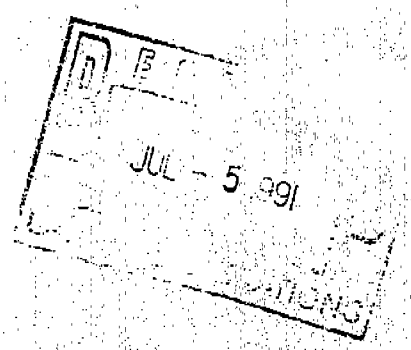
BFI Waste Systems™
BROWNING-FERRIS INDUSTRIES

Interoffice Correspondence



DATE: July 3, 1991

TO: Richard Echols

FROM: Les Sakoda

As requested a copy of the Sunshine Canyon Landfill gas flare emissions source test is attached. The original report contains values which exceeded NOx the permit limits. After contacting McGill and investigating the unit the stack velocity was found to be in error. The subsequent report to SCAQMD utilizing a stoichiometric calculation to determine stack velocity reduces NOx emissions to within operating limits. When calculating the total emissions the test values are increased by a factor of the test Btu rate divided by the permitted value of 105 MMBtu/hr.

Attachments

cc: Dean Wise
Glenn Wolthausen
Jim Aidukas
Bob Jamieson - (with attachment)

SUNSHINE CANYON LANDFILL
14747 SAN FERNANDO ROAD • SYLMAR, CALIFORNIA 91342 • (818) 362-1567 • TELEX (818) 362-5484

Waste Systems™
BROWNING-FERRIS INDUSTRIES
Sunshine Canyon Landfill District

October 8, 1990

Mr. Jay Chen
South Coast Air Quality District
9150 Flair Drive
El Monte, CA 91731

Attention: Mr. Jay Chen

Attached is the revised emission test results by CTL Environmental Services regarding the Browning-Ferris Industries Sunshine Canyon Landfill gas incinerator. All emission components as identified in permit number 149462 are within the permit limits. Further the limits shall not be exceeded for maximum operation. The oxides of sulfur component concentration is expected to lower at higher gas recovery volumes. For this reason the oxide of sulfur emission at maximum incinerator operation will not exceed the limit of 1.35 lb/hr.

If there are any questions please contact Les Sakoda at (818) 362-1567.

Sincerely,

Lester M. Sakoda
Project Manager Pacific Region

Attachment

cc: Jim Aidukas - with attachment
Dean Wise - w/o attachment
Dilip Patel - with attachment
Bob Jamieson - with attachment
Richard Echols - with attachment

Environmental Services

September 27, 1990

Browning Ferris Industries
1201 West Gladstone Street
Azusa, CA 91702

Attn: Mr. Les Sakoda

Re: **Recalculation of Emissions for Sunshine Canyon Source test conducted on May 21 and 22 1990. Job# 90-0659.2**

Dear Les,

As we discussed on the telephone, we have recalculated our exhaust gas flow rates as per EPA Method 2B. Copies of our calculations are attached as well as corrected Mass Emission Rates for the compounds measured.

If you have any questions, please do not hesitate to contact me at (213) 530-5006.

Respectfully Submitted,
CTL Environmental Services

Paul Jordan
Vice President Environmental Services

PJ/sec/a:PJ0006.ltr

24404 So. Vermont Ave., Suite #307 • Harbor City, CA 90710 • TEL: (213) 530-5006 • FAX: (213) 530-0792

Client: BFI
Project: Sunshine Canyon Flare 1 - Recalculations
Job Number: 90-0659.2

CALCULATION OF EXHAUST GAS VOLUMETRIC FLOW RATE AS PER EPA METHOD 2B

FORMULAS

$$V_{es} = V_{is} \frac{K\ (HC_i) + CO_{2i}^{*}}{K\ (HC_e) + CO_{2e} + CO_e - 300}$$

$$Q_{es} = \frac{V_{es}}{t}$$

Definitions:

V_{es}	=	Volume of exhaust gas (m^3)
V_{is}	=	Velocity of inlet gas (m^3)
K^{**}	=	Calibration gas factor
HC_i	=	Hydrocarbon concentration at inlet (ppm)
HC_e	=	Hydrocarbon concentraion at exhaust (ppm)
CO_{2e}	=	Carbon Dioxide concentraion at exhaust (ppm)
CO_e	=	Carbon Monoxide concentration at exhaust (ppm)
300	=	Estimated ambient concentration of CO_2 (ppm)
Q_{es}	=	Exhaust Gas volumetric flow rate (m^3/min)

* There was a high level of Carbon Dioxide measured in the inlet gas; the formula was modified to account for this.

** The calibration gas used for determination of hydrocarbon concentration was methane; therefore the calibration gas factor is 1.

Client: BFI
Project: Sunshine Canyon Flare 1 - Recalculations
Job Number: 90-0659.2

Volume of Inlet Gas

$$V_{is} = (1467\ SCFM)\ (60\ min/hr)$$

$$= 88020\ SCFH$$

$$= 3108.4\ m^3/hr$$

Volume of Exhaust Gas

$$V_{es} = (3108.4)\ \frac{520000 + 4400 + 429000}{3 + 76000 + 10 - 300}$$

$$V_{es} = (3108.4)\ \frac{953400}{75713}$$

$$V_{es} = 39141.9\ m^3$$

Volumetric Flow Rate of exhaust gas

$$Q_{es} = \frac{V_{es}}{t}$$

$$Q_{es} = \frac{(39141.9\ m^3)}{60\ min}$$

$$Q_{es} = (652.4\ m^3/min)\ (28.317\ ft^3/m^3)$$

$$Q_{es} = 18473.0\ DSCFM$$

Client: BFI
Project: Sunshine Canyon Flare 1 - Recalculations
Job Number: 90-0659.2

Test Results and Permit Limits

	Component	Permit Limit	Test Results
a)	Inlet gas flow rate	4167 DSCFM	1467 SCFM
b)	Oxides of Nitrogen	6.03 lb/hr	2.22 lb/hr
c)	Particulates	0.75 lb/hr	0.30 lb/hr
d)	Carbon Monoxide	30 lb/hr	0.58 lb/hr
e)	Total non-Methane Inorganics	0.63 lb/hr	0.08 lb/hr
f)	Oxides of Sulfur	1.35 lb/hr	0.72 lb/hr
g)	Heat Output	105×10^{6} BTU/hr	46.3×10^{6} BTU/hr

