2) 0.2	(3) 0.001266	0.001160	0.001889	(4) 0.05
Filter:	10	0	0	0	0	0
Condensables:	22	0.1	0.000557	0.000510	0.000831	0.02
Total:			0.001823	0.001670	0.002721	0.07

ADDITIONAL DATA:

TIME start	TIME finish	%O2	%CO2	%H2O	Vm(std)	SDCFM
1030	1130	11.43	8.04	8.36	28.64	4174

(3) $gr/DSCF = \frac{(\text{Normality BaCl})(0.00971)(\text{Vol titrant})(0.2)(\text{coefficient to grams})(48.5)(\text{grains/grains})(0.0154)}{\text{Vol aliq}\ (25)} \Big/ \frac{28.64}{V_m\ \text{std}}$

Equation: CFR method 8

(4) $Lbs/HR = (0.001266)(0.00858)(4174)$ (gr/DSCF, grains/lbs, DSCFM, min/HR)

COMPANY: BELL JR. HIGH
DATE: 4-7-92
UNIT: FLARE
REPORT #: T1482-2

RUN #:	1	2	3
TIME			
start	1030	1220	1445
finish	1130	1302	1555
%O2	11.43	12.11	12.33
%CO2	8.04	7.47	6.9
%H2O	8.36	10.97	10.24
Vm std	28.64	18.94	29.59
SDCFM	4174	3834	4497
DATA @68' Vm std	28.64	35.25	32.36
PARTICULATE DATA %H2O	8.36	9.74	8.65
SDCFM	4174	3402	3267
PROBE/NOZZLE WT			
final # gms (200 ML./250 Sample)	98.5025	96.8154	101.3358
init # gms	98.4942	96.8154	101.3356
net [redacted] gms	0.01038	0	0.00033
FILTER WT			
final # gms	0.5262	0.5279	0.4928
init. #	0.5256	0.5267	0.4927
net [redacted]	0.0006	0.0012	0.0001
CONDENSABLE WT			
sample vol	220	220	203
alliq. vol	150	100	100
final #	95.4208	101.9367	95.4276
init #	95.42	101.9301	95.4205
net	0.001173	0.01452	0.013804

TITRAMETRIC DATA

PROBE/NOZZLE			
norm. BaCl	0.00971	0.00971	0.00971
sample vol	1 (250)	130	165
aliq. vol	(10)	10	10
dilution	1	1	1
mls titrant	(≈ 0.2)	0.05	0.1
FILTER			
norm. BaCl	0.00971	0.00971	0.00971
sample vol	100	100	100
aliq. vol	10	10	10
dilution	1	1	1
mls. titrant	0	0	0
CONDENSABLES	mls Titrant 0.1	0.1	0.24
norm. BaCL	0.00971	0.00971	0.00971
sample vol	220	220	203
aliq. vol	10	10	10
dilution			

SAN DIEGO AIR POLLUTION CONTROL DISTRICT
MONITORING AND TECHNICAL SERVICES
9150 CHESAPEAKE DRIVE
SAN DIEGO, CA 92123

NITROGEN OXIDES, CARBON MONOXIDE, PARTICULATE, AND SULFUR EMISSIONS SUMMARY REPORT

SITE: Bell Jr. High School

P/O NUMBER: 56896 and 59383 JOB NO: T1482-2

TEST DATE: 4/7/92

EQUIPMENT: Bell Jr. High Landfill Gas Collection and Incineration System

REPORT BY: R.P. Logan - SCEC DATE: 5/14/92

APCD PERSONNEL: Janet Cawyer/David Shina

SITE PERSONNEL: Bob Hanley/Bob Hobbs

APPROVED BY: _____ DATE: _____

SCEC
1582-1 N. BATAVIA
ORANGE, CA 92667
(714)282-8240

COMPANY: S.D.A.P.C.D. @ BELL JR. HIGH SCHOOL
DATE: APRIL 7, 1992
UNIT: FLARE @ EXHAUST
REPORT #:T1482-2

FIELD DATA @ 68'

SITE:

RUN #:	1	2	3
TIME:	1030	1220	1445
Vm (dry gas sampled)	30.05	19.991	30.755
Y (meter calib. factor)	0.976583	0.976583	0.976583
P bar (Barometric pressure)	29.85	29.85	29.85
P static (stack pressure, " H2O)	0	0	0
Delta H (differential meter press, " H2O)	0.791	0.667	0.873
Tm (meter temperature, R')	540.8	543.8	535.9
Vol H2O mls	55.5	49.6	71.7
Vm(std),dscf	28.64	18.94	29.59
Bws-H2O vapor	0.0836	0.1097	0.1024
MF-moisture factor	0.9164	0.8903	0.8976
% CO2	8.04	7.47	6.9
% O2	11.43	12.11	12.33
% N2	80.53	80.42	80.77
Md-MW stk gas,dry	29.74	29.68	29.6
Ms-MW stk gas,wet	28.76	28.4	28.41
Cp-pitot tube	0.84	0.84	0.84
Avg sq rt ^p	0.202	0.19	0.221
T stack, R'	1771.4	1775.8	1777.1
Stack area,ft2	12.25	12.25	12.25
Vs-fps	20.84	19.75	22.97
Qstd-dscfm	4174	3834	4492
Area noz,ft2	1.28E-03	1.28E-03	1.30E-03
Sample time	60	40	60
% Isokinetic	109.2	117.9	103.5

NOMENCLATURE (concl.)

symbol	units	explanation	equation
	P		
ΔP	in H2O	pitot diff. press.-velocity head of stack gas	read from measuring device
Pbar	in Hg	barometric pressure at sampling pt.	read from press measuring device
π(pi)	none	the ratio of the circumference of a circle to its diameter	3.14165 (see CRC)
Pm	in Hg	absoulte meter pressure	Pbar+(ΔH/13.6)
Ps	in Hg	absolute stack pressure	Pbar+(Pstatic/13.6)
Pg	in H2O	static pressure of stack	read from pressure sensing device
Pstd	in Hg	press at std conditions (29.92)	see CFR
	Q		
Qs	acfm	flow rate	vs*Ao*60
Qstd	dscfm	dry volumetric stack gas flow rate, corrected to STP	17.64*Qs(1-Bws)*(Ps/Ts)
	R		
R	in Hg-ft^3/°R-lb-mo	ideal gas constant	21.85 (see CRC)
	S		
S.L.	none	Sea Level	read from a relief map
	T		
t1	°F	dry gas meter inlet temp, uncorrected	read from temp sensing device
t2	°F	dry gas meter outlet temp,uncorrected	read from temp sensing device
t1 corr	°F	dry gas meter outlet temp,corrected	t1 + temperature correction
t2 corr	°F	dry gas meter outlet temp,corrected	t2 + temperature correction
θ(theta)	min	sampling time/point	Ø/tn
Ø(Theta)	min	total sampling time	none
ti	°F	impinger outlet temp	read from temp sensing device
tm	°F	dry gas meter temp in F°	(t1+t2)/2
Tm	°R	dry gas meter temp in R	tm+460
n	none	tl number or traverse pts	summation of the traverse points
ts	°F	stack temp in F	read from temp sensing device
Ts	°R	stack temp in R	ts+460
Tstd	°R	temp at std conditions (528)	see CFR
	V		
Vlc	ml	water collected from impingers and the silica gel (if applicable)	from lab analysis
Vm	ft^3	sample gas volume, uncorrected	read from dry gas meter
Vm'	ft^3	sample gas volume, corrected	Vm*Y
Vm std	ft^3	volume of gas sample by the dry gas meter,corrected to STP	((Vm'*Tstd)Pm)/((Pstd*Tm)-corr Vm)
Vpw@ts	in Hg	vapor pressure of water at ts	see CRC water vapor press. tables
Vpw@ti	in Hg	vapor pressure of water at ti	see CRC water vapor press. tables
Vs	ft/sec	stack gas velocity	85.49*Cp((Ts*ΔP)/(Ps*Ms))^0.5
Vw std	ft^3	Vol. of water vapor in gas sample, corrected to STP	(Vlc*∂*R*Tstd)/(Pstd*MW H2O)+corr Vwm
	Y		
Y	none	dry gas meter calibration factor	see CFR 40, parts 53-60

Conversion Factors

(multiply by the number)			
0.002669	in Hg-ft^3/°R-ml	conversion to get in Hg-ft^3/R	see CRC
0.00857	lb/gr-min/hr	conv from gr/min to lb/hr (60/7000)	see Lange's Handbook of Chemistry
0.04707	ft^3/ml	conversion from ml to ft^3	see Lange's Handbook of Chemistry
15.43	gr/g	conversion from g to gr	see Lange's Handbook of Chemistry
17.64	°R/in H2O	Tstd/Pstd (528/29.92)	see Lange's Handbook of Chemistry
85.49	(ft/sec)-(lb-in Hg/lb-mo-°R-in H20))^.5	conversion factor to get velocity in ft/sec	see CRC
(divide by the number)			
144	in^2/ft^2	conversion from in^2 to ft^2	see CRC
13.6	in H20/in Hg	conversion from in H20 to in Hg	see CRC
(add to the number)			
460	°R/°F	conversion from F to R	see CRC

Bell Jr. High Landfill flare on 4/7/92

SAN DIEGO AIR POLLUTION CONTROL DISTRICT, 9150 CHESAPEAKE DRIVE, SAN DIEGO, CA. 92123 P.O.#880614 TEST #92098.1

SOURCE TEST OF PARTICULATE EMISSIONS TO THE ATMOSPHERE

TEST SITE: Bell Junior High Landfill Flare
620 South Briarwood Road
Paradise Hills, CA

TEST WITNESS - RUN #1

TEST #: 92098.1 P.O.# 880614 TEST DATE: 4/7/92

Type of plant (Asphalt /Perlite / Combustion): COMBUSTION

UNIT TESTED: INCINERATOR

EQUIPMENT: LANDFILL FLARE

TESTED BY: Russ Logan & Ted Jackman of SCEC	DATE: 4/7/92
SITE PERSONNEL: Bob Hanley	DATE: 4/7/92
APCD ENGINEER: Archi de la Cruz	DATE: 4/7/92
LAB ANALYSIS BY: SCEC	DATE: 4/21/92
REPORT BY: SCEC (Russ Logan)	DATE: 5/14/92
REVIEWED BY: David N. Shina	DATE: 6/17/92
APPROVED BY:	DATE:

ROBERT YELENOSKY, SENIOR AIR POLLUTION CHEMIST

This report has been reviewed and found to be representative of the testing that was performed.

SDAPCD RULES

TEST	LIMIT	MEASURED	PASS/FAIL
RULE 53 SPECIFIC CONT.	0.10 gr/dscf	0.010 gr/dscf	NON-EXCEEDANCE

..ST RESULTS SUMMARY:

ITEM	I	Cs(12%)	E
UNITS	%	gr/dscf	lbs/hr
VALUE	109	0.0097	0.23

ENGINEERING SUMMARY

Qstd	TYPE OF FUEL	LOAD	RATE
dscfm		Tons/Hr	Tons
4192			

TEST PARAMETERS:

SYSTEM DESCRIPTION:

Landfill gas is allowed to accumulate in the wells and piping of a flare system. Every 12 hours the incinerator ignites its flare to destroy by combustion, the accumulated landfill gases. The flare is at the bottom of the incinerator stack. The sampling points are near the top of the stack. The particulate emissions from this process are the subject of the report.

PROCEDURES:

The procedures and equipment utilized in these tests are based on EPA New Source Performance guidelines and from EPA CFR 40, Standards Method 5. The sampling train utilized a front-end filter.

CALCULATIONS

All calculations are based on the EPA CFR 40 Standards Method 5, July 1, 1991, Parts 53-60, Appendix A.

PARTICULATE SAMPLING:

The test consisted of sampling at 8 traverse points, 4 from 1 sampling port (fig.2) and 2 from 2 sample ports, collected from 84 inches below the stack (fig.3). It was done this way, because the stack thermocouple interfered with the last 2 points on the second and third traverse. All field data was transferred to the computer printout. All calculations were done by the computer and the emissions were ompared to SDAPCD rules.

ANALYSES:

Gas: A CEM analysis was performed by SCEC.

ticulate: All procedures follow EPA guidelines, except where noted in the SDAPCD QA manual.

EQUIPMENT:

All testing and analysis equipment was calibrated according to EPA guidelines and performed by SCEC.

SCEC

FACSIMILE TRANSMISSION

DATE: 7/30/92

TO: SOAQMD Qavia Shiva

COMPANY:

TRANSMITTING TO TELECOPY #: (619) 694-2730

FROM: RUSS LOGAN

TELEPHONE #: (714) 282-8240

TELECOPY #: (714) 282-8247

REGARDING: SOx Equation

TOTAL NUMBER OF PAGES INCLUDING COVER SHEET: 3

If there is a transmission problem, please call ASAP

TRANSMISSION SENT FROM:

SCEC
1582-1 N. Batavia Street
Orange, CA 92667
(714) 282-8240
FAX (714) 282-8247

COMMENTS:

Qavia, I hope this helps! I'll be in the office all day Thursday & then Friday afternoon. Thanks Russ

MESSAGE # 2666

P.O.#880614 TEST #92098.1

CALCULATIONS:

TEMPERATURES:

01)	ts = (Σ ts(n))/total n's		1311 °F
02)	Ts = ts+460		1771 °R
03)	tm= (Σ {(t 1(n)+t 2t(n))/2)/total n's=(t1+t2)/2		81 °F
04)	Tm= (t1+t2)/2 + 460		541 °R
05)	ti= (Σ ti(n))/total n's		68 °F
06)	Tstd		528 °R

PRESSURES:

07)	Pbar= {(P @ S.L.)+[ft. above S.L.*(-0.1 in Hg/100ft)]}		29.85 in Hg
08)	Pg= read from pressure sensing device		0.00 in H2O
09)	Ps= Pbar + (Pg/13.6)		29.85 in Hg
10)	ΔH		0.79 in H20
11)	Pm= Pbar+(ΔH/13.6)		29.91 in Hg
12)	Pstd		29.92 in Hg

VOLUME:

13)	Vm= Vm(end)-Vm(begin)		30.054 ft^3
14)	Y		0.9766
15)	Vm'= Vm*Y		29.351 ft^3
16)	Vpw @ ti = from appendix		N/A in Hg
17)	corr Vwm = {[(Vm'*Vpw@imp/Ps)*Pm*Tstd]/(Tm*Pstd)}		0.0000 ft^3
18)	Vm std = {[Vm'*(Tstd/Tm)*(Pm/Pstd)]-corr Vwm}		28.647 ft^3
19)	Vlc= (Σ Volume of impingers)		55.50 ml
20)	∂		0.002010 lb/ml
21)	R		21.85 in Hg-ft^3/°R-lb-mo
22)	MwH2O		18.00 g/g-mo
23)	Vw std = {[(Vlc*∂*R*Tstd)/(Pstd*MwH2O)}+corr Vwm}		2.6196 ft^3

MOISTURE:

24)	Bws(1) =(Vw std)/(Vw std+Vm std)100	8.38 %	
25)	Vpw @ ts = from appendix	29.92 in Hg	
26)	Bws(2) =[(Vpw @ ts)/Ps]*100	100.23 %	
27)	Bws = lower value of equation 24 or 26		8.38 %

MOLECULAR WEIGHT:

28)	%O2	11.43 %
29)	%CO2	8.04 %
30)	%N2+inerts+%CO	80.53 %
31)	Md=[0.440(%CO2)]+[0.320*(%O2)]+[0.280(%N2+inerts+%CO)]	29.74 g/g*mole
32)	Ms=Md*(1-Bws)+18.0*(Bws)	28.76 g/g*mole

FLOW:

33)	ΔP	0.0412 in H2O
34)	Cp	0.840
35)	vs= 85.49*Cp*{[(Ts*ΔP)/(Ps*Ms)]^.5}	20.941 ft/sec
36)	As=3.14*[(Ds)^2/4]	12.250 ft^2
37)	Qs = (vs)*As*60	15392 acfm
38)	Qstd =17.64*Qs*(1-Bws)*Ps/Ts	4192 dscfm

EMISSIONS:

FRONT HALF

39)	mn (front)	0.01090 g
40)	Cs (front) =15.43*mn(front)/Vm std	0.00587 grains/dscf
41)	Cs(12%,front)=(12/%CO2)*Cs(front)	0.00876 grains/dscf
42)	E (front) = (0.00857)*(Qstd)*Cs (front)	0.21 lbs/hr

BACK HALF

43)	mn (back)	0.00117 g
44)	Cs (back) =15.43*mn(back)/Vm std	0.00063 grains/dscf
45)	Cs(12%,back)=(12/%CO2)*Cs(back)	0.00094 grains/dscf
46)	E (back) = (0.00857)*(Qstd)*Cs (back)	0.02 lbs/hr

TOTAL

47)	mn (total) = mn(front)+mn(back)	0.01207 g
48)	Cs (total) =15.43*mn(total)/Vm std	0.00650 grains/dscf
49)	Cs(12%,total)=(12/%CO2)*Cs(total)	0.00970 grains/dscf
50)	E (total) = (0.00857)*(Qstd)*Cs (total)	0.23 lbs/hr
51)	E.A. =[(%O2-.5(%CO)*100]/[0.264(%N2)-(%O2)-0.5(%CO)]	116.28 %

ISOKINETICS:

52)	Dn=		0.485 in
53)	An=3.14*[(Dn)^2/4]		0.1847 in^2
54)	I=.09450(Ts*Vm std)/Ps*VsAnØ(1-Bws)	108.77 % =	109 %

Bell Jr. High Landfill flare on 4/7/92

P.O.#880614 TEST #92098.1

FIELD DATA & DATA SUMMARY:

Trav. Pt	Vm (ft^3)	ΔP	ΔH	Stack Temp	Box Temp	Imp Temp	t 1 (in)	t 2 (out)	velocity
	487.162	(in H2O)	(in H20)	(°F)	(°F)	(°F)	(°F)	(°F)	(ft/sec)
1		0.030	0.540	1303		68	75.00	73.00	017.82
2		0.050	0.900	1307		68	78.00	76.00	023.04
3		0.030	0.530	1331		68	79.00	77.00	017.97
4		0.020	0.360	1313		68	83.00	85.00	014.59
5		0.040	0.720	1312		68	82.00	81.00	020.63
6		0.030	0.540	1325		68	84.00	82.00	017.94
7		0.100	1.820	1311		68	84.00	83.00	032.62
8	517.216	0.050	0.920	1289		68	86.00	84.00	022.92

	Vm	ΔP	ΔH	ts	tbox	ti	t 1 (in)	t 2 (out)	vs
Average:	30.054	0.041	0.791	1311	not done	68	81.38	80.13	20.94

METER BOX PARAMETERS:

Box ID = NUTECH
ΔH@ =
Y = 0.9766

NOZZLE & PROBE:

Dn = 0.485 in
An = 0.1847 in^2
Cp = 0.840

MISCELLANEOUS:

Maximum vacuum = 5.0 in. Hg.
Circular stack (Y/N) = NO
Silica gel (Y/N) = YES

VOLUME:

start leak rate = 0.000 cfm
Pass/Fail PASS
final leak rate = 0.000 cfm
Pass/Fail PASS
Vm 30.054 ft^3

PRESSURES:

Pbar= 29.85 in Hg
Pg= 0.00 in H2O
Vpw @ ts= 29.9200 in Hg
Vpw @ ti= N/A in Hg

LABORATORY DATA:

mn(front) = 0.01090 g
mn(back) = 0.00117 g
mn(total)= 0.01207 g
Vlc 55.50 ml
CO2 = 8.04 %
O2 = 11.43 %
CO = 0.00 %
N2 = 80.53 %

STACK PARAMETERS:

Width = 3.50 ft
Length = 3.50 ft
As = 12.250 ft^2

TIME:

Ø = 60.0 min
tn = 8 points
ø = 7.5 min/pt

TEMPERATURES:

t1= 81.38 °F
t2= 80.13 °F
tm= 80.75 °F
ti= 68 °F
tbox= not done °F
ts= 1311 °F

CONTRACTOR TEST REPORT

Bell Jr. High (Run #1) on 4/7/92

.O. #:880614 TEST#: 92098.1

SAN DIEGO AIR POLLUTION CONTROL DISTRICT, 9150 CHESAPEAKE DRIVE, SAN DIEGO, CA 92123

PARTICULATE TEST LABORATORY ANALYSIS DATA SHEET

TEST SITE: Bell Jr. High
620 South Briarwood Road
Paradise Hills, CA

TEST WITNESS - RUN #1

TEST #: 92098.1 P.O.#: 880614 TEST DATE: 4/7/92

LAB ANALYSIS BY: Russ Logan (of SCEC) DATE: 4/21/92

LAB REPORT BY: Russ Logan (of SCEC) DATE: 5/14/92

REVIEWED BY: David Shina (of SDAPCD) DATE: 6/17/92

(1) IMPINGER VOLUMES

	FINAL WGT.		INIT WGT.		NET WGT.
#1	572.70 g	-	545.90 g	=	26.80 g
#2	486.80 g	-	481.80 g	=	5.00 g
#3	579.70 g	-	566.80 g	=	12.90 g
#4	476.30 g	-	476.80 g	=	-0.50 g
#5	787.20 g	-	775.90 g	=	11.30 g

Was silica gel used (Y/N) ?= y

Total impinger charge= 0 ml

Total weight collected= 55.50 g

Total volume collected,Vlc= 55.50 ml

(2) BLANKS

A	B	C	D	E	F	G	STANDARDS H	I	J	K	L
LOCATION	SOLVENT	ID	END WGT g	INIT WGT g	NET WGT. (E-F) g	RINSES ml	g/ml (G/D)	% (H*100)	ppm (H*10^6)	PASS FAIL	LIMITS
BLANK	ACETONE	E9	99.63435	99.63420	0.00015	100.00	0.0000015	0.0001500	1.50	P	0.0010%=10ppm
BLANK	WATER	E14	96.75430	96.75430	0.00000	100.00	0.0000000	0.0000000	0.00	P	0.0004%=4ppm

(3) WEIGHTS & RINSES

a	b	c	d	e	f	g	h	i	j	k
LOCATION	SOLVENT	ID	END WGT g	INIT. WGT g	NET WGT. (e-f) g	RINSES ml	SOLV. WGT (g*H) g	WGT (corr) (f-h) g	ALIQUOTS g	Totals (ΣSubtotals(i+j)) g
FRONT	ACETONE									
FRONT	WATER									
FRONT	TOTAL	E7	99.50250	99.49420	0.00830	**50	0.000075	0.008225	0.00208	
FRONT	FILTER	F5	0.52620	0.52560	0.00060	N/A	N/A	0.000600	N/A	
FRONT							Subtotals (Σcolumn)=	0.00882	0.00208	0.01090 g
BACK	ACETONE									
BACK	WATER									
BACK	TOTAL	E5	95.42080	95.42000	0.00080	***0.00	0.000000	0.000800	0.00037	
BACK	FILTER	N/A								
BACK							Subtotals (Σcolumn)=	0.00080	0.00037	0.00117 g
TOTAL							Totals =(Σsubtotals= Σcolumn k(front & back)=			0.01207 g

SCEC did not charge the impingers with water, because they were analyzing for SOx and needed a different charge. This was acceptable to the District.

SCEC used only 50 mls of acetone for the FRONT half rinses. The water blank is 0 ppm, so there will be no SOLV. WGT. value.

SCEC did not wash out the BACK half with acetone, so the SOLV. WGT. contribution will be zero

COMPANY: BELL JR. HIGH
DATE: 4-7-92
UNIT: FLARE
REPORT #:T1482-2

RUN #1
@ 68'F
EPA METHOD 5/8

PARTICULATE RESULTS:	net mg	gr/dscf	gr/scf	gr/dscf @ 12% CO2	lbs/hr
Probe & Nozzle:	10.38	0.005581	0.005114	0.008330	0.2
Filter:	0.6	0.000322	0.000295	0.000481	0.01
Condensables:	1.173333	0.000630	0.000578	0.000941	0.02
Total:	12.15333	0.006534	0.005988	0.009753	0.23

N BaCl = 0.00971

SULFATE RESULTS:	Vol aliq	Vt	gr/dscf	gr/scf	gr/dscf @ 12% CO2	lbs/hr
Probe & Nozzle:	25	0.2	0.001266	0.001160	0.001889	0.05
Filter:	10	0	0	0	0	0
Condensables:	22	0.1	0.000557	0.000510	0.000831	0.02
Total:			0.001823	0.001670	0.002721	0.07

ADDITIONAL DATA:

TIME start	TIME finish	%O2	%CO2	%H2O	Vm(std)	SDCFM
1030	1130	11.43	8.04	8.36	28.64	4174

SAN DIEGO AIR POLLUTION CONTROL DISTRICT
MONITORING AND TECHNICAL SERVICES
9150 CHESAPEAKE DRIVE
SAN DIEGO, CA 92123

NITROGEN OXIDES, CARBON MONOXIDE, PARTICULATE, AND SULFUR EMISSIONS SUMMARY REPORT

SITE: Bell Jr. High School

P/O NUMBER: 56896 and 59383 JOB NO: T1482-2

TEST DATE: 4/7/92

EQUIPMENT: Bell Jr. High Landfill Gas Collection and Incineration System

REPORT BY: R.P. Logan - SCEC DATE: 5/14/92

APCD PERSONNEL: Janet Cawyer/David Shina

SITE PERSONNEL: Bob Hanley/Bob Hobbs

APPROVED BY: DATE: 10/12/92

SOUTH COAST ENVIRONMENTAL COMPANY

PLANT Flare @ Bell Jr. High TEST TYPE Method 5/8 FIELD TEST DATA SHEET

Date 4/7/92 Barometric Pressure 29.85

Test Location Bell @ Outlet Static In. wg. 0.0

Run Number #[redacted] 1 Probe Type/Length 6' H_2O

Stack Diameter 42x42 Pitot Coefficient 0.84

Operator TJE Meter Box No. MJ Tech

Filter No. [redacted] F5 Nozzle No./Size .485

Start: 10:30

Impinger Volumes/Heights			
Contents	Final	Initial	Net
IPA	572.7	545.9	26.80
KO	486.8	481.8	5.00
H_2O_2	577.7	565.8	12.90
KO	476.3	476.8	-0.5
Silicabel	787.2	775.9	11.30
		Total	55.50

Gas Composition			
Time	CO_2	O_2	CO
	8.04	11.43	

Leak Rate	cfm	"Hg
Initial	0.00	20"
Final	0.00	15"

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
~~Point~~													
1	0:00	.03	.54	487.162	1303			·	75	73	5		
2	7:30	.05	.90	490.42	1307				78	76	5		
3	15:00	.03	.53	494.38	1331				79	77	5		
4 ~~#2~~	22:30	.02	.36	497.35	1313				83	85	5		V_m = 30.05
1	30:00	.04	0.72	500.00	1312			·	82	81	5		ΔP = 0.041
2	37:30	.03	0.54	503.81	1325				84	82	5		ΔH = 0.791
3	45:00	.00	1.01	507.003	1311				84	83	5		T_s = 1,311.4°F
4	52:30	.05	0.92	511.48	1289				86	84	5		T_m = 80.8°F
	1.0			517.216									Duration = 60 min

Client: [illegible]

Analyst: [illegible]

Report #: T-1452-2

Site: [illegible]

Test Date: 4-7-92

Run No: 1

GRAVIMETRIC ANALYSIS

Fraction: Probes and Nozzle Washings [illegible]

REF: ST17

Date: / Time: #1	Date: / Time: #2	Date: / Time: #3	AVERAGE
Final: 98.5025	98.5024	98.5025	[illegible] grms.
Tare:			98.[illegible] grms.
		NET:	[illegible] mg.

Fraction: Filter

Filter No: F5

Date: 4/21/92 Time: 1200 #1	Date: 4/21/92 Time: 1800 #2	Date: / Time: #3	AVERAGE
Final: 0.[illegible]	0.5262		0.5262 grms.
Tare:			0.5256 grms.
		NET:	[illegible] mg.

Fraction: Condensables

Aliquot: [illegible]

Total Sample: [illegible]

Date: / Time: #1	Date: / Time: #2	Date: / Time: #3	AVERAGE
Final: 95.[illegible]07	95.[illegible]209		95.[illegible] grms.
Tare:			95.[illegible]200 grms.
		NET:	[illegible] mg.
		TOTAL:	[illegible] mg.

Fraction: Condensable Organics

Date: / Time: #1	Date: / Time: #2	Date: / Time: #3	AVERAGE
Final:			grms.
Tare:			grms.
		NET:	mg.

Bell Jr. High Landfill flare on 4/7/92

P.O.#880614 TEST #92098.2

FIELD DATA & DATA SUMMARY:

Trav. Pt	Vm (ft^3)	ΔP	ΔH	Stack Temp	Box Temp	Imp Temp	t 1 (in)	t 2 (out)	velocity
	517.487	(in H2O)	(in H2O)	(°F)	(°F)	(°F)	(°F)	(°F)	(ft/sec)
1		0.030	0.550	1283		68	81.00	81.00	017.89
2		0.030	0.540	1318		68	83.00	82.00	018.01
3		0.030	0.540	1328		68	82.00	82.00	018.07
4		0.030	0.540	1321		68	82.00	82.00	018.03
5		0.050	0.920	1303		68	88.00	86.00	023.16
6	537.478	0.050	0.910	1332		68	90.00	87.00	023.35

	Vm	ΔP	ΔH	ts	tbox	ti	t 1 (in)	t 2 (out)	vs
Average:	19.991	0.036	0.667	1316	not done	68	84.33	83.33	19.75

METER BOX PARAMETERS:

Box ID = NUTECH
ΔH@ =
Y = 0.9766

NOZZLE & PROBE:

Dn = 0.485 in
An = 0.1847 in^2
Cp = 0.840

MISCELLANEOUS:

Maximum vacuum = 5.0 in. Hg.
Circular stack (Y/N) = NO
Silica gel (Y/N) = YES

VOLUME:

start leak rate = 0.000 cfm
Pass/Fail PASS
final leak rate = 0.000 cfm
Pass/Fail PASS
Vm 19.991 ft^3

PRESSURES:

Pbar= 29.85 in Hg
Pg= 0.00 in H2O
Vpw @ ts= .29.92 in Hg
Vpw @ ti= in Hg

LABORATORY DATA:

mn(front) = 0.00120 g
mn(back) = 0.01452 g
mn(total)= 0.01572 g
Vlc 49.60 ml
CO2 = 7.47 %
O2 = 12.11 %
CO = 0.00 %
N2 = 80.42 %

STACK PARAMETERS:

Width = 3.50 ft
Length = 3.50 ft
As = 12.250 ft^2

TIME:

Ø = 40 min
tn = 6 points
ø = 6.7 min/pt

TEMPERATURES:

t1= 84.33 °F
t2= 83.33 °F
tm= 83.83 °F
ti= 68 °F
tbox= not done °F
ts= 1316 °F

SAN DIEGO AIR POLLUTION CONTROL DISTRICT, 9150 CHESAPEAKE DRIVE, SAN DIEGO, CA. 92123

SOURCE TEST OF PARTICULATE EMISSIONS TO THE ATMOSPHERE

TEST SITE: Bell Junior High Landfill Flare
620 South Briarwood Road
Paradise Hills, CA

TEST WITNESS - RUN #2

TEST #: 92098.2 P.O.# 880614 TEST DATE: 4/7/92

Type of plant (Asphalt /Perlite / Combustion): COMBUSTION

UNIT TESTED: INCINERATOR

EQUIPMENT: LANDFILL FLARE

TESTED BY:	Russ Logan & Ted Jackman of SCEC	DATE: 4/7/92
SITE PERSONNEL:	Bob Hanley	DATE: 4/7/92
APCD ENGINEER:	Archi de la Cruz	DATE: 4/7/92
LAB ANALYSIS BY:	SCEC	DATE: 4/21/92
REPORT BY:	SCEC (Russ Logan)	DATE: 5/14/92
REVIEWED BY:	David N. Shina	DATE: 6/17/92
APPROVED BY:		DATE:

ROBERT YELENOSKY, SENIOR AIR POLLUTION CHEMIST

This report has been reviewed and found to be representative of the testing that was performed.