CTL ENVIRONMENTAL SERVICES
24404 S VERMONT AV SUITE 307
HARBOR CITY, CA 90710
(213) 530-5006

CLIENT: BFI
TEST DATE: 21,22 May 1990
LOCATION: Sunshine Canyon
JOB NUMBER: 90-0659

TABLE I

SUMMARY OF TEST RESULTS AND EMISSION RATES

TIME/DATE TEST POINT	STACK TEMP (F)	OXYGEN (%)	CARBON DIOXIDE (%)	CARBON MONOXIDE (ppm)	CARBON MONOXIDE (lb/hr)	OXIDES OF NITROGEN (ppm)	OXIDES OF NITROGEN (lb/hr)	INTAKE FLOW RATE (KSCFH)	EXHAUST FLOW RATE (DSCFM)
21 May 1990 1540 hrs Exhaust	1712	10.8	7.8	11.7	.94	16.3	2.19	88	18473
21 May 1990 1645 hrs Exhaust	1700	12.3	7.6	2.0	.16	16.4	2.19	88	18473
22 May 1990 1000 hrs Exhaust	1695	11.3	7.6	8.0	.65	16.9	2.27	88	18473
AVERAGE	1702	11.5	7.7	7.2	.58	16.5	2.22	88	18473

CTL ENVIRONMENTAL SERVICES
24404 S VERMONT AV. SUITE 307
HARBOR CITY, CA 90710
(213) 530-5006

CLIENT: BFI
TEST DATE: 21,22 May 1990
LOCATION: Sunshine Canyon
JOB NUMBER: 90-0659

TABLE 2

MISCELLANEOUS TEST DATA

	INLET GAS	EXHAUST
PM10 (ug/m3)	.05 ‡	-----
PARTICULATES (lb/hr)	-----	.3
SULFUR DIOXIDE (ppm)	-----	3.78
SULFUR DIOXIDE (lb/hr)	-----	.71
SULFATES (gr/DSCF)	-----	.00009
SULFATES (lb/hr)	-----	.01
HCl (ug/m3)	-----	< 52
HCl (lb/hr)	-----	< 0.0001
MOISTURE CONTENT (%)	6.5	7.16
CARBON DIOXIDE (%)	42.9	7.7
NITROGEN (%)	4.7	80.2
OXYGEN (%)	.3	11.47
GAS TEMPERATURE (F)	100	1702
HEAT CONTENT	526 BTU/SCF	46,300,000 BTU/hr
VOLUMETRIC FLOW RATE (DSCFM)	1467	18473

‡ inlet air at Louvers

CTL ENVIRONMENTAL SERVICES
24404 S VERMONT AV · SUITE 307
HARBOR CITY, CA 90710
(213) 530-5006

CLIENT: BFI
TEST DATE: 21,22 May 1990
LOCATION: Sunshine Canyon
JOB NUMBER: 90-0659

TABLE 3

HYDROCARBONS/COMBUSTION PRODUCTS SUMMARY

RUN 3 - EXHAUST

PRODUCT	AMOUNT	MOL. WEIGHT	FLOW RATE (DCFM)	MASS EMISSION RATE (lb/hr)
METHANE	1.4 ppm	16	18473	.065
Total Non-Methane Hydrocarbons	1.4 ppm	16	18473	.065
TOLUENE	.062 ppm	92	18473	.016
TOTAL XYLENES	.005 ppm‡	106	18473	.002‡
ETHANOL	.0065 ppm	46	18473	.001
2-PROPANOL	.016 ppm	60	18473	.003
BUTANE	.052 ppm	58	18473	.009
PHENOL	.12 ppm	94	18473	.033

(Total Non-Methane Hydrocarbons as Hexanes)

RUN 4 - EXHAUST

PRODUCT	AMOUNT	MOL. WEIGHT	FLOW RATE (DCFM)	MASS EMISSION RATE (lb/hr)
METHANE	1.1 ppm	16	18473	.051
Total Non-Methane Hydrocarbons	2.2 ppm	16	18473	.101
TOLUENE	.2 ppm	92	18473	.053
TOTAL XYLENES	.0074 ppm	106	18473	.002
ETHANOL	.0065 ppm	46	18473	.001
2-PROPANOL	.0097 ppm	60	18473	.002
BUTANE	.1 ppm	58	18473	.017
PHENOL	.11 ppm	94	18473	.030

(Total Non-Methane Hydrocarbons as Methane)

‡ indicates limits of detection

CTL ENVIRONMENTAL SERVICES
24404 S VERMONT AV. SUITE 307
HARBOR CITY, CA 90710
(213) 530-5006

CLIENT: BFI
TEST DATE: 21,22 May 1990
TEST LOCATION: Sunshine Canyon
JOB NUMBER: 90-0659

TABLE 4

FLARE 1 - INLET TEST RESULTS

RUN 2 - INLET

PRODUCT	AMOUNT	MOL. WEIGHT	FLOW RATE (KSCFH)	MASS EMISSION RATE (lb/hr)
METHANE	520000 ppm	16	88	1903.616 - .065 =
Total Non-Methane Hydrocarbons	4400 ppm	16	88	16.108 - .065 / 16.108 = 99.60
TRICHLOROETHENE	2.4 ppm	133.5	88	.073
BENZENE	2.2 ppm	78	88	.039
TETRACHLOROETHENE	13 ppm	168	88	.500
TOLUENE	100 ppm	92	88	2.105 - 0.016 = 99.2
ETHYL BENZENE	59 ppm	106	88	1.431
Total XYLENES	92 ppm	106	88	2.231 - .002 =
ETHANOL	46 ppm	46	88	.484
2-PROPANOL	54 ppm	60	88	.741
BUTANE	38 ppm	58	88	.504
Other HC (C5-C7)	65 ppm		88	
Other HC (C8-C10)	234 ppm		88	

(Total Non-Methane Hydrocarbons as Methane)

HYDROGEN SULFIDE	78 ppm	34	88	.607
METHYL MERCAPTAN	12 ppm	48	88	.132
ETHYL MERCAPTAN	.5 ppm‡	62	88	.007‡
PROPYL MERCAPTAN	.5 ppm‡	76	88	.009‡
DIMETHYL SULFIDE	6.2 ppm	62	88	.088

‡ indicates limits of detection

BTU Value per SCF	526	88

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HARBOR CITY, CA 90710
(213) 530-5006

CLIENT: BFI
TEST DATE: 21,22 May 1990
LOCATION: Sunshine Canyon
JOB NUMBER: 90-0659

TABLE 5

AMBIENT SAMPLE AND BLANK SAMPLE RESULTS SUMMARY

RUN 1 - AMBIENT AIR SAMPLE

PRODUCT	AMOUNT	MOL. WEIGHT	FLOW RATE (DCFM)	MASS EMISSION RATE (lb/hr)
METHANE	7.2 ppm	16	N/A	N/A
Total Non-Methane Hydrocarbons	.67 ppm	16	N/A	N/A
TOLUENE	.0062 ppm	92	N/A	N/A
TOTAL XYLENES	.005 ppm‡	106	N/A	N/A‡
ETHANOL	.0065 ppm	46	N/A	N/A
2-PROPANOL	.026 ppm	60	N/A	N/A
BUTANE	.0097 ppm	58	N/A	N/A
PHENOL	.084 ppm	94	N/A	N/A

(Total Non-Methane Hydrocarbons as Hexanes)

‡ indicates limits of detection

RUN 5 - SAMPLE BLANK

PRODUCT	AMOUNT	MOL. WEIGHT	FLOW RATE (DCFM)	MASS EMISSION RATE (lb/hr)
METHANE	1 ppm‡	16	N/A	N/A‡
Total Non-Methane Hydrocarbons	.26 ppm	16	N/A	N/A
TOLUENE	.0037 ppm	92	N/A	N/A
PHENOL	.041 ppm	94	N/A	N/A

(Total Non-Methane Hydrocarbons as Methane)

CTL ENVIRONMENTAL SERVICES
24404 S. VERMONT AV. ST. 307
HARBOR CITY, CA 90710
(213) 530-5006

CLIENT: BFI
DATE OF TESTING: 21 May 1990
SAMPLING LOCATION: Sunshine Canyon
JOB NUMBER: 90-0659

CONTINUOUS ANALYSER DATA & RESULTS

SAMPLE POINT	TIME	% O2 dry	% O2 Drift Corrected	ppm NOx Drift not Corrected	ppm NOx Drift Corrected	NOx lb/hr	Flow Rate DSCFM (AVERAGE)
1	1450	11	11.0	16	15.6	2.10	18473
2	1500	9.5	9.5	16	15.6	2.10	18473
3	1510	10	10.0	17	16.6	2.24	18473
4	1520	11.25	11.3	17	16.6	2.24	18473
5	1530	11.25	11.3	17	16.6	2.24	18473
6	1540	11.5	11.5	17	16.6	2.24	18473
7	1555	12.25	12.2	17	16.7	2.24	18473
8	1605	12.25	12.2	17	16.7	2.24	18473
9	1615	12.25	12.2	17	16.7	2.24	18473
10	1625	12.5	12.4	17	16.7	2.24	18473
11	1635	12.5	12.4	16	15.7	2.10	18473
12	1645	12.25	12.2	16	15.7	2.10	18473
MEAN		11.5	11.5	16.7	16.3	2.19	

CORRECTION FOR INSTRUMENT DRIFT

CALIBRATION:	1 st hour % O2	1 st hour ppm NOx	2 nd hour % O2	2 nd hour ppm NOx
ZERO READING (end of hour)	.0	2	.25	2
SPAN READING (end of hour)	20.8	189	21	188
SPAN GAS VALUE	20.9	187	20.9	187
ZERO DRIFT FACTOR	.00 %/10 min	.33 ppm/10 min	.04 %/10 min	.33 ppm/10 min
SPAN DRIFT FACTOR	.08 %/10 min	-.18 %/10 min	-.08 %/10 min	-.09 %/10 min

CTL ENVIRONMENTAL SERVICES
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HARBOR CITY, CA 90710
(213) 530-5006

CLIENT: BFI
DATE OF TESTING: 22 May 1990
SAMPLING LOCATION: Sunshine Canyon
JOB NUMBER: 90-0659

CONTINUOUS ANALYSER DATA & RESULTS

SAMPLE POINT	TIME	% O2 dry	% O2 Drift Corrected	ppm NOx Drift not Corrected	ppm NOx Drift Corrected	NOx lb/hr	Flow Rate DSCFM (AVERAGE)
1	910	11.25	11.3	16	15.6	2.09	18473
2	920	11.5	11.5	17	16.6	2.23	18473
3	930	11.5	11.5	17.5	17.1	2.30	18473
4	940	11.25	11.3	17.5	17.1	2.30	18473
5	950	11	11.0	18	17.6	2.36	18473
6	1000	11.25	11.3	18	17.6	2.36	18473
MEAN		11.3	11.3	17.3	16.9	2.27	

CORRECTION FOR INSTRUMENT DRIFT

CALIBRATION:	% O2	ppm NOx
ZERO READING (end of hour)	.0	2.5
SPAN READING (end of hour)	20.5	187
SPAN GAS VALUE	20.9	187
ZERO DRIFT FACTOR	.00 %/10 min	.42 ppm/10 min
SPAN DRIFT FACTOR	.32 %/10 min	.00 %/10 min

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HARBOR CITY, CA 90710
(213) 530-5006

CLIENT: BFI
DATE OF TESTING: 22 May 1990
SAMPLING LOCATION: Sunshine Canyon
JOB NUMBER: 90-0659.2

PARTICULATE TEST DATA

	RUN 1 OUTLET	RUN 2 OUTLET
INITIAL FILTER WEIGHT (mg)	341.9	343.0
FINAL FILTER WEIGHT (mg)	342.1	344.1
WEIGHT GAIN (mg)	.2	1.1
PROBE WASH (mg)	1.80	1.90
PROBE WASH BLANK (mg)	.00	.00
CONDENSABLES FROM IMPINGER CATCH (mg)	.75	.90
TOTAL PARTICULATE CATCH (mg)	2.75	3.90
VOLUME COLLECTED (DSCF)	23.506	30.512
PARTICULATE EMISSIONS (GR/DSCF)	.0018	.0020
STACK % CO2 (DRY BASIS)	7.80	7.80
GRAINS/DSCF @ 12% CO2	.0028	.0030
STACK MOISTURE (% H2O VAPOR)	7.54	6.77
GRAINS/SCF	.0017	.0018
GRAINS/SCF @ 12% CO2	.0028	.0030
STACK FLOW RATE (DSCFM) (at outlet)	18473	18473
MASS EMISSION RATE (lb/hr)	.29	.31