SDAPCD RULES

TEST	LIMIT	MEASURED	PASS/FAIL
.ULE 53 SPECIFIC CONT.	0.10 gr/dscf	0.02428 gr/dscf	NON-EXCEEDANCE

..ST RESULTS SUMMARY:

ITEM	I	Cs(12%)	E
UNITS	%	gr/dscf	lbs/hr
VALUE	118	0.02428	0.42

ENGINEERING SUMMARY

Qstd	TYPE OF FUEL	LOAD	RATE
dscfm		Tons/Hr	Tons
3831			

TEST PARAMETERS:

SYSTEM DESCRIPTION:

Landfill gas is allowed to accumulate in the wells and piping of a flare system. Every 12 hours the incinerator ignites its flare to destroy by combustion, the accumulated landfill gases. The flare is at the bottom of the incinerator stack. The sampling points are near the top of the stack. The particulate emissions from this process are the subject of the report.

PROCEDURES:

The procedures and equipment utilized in these tests are based on EPA New Source Performance guidelines and from EPA CFR 40, Standards Method 5. The sampling train utilized a front-end filter.

CALCULATIONS

All calculations are based on the EPA CFR 40 Standards Method 5, July 1, 1991, Parts 53-60, Appendix A.

PARTICULATE SAMPLING:

The test consisted of sampling at 8 traverse points, 4 from 1 sampling port (fig.2) and 2 from 2 sample ports, collected from 84 inches below the stack (fig.3). It was done this way, because the stack thermocouple interfered with the last 2 points on the second and third traverse. All field data was transferred to the computer printout. All calculations were done by the computer and the emissions were compared to SDAPCD rules.

WALYSES:

Gas: A CEM analysis was performed by SCEC.

ticulate: All procedures follow EPA guidelines, except where noted in the SDAPCD QA manual.

EQUIPMENT:

All testing and analysis equipment was calibrated according to EPA guidelines and performed by SCEC.

Bell Jr. High (Run #2) on 4/7/92 .O. #:880614 TEST#: 92098.2

SAN DIEGO AIR POLLUTION CONTROL DISTRICT, 9150 CHESAPEAKE DRIVE, SAN DIEGO, CA 92123

PARTICULATE TEST LABORATORY ANALYSIS DATA SHEET

TEST SITE: Bell Jr. High
620 South Briarwood Road
Paradise Hills, CA

TEST WITNESS - RUN #2

TEST #: 92098.2 P.O.#: 880614 TEST DATE: 4/7/92

LAB ANALYSIS BY: Russ Logan (of SCEC) DATE: 4/21/92

LAB REPORT BY: Russ Logan (of SCEC) DATE: 5/14/92

REVIEWED BY: David Shina (of SDAPCD) DATE: 6/17/92

(1) IMPINGER VOLUMES

	FINAL WGT.		INIT WGT.		NET WGT.
#1	546.30 g	-	524.10 g	=	22.20 g
#2	489.90 g	-	486.80 g	=	3.10 g
#3	577.50 g	-	565.60 g	=	11.90 g
#4	478.00 g	-	476.30 g	=	1.70 g
#5	749.80 g	-	739.10 g	=	10.70 g

Was silica gel used (Y/N) ?= y

Total impinger charge= *0 ml

Total weight collected= 49.60 g

Total volume collected, Vlc= 49.60 ml

(2) BLANKS

A	B	C	D	E	F	G	STANDARDS H	I	J	K	L
LOCATION	SOLVENT	ID	END WGT g	INIT WGT g	NET WGT. (E-F) g	RINSES ml	g/ml (G/D)	% (H*100)	ppm (H*10^6)	PASS FAIL	LIMITS
BLANK	ACETONE	E9	99.63435	99.63420	0.00015	100.00	0.0000015	0.0001500	1.50	P	0.0010%=10ppm
BLANK	WATER	E14	96.75430	96.75430	0.00000	100.00	0.0000000	0.0000000	0.00	P	0.0004%=4ppm

(3) WEIGHTS & RINSES

a	b	c	d	e	f	g	h	i	j	k
LOCATION	SOLVENT	ID	END WGT g	INIT. WGT g	NET WGT. (e-f) g	RINSES ml	SOLV. WGT (g*H) g	WGT (corr) (f-h) g	ALIQUOTS g	Totals (ΣSubtotals(i+j)) g
FRONT	ACETONE									
FRONT	WATER									
FRONT	TOTAL	**E12	96.81510	96.81540	0.00000	***50	0.000075	N/A	N/A	
FRONT	FILTER	F6	0.52790	0.52670	0.00120	N/A	N/A	0.001200	N/A	
FRONT							Subtotals (Σcolumn)=	0.00120	N/A	0.00120 g
BACK	ACETONE									
BACK	WATER									
BACK	TOTAL	E3	101.93670	101.93010	0.00660	****0.00	0.000000	0.006600	0.00792	
BACK	FILTER	N/A								
BACK							Subtotals (Σcolumn)=	0.00660	0.00792	0.01452 g
TOTAL							Totals =(Σsubtotals= Σcolumn k(front & back))=			0.01572 g

* SCEC did not charge the impingers with water, because they were analyzing for SOx and needed a different charge. This was acceptable to the District.

* For the FRONT HALF totals, SCEC did NOT allow the beakers to come to a constant weight and they took an incorrect ɔrage weight. To get a weight, I took the last recorded weight and deemed it the "official average" weight.

** SCEC used only 50 mls of acetone for the FRONT half rinses. The waterblank is 0 ppm, so there will be no SOLV. WGT. value.

**** SCEC did not wash out the BACK half with acetone, so the SOLV. WGT. contribution will be zero

CALCULATIONS:

TEMPERATURES:			
01)	ts = (Σ ts(n))/total n's		1316 °F
02)	Ts = ts+460		1776 °R
03)	tm= (Σ {(t 1(n)+t 2t(n))/2}/total n's=(t1+t2)/2		84 °F
04)	Tm= (t1+t2)/2 + 460		544 °R
05)	ti= (Σ ti(n))/total n's		68 °F
06)	Tstd		528 °R
PRESSURES:			
07)	Pbar= {(P @ S.L.)+[ft. above S.L.*(-0.1 in Hg/100ft)]}		29.85 in Hg
08)	Pg= read from pressure sensing device		0.00 in H2O
09)	Ps= Pbar + (Pg/13.6)		29.85 in Hg
10)	ΔH		0.67 in H20
11)	Pm= Pbar+(ΔH/13.6)		29.90 in Hg
12)	Pstd		29.92 in Hg
VOLUME:			
13)	Vm= Vm(end)-Vm(begin)		19.991 ft^3
14)	Y		0.9766
15)	Vm'= Vm*Y		19.523 ft^3
16)	Vpw @ ti = from appendix		N/A in Hg
17)	corr Vwm = {[(Vm'*Vpw@imp/Ps)*Pm*Tstd]/(Tm*Pstd)}		0.0000 ft^3
18)	Vm std = {[Vm'*(Tstd/Tm)*(Pm/Pstd)]-corr Vwm}		18.942 ft^3
19)	Vlc= (Σ Volume of impingers)		49.60 ml
20)	∂		0.002010 lb/ml
21)	R		21.85 in Hg-ft^3/°R-lb-mo
22)	MwH2O		18.00 g/g-mo
23)	Vw std = {[(Vlc*∂*R*Tstd)/(Pstd*MwH2O)}+corr Vwm}		2.3411 ft^3
MOISTURE:			
24)	Bws(1) =(Vw std)/(Vw std+Vm std)100	11.00 %	
25)	Vpw @ ts = from appendix	29.92 in Hg	
26)	Bws(2) =[(Vpw @ ts)/Ps]*100	100.23 %	
27)	Bws = lower value of equation 24 or 26		11.00 %
MOLECULAR WEIGHT:			
28)	%O2		12.11 %
29)	%CO2		7.47 %
30)	%N2+inerts+%CO		80.42 %
31)	Md=[0.440(%CO2)]+[0.320*(%O2)]+[0.280(%N2+inerts+%CO)]		29.68 g/g*mole
32)	Ms=Md*(1-Bws)+18.0*(Bws)		28.39 g/g*mole
FLOW:			
33)	ΔP		0.0361 in H2O
34)	Cp		0.840
35)	vs= 85.49*Cp*{[(Ts*ΔP)/(Ps*Ms)]^.5}		19.751 ft/sec
36)	As=3.14*[(Ds)^2/4]		12.250 ft^2
37)	Qs = (vs)*As*60		14517 acfm
38)	Qstd =17.64*Qs*(1-Bws)*Ps/Ts		3831 dscfm
EMISSIONS:			
FRONT HALF			
39)	mn (front)		0.00120 g
40)	Cs (front) =15.43*mn(front)/Vm std		0.00098 grains/dscf
41)	Cs(12%,front)=(12/%CO2)*Cs(front)		0.00157 grains/dscf
42)	E (front) = (0.00857)*(Qstd)*Cs (front)		0.03 lbs/hr
BACK HALF			
43)	mn (back)		0.01452 g
44)	Cs (back) =15.43*mn(back)/Vm std		0.01183 grains/dscf
45)	Cs(12%,back)=(12/%CO2)*Cs(back)		0.01900 grains/dscf
46)	E (back) = (0.00857)*(Qstd)*Cs (back)		0.39 lbs/hr
TOTAL			
47)	mn (total) = mn(front)+mn(back)		0.01572 g
48)	Cs (total) =15.43*mn(total)/Vm std		0.01281 grains/dscf
49)	Cs(12%,total)=(12/%CO2)*Cs(total)		0.02057 grains/dscf
50)	E (total) = (0.00857)*(Qstd)*Cs (total)		0.42 lbs/hr
51)	E.A. =[(%O2-.5(%CO)*100]/[0.264(%N2)-(%O2)-0.5(%CO)]		132.77 %
ISOKINETICS:			
52)	Dn=		0.485 in
53)	An=3.14*[(Dn)^2/4]		0.1847 in^2
54)	I=.09450(Ts*Vm std)/Ps*VsAnØ(1-Bws)	118.05 % =	118 %
CORRECTION FOR NON-ISOKINETIC CONDITIONS:			
	Cs(12%,total)--corrected={Cs(12%,total)*(I/100)		0.02428 grains/dscf
	E (total)--corrected=(0.00857)*(Qstd)*{Cs (total)--corrected}		0.42 lbs/hr

SAN DIEGO AIR POLLUTION CONTROL DISTRICT
MONITORING AND TECHNICAL SERVICES
9150 CHESAPEAKE DRIVE
SAN DIEGO, CA 92123

NITROGEN OXIDES, CARBON MONOXIDE, PARTICULATE, AND SULFUR EMISSIONS SUMMARY REPORT

SITE: Bell Jr. High School

P/O NUMBER: 56896 and 59383 JOB NO: T1482-2

TEST DATE: 4/7/92

EQUIPMENT: Bell Jr. High Landfill Gas Collection and Incineration System

REPORT BY: R.P. Logan - SCEC DATE: 5/14/92

APCD PERSONNEL: Janet Cawyer/David Shina

SITE PERSONNEL: Bob Hanley/Bob Hobbs

APPROVED BY: Judith A Kalk DATE: 10/6/92

CONTRACTOR TEST REPORT

Client: [illegible]

Report #: 7-1482-2

Test Date: 4-7-92

Analyst: _____

Site: [illegible]

Run No: 2

GRAVIMETRIC ANALYSIS

Fraction: Probes and Nozzle Washings REF: ST17

Date: Time: #1	Date: Time: #2	Date: Time: #3	AVERAGE
Final: 96.8156	96.8173	96.8151	96.8154 grms.
Tare:			96.8 [illegible] grms.
		NET:	mg.

Fraction: Filter Filter No: F6

Date: 4/21/92 Time: 12[illegible] #1	Date: 4/22/92 Time: 1000 #2	Date: Time: #3	AVERAGE
Final: 0.5279	0.5280		0.5279 grms.
Tare:			0.5252 grms.
		NET:	— mg.

Fraction: Condensables Aliquot: 100 Total Sample: 230

Date: Time: #1	Date: Time: #2	Date: Time: #3	AVERAGE
Final: 101.9369	101.9365		101.9367 grms.
Tare:			101.9301 grms.
		NET:	mg.
		TOTAL:	[illegible] mg.

Fraction: Condensable Organics

Date: Time: #1	Date: Time: #2	Date: Time: #3	AVERAGE
Final:			grms.
Tare:			grms.
		NET:	mg.

COMPANY: BELL JR. HIGH
DATE: 4-7-92
UNIT: FLARE
REPORT #:T1482-2

RUN #2
@ 68'F
EPA METHOD 5/8

PARTICULATE RESULTS:	net mg	gr/dscf	gr/scf	gr/dscf @ 12% CO2	lbs/hr
Probe & Nozzle:	0	0	0	0	0
Filter:	1.2	0.000975	0.000868	0.001567	0.03
Condensables:	14.52	0.011806	0.010510	0.018965	0.39
Total:	15.72	0.012781	0.011379	0.020533	0.42

N BaCl = 0.00971

SULFATE RESULTS:	Vol aliq	Vt	gr/dscf	gr/scf	gr/dscf @ 12% CO2	lbs/hr
Probe & Nozzle:	13	0.05	0.000248	0.000221	0.000399	0.01
Filter:	10	0	0	0	0	0
Condensables:	22	0.1	0.000842	0.000749	0.001353	0.03
Total:			0.001091	0.000971	0.001753	0.04

ADDITIONAL DATA:

TIME start	TIME finish	%O2	%CO2	%H2O	Vm(std)	SDCFM
1220	1302	12.11	7.47	10.97	18.94	3834

SAN DIEGO AIR POLLUTION CONTROL DISTRICT, 9150 CHESAPEAKE DRIVE, SAN DIEGO, CA. 92123 P.O.#880614 TEST #92098.3

SOURCE TEST OF PARTICULATE EMISSIONS TO THE ATMOSPHERE

TEST SITE: Bell Junior High Landfill Flare
620 South Briarwood Road
Paradise Hills, CA

TEST WITNESS - RUN #3

TEST #: 92098.3 P.O.# 880614 TEST DATE: 4/7/92

Type of plant (Asphalt /Perlite / Combustion): COMBUSTION

UNIT TESTED: INCINERATOR

EQUIPMENT: LANDFILL FLARE

TESTED BY: Russ Logan & Ted Jackman of SCEC DATE: 4/7/92
SITE PERSONNEL: Bob Hanley DATE: 4/7/92
APCD ENGINEER: Archi de la Cruz DATE: 4/7/92
LAB ANALYSIS BY: SCEC DATE: 4/21/92
REPORT BY: SCEC (Russ Logan) DATE: 5/14/92
REVIEWED BY: David N. Shina DATE: 6/17/92
APPROVED BY: DATE:

ROBERT YELENOSKY, SENIOR AIR POLLUTION CHEMIST
This report has been reviewed and found to be representative of the testing that was performed.

SDAPCD RULES

TEST	LIMIT	MEASURED	PASS/FAIL
RULE 53 SPECIFIC CONT.	0.10 gr/dscf	0.009 gr/dscf	NON-EXCEEDANCE

ST RESULTS SUMMARY:

ITEM	I	Cs(12%)	E
UNITS	%	gr/dscf	lbs/hr
VALUE	104	0.0092	0.20

ENGINEERING SUMMARY

Qstd	TYPE OF FUEL	LOAD	RATE
dscfm		Tons/Hr	Tons
4478			

TEST PARAMETERS:

SYSTEM DESCRIPTION:
Landfill gas is allowed to accumulate in the wells and piping of a flare system. Every 12 hours the incinerator ignites its flare to destroy by combustion, the accumulated landfill gases. The flare is at the bottom of the incinerator stack. The sampling points are near the top of the stack. The particulate emissions from this process are the subject of the report.

PROCEDURES:
The procedures and equipment utilized in these tests are based on EPA New Source Performance guidelines and from EPA CFR 40, Standards Method 5. The sampling train utilized a front-end filter.

CALCULATIONS
All calculations are based on the EPA CFR 40 Standards Method 5, July 1, 1991, Parts 53-60, Appendix A.

PARTICULATE SAMPLING:
The test consisted of sampling at 8 traverse points, 4 from 1 sampling port (fig.2) and 2 from 2 sample ports, collected from 84 inches below the stack (fig.3). It was done this way, because the stack thermocouple interfered with the last 2 points on the second and third traverse. All field data was transferred to the computer printout. All calculations were done by the computer and the emissions were compared to SDAPCD rules.

ANALYSES:
Gas: A CEM analysis was performed by SCEC.
ticulate: All procedures follow EPA guidelines, except where noted in the SDAPCD QA manual.

QUIPMENT:
All testing and analysis equipment was calibrated according to EPA guidelines and performed by SCEC.

SOUTH COAST ENVIRONMENTAL COMPANY

PLANT Flare Exhaust TEST TY. CARB Method 5/8 FIELD TEST DATA SHEET

Date 4-7-92
Test Location Bell JR. HGH
Run Number #2A
Stack Diameter 42x42
Operator TJS
Filter No. F6

Barometric Pressure
Static in. wg. +0.0
Probe Type/Length 6' H2O
Pitot Coefficient 0.84
Meter Box No. NuTech
Nozzle No./Size .485
Start 12:20

Impinger Volumes/Weights			
Contents	Final	Initial	Net
80% IPA	546.3	524.1	22.20
K.O.	489.9	486.8	3.10
3% H_2O_2	577.5	565.6	11.90
K.O.	478.0	476.3	1.70
Silica Gel	749.8	739.1	10.70
		Total	49.60

Gas Composition			
Time	CO_2	O_2	CO
	7.47	12.11	

Leak Rate	cfm	"Hg
Initial	0.00	22"
Final	[redacted]	

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
Dut #1													
1	0:00	.03	0.55	517.487	1293			•	81	81			
2	5:00	.03	0.54	520.13	1318				83	82			
3	10:00	.03	0.54	521.90	1328				82	82			
4	15-	.03	0.54	523.83	1321				82	82			
Nut #2													
1	20-	.05	0.92	526.730	1303			•	88	86			
2	30-	.05	0.91	532.20	1332				90	87			
	40-			537.478									

V_m = 19.991
ΔP = 0.036
ΔH = 0.667
T_s = 1315.8 °F
T_m = 83.8
Duration 40 min

CALCULATIONS:

TEMPERATURES:

01)	ts = (Σ ts(n))/total n's	1321 °F
02)	Ts = ts+460	1781 °R
03)	tm= (Σ {(t 1(n)+t 2t(n))/2}/total n's=(t1+t2)/2	76 °F
04)	Tm= (t1+t2)/2 + 460	536 °R
05)	ti= (Σ ti(n))/total n's	68 °F
06)	Tstd	528 °R

PRESSURES:

07)	Pbar= {(P @ S.L.)+[ft. above S.L.*(-0.1 in Hg/100ft)]}	29.85 in Hg
08)	Pg= read from pressure sensing device	0.00 in H2O
09)	Ps= Pbar + (Pg/13.6)	29.85 in Hg
10)	ΔH	0.87 in H20
11)	Pm= Pbar+(ΔH/13.6)	29.91 in Hg
12)	Pstd	29.92 in Hg

VOLUME:

13)	Vm= Vm(end)-Vm(begin)	30.755 ft^3
14)	Y	0.9766
15)	Vm'= Vm*Y	30.035 ft^3
16)	Vpw @ ti = from appendix	N/A in Hg
17)	corr Vwm = {[(Vm'*Vpw@imp/Ps)*Pm*Tstd]/(Tm*Pstd)}	0.0000 ft^3
18)	Vm std = {[Vm'*(Tstd/Tm)*(Pm/Pstd)]-corr Vwm}	29.578 ft^3
19)	Vlc= (Σ Volume of impingers)	71.70 ml
20)	∂	0.002010 lb/ml
21)	R	21.85 in Hg-ft^3/°R-lb-mo
22)	MwH2O	18.00 g/g-mo
23)	Vw std = {[(Vlc*∂*R*Tstd)/(Pstd*MwH2O)}+corr Vwm}	3.3842 ft^3

MOISTURE:

24)	Bws(1) =(Vw std)/(Vw std+Vm std)100	10.27 %	
25)	Vpw @ ts = from appendix	29.92 in Hg	
26)	Bws(2) =[(Vpw @ ts)/Ps]*100	100.23 %	
27)	Bws = lower value of equation 24 or 26		10.27 %

MOLECULAR WEIGHT:

28)	%O2	12.33 %
29)	%CO2	6.90 %
30)	%N2+inerts+%CO	80.77 %
31)	Md=[0.440(%CO2)]+[0.320*(%O2)]+[0.280(%N2+inerts+%CO)]	29.60 g/g*mole
32)	Ms=Md*(1-Bws)+18.0*(Bws)	28.41 g/g*mole

FLOW:

33)	ΔP	0.0487 in H2O
34)	Cp	0.840
35)	vs= 85.49*Cp*{[(Ts*ΔP)/(Ps*Ms)]^.5}	22.963 ft/sec
36)	As=3.14*[(Ds)^2/4]	12.250 ft^2
37)	Qs = (vs)*As*60	16878 acfm
38)	Qstd =17.64*Qs*(1-Bws)*Ps/Ts	4478 dscfm

EMISSIONS:

FRONT HALF

39)	mn (front)	0.00044 g
40)	Cs (front) =15.43*mn(front)/Vm std	0.00023 grains/dscf
41)	Cs(12%,front)=(12/%CO2)*Cs(front)	0.00040 grains/dscf
42)	E (front) = (0.00857)*(Qstd)*Cs (front)	0.01 lbs/hr

BACK HALF

43)	mn (back)	0.00974 g
44)	Cs (back) =15.43*mn(back)/Vm std	0.00508 grains/dscf
45)	Cs(12%,back)=(12/%CO2)*Cs(back)	0.00884 grains/dscf
46)	E (back) = (0.00857)*(Qstd)*Cs (back)	0.20 lbs/hr

TOTAL

47)	mn (total) = mn(front)+mn(back)	0.01018 g
48)	Cs (total) =15.43*mn(total)/Vm std	0.00531 grains/dscf
49)	Cs(12%,total)=(12/%CO2)*Cs(total)	0.00924 grains/dscf
50)	E (total) = (0.00857)*(Qstd)*Cs (total)	0.20 lbs/hr
51)	E.A. =[(%O2-.5(%CO)*100]/[0.264(%N2)-(%O2)-0.5(%CO)]	137.10 %

ISOKINETICS:

52)	Dn=		0.488 in
53)	An=3.14*[(Dn)^2/4]		0.1870 in^2
54)	I=.09450(Ts*Vm std)/Ps*VsAnØ(1-Bws)	103.84 % =	104 %

Bell Jr. High Landfill flare on 4/7/92 P.O.#880614 TEST #92098.3

FIELD DATA & DATA SUMMARY:

Trav. Pt	Vm (ft^3)	ΔP	ΔH	Stack Temp	Box Temp	Imp Temp	t 1 (in)	t 2 (out)	velocity
	537.875	(in H2O)	(in H20)	(°F)	(°F)	(°F)	(°F)	(°F)	(ft/sec)
1		0.050	0.900	1316		68	77.00	77.00	023.24
2		0.050	0.890	1335		68	77.00	77.00	023.36
3		0.050	0.880	1335		68	76.00	76.00	023.36
4		0.050	0.880	1343		68	76.00	77.00	023.42
5		0.040	0.710	1320		68	76.00	76.00	020.81
6		0.050	0.890	1320		68	77.00	76.00	023.27
7		0.050	0.900	1307		68	75.00	75.00	023.18
8	568.630	0.050	0.910	1290		68	75.00	75.00	023.07

	Vm	ΔP	ΔH	ts	tbox	ti	t 1 (in)	t 2 (out)	vs
Average:	30.755	0.049	0.870	1321	not done	68	76.00	76.13	22.96

METER BOX PARAMETERS:
Box ID = NUTECH
ΔH@ =
Y = 0.9766

NOZZLE & PROBE:
Dn = 0.488 in
An = 0.1870 in^2
Cp = 0.840

MISCELLANEOUS:
Maximum vacuum = 5.0 in. Hg.
Circular stack (Y/N) = NO
Silica gel (Y/N) = YES

VOLUME:
start leak rate = 0.000 cfm
Pass/Fail = PASS
final leak rate = 0.000 cfm
Pass/Fail = PASS
Vm = 30.755 ft^3

PRESSURES:
Pbar= 29.85 in Hg
Pg= 0.00 in H2O
Vpw @ ts= 29.92 in Hg
Vpw @ ti= in Hg

LABORATORY DATA:
mn(front) = 0.00044 g CO2 = 6.90 %
mn(back) = 0.00974 g O2 = 12.33 %
mn(total)= 0.01018 g CO = 0.00 %
Vlc 71.70 ml N2 = 80.77 %

STACK PARAMETERS:
Width = 3.50 ft
Length = 3.50 ft
As = 12.250 ft^2

TIME:
Ø = 60 min
tn = 8 points
ø = 7.5 min/pt

TEMPERATURES:
t1= 76.00 °F ti= 68 °F
t2= 76.13 °F tbox= not done °F
tm= 76.06 °F ts= 1321 °F

CONTRACTOR TEST REPORT

Bell Jr. High (Run #3) on 4/7/92 .O. #:880614 TEST#: 92098.3

SAN DIEGO AIR POLLUTION CONTROL DISTRICT, 9150 CHESAPEAKE DRIVE, SAN DIEGO, CA 92123

PARTICULATE TEST LABORATORY ANALYSIS DATA SHEET

TEST SITE: Bell Jr. High
620 South Briarwood Road
Paradise Hills, CA

TEST WITNESS - RUN #3

TEST #: 92098.3 P.O.#: 880614 TEST DATE: 4/7/92

LAB ANALYSIS BY: Russ Logan (of SCEC) DATE: 4/21/92

LAB REPORT BY: Russ Logan (of SCEC) DATE: 5/14/92

REVIEWED BY: David Shina (of SDAPCD) DATE: 6/17/92

(1) IMPINGER VOLUMES

	FINAL WGT.		INIT WGT.		NET WGT.
#1	591.90 g	-	547.10 g	=	44.80 g
#2	491.70 g	-	489.90 g	=	1.80 g
#3	566.50 g	-	553.60 g	=	12.90 g
#4	478.90 g	-	478.00 g	=	0.90 g
#5	760.40 g	-	749.10 g	=	11.30 g

Was silica gel used (Y/N) ?= y

Total impinger charge= *0 ml

Total weight collected= 71.70 g

Total volume collected,Vlc= 71.70 ml

(2) BLANKS

A	B	C	D	E	F	G	STANDARDS H	I	J	K	L
LOCATION	SOLVENT	ID	END WGT g	INIT WGT g	NET WGT. (E-F) g	RINSES ml	g/ml (G/D)	% (H*100)	ppm (H*10^6)	PASS FAIL	LIMITS
BLANK	ACETONE	E9	99.63435	99.63420	0.00015	100.00	0.0000015	0.0001500	1.50	P	0.0010%=10ppm
BLANK	WATER	E14	96.75430	96.75430	0.00000	100.00	0.0000000	0.0000000	0.00	P	0.0004%=4ppm

(3) WEIGHTS & RINSES

a	b	c	d	e	f	g	h	i	j	k
LOCATION	SOLVENT	ID	END WGT g	INIT. WGT g	NET WGT. (e-f) g	RINSES ml	SOLV. WGT (g*H) g	WGT (corr) (f-h) g	ALIQUOTS g	Totals (ΣSubtotals(i+j)) g
FRONT	ACETONE									
FRONT	WATER									
FRONT	TOTAL	E6	101.33585	101.33560	0.00025	**50	0.000075	0.000175	0.00016	
FRONT	FILTER	F4	0.49280	0.49270	0.00010	N/A	N/A	0.000100	N/A	
FRONT							Subtotals (Σcolumn)=	0.00027	0.00016	0.00044 g
BACK	ACETONE									
BACK	WATER									
BACK	TOTAL	E5***	95.42560	95.42080	0.00480	0.00	0.000000	0.004800	0.00494	
BACK	FILTER	N/A								
BACK							Subtotals (Σcolumn)=	0.00480	0.00494	0.00974 g
TOTAL							Totals =(Σsubtotals= Σcolumn k(front & back))=			0.01018 g

* SCEC did not charge the impingers with water, because they were analyzing for SOx and needed a different charge. This was acceptable to the District.

** SCEC used only 50 mls of acetone for the FRONT half rinses. The water blank is 0 ppm, so there will be no SOLV. WGT. value.

*** (1) SCEC did not wash out the BACK half with acetone, so the SOLV. WGT. contribution will be zero.

(2) For the BACK HALF-END WGT,SCEC did NOT allow the beakers to come to a constant weight and they took an incorrec average weight. To get a weight, I took the last recorded weight and deemed it the "official average" weight.

(3) For the BACK HALF-INIT. WGTof Run #3, SCEC used the BACK HALF-END WGT. of Bell Jr. High Lab Run #1. They used the same beaker for 2 different laboratory analyses.