CTL ENVIRONMENTAL SERVICES
24404 S VERMONT AV. SUITE 307
HARBOR CITY, CA 90710
(213) 530-5006

CLIENT: BFI
TEST DATE: 21,22 May 1990
LOCATION: Sunshine Canyon
JOB NUMBER: 90-0659

SULFUR DIOXIDE TEST DATA

	RUN 2 OUTLET
GAS VOLUME COLLECTED (dry standard cu ft)	23.506
NORMALITY OF Ba(ClO4)2	.0101
TOTAL SAMPLE VOLUME (ml)	350
ALIQUOT VOLUME (ml)	20
TITRATION VOLUME (ml)	1.4
BLANK VOLUME (ml)	.2
CONCENTRATION OF SO2 (lb/DSCF)	6.371e-7
SO2 CONCENTRATION (ppm dry basis)	3.78
STACK FLOW RATE (dscfm at Outlet)	18473
MASS EMISSION RATE (lb/hr)	.71
% WATER VAPOR	7.16
SO2 CONCENTRATION (ppm wet basis)	3.51

CTL ENVIRONMENTAL SERVICES
24404 S VERMONT AV. SUITE 307
HARBOR CITY, CA 90710
(213) 530-5006

CLIENT: BFI
DATE OF TESTING: 21 May 1990
SAMPLING LOCATION: Sunshine Canyon
REPORT NUMBER: 90-0659

SULFURIC ACID MIST AND SULFATE PARTICULATE DATA

	RUN 1 OUTLET
GAS VOLUME COLLECTED (dry standard cu ft)	23.506
TOTAL SULFATE PARTICULATE (grains)	.0014
SULFATE CONCENTRATION (grains/DSCF)	.00006
% CO2 (dry basis)	7.8
SULFATE CONCENTRATION (grains/DSCF @ 12 % CO2)	.00009
STACK FLOW RATE (OUTLET) (DSCFM)	18473
MASS EMISSION RATE (lb/hr)	.01
% WATER VAPOR	7.54
SULFATE CONCENTRATION (grains/SCF)	.00006
SULFATE CONCENTRATION (grains/SCF @ 12 % CO2)	.00009

c) The emissions of total particulate matter from the flare did not exceed the permit limit of 0.75 per hour.

d) The emissions of carbon monoxide did not exceed the permit limit of 30 pounds per hour.

e) The emissions of total non-methane organics did not exceed the limit of 0.63 pounds per hour.

f) The emissions of oxides of sulfur did not exceed the permit limit of 1.35 pounds per hour.

g) The heat output of the flare did not exceed the permit limit of 105 x 10^6 BTU/hour.

The test results and permit limits are tabulated below:

	Component	Permit Limit	Test
a)	Inlet gas flow rate	4167 DSCFM	1467 SCFM
b)	Oxides of nitrogen	6.03 lb/hr	4.05 lb/hr (average)
c)	Particulates	0.75 lb/hr	0.53 lb/hr (average)
d)	Carbon monoxide	30 lb/hr	1.03 lb/hr (average)
e)	Total non-methane Inorganics	0.63 lb/hr	0.15 lb.hr
f)	Oxides of sulfur	1.35 lb/hr	1.24 lb/hr
g)	Heat output (BTU/hr)	105 x 10^6	46.3 x 10^6

If you have any questions or comments, please feel free to call me at (213) 530-5006.

Respectfully submitted,
CTL Environmental Services

Paul Jordan
Vice President, Operations

RESULT TABLES

FLARE 1

CTL ENVIRONMENTAL SERVICES
24404 S VERMONT AV SUITE 307
HARBOR CITY, CA 90710
(213) 530-5006

CLIENT: BFI
TEST DATE: 21,22 May 1990
LOCATION: Sunshine Cany
JOB NUMBER: 90-0659

TABLE I

SUMMARY OF TEST RESULTS AND EMISSION RATES

TIME/DATE TEST POINT	STACK TEMP (F)	OXYGEN (%)	CARBON DIOXIDE (%)	CARBON MONOXIDE (ppm)	CARBON MONOXIDE (lb/hr)	OXIDES OF NITROGEN (ppm)	OXIDES OF NITROGEN (lb/hr)	INTAKE FLOW RATE (KSCFH)	EXHAUST FLOW RATE (DSCFM)
21 May 1990 1540 hrs Exhaust	1712	10.75	7.8	11.7	1.67	16.3	4.00	88	32750
21 May 1990 1645 hrs Exhaust	1700	12.3	7.6	2.0	.29	16.4	4.02	88	32750
22 May 1990 1000 hrs Exhaust	1695	11.3	7.6	8.0	1.14	16.9	4.14	88	32750

CTL ENVI
24404 S \
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(213) 530-5006

CLIENT: BFI
TEST DATE: 21.22 May 1990
TEST LOCATION: Sunshine Canyon
JOB NUMBER: 90-0659

TABLE 2

MISCELLANEOUS TEST DATA

	INLET GAS	EXHAUST
PM10 (ug/m3)	.05 *	-----
PARTICULATES (lb/hr)	-----	.53
SULFUR DIOXIDE (ppm)	-----	3.78
SULFUR DIOXIDE (lb/hr)	-----	1.22
SULFATES (gr/DSCF)	-----	.00006
SULFATES (lb/hr)	-----	.02
HCl (ug/m3)	-----	< 52
HCl (lb/hr)	-----	< 0.0001
MOISTURE CONTENT (%)	6.5	7.15
CARBON DIOXIDE (%)	42.9	7.8
NITROGEN (%)	4.7	80.2
OXYGEN (%)	.3	11.5
GAS TEMPERATURE (F)	100	1700
HEAT CONTENT	526 BTU/SCF	46,300,000 BTU/hr
VOLUMETRIC FLOW RATE (DSCFM)	1467	32750