(4) SCEC used an incorrect value for the NET WGT.

COMPANY: BELL JR. HIGH
DATE: 4-7-92
UNIT: FLARE
REPORT #:T1482-2

RUN #3
@ 68'F
EPA METHOD 5/8

PARTICULATE RESULTS:	net mg	gr/dscf	gr/scf	gr/dscf @ 12% CO2	lbs/hr
Probe & Nozzle:	0.33	0.000171	0.000154	0.000298	0.01
Filter:	0.1	0.000052	0.000046	0.000090	0
Condensables:	13.804	0.007184	0.006448	0.012494	0.28
Total:	14.234	0.007408	0.006649	0.012883	0.29

N BaCl = 0.00971

SULFATE RESULTS:	Vol aliq	Vt	gr/dscf	gr/scf	gr/dscf @ 12% CO2	lbs/hr
Probe & Nozzle:	16.5	0.1	0.000404	0.000362	0.000703	0.02
Filter:	10	0	0	0	0	0
Condensables:	20.3	0.24	0.001194	0.001071	0.002076	0.05
Total:			0.001598	0.001434	0.002780	0.07

ADDITIONAL DATA:

TIME start	TIME finish	%O2	%CO2	%H2O	Vm(std)	SDCFM
1445	1555	12.33	6.9	10.24	29.59	4497

SAN DIEGO AIR POLLUTION CONTROL DISTRICT
MONITORING AND TECHNICAL SERVICES
9150 CHESAPEAKE DRIVE
SAN DIEGO, CA 92123

NITROGEN OXIDES, CARBON MONOXIDE, PARTICULATE, AND SULFUR EMISSIONS SUMMARY REPORT

SITE: Bell Jr. High School

P/O NUMBER: 56896 and 59383 JOB NO: T1482-2

TEST DATE: 4/7/92

EQUIPMENT: Bell Jr. High Landfill Gas Collection and Incineration System

REPORT BY: R.P. Logan - SCEC DATE: 5/14/92

APCD PERSONNEL: Janet Cawyer/David Shina

SITE PERSONNEL: Bob Hanley/Bob Hobbs

APPROVED BY: DATE: 10/12/92

EVAPORATION DISH TARE WEIGHTS

used new anti-static gloves!

D/T T/RH BP	~~4/8~~/92 1600	4/11/92 1240	4/12/92 1110	
DISH #	TARE 1	TARE 2	TARE 3	AVERAGE
E 1				
E 2	97.2815	97.2817	97.2817	97.2816
E 3	101.9300	101.9300	101.9302	101.9301
E 4	99.8116	99.~~8116~~ 8115	99.8112	99.8114
E 5	95.4200	95.4202	95.4~~200~~ 199	95.4200
E 6	101.3355	101.3356	101.3356	101.3356
E 7	98.4943	98.4942	98.4941	98.4942
E 8				
E 9	99.6342	weight # 4 97.6342 ~~99.6336~~ ?	99.6341	99.6342
E 10	Henkel finals			
E 11				
E 12	96.8153	96.8155	96.8155	96.8154
E 13	Henkel			
E 14	96.7543	96.7543		96.7543
E 15	Henkel	final weights		
~~E 16~~				
E 17	95.8822	95.8824	95.8824	95.8824
E 18	96.3234	96.3234	96.3231	96.3233
E 19	Henkel final			
E 20	99.0757	99.0758	99.0757	99.0757
E 21				
~~E 22~~				

→ broken, opps!

07/08/92 14:10

MTS

SCEC

FACSIMILE TRANSMISSION

DATE: 7-8-92

TO: David SHIWa

COMPANY: SDAPCD

TRANSMITTING TO TELECOPY #: (619) 694-2730

FROM: RUSS LOGAN

TELEPHONE #: (714) 282-8240

TELECOPY #: (714) 282-8247

REGARDING: TARE Weights

TOTAL NUMBER OF PAGES INCLUDING COVER SHEET: 2

If there is a transmission problem, please call ASAP

TRANSMISSION SENT FROM: SCEC
1582-1 N. Batavia Street
Orange, CA 92667
(714) 282-8240
FAX (714) 282-8247

COMMENTS:

David,
Here's the Tare Weights sheet.
Russ

MESSAGE # 2613

SOUTH COAST ENVIRONMENTAL COMPANY

PLANT Flare Exhaust TEST TYPE CARB Method 5/8 FIELD TEST DATA SHEET

Date 4-7-92
Test Location Bell JR. #464
Run Number #3
Stack Diameter 42x42
Operator TSE
Filter No.

Barometric Pressure 29.85
Static in. wg. 0.00
Probe Type/Length 6' H&O
Pitot Coefficient 0.84
Meter Box No. Nu Tech
Nozzle No./Size .488

START: 14:45

Impinger Volumes/Weights			
Contents	Final	Initial	Net
IPA 80%	591.9	547.1	44.80
H.O.	491.7	489.9	1.80
Hyflo 3%	566.5	553.6	12.90
H.O.	478.9	478.0	0.90
Silicagel	760.4	749.1	11.30
		Total	71.70

Gas Composition			
Time	CO_2	O_2	CO
	6.9	12.33	

Leak Rate	cfm	"Hg
Initial	0.00	20"
Final	0.00	15"

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
~~Port #1~~													
1	0:00	.05	.90	537.875	1316				77	77			
2	5:00	.05	.89	540.61	1335				77	77			
3	10:00	.05	.88	543.00	1335				75	76			
4	15-	.05	.88	545.81	1343				76	77			
~~Port #2~~													
1	20-	.04	.71	548.105	1320				76	76			
2	30-	.05	.89	553.24	1326				77	76			
3	40-	.05	.90	558.51	1307				75	75			
4	50-	.05	.91	563.54	1290				75	75			
	60-	.05	.90	568.63	1288				75	75			

$\sqrt{\Delta P}_m = 30.755$

$\Delta P = 0.049$

$\Delta H = 0.873$

$T_s = 1317.1$ {+46.17

$T_m = 75.9$

Duration = 60 min

Client: [illegible] Analyst: _____

Report #: T-1432-2 Site: [illegible]

Test Date: 4.7.92 Run No: 3

GRAVIMETRIC ANALYSIS

Fraction: Probes and Nozzle Washings [illegible] REF: ST17

Date: Time: #1	Date: Time: #2	Date: Time: #3	AVERAGE
Final: [illegible]	[illegible]		grms.
Tare:			101.2256 grms.
		NET:	mg.

Fraction: Filter Filter No: F4

Date: 4/[illegible]/92 Time: 1200 #1	Date: 4/[illegible]/92 Time: 1600 #2	Date: Time: #3	AVERAGE
Final: 0.4925	0.4920		0.4928 grms.
Tare:			0.1923 grms.
		NET:	mg.

Fraction: Condensables Aliquot: 100 Total Sample: [illegible]

Date: Time: #1	Date: Time: #2	Date: Time: #3	AVERAGE
Final: 95.4300	[illegible]	[illegible]	grms.
Tare:			95.4328 grms.
		NET:	[illegible] mg.
		TOTAL:	mg.

(Trey use E5 before)

Fraction: Condensable Organics

Date: Time: #1	Date: Time: #2	Date: Time: #3	AVERAGE
Final:			grms.
Tare:			grms.
		NET:	mg.

EVAPORATION DISH TARE WEIGHTS

Used new anti-static gloves!

D/T T/RH BP	~~4/8~~/92 1400	4/4/92 1260	4/12/92 1110	
DISH #	TARE 1	TARE 2	TARE 3	AVERAGE
~~E 1~~				
E 2	97.2815	97.2817	97.2817	97.2816
E 3	101.9300	101.9300	101.9302	101.9301
E 4	99.8116	99.~~8116~~ 8115	99.8112	99.8114
E 5	95.4200	95.4202	95.4~~7~~ 199	95.4200
E 6	101.3355	101.3356	101.3356	101.3356
E 7	98.4943	98.4942	98.4941	98.4942
E 8				
E 9	99.6342	weight 44 99.6342 ~~99.6356~~ ?	99.6341	99.6342
E 10	Herkel finals			
E 11				
E 12	96.8153	96.8155	96.8155	96.8154
E 13	Herkel			
E 14	96.7543	96.7543		96.7543
E 15	Herkel	final weights		
~~E 16~~				
E 17	95.8822	95.8824	95.8824	95.8824
E 18	96.3234	96.3234	96.3231	96.3233
E 19	Herkel final			
E 20	99.0757	99.0758	99.0757	99.0757
E 21				
~~E 22~~				

→ broken, opps!

MTS

SCEC

FACSIMILE TRANSMISSION

DATE: 7-8-92

TO: David SHIWa

COMPANY: SDAPCD

TRANSMITTING TO TELECOPY #: (619) 694-2730

FROM: RUSS LOGAN

TELEPHONE #: (714) 282-8240

TELECOPY #: (714) 282-8247

REGARDING: TARE Weights

TOTAL NUMBER OF PAGES INCLUDING COVER SHEET: 2

If there is a transmission problem, please call ASAP

TRANSMISSION SENT FROM: SCEC
1582-1 N. Batavia Street
Orange, CA 92667
(714) 282-8240
FAX (714) 282-8247

COMMENTS:

David,
Here's the Tare Weights sheet.
Russ

MESSAGE # 2613

NOMENCLATURE

symbol	units	explanation	equation
	A		
An	in^2	nozzle area	π/4((Dn)^2)
As	ft^2	stack area	π/4((Ds)^2) or LxW
	B		
Bws(1)	%	fractional stack gas moisture-equ 1	((Vw std)/(Vw std+Vm std))100
Bws(2)	%	fractional stack gas moisture-equ 2	((Vpw @ ts)/Ps)100
Bws	%	water vapor in the gas stream	lower of Bws(1) and Bws(2)
	C		
CO	%	carbon monoxide	read from measuring device(0 for Asphalt plants)
CO2	%	carbon dioxide	read from measuring device
Corr Vwm	ft^3	correction for Vw w/o silica gel	((Vm*(Vpw@ti)/Ps)*Pm*Tstd)/ (Tm*Pstd)
Cp	none	pitot tube correction factor	see EPA method 3
Cs(front)	gr/dscf	concentration of particulate in stack gas, corrected to STP-for front	(15.43*mn(front))/(Vm std)
Cs(back)	gr/dscf	concentration of particulate in stack gas, corrected to STP-for back	(15.43*mn(back))/(Vm std)
Cs(total)	gr/dscf	concentration of particulate in stack gas, corrected to STP-for total	(15.43*mn(total))/(Vm std)
Cs12(front, back,total)		same as Cs(front,back,total) except-corrected for grain loading at 12% CO2	(12/%CO2)*(15.43*mn(fr, back,total))/(Vm std)
	D		
∂ (density)	lb/ml	density of water at STP	0.002201 (see CRC)
Ds	in or ft	stack diameter	measure at site
Dn	in	nozzle diameter	avg of at least three measurements
	E		
E.A.	%	Excess air (for combustion)	((%O2-.5%CO)*100)/ (.264*%N2-%O2-.5*%CO)
E(front)	lbs/hr	part. emissions rate-front	(0.00857)(Qsd*Cs(front))
E(back)	lbs/hr	part. emissions rate-back	(0.00857)(Qsd*Cs(back))
E(total)	lbs/hr	part. emissions rate-total	(0.00857)(Qsd*Cs(total))
	H		
ΔH	in H2O	average differential pressure across the orifice meter	avg of the readings from the pressure measuring device
ΔH@	none	orifice pressure differential at STP	see EPA Method 5 Appendix
	I		
I	%	Isokinetics	[0.09450*Ts*Vm std]/ [Ps*vs*Θ*(An/144)*(1-(Bws/100))]
	M		
Md	g/g-mole	dry stack gas molecular wgt	0.44(%CO2)+0.320(%O2)+0.280 (%N2+inerts+CO)
mn(back)	g	particulate in impingers	measurement from lab analysis
mn(front)	g	particulate in nozzle & probe	measurement from lab analysis
mn(total)	g	total particulate collected	measurement from lab analysis
Ms	g/g-mole	wet stack gas molecular wgt	Md(1-Bws)+18.0(Bws)
MW CO2	g/mole	mo. wgt of carbon dioxide	44 (see periodic table)
MW N2	g/mole	mo. wgt of nitrogen	28 (see periodic table)
MW O2	g/mole	mo. wgt of oxygen	32 (see periodic table)
MW H2O	g/mole	mo. wgt of water	18 (see periodic table)
	N		
N2	%	percent nitrogen	100-(%CO2+%O2+%CO+inerts)
	O		
O2	%	percent oxygen	read from measuring device

NOMENCLATURE (cont.)

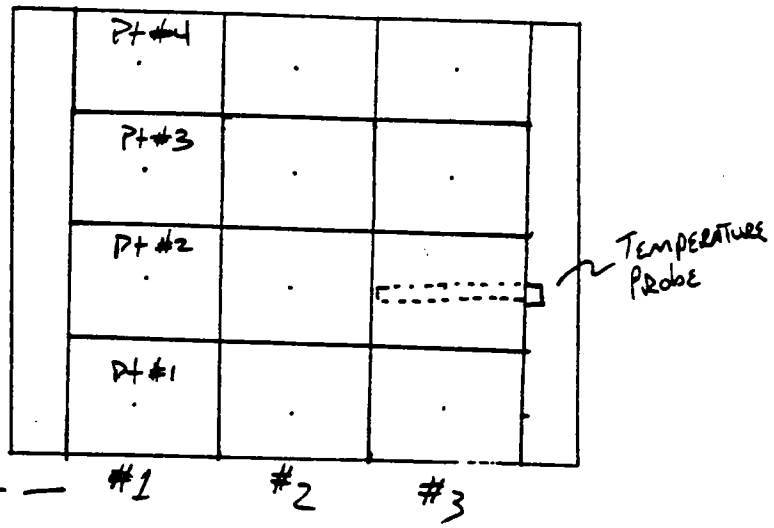
ver. 3 by DNS on 9/10/91

SCEC
1582-1 N. BATAVIA
ORANGE, CA 92667

FILE REF: ST12

SAMPLE POINT LOCATION DATA SHEET

FACILITY: Bell JR. High
PROJECT #: T1482-1
DATE: 4-7-92
STACK DIMENSIONS: L= 42
W= 42
H=
UPSTREAM DIST./
EQUIVALENT DIAMETERS 5
DOWNSTREAM DIST./
EQUIVALENT DIAMETERS 2
NO. OF SAMPLING POINTS
SAMPLING PORT DIMENSIONS:
DIA.= 3
PROTRUSION DIST.= 3"



SAMPLE POINT Each Port	% OF STACK DIAMETER	DISTANCE FROM STACK WALL (IN.)	DISTANCE FROM SAMPLE PORT (IN.)
#1		36.75	39.75
#2		26.25	29.25
#3		15.75	18.75
#4		5.25	8.25

1582-1 N. Batavia
Orange, CA 92667
714-282-8210
714-282-8211 Fax

NOx and CO Analysis

OFFICIAL TEST RESULTS:

GAS	TEST (PPM)	LIMITS (PPM)	PERFORMANCE EXCEEDANCE/NON-EXCEEDANCE
NOx	18.98	N/A	N/A
CO	0.00	N/A	N/A

TEST PARAMETERS:

PROCEDURES & CALCULATIONS:

All the procedures, calculations, and equipment utilized in these tests are based on EPA NSPS guidelines and from the EPA CFR 40, July 1, 1991, parts 53-60, Method 20, except where noted in the SDAPCD QA manual for Method 20 testing.

SAMPLING & EQUIPMENT:

SCEC provided all the sampling and analysis equipment, and they were responsible for all the calibrations according to EPA guidelines.

OVERVIEW OF THE TEST:

(1) SCEC did not perform the NO2 converter equation correctly. The District corrected for this.
(2) SCEC did not subtract [NO] from [NOx].

RUN #1: *ACCEPTED* **RUN #2:** *ACCEPTED* **RUN #3:** *ACCEPTED*

SUMMARY OF ALL 3 TESTS:

	NOx		CO	
	SCEC	APCD	SCEC	APCD
RUN 1	20.00	20.04	0.00	0.00
RUN 2	18.89	18.90	0.00	0.00
RUN 3	17.97	18.00	0.00	0.00
AVERAGE	18.95	18.98	0.00	0.00

Client: SOAPCO-Bell Jr. High

Analyst: KS

Report #: T1482-2

Test Date: 4/27/92

TITRIMETRIC ANALYSIS

Sample I.D./Run #	Total Sample (mls)	Aliquot mls	Normality	Titrant mls
Filter # 3	100 mls. IPA	10	0.009710	0
Filter #2	100 mls IPA	10	0.009710	0
Filter #1	100 mls IPA	10	0.009710	0

COMMENTS:

CONTRACTOR TEST REPORT

COMPANY: BELL JR. HIGH SCHOOL
DATE: MARCH 31, 1992
UNIT: FLARE
REPORT #:T 1482-1

NO2 - NOx ADJUSTMENTS

RUN #	NOX	NO ppm	NO2 ppm	% Recovery	NOx ADJUSTED VALUES	
					NO2 ppm	NOX ppm
#1	10.5	9.75	0.75	90.2	0.83	10.58
#2	9.2	8.5	0.7	90.2	0.78	9.28
#3	8.58	8.25	0.33	90.2	0.37	8.62
				AVERAGE	0.66	9.49

P/O NUMBER: 56896 and 59383 DATE: 4/7/92

Table 2. Stack Emissions of NO_x, CO, and O_2

RUN	SCALE / TIME	NO_x 0-100 PPM CHART (div)	NO_x UNCORR (ppm)	NO_x CORR 3%O_2 (ppm)	CO 0-500 PPM CHART (div)	CO UNCORR (ppm)	CO CORR 3% O_2 (ppm)	O_2 0-25% CHART (div)	O_2 %
R1 Avg.	12:45 13:25	4.23	10.58	20.04	0.0	0.0	0.0	45.7	11.45
PK1									
PK2									
R2 Avg.	13:30 14:10	3.71	9.28	18.90	0.0	0.0	0.0	48.5	12.11
PK1									
PK2									
R3 Avg.	14:10 14:50	3.45	8.62	18.00	0.0	0.0	0.0	49.3	12.33
PK1									
PK2									
Peak =									
Overall =		3.80	9.49	18.78	0.0	0.0	0.0	47.8	11.96

NO_x and CO:

- The value reported is the average concentration value at 3% O_2, when:
  The average pollutant concentration exceeds the permit limit, or the average value is within the permit limit and there are less than two excursions above the limit.

- The value reported is the highest excursion value at 3% O_2, when: There are two or more excursions above the permit limit during the three subtests.

- If it has been determined that stratification exists, the average concentration values of NO_x and CO, at 3% O_2, are then reported.

Table 3. Calibration Gases

	CYLINDER	MANUFACTURER	CONCENTRATION (ppm)
NO_x	CC7297	Scott Marrin	214.2
CO	CC67219	Scott Marrin	476
O_2	CC106786	Scott Marrin	8.40%
NO_2	CC648	Scott Marrin	176.0

SAN DIEGO AIR POLLUTION CONTROL DISTRICT
MONITORING AND TECHNICAL SERVICES
9150 CHESAPEAKE DRIVE
SAN DIEGO, CA 92123

NITROGEN OXIDES, CARBON MONOXIDE, PARTICULATE, AND SULFUR EMISSIONS SUMMARY REPORT

SITE: Bell Jr. High School

P/O NUMBER: 56896 and 59383 JOB NO: T1482-2

TEST DATE: 4/7/92

EQUIPMENT: Bell Jr. High Landfill Gas Collection and Incineration System

REPORT BY: R.P. Logan - SCEC DATE: 5/14/92

APCD PERSONNEL: Janet Cawyer/David Shina

SITE PERSONNEL: Bob Hanley/Bob Hobbs

APPROVED BY: _____ DATE: _____

Table 1. Summary of Results - average NO_x and CO stack emissions corrected to 3% O_2

	TEST (ppm)	PERMIT LIMITS (ppm)	PERFORMANCE	HOURS OF TEST
NO_x	18.98	N/A	N/A	1.9
CO	0.00	N/A	N/A	1.9

* Particulate and sulfur results can be found on Page 4.

TEST REFERENCE: This testing was performed in accordance with the San Diego Air Pollution Control District Method 20: "Test Procedures For The Determination of Nitrogen Oxides, Carbon Monoxide and Diluent Gases by Continuous Emission Monitoring"

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

REPORT OF ANALYSIS
EPA PROTOCOL GAS MIXTURES

SOCE01

TO:

KEITH SHANNON
SCEC
15882-1 NORTH BATAVIA
ORANGE, CA 92667-

DATE : 03/02/92

CUSTOMER ORDER NUMBER: 446

COMPONENT	CONCENTRATION(v/v)	REFERENCE STANDARD	ANALYZER MAKE,MODEL,S/N,DETECTION	EXPIRATION DATE	REPLICATE ANALYSIS DATA
CYLINDER NO.:	CC29002				
Carbon Dioxide	12.16 ± 0.12 %	GMIS Cylinder # CC68263 @ 17.61 #	Varian Model 1868 S/N None Thermal Conductivity Gas Chromatography Last Cal Date: 12/06/91	08/26/93	02/26/92 12.23 % 11.99 % 12.25 % Mean: 12.16 %
Oxygen	4.08 ± 0.04 %	GMIS Cylinder # CC81219 @ 5.18 #	Varian Model 1868 S/N None Thermal Conductivity Gas Chromatography Last Cal Date: 12/30/91	08/25/93	02/25/92 4.09 % 4.08 % 4.08 % Mean: 4.08 %
Nitrogen	Balance				
Cylinder Pressure: 2000 psig					
CYLINDER NO.:	CC106786				
Oxygen	8.40 ± 0.08 %	GMIS Cylinder # CC62358 @ 7.37 #	Varian Model 1868 S/N None Thermal Conductivity Gas Chromatography Last Cal Date: 8/25/92	08/25/93	02/25/92 8.42 % 8.38 % 8.40 % Mean: 8.40 %
Carbon Dioxide	13.47 ± 0.13 %	GMIS Cylinder # CC68263 @ 17.61 #	Varian Model 1868 S/N None Thermal Conductivity Gas Chromatography Last Cal Date: 12/06/91	08/26/93	02/26/92 13.42 % 13.46 % 13.53 % Mean: 13.47 %
Nitrogen	Balance				
Cylinder Pressure: 2000 psig					

ppm = umole/mole % = mole-%

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

Analyst: M.S. Calhoun

Approved: J.T. Marrin

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

STANDARD CALIBRATION GASES IN ALUMINUM CYLINDERS

P/O NUMBER: 56896 and 59383 DATE: 4/7/92

ANALYZER CHECK LIST

	YES	NO	COMMENTS
NO_x Analyzer			
analyzer calibrated	X		
analyzer set to zero	X		
zero drift < or = 2% of span	X		
reset zero		X	
span drift < or = 2%	X		
reset span		X	
response time within limits	X		
CO Analyzer			
analyzer calibrated	X		
analyzer set to zero	X		
zero drift < or = 2% of span	X		
reset zero		X	
span drift < or = 2%	X		
reset span		X	
O_2 Analyzer			
high calibration set to 20.95%	X		
low cal. set to exhaust gas		X	Set @ 8.4% Gas
zero drift < or = 2% of span	X		
reset zero		X	
span drift < or = 2%	X		
reset span		X	
System Integrity/Leak Check			
pre-testing: performed w/NO/NO_2	X		
post testing: performed w/NO/NO_2	X		
System Assembly			
probe installed	X		
moisture removal trap used	X		
particulate filter used	X		
sample manifold pressure set	X		
Data Recording			
annotated	X		
electronic zero set on each pen	X		
chart speed set	X		
convertor efficiency: NO_2 to NO	X		
certificates of cal. gases	X		

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

RECEIVED SEP

REPORT OF ANALYSIS
EPA PROTOCOL GAS MIXTURES

SOCE01
TO: RUSS LOGAN
SOUTH COAST ENVIRONMENTAL CORP
1915 MCKINLEY AVE.
SUITE E
LAVERNE, CA 91750

DATE : 08/30/91

CUSTOMER ORDER NUMBER: 343

COMPONENT	CONCENTRATION(v/v)	REFERENCE STANDARD	ANALYZER MAKE,MODEL,S/N,DETECTION	EXPIRATION DATE	REPLICATE ANALYSIS DATA	
CYLINDER NO.:	CC67219					
Carbon Monoxide	476 ± 5 ppm	GMIS Cylinder # CC28362 @ 496 ppm	Carle Instm Model 8000 S/N 8249 Methanation/FID Gas Chromatography Last Cal Date: 07/19/91	02/29/93	07/28/89	08/29/91
					475 ppm	475 ppm
Nitrogen	Balance				473 ppm	477 ppm
Cylinder Pressure: 2000 psig					473 ppm	481 ppm
					Mean: 474 ppm	478 ppm

ppm = umole/mole % = mole-%

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

Analyst: Mark Monson
M.J. Monson

Approved:
J.T. Marrin

STANDARD CALIBRATION GASES

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

RECEIVED

REPORT OF ANALYSIS
EPA PROTOCOL GAS MIXTURES

SOCE01

TO:
KEITH SHANNON
SOUTH COAST ENVIRONMENTAL CORP
1915 MCKINLEY AVE., ST. E
LA VERNE, CA 91750

DATE : 05/14/91

CUSTOMER ORDER NUMBER: 294

COMPONENT	CONCENTRATION(v/v)	REFERENCE STANDARD	ANALYZER MAKE,MODEL,S/N,DETECTION	EXPIRATION DATE	REPLICATE ANALYSIS DATA
CYLINDER NO.:	CC7297				
Nitric Oxide	214.2 ± 2.1 ppm	GMIS Cylinder # CC7341 @ 247.6 ppm	Monitor Labs Model 8440 S/N 136 Continuous Chemiluminescence Last Cal Date: 05/01/91	11/14/92	05/06/91: 213.2 ppm, 214.9 ppm, 213.3 ppm; Mean: 213.8 ppm 05/14/91: 215.8 ppm, 214.4 ppm, 214.5 ppm; Mean: 214.6 ppm
Nitrogen,O2-Free Balance					
Cylinder Pressure: 2000 psig					

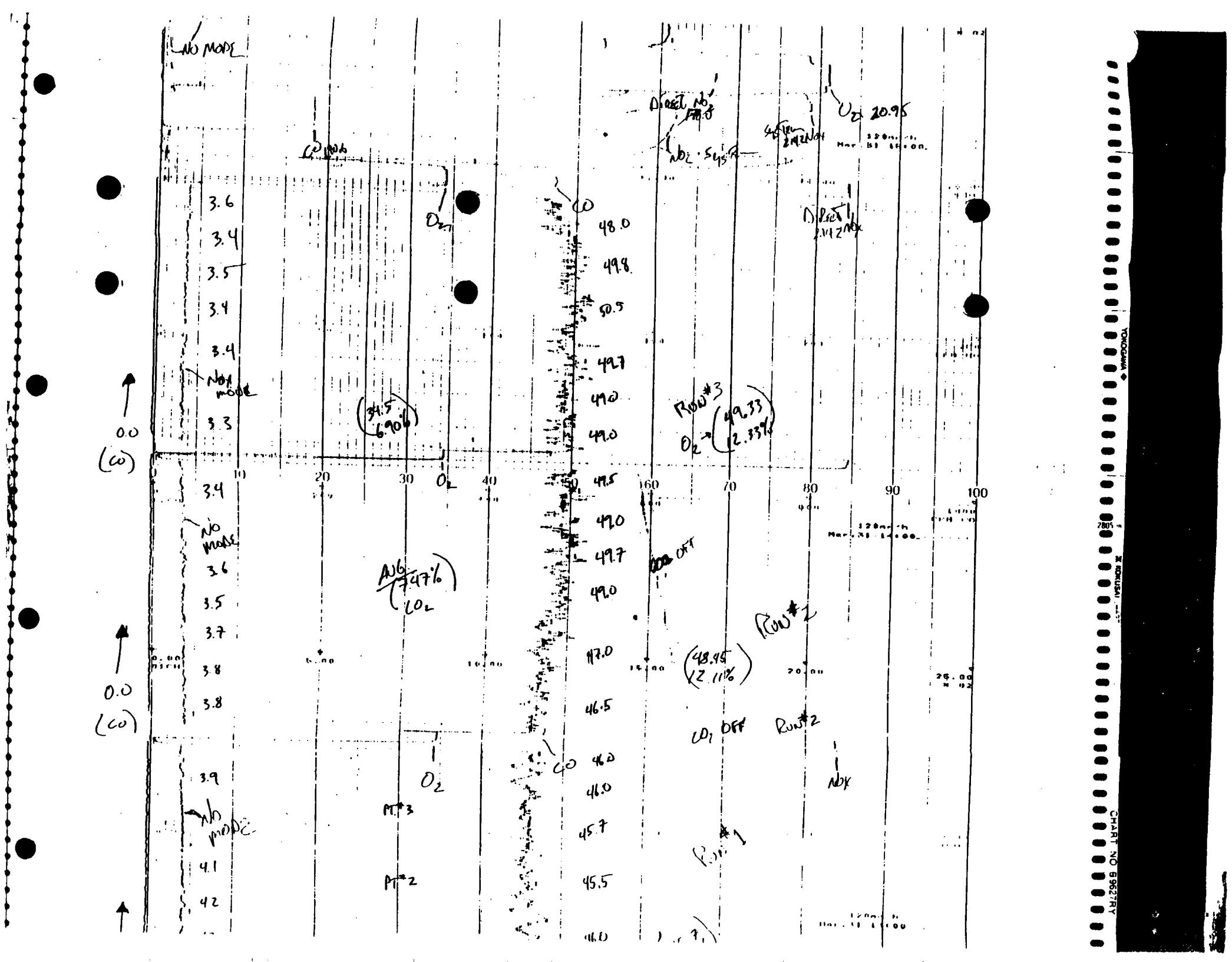
ppm = umole/mole % = mole-%

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

Analyst: B.E. Gross Approved: J.T. Marrin

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

STANDARD CALIBRATION GASES


NO MODE
CO MODE
O2
Direct NO
NO2 SW
20.95
3.6
3.4
3.5
3.4
3.4
NOx mode
3.3
0.0
(CO)
3.4
NO mode
3.6
3.5
3.7
3.8
3.8
0.0
(CO)
3.9
NO mode
4.1
4.2
34.5
6.90%
NO
747%
CO2
O2
Pt*3
Pt*2
48.0
49.8
50.5
49.7
49.0
49.5
49.0
49.7
49.0
47.0
46.5
46.0
46.0
45.7
45.5
46.0
Run*3
O2
49.33
12.33%
OFF
Run*2
48.95
12.11%
CO2 OFF
Run*2
NOx
Pt*1
10
20
30
40
60
70
80
90
100
YOKOGAWA
CHART NO 5962RY