ACFM
$\frac{1467}{1-.065} = 1569$

* inlet air at Louvers

CTL ENVIRONMENTAL SERVICES
24404 S VERMONT AV SUITE 307
HARBOR CITY, CA 90710
(213) 530-5006

CLIENT: BFI
TEST DATE: 21,22 May 1990
LOCATION: Sunshine Canyon
JOB NUMBER: 90-0659

TABLE 3

HYDROCARBONS/COMBUSTION PRODUCTS SUMMARY

RUN 3 - EXHAUST

PRODUCT	AMOUNT	MOL. WEIGHT	FLOW RATE (DCFM)	MASS EMISSION RATE (lb/hr)
METHANE	1.4 ppm	16	32750	.114
Total Non-Methane Hydrocarbons	1.4 ppm	16	32750	.114
TOLUENE	.052 ppm	92	32750	.029
TOTAL XYLENES	.005 ppm*	106	32750	.003*
ETHANOL	.0065 ppm	46	32750	.002
2-PROPANOL	.016 ppm	60	32750	.005
BUTANE	.052 ppm	58	32750	.015
PHENOL	.12 ppm	94	32750	.058

(Total Non-Methane Hydrocarbons as Hexanes)

* indicates limits of detection

RUN 4 - EXHAUST

PRODUCT	AMOUNT	MOL. WEIGHT	FLOW RATE (DCFM)	MASS EMISSION RATE (lb/hr)
METHANE	1.1 ppm	16	32750	.090
Total Non-Methane Hydrocarbons	2.2 ppm	16	32750	.180
TOLUENE	.2 ppm	92	32750	.094
TOTAL XYLENES	.0074 ppm	106	32750	.004
ETHANOL	.0065 ppm	46	32750	.002
2-PROPANOL	.0097 ppm	60	32750	.003
BUTANE	.1 ppm	58	32750	.030
PHENOL	.11 ppm	94	32750	.053

(Total Non-Methane Hydrocarbons as Methane)

CTL ENVIRONMENTAL SERVICES
24404 S VERMONT AV. SUITE 307
HARBOR CITY, CA 90719
(213) 530-5006

CLIENT: BFI
TEST DATE: 21,22 May 1990
TEST LOCATION: Sunshine Canyon
JOB NUMBER: 90-0659

TABLE 4

FLARE 1 - INLET TEST RESULTS

RUN 2 - INLET

PRODUCT	AMOUNT	MOL. WEIGHT	FLOW RATE (KSCFH)	MASS EMISSION RATE (lb/hr)
METHANE	520000 ppm	16	88	1903.616
Total Non-Methane Hydrocarbons	4400 ppm	16	88	16.108
TRICHLOROETHENE	2.4 ppm	133.5	88	.073
BENZENE	2.2 ppm	78	88	.039
TETRACHLOROETHENE	13 ppm	168	88	.500
TOLUENE	100 ppm	92	88	2.105
ETHYL BENZENE	59 ppm	106	88	1.431
Total XYLENES	92 ppm	106	88	2.231
ETHANOL	46 ppm	46	88	.484
2-PROPANOL	54 ppm	60	88	.741
BUTANE	38 ppm	58	88	.504
Other HC (C5-C7)	65 ppm		88	
Other HC (C8-C10)	234 ppm		88	

(Total Non-Methane Hydrocarbons as Methane)

HYDROGEN SULFIDE	78 ppm	34	88	.807
METHYL MERCAPTAN	12 ppm	48	88	.132
ETHYL MERCAPTAN	.5 ppm*	62	88	.007*
PROPYL MERCAPTAN	.5 ppm*	76	88	.009*
DIMETHYL SULFIDE	6.2 ppm	62	88	.088

* indicates limits of detection

CTL ENVIRONMENTAL SERVICES
24404 S VERMONT AV SUITE 307
HARBOR CITY, CA 90710
(213) 530-5006

CLIENT: BFI
TEST DATE: 21,22 May 1990
LOCATION: Sunshine Canyon
JOB NUMBER: 90-0659

TABLE 5

AMBIENT SAMPLE AND BLANK SAMPLE RESULTS SUMMARY

RUN 1 - AMBIENT AIR SAMPLE

PRODUCT	AMOUNT	MOL. WEIGHT	FLOW RATE (DCFM)	MASS EMISSION RATE (lb/hr)
METHANE	7.2 ppm	16	32750	.589
Total Non-Methane Hydrocarbons	.67 ppm	16	32750	.055
TOLUENE	.0062 ppm	92	32750	.003
TOTAL XYLENES	.005 ppm*	106	32750	.003*
ETHANOL	.0065 ppm	46	32750	.002
2-PROPANOL	.025 ppm	60	32750	.008
BUTANE	.0097 ppm	58	32750	.003
PHENOL	.084 ppm	94	32750	.040

(Total Non-Methane Hydrocarbons as Hexanes)

* indicates limits of detection

RUN 5 - SAMPLE BLANK

PRODUCT	AMOUNT	MOL. WEIGHT	FLOW RATE (DCFM)	MASS EMISSION RATE (lb/hr)
METHANE	1 ppm*	16	32750	.082*
Total Non-Methane Hydrocarbons	.26 ppm	16	32750	.021
TOLUENE	.0037 ppm	92	32750	.002
PHENOL	.041 ppm	94	32750	.020

(Total Non-Methane Hydrocarbons as Methane)

APPENDIX A

FIELD DATA

FLARE # 1

CTL ENVIRONMENTAL SERVICES
24404 S. VERMONT AV. SUITE 307
HARBOR CITY, CA 90710
(213) 530-5006

FIELD DATA SHEET

TEST DATE: 21,22 May 1990

JOB NUMBER: 90-0659

CLIENT: BFI
14747 San Fernando Road
Sylmar, CA 91342

SITE LOCATION: Sunshine Canyon Landfill
same as above

UNIT UNDER TEST: Landfill gas flaring system
TX-400, McGill, Model EGF 125

MANUFACTURE (MAIN UNIT): McGill

CONTROL EQUIPMENT:

UNIT SIZE (RATED CAPACITY): 4167 DSCFM

TEST TEAM MEMBERS: Paul Jordan, Terry Wong, Mike Fukuda, Mike Legerski

OBSERVERS (FOR): Lester Sakoda (BFI)
Dennis Hayashi (BFI)

PHOTOS: NONE

STACK OPERATING CONDITIONS:

STACK DIAMETER: 13 feet

AVERAGE dP (in Hg): .03

OPERATING TEMPERATURE (F): 1700

CYCLONIC FLOW: none

NOTES: None

STATIC PRESSURE (in Hg): -.3

CTL ENVIRONMENTAL SERVICES
24404 S. VERMONT AV. ST. 307
HARBOR CITY, CA 90710
(213) 530-3006

CLIENT: BFI
DATE OF TESTING: 21 May 1990
SAMPLING LOCATION: Sunshine Canyon
JOB NUMBER: 90-0660.1

CONTINUOUS ANALYSER DATA & RESULTS

SAMPLE POINT	TIME	% 02 dry	% 02	ppm NOx		NOx lb/hr	Flow Rate DSCFM (AVERAGE)
			Drift Corrected	Drift not Corrected	Drift Corrected		
1	1450	11	11.0	16	15.6	3.73	32750
2	1500	9.5	9.5	16	15.6	3.73	32750
3	1510	10	10.0	17	16.6	3.96	32750
4	1520	11.25	11.3	17	16.6	3.96	32750
5	1530	11.25	11.3	17	16.6	3.96	32750
6	1540	11.5	11.5	17	16.6	3.96	32750
7	1555	12.25	12.2	17	16.7	3.97	32750
8	1605	12.25	12.2	17	16.7	3.97	32750
9	1615	12.25	12.2	17	16.7	3.97	32750
10	1625	12.5	12.4	17	16.7	3.97	32750
11	1635	12.5	12.4	16	15.7	3.73	32750
12	1645	12.25	12.2	16	15.7	3.73	32750
MEAN		11.5	11.5	16.7	16.3	3.89	

CORRECTION FOR INSTRUMENT DRIFT

CALIBRATION:	1 st hour		2 nd hour	
	% 02	ppm NOx	% 02	ppm NOx
ZERO READING (end of hour)	.0	2	.25	2
SPAN READING (end of hour)	20.8	189	21	188
SPAN GAS VALUE	20.9	187	20.9	187
ZERO DRIFT FACTOR	.00 %/10 min	.33 ppm/10 min	.04 %/10 min	.33 ppm/10 min
SPAN DRIFT FACTOR	.08 %/10 min	-.16 %/10 min	-.08 %/10 min	-.09 %/10 min

CTL ENVIRONMENTAL SERVICES
24404 S. VERMONT AV. ST. 307
HARBOR CITY, CA 90710
(213) 530-5006

CLIENT: BFI
DATE OF TESTING: 22 May 1990
SAMPLING LOCATION: Sunshine Canyon
JOB NUMBER: 90-0660.1

CONTINUOUS ANALYSER DATA & RESULTS

SAMPLE POINT	TIME	% 02 dry	% 02	ppm NOx		NOx lb/hr	Flow Rate DSCFM (AVERAGE)
			Drift Corrected	Drift not Corrected	Drift Corrected		
1	910	11.25	11.3	16	15.6	3.71	32750
2	920	11.5	11.5	17	16.6	3.95	32750
3	930	11.5	11.5	17.5	17.1	4.07	32750
4	940	11.25	11.3	17.5	17.1	4.07	32750
5	950	11	11.0	18	17.6	4.19	32750
6	1000	11.25	11.3	18	17.6	4.19	32750
MEAN		11.3	11.3	17.3	16.9	4.03	

CORRECTION FOR INSTRUMENT DRIFT

CALIBRATION:	% 02	ppm NOx
ZERO READING (end of hour)	.0	2.5
SPAN READING (end of hour)	20.5	187
SPAN GAS VALUE	20.9	187
ZERO DRIFT FACTOR	.00 %/10 min	.42 ppm/10 min
SPAN DRIFT FACTOR	.32 %/10 min	.00 %/10 min

CTL ENVIRONMENTAL SERVICES
24404 S. VERMONT AVENUE, SUITE 307
HARBOR CITY, CA 90710
(213) 530-8006

CLIENT: BFI
DATE OF TESTING: MAY 22 1990
SAMPLING LOCATION: FLARE
JOB NUMBER: 90-0659

PARTICULATE TEST DATA

	RUN 1 OUTLET	RUN 2 OUTLET
INITIAL FILTER WEIGHT (gg)	341.9	343.0
FINAL FILTER WEIGHT (gg)	342.1	344.1
WEIGHT GAIN (gg)	.19	1.1
PROBE WASH (gg)	1.80	1.90
PROBE WASH BLANK (gg)	.00	.00
CONDENSABLES FROM IMPINGER CATCH (gg)	.75	.90
TOTAL PARTICULATE CATCH (gg)	2.74	3.89
VOLUME COLLECTED (DSCF)	23.306	30.512
PARTICULATE EMISSIONS (GR/DSCF)	.0018	.0020
STACK % CO2 (DRY BASIS)	7.80	7.80
GRAINS/DSCF @ 12% CO2	.0028	.0030
STACK MOISTURE (% H2O VAPOR)	7.54	6.77
GRAINS/SCF	.0017	.0018
GRAINS/SCF @ 12% CO2	.0028	.0030
STACK FLOW RATE (DSCFM) (at outlet)	31832	33673
MASS EMISSION RATE (lb/hr)	.49	.57

CTL ENVIRONMENTAL SERVICES
24404 S VERMONT AV. SUITE 307
HARBOR CITY, CA 90710
(213) 530-5006

CLIENT: BFI
TEST DATE: 21,22 May 1990
SAMPLING LOCATION: Sunshine Canyon
JOB NUMBER: 90-0659

SULFUR DIOXIDE TEST DATA

	RUN 1 OUTLET	RUN 2 OUTLET		RUN 3 OUTLET
GAS VOLUME COLLECTED (dry standard cu ft)	35.1207	36.9189		32.683
NORMALITY OF Ba(C104)2	.0108	.0108		.0108
TOTAL SAMPLE VOLUME (ml)	345	335		320
ALIQUOT VOLUME (ml)	20	20		20
TITRATION VOLUME (ml)	9.05	8.5		4.65
BLANK VOLUME (ml)	.2	.2		.2
CONCENTRATION OF SO2 (lb/DSCF)	3.315e-6	2.872e-6		1.661e-6
SO2 CONCENTRATION (ppm dry basis)	19.66	17.03		9.85
STACK FLOW RATE (dscfm at Outlet)	17497	18114	Average	17806
MASS EMISSION RATE (lb/hr)	3.48	3.12		1.77
% WATER VAPOR	17.65	18.05	Average	17.95
SO2 CONCENTRATION (ppm wet basis)	16.15	13.96		8.08