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

REPORT OF ANALYSIS
NIST TRACEABLE GAS MIXTURES

SOCE01

TO:

LESLIE JOHNSON
SOUTH COAST ENVIRONMENTAL
1582-1 N. BATAVIA STREET
ORANGE, CA 92667-

DATE: 01/13/92

CUSTOMER ORDER NUMBER: 427

CYLINDER NUMBER	COMPONENT	CONCENTRATION (v/v)	NIST TRACEABLE REFERENCE STANDARD
CC648	Nitrogen Dioxide Nitrogen	176.8 ± 1.8 ppmv Balance	SRM 2627

Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 1

To Russ Logan	From Debbie
Co.	Co.
Dept.	Phone # 1853 6780
Fax # (714) 252-8217	Fax #

ppm = umole/mole % = mole-%

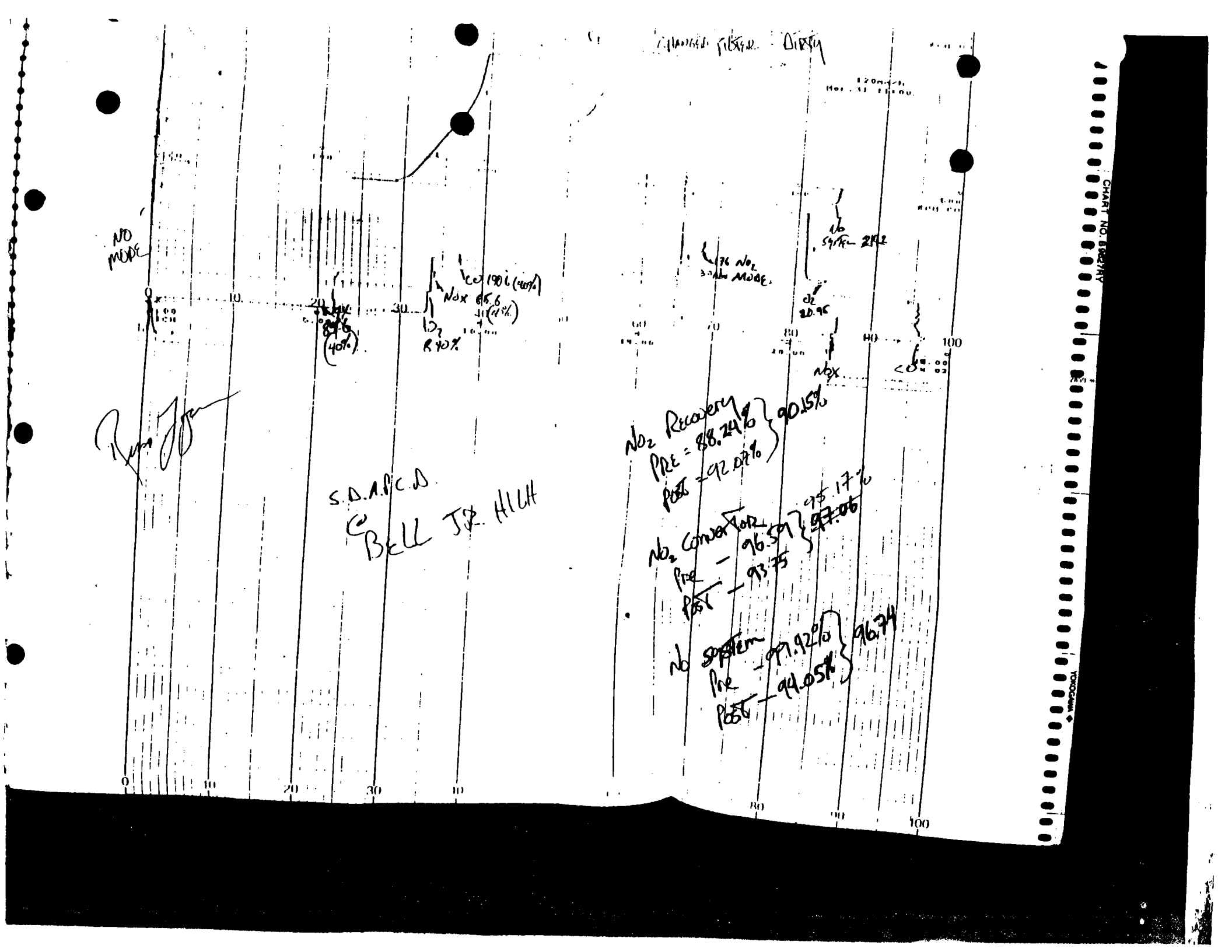
The above analysis is traceable to the National Institute of Standards and Technology by intercomparison with the reference standard listed above.
Where indicated, volumetric and gravimetric reference standards are traceable thru use of our analytical balance. NIST Report No. MMAP 232.09/282491.

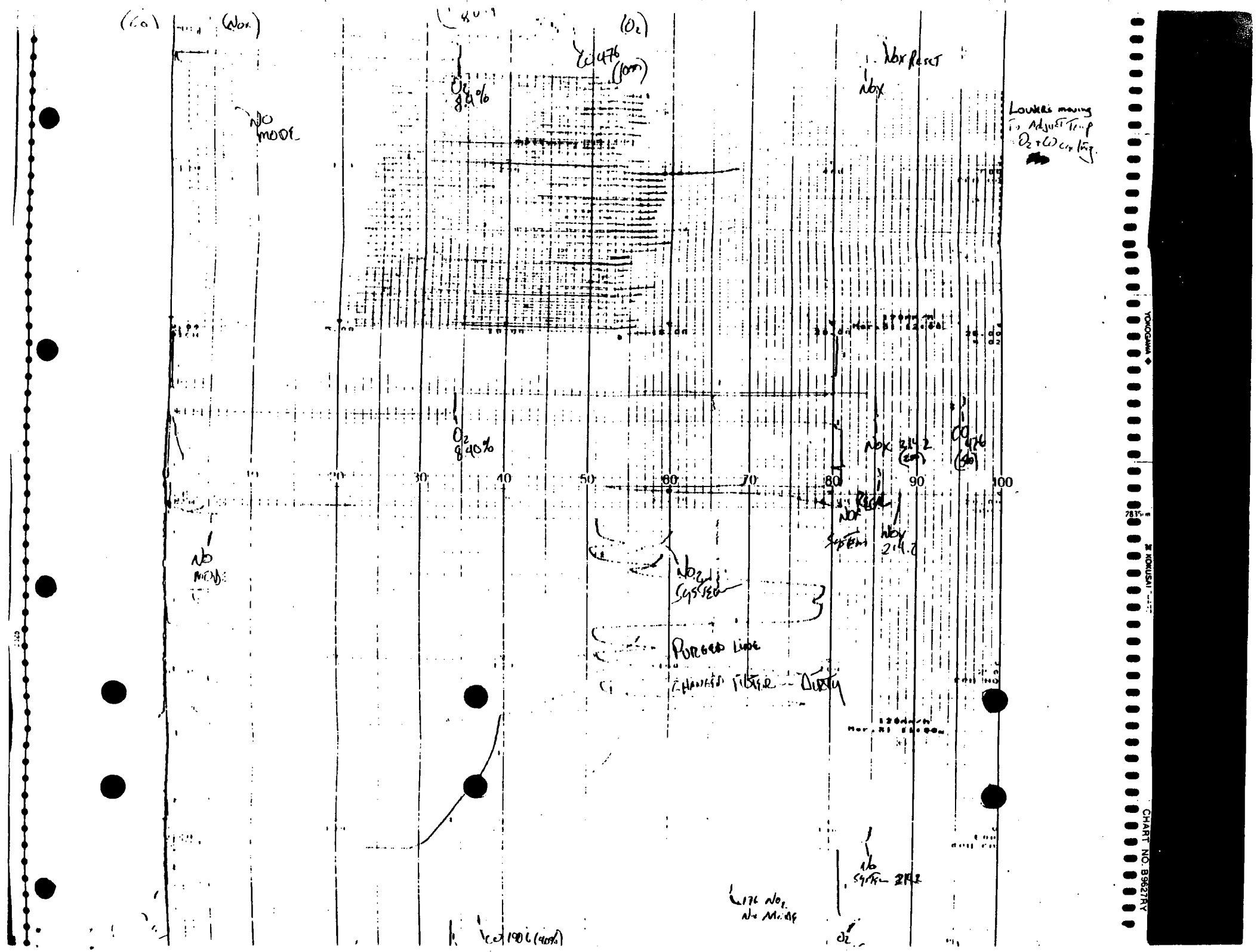
Analyst:

R.E. Gross

Approved:

J.T. Marrin


NO MODE
0
10
20
30
40
100
CHART NO. B82JRY
S.D.A.S.C.D
BELL JR. HIGH
NO2 Recovery
PRE = 88.24%
POST = 92.07%
90.25%
NO2 Conversion
PRE - 96.59
POST - 93.75
95.17%
97.06
NO System
PRE - 97.92%
POST - 99.05%
96.74


(Co)
(Wor.)
(O2)
Co 476 (ppm)
O2 8.9%
NO mode
Nox Reset
Nox
Louvers moving To Adjust Temp O2+CO cut ing.
O2 8.90%
Nox 314.2 (ppm)
CO 476 (ppm)
10
20
30
40
50
60
70
80
90
100
NO mode
NO2 system
Nox 214.7
Purged Line
Heated Filter Dusty
Co 1906 (40%)
Nox 214.2
Lite No. No Mode
O2
YOKOGAWA
KOKUSAI
CHART NO. B9627AY

Dale J. High: QC mgr @ JC 7/13/92

SCALES: NO_x 0-250 ppm (Avg. Scale)
CO 0-1000 ppm (Avg. Scale) → FOR TEST
O_2 0-25%

STDS: 176.0 ppm NO_2 = [illegible]
[illegible] ppm NO = [illegible]
55.0 ppm CO = [illegible]
476 ppm CO = [illegible]
20.95% O_2 = [illegible]
8.40% O_2 = [illegible]

ALLOWED = 2 ch div (±2% FS)

GAS	CAL	ACT	DIF	OK	ZERO	ACT	DIF	OK
NO	85.5	85.7	.2	✓	0	0	0	✓
NO	34.1	34.2	.1	✓	0	0	0	✓
CO	95.5	95.2	.3	✓	0	0	0	✓
NO	34.1	34.2	.1	✓	0	0	0	✓
CO	37.1	38.1	1.0	✓	0	0	0	✓
O_2	33.2	33.6	.4	✓	.1	0	.1	✓
2	84	83.8	.2	✓	.1	0	.1	✓
NO_2	68.2	70.4	2.2	X	0	0	0	0

NO_x mode = 68.2
NO_2 (NO mode) = 0 OK (RIGHT ON LIMIT)

NO_2 = 68.2

Conversion eff = 96.9% ok

NO_2 system = 70.4

NO mode = 55.2

= 55.2/68.2 = 80.9%

NO system = 85 ch div

NO R[illegible] 95/855 = 99.4%

Cals:

NO	85.	85.7	.7	✓	.2	0	.2	—
CO	95.5	95.2	.3	✓	0	0	0	✓
O2	34.1	33.6	.5	✓	.5	0	.5	✓

2 UN = UNIT NOT STABLE / RECAL & RUN AGAIN

SYSTEMS = OK (NO2 low - will correct [illegible])

DISTRICT QC

Ajax Mon: QC mzw

	CAL	ACT	DIF	OK	ZERO	ACT	DIF	OK
NOx	84.5	85.7	1.2	✓	.3	✓	.2	✓
CO	47.5	47.6	0.1	✓	-.3	✓	-.3	✓
O2	34.1	33.6	0.5	✓	.5	✓	.5	✓

CALS = OK

RUN #3 @ 19:52

	ch div	ppm	= at 3% O2
CO =	✓	= ✓	= ✓
NOx =	3.45	= 863	= 17.97
O2 =	49.3	= 12.33	CF = 2.63

GAS	CAL	ACT	DIF	OK	ZERO	ACT	DIF	OK
NOx	84.0	85.7	1.7	✓	.5	✓	.5	✓
CO	47.4	47.6	0.2	✓	-.1	✓	-.1	✓
O2	34.1	33.6	0.5	✓	✓	✓	✓	✓
O2	18.3	19.1	0.8	✓	-.1	✓	-.1	—

SCALE NOx 0-250 3PT CAL OK (214.2/190.6 ppm)
O2 0-25% " OK (20.95/8.40)
CO 0-1000 " OK (476/190.6)

CALS = OK

NO SYSTEM = 79.0 79.0/84.0 = 94.05%

NO2 converter: Nox mode NO2 = 67.0 ACT = 70.4
NO mode = 1.0
NO2 = 66.0 66.0/70.4 = 93.75

O2 SYSTEM: 62.0 ch dir
NO mode = 1.0 ch dir 61.0/62.0 = 98.4%
61.0

Mfg. High: QC mzø

GAS	CAL	ACT	DIF	OK	ZERO	ACT	DIF	OK
O_2	34ø	33.6	ø.4	✓	.5	ø	.5	✓
CO (0-1000)	47.5	47.6	ø.1	✓	ø	ø	ø	✓
NO_x	83.8	85.7	1.9	✓	.3	ø	.3	✓
NO_x (RESET)	85.8	85.7	ø.1	✓	.3	ø	.3	✓

CALS = OK

UN #1:

		ch div	ppm	at 3% O_2
1:45 - 13:27	CO =	ø	= ø	= ø
	NO_x =	4.23	= 10.58	= 20,øø
	O_2 =	45.7	= 11.45	CF = 1.89

$[NO_2]$ = ø → NO STRAT° IN STACK

TIME TEST = 30 min + 10 min NO_x → NO PEAKS
30+ min CO 30+ min O_2.

→ NO PEAKS.

GAS	CAL	ACT	DIF	OK	ZERO	ACT	DIF	OK
NO_x	83.6	85.7	2.1	✓	.4	ø	.4	✓
CO	47.8	47.6	ø.2	✓	-.3	ø	-.3	✓
O_2	34.5	[redacted]	ø.9	✓	.5	ø	.5	✓

[redacted] = OK

UN #2:

		ch div	ppm	at 3% O_2
30 - 14:1ø	CO =	ø	= ø	= ø
	NO_x =	3.71	= 9.28	= 18.89
	O_2 =	48.5	= 12.13	CF = 2.ø4

$[NO_2]$ = ø → sample AT CENTRAL PT

TIME: NO_x = 30min + 10min

CO = 30+min O_2 = 30+ min

→ UN

P/O NUMBER: 56896 and 59383 DATE: 4/7/92

Table 2. Stack Emissions of NO_x, CO, and O_2

RUN	SCALE: TIME	NO_x 0-250 PPM CHART (div)	NO_x UNCORR (ppm)	NO_x CORR 3% O_2 (ppm)	CO 0-1000 PPM CHART (div)	CO UNCORR (ppm)	CO CORR 3% O_2 (ppm)	O_2 0-25% CHART (div)	O_2 %
R1 Avg.	12:45 13:25	4.23	10.58	20.04	0.0	0.0	0.0	45.7	11.45
PK1									
PK2									
R2 Avg.	13:30 14:10	3.71	9.28	18.90	0.0	0.0	0.0	48.5	12.11
PK1									
PK2									
R3 Avg.	14:10 14:50	3.45	8.62	18.00	0.0	0.0	0.0	49.3	12.33
PK1									
PK2									
Peak =									
Overall =		3.80	9.49	18.98	0.0	0.0	0.0	47.8	11.96

NO_x and CO:

- The value reported is the average concentration value at 3% O_2, when:
  The average pollutant concentration exceeds the permit limit, or the average value is within the permit limit and there are less than two excursions above the limit.

- The value reported is the highest excursion value at 3% O_2, when: There are two or more excursions above the permit limit during the three subtests.

- If it is determined that stratification exists, the average concentrations of NO_x and CO, at 3% O_2, are then reported.

Table 3. Calibration Gases

	CYLINDER	MANUFACTURER	CONCENTRATION (ppm)
NO_x	CC7297	Scott Marrin	214.2
CO	CC67219	Scott Marrin	476
O_2	CC106786	Scott Marrin	8.40%
NO_2	CC648	Scott Marrin	176.0

Dr. Ben Hyde QC 11/20

QC VALUES

SCEC VALUES

CYCLE 1

NO RECOVERY = OK

AVE = $\frac{99.4 + 94.65}{2}$ = 96.73% 96.24%

NO_2 Converter = OK

AVE = $\frac{96.9 + 93.75}{2}$ = 95.33% 95.17%

NO_2 Recovery = OK

AVE = $\frac{80.94 + 92.4}{2}$ = ~~85.67%~~ 86.68% SC 90.15% (88.24 92.07

SCEC - DID NOT SUBTRACT NO mode values from the "de values for [NO_2]. Assumed all NO_x was NO_2

PT CALIBRATION = DONE / ACCEPTABLE.

PAT = DONE — NO STRATIFICATION

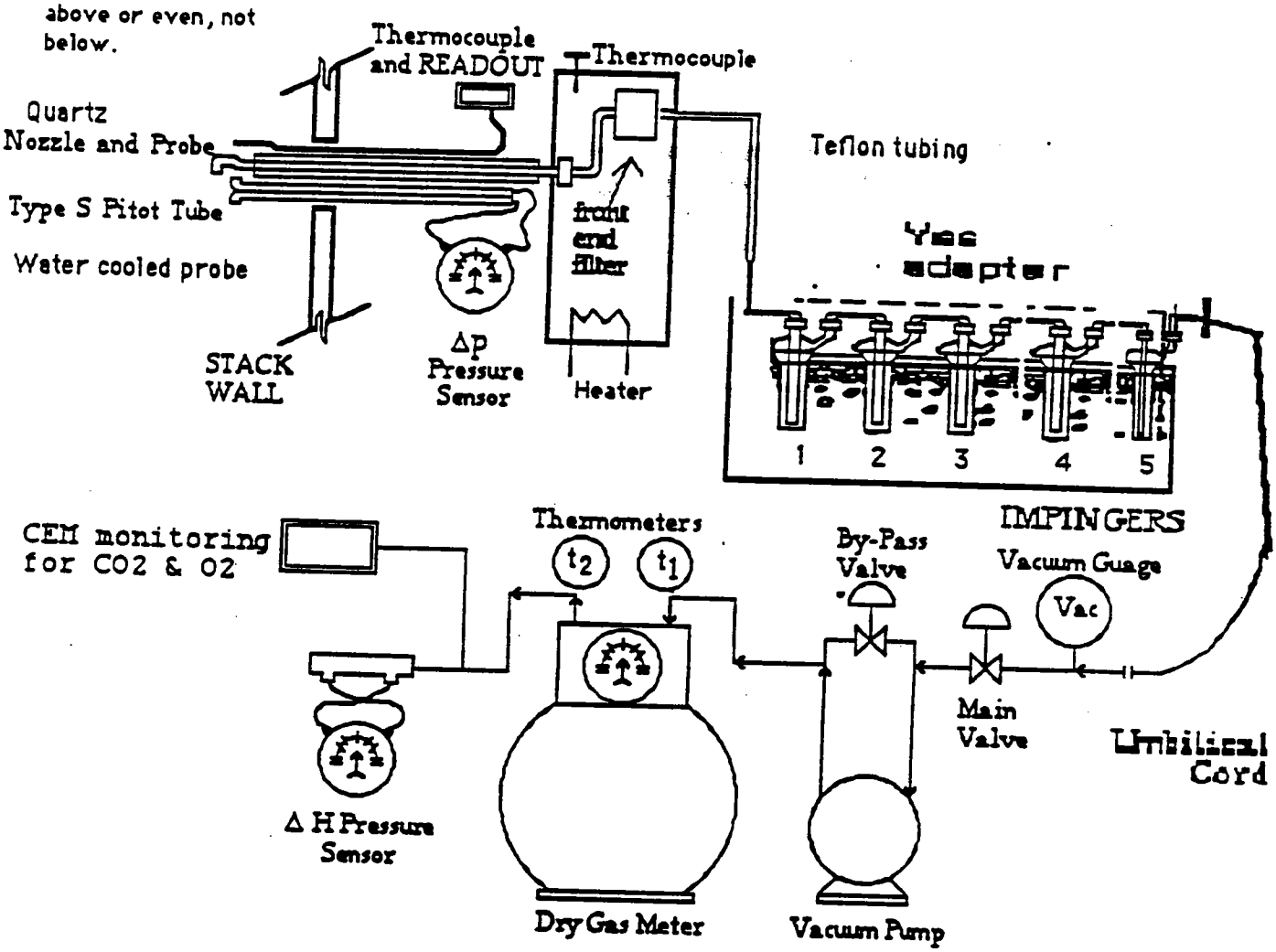
NO/CAL D[redacted] = NO PRINTS >±2% ES / NO CORR NEEDED

DATA TOTALS	QC ppm	SCEC ppm	COM NO_x AVE = 18.98
Com NO_x	20.00	20.00	" CO AVE > 0
Com CO	0	0	
Com NO_x	18.89	18.90	*SCEC REPORT
" CO	0	0	Com NO_x AVE = 15.75
" NO_x	17.97	18.00	* REPORT NEEDS
" CO			

SAN DIEGO COUNTY AIR POLLUTION CONTROL DISTRICT

FIGURE 1

CONDENSOR SYSTEM



LEGEND

No. 1 - IPa

No. 2 - K.O.

No. 3 - H2O2

No. 4 - K.O.

No. 5 - Silica Gel

FIELD DATA ABBREVIATIONS

PT = Point Number
T_s = Stack Temperature
Δp = Pitot Tube Pressure Differential; in H_2O
V_s = Stack Velocity, fps
ΔH = Orifice Meter Pressure Drop, in H_2O
t_1 = Meter Inlet Temperature, °F
t_2 = Meter Outlet Temperature, °F
Pm = Pump Vacuum, in Hg
ti = Impinger Temperature
P_{bar} = Barometric Pressure

FIGURE 1 : PARTICULATE MATTER SAMPLING TRAIN

Test Witness - Avg

TEST PARAMETERS:

PROCEDURES:

The procedures and equipment utilized in these tests are based on EPA NSPS guidelines and from the EPA CFR 40, Standards Method 5. The sampling utilized a front-end filter (fig. 1).

CALCULATIONS:

All calculations are based on the EPA CFR 40, Standards Method 5, July 1, 1991, Parts 53-60, Appendix A, Methods 1-5 inclusive.

PARTICULATE SAMPLING:

The test consisted of sampling at 8 traverse points, 4 from 1 sampling port (fig.2) and 2 from 2 sample ports, collected from 84 inches below the stack (fig.3). It was done this way, because the stack thermocouple interfered with the last 2 points on the second and third traverse. All field data, SCEC's as well as SDAPCD's, were transferred to the computer printout. All calculations were done by computer and the emissions were compared to SDAPCD rules.

ANALYSES:

Gas: A CEM analysis was performed by SCEC.

Particulate. All procedures follow EPA guidelines, except where noted in the SDAPCD QA manual.

EQUIPMENT:

All testing and analysis equipment was calibrated according to EPA guidelines and performed by SCEC.

OVERVIEW OF THE TEST:

RUN #1:	*LAB:* Passed *PM.:* Passed	**RUN #2:**	*LAB:* Eliminated from the test average *PM.:* Eliminated from the test average	**RUN #3:**	*LAB:* Passed *PM.:* Passed

Because of the disparity in numbers between the District and SCEC, it was decided to use the District's values. The District used the values from Runs #1 & 3, because they produced the only reliable numbers. A complete critique of the performance of SCEC's testing procedures and calculations are on page 4 and a data summary of all 3 runs are on page 5.

Figure 3

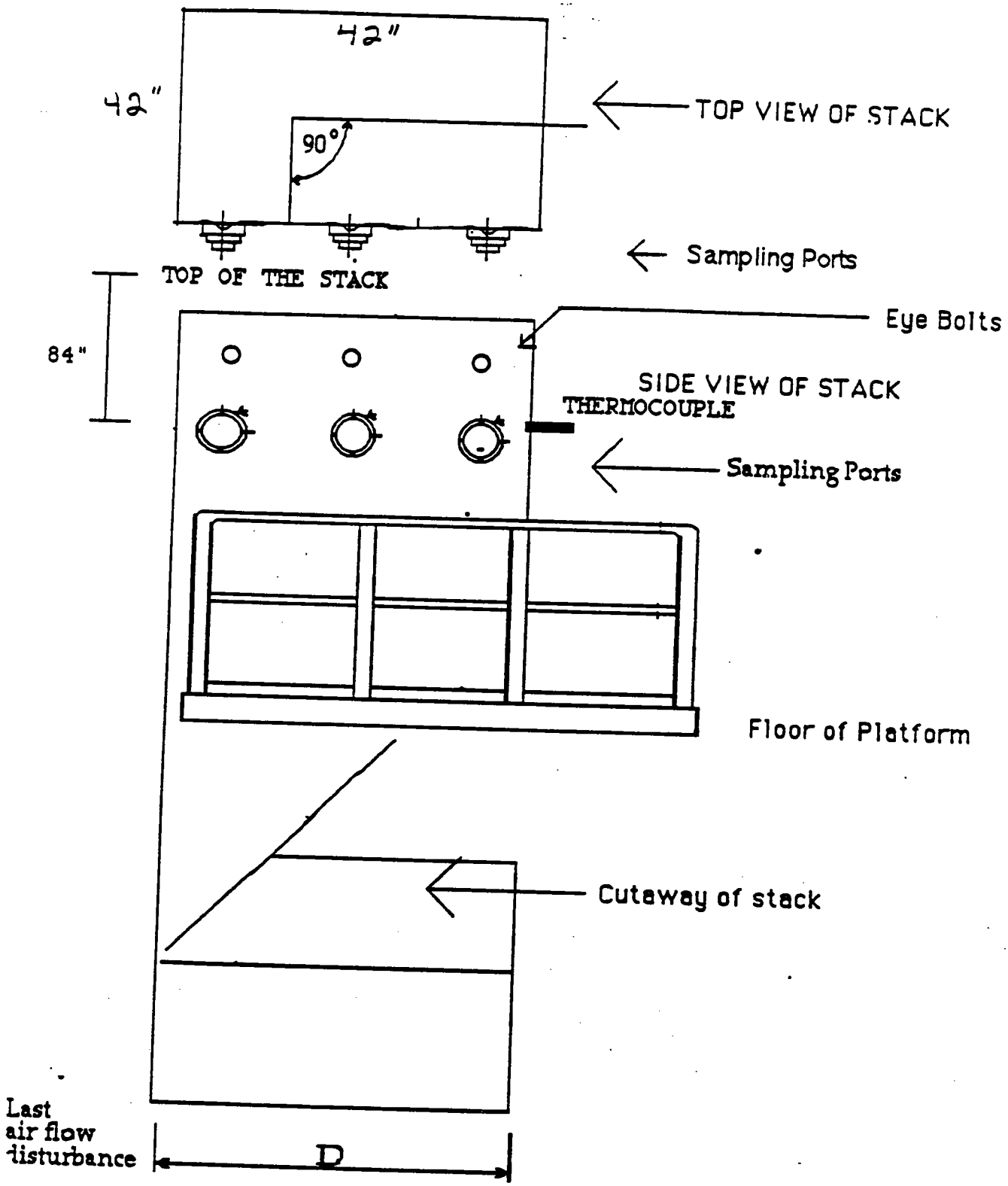


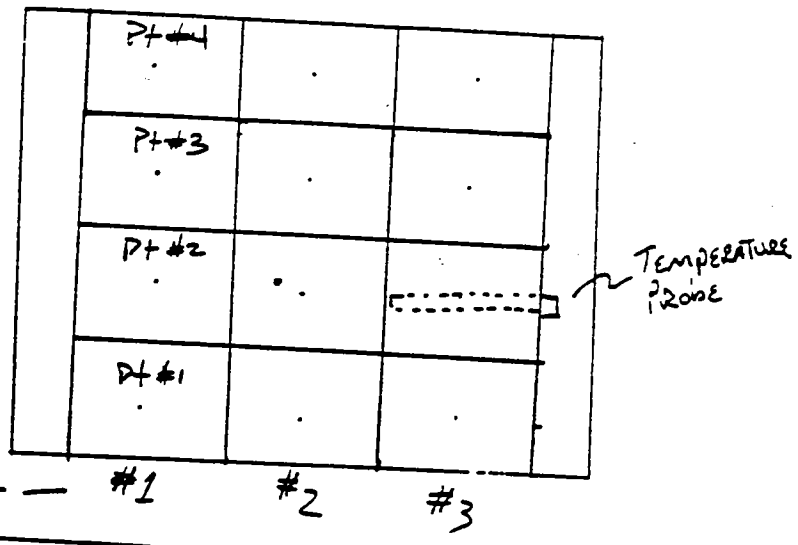
Figure 3

FIGURE 2

FILE REF: ST12

SAMPLE POINT LOCATION DATA SHEET

FACILITY: Bell JR. High
PROJECT #: T1482-1
DATE: 4-7-92
STACK DIMENSIONS: L= 42
W= 42
H=
UPSTREAM DIST./ EQUIVALENT DIAMETERS 5
DOWNSTREAM DIST./ EQUIVALENT DIAMETERS 2
NO. OF SAMPLING POINTS
SAMPLING PORT DIMENSIONS:
DIA.= 3
PROTRUSION DIST.= 3"



SAMPLE POINT Each Port	% OF STACK DIAMETER	DISTANCE FROM STACK WALL (IN.)	DISTANCE FROM SAMPLE PORT (IN.)
#1		36.75	39.75
#2		26.25	29.25
#3		15.75	18.75
#4		5.25	8.25

Client: SDAPCD - Gill Jr High

Analyst: KBS

Report #: T-1482-2

Test Date: 4-7-92

TITRIMETRIC ANALYSIS

Sample I.D./Run #	Total Sample (mls)	Aliquot mls	Normality	Titrant mls
F/N #1	250	10	0.009710	0.20
COND #1	220	10	0.009710	0.10
H_2O_2 #1	190	10	0.009710	0.34
F/N #2A	130	10	0.009710	0.05
COND #2A	220	10	0.009710	0.10
H_2O_2 #2A	210	10	0.009710	0.09
F/N #3	165	10	0.009710	0.10
COND #3	203	10	0.009710	0.24
H_2O_2 [redacted]	210	10	0.009710	0.08

COMMENTS:

ST18