CTL ENVIRONMENTAL SERVICES
24404 S VERMONT AV. SUITE 307
HARBOR CITY, CA 90710
(213) 530-5006

CLIENT: BFI
DATE OF TESTING: 21 May 1990
SAMPLING LOCATION: Sunshine Canyon
REPORT NUMBER: 90-0659

SULFURIC ACID MIST AND SULFATE PARTICULATE DATA

	RUN 1 OUTLET
GAS VOLUME COLLECTED (dry standard cu ft)	23.506
TOTAL SULFATE PARTICULATE (grains)	.0014
SULFATE CONCENTRATION (grains/DSCF)	.00006
% CO2 (dry basis)	7.8
SULFATE CONCENTRATION (grains/DSCF @ 12 % CO2)	.00009
STACK FLOW RATE (OUTLET) (DSCFM)	31382
MASS EMISSION RATE (lb/hr)	.02
% WATER VAPOR	7.54
SULFATE CONCENTRATION (grains/SCF)	.00006
SULFATE CONCENTRATION (grains/SCF @ 12 % CO2)	.00009

CTL ENVIRONMENTAL SERVICES
24404 S. VERMONT AV., ST. 307
HARBOR CITY, CA 90710
(213) 530-5006

CLIENT: SFI
DATE: 21- 22 May 1990
LOCATION: Sunshine Canyon
JOB: 90-0660.1

SAMPLE TYPE: PARTICULATE
RUN NUMBER: 1
OPERATOR: MF ML
SAMPLE CASE NUMBER: 5
MONITOR UNIT NUMBER: 3
METER CORRECTION FACTOR: .97
PITOT TUBE FACTOR: .84
PRE-LEAK CHECK: < 0.01 CFM @ 15 psi
POST-LEAK CHECK: < 0.01 CFM @ 5 psi
PURGE W/AIR FOR: 15 min @ .3 in-H2O
NOZZLE AREA (sq ft) .0012566

AMBIENT TEMPERATURE (deg F) 73
BAROMETRIC PRESSURE (in-Hg) 28.26
ASSUMED MOISTURE (%): 5
STATIC PRESSURE (in-H2O): -.3
NOZZLE DIAMETER (in): .48
FILTER TEMPERATURE (deg F): 250
PROBE TEMPERATURE (deg F): 250
PITOBE LENGTH (ft): 15
LINER MATERIAL: ss
STACK DIAMETER (in): 156
STACK AREA (sq ft) 132.747

TRAVERSE POINT NUMBER	SAMPLE TIME (MIN)	DRY GAS METER READING	VELOCITY HEAD (in-H2O)	ORIFICE DIF PRESS (in-H2O)	DRY GAS TEMP (deg F)	PUMP VACUUM (in-Hg)	FILTER TEMP (deg F)	IMPINGER TEMP (deg F)	STACK PRESSURE (in-Hg)	STACK TEMP (deg F)	NOTES
1	0	970.636	.01	.13	88	3	230	60	28.26	1712	START 1608
2	3		.02	.25	90	5	270	52	28.26	1712	on 21 May 1990
3	6		.01	.13	90	5	270	52	28.26	1712	
4	9		.02	.25	90	3	250	60	28.26	1712	
5	12		.02	.25	92	3	250	51	28.26	1712	
6	15		.02	.25	94	3	260	51	28.26	1712	
7	18		.02	.25	96	3	250	51	28.26	1712	
8	21		.03	.38	98	5	250	55	28.26	1712	
9	24		.03	.38	100	5	250	55	28.26	1712	
10	27		.03	.38	100	5	250	55	28.26	1712	
11	30		.02	.25	101	4	250	55	28.26	1712	
12	33		.02	.25	102	4	250	60	28.26	1712	Switch 1646
13	36	986.12	.02	.25	94	2	250	50	28.26	1700	Resume 0915
14	39		.03	.38	96	3	250	50	28.26	1695	on 22 May 1990
15	42		.03	.38	97	3	250	50	28.26	1706	
16	45		.04	.51	98	3	250	50	28.26	1701	
17	48		.04	.51	101	3	250	50	28.26	1705	
18	51		.04	.51	102	3	250	50	28.26	1701	
19	54		.04	.51	102	3	250	50	28.26	1704	
20	57		.04	.51	102	3	250	50	28.26	1702	
21	60		.04	.51	104	3	250	50	28.26	1701	
22	63		.04	.51	105	3	250	50	28.26	1700	
23	66		.03	.38	105	4	250	50	28.26	1703	
24	69	998.116	.02	.25	110	3	250	50	28.26	1705	END 0951
TOTALS	72	27.48									
AVERAGES		AVG SQRT=	.1650	.35	98.21				28.26	1707.04	

	CONTENTS	INIT WT	FINAL WT	DIF (g)
IMPINGER #1	D.I. H2O	562.6	595.7	33.1
IMPINGER #2	D.I. H2O	555.7	558.2	2.5
IMPINGER #3	EMPTY	449	449.6	.6
IMPINGER #4	SiO2	669.6	674.6	5
	TOTAL WT GAIN (g)			41.2

%CO2:	7.8
%O2 :	12
PPM CO :	10
%N2 :	80.2
M.W. DRY	29.73
M.W. WET	28.84

VOL. (DSCF) :	23.50562
% H2O :	7.54
VEL (ft/sec) :	17.08
% ISOKINETIC :	108.32
STACK FLOW RATE:	151991 CFM
FLOW RATE (std):	31832 SCFM

CTL ENVIRONMENTAL SERVICES
24404 S. VERMONT AV., ST. 307
HARBOR CITY, CA 90710
(213) 530-5006

CLIENT: BFI
DATE: 22 May 1990
LOCATION: Sunshine Canyon
JOB: 90-0660.1

SAMPLE TYPE: PARTICULATE
RUN NUMBER: 2
OPERATOR: PJ ML
SAMPLE CASE NUMBER: 6
MONITOR UNIT NUMBER: 3
METER CORRECTION FACTOR: .97
PITOT TUBE FACTOR: .84
PRE-LEAK CHECK: < 0.01 CFM @ 16 psi
POST-LEAK CHECK: < 0.01 CFM @ 5 psi
PURGE W/AIR FOR: 15 min @ .3 in-H2O
NOZZLE AREA (sq ft) .0021305

AMBIENT TEMPERATURE (deg F)	80
BAROMETRIC PRESSURE (in-Hg)	28.3
ASSUMED MOISTURE (%):	10
STATIC PRESSURE (in-H2O):	-.3
NOZZLE DIAMETER (in):	.625
FILTER TEMPERATURE (deg F):	250
PROBE TEMPERATURE (deg F):	250
PITOBE LENGTH (ft):	15
LINER MATERIAL:	quartz
STACK DIAMETER (in):	156
STACK AREA (sq ft)	132.747

TRAVERSE POINT NUMBER	SAMPLE TIME (MIN)	DRY GAS METER READING	VELOCITY HEAD (in-H2O)	ORIFICE DIF PRESS (in-H2O)	DRY GAS TEMP (deg F)	PUMP VACUUM (in-Hg)	FILTER TEMP (deg F)	IMPINGER TEMP (deg F)	STACK PRESSURE (in-Hg)	STACK TEMP (deg F)	NOTES
1	0	.411	.02	.66	108	2	250	45	28.28	1700	START 1100
2	2.5		.02	.66	109	2	250	45	28.28	1705	
3	5		.03	.99	108	2	250	45	28.28	1700	
4	7.5		.03	.99	110	2	270	50	28.28	1705	
5	10		.03	.99	110	2	270	50	28.28	1701	
6	12.5		.03	.99	111	2	270	50	28.28	1702	
7	15		.03	.99	111	2	270	50	28.28	1702	
8	17.5		.02	.66	112	2	270	50	28.28	1701	
9	20		.02	.66	112	2	270	50	28.28	1699	
10	22.5		.02	.66	112	3	260	50	28.28	1700	
11	25		.03	.99	113	3	260	50	28.28	1700	
12	27.5		.03	.99	113	3	260	50	28.28	1705	
13	30		.04	1.32	114	4	260	50	28.28	1704	
14	32.5		.04	1.32	118	4	260	50	28.28	1700	
15	35		.04	1.32	120	4	260	50	28.28	1710	
16	37.5		.04	1.32	120	4	260	50	28.28	1715	
17	40		.03	.99	121	4	260	50	28.28	1710	
18	42.5		.03	.99	121	4	260	50	28.28	1701	
19	45		.03	.99	121	4	260	50	28.28	1701	
20	47.5		.03	.99	121	3	260	50	28.28	1706	
21	50		.03	.99	122	3	260	50	28.28	1705	
22	52.5		.03	.99	122	3	260	50	28.28	1702	
23	55		.03	.99	124	3	260	50	28.28	1701	
24	57.5	.715	.03	.99	124	3	260	50	28.28	1701	END 1200
TOTALS	60	76.704									
AVERAGES		AVG SQRT=	.1710	.98	115.71				28.28	1703.17	

	CONTENTS	INIT WT	FINAL WT	DIF (g)
IMPINGER #1	D.I. H2O	538.2	570.9	32.7
IMPINGER #2	D.I. H2O	528	533.9	5.9
IMPINGER #3	EMPTY	434.3	436.5	2.2
IMPINGER #4	SiO2	611.4	618.2	6.8
	TOTAL WT GAIN (g)			47.6

%CO2:	7.8
%O2 :	12
PPM CO :	10
%N2 :	80.2
M.W. DRY	29.73
M.W. WET	28.93

VOL. (DSCF) :	30.51174
% H2O :	6.77
VEL (ft/sec) :	19.97
% ISOKINETIC :	94.08
STACK FLOW RATE:	159047 CFM
FLOW RATE (std):	33673 SCFM

Plant BFI Sunshine
Run number 1 Part
Location Flare
Date 5/21/10
Operator MT
Sample case number 5
Monitor unit number 3
Meter corr. factor .97
Pitot factor (C_p) .84
Leak check (PRE) <0.01 @ 15
Leak check (POST) <0.01 @ 5

CTL ENVIRONMENTAL SERVICES
2905 E. CENTURY BLVD.
SOUTH GATE, CALIF. 90280
(213) 564-2641

Ambient temp. 73°
Bar. pressure 28.28
Assumed moisture 5%
Filter box temp. 250
Probe temp. 250
Pitobe tip diam. .48
Pitobe length 15'
Pitobe liner material SS

Stack area 13' Dia

Run 1

K = 12.68

POINT #	CLOCK TIME (min)	DRY GAS METER (cu ft)	PITOT ΔP ("H_2O)	ORIFICE ΔH ("H_2O)	DRY GAS TEMP (°F)	PUMP VAC ("H_2O)	FILTER TEMP (°F)	IMPINGER TEMP (°F)	STACK PRESS. ("H_2O)	STACK TEMP (°F)	NOTES
1	0	970.638	.01	.13	88	3	250	60		1712 F	START 1608
2	3		.02	.25	90	5	270	52		1712	
3	6		.01	.13	90	5	270	52		1712	
4	9		.02	.25	90	3	250	60		1712	
5	12		.02	.25	92	3	250	51		1712	
6	15		.02	.25	94	3	260	51		1712	
7	18		.02	.25	96	3	250	51		1712	
8	21		.03	.38	98	5	250	55		1712	
9	24		.03	.38	100	5	250	55		1712	
10	27		.03	.38	100	5	250	55		1712	
11	30		.02	.25	101	4	250	55		1712	
12	33		.02	.25	102	4	250	60		1712	SWITCH 1646
13	36	986.120	.02	.25	94	2	250	50		1700	RESUME 0915 5/22/10
14	39		.03	.38	96	3	250	50		1695	
15	42		.03	.38	97	3	250	50		1706	
16	45		.04	.61	98	3	250	50		1701	
17	48		.04	.61	101	3	250	50		1705	
18	51		.04	.61	102	3	250	50		1701	
19	54		.04	.61	102	3	250	50		1704	
20	57		.04	.61	103	3	250	50		1702	
21	60		.04	.61	104	2	250	50		1701	
22	63		.04	.61	105	2	250	50		1700	
23	66		.03	.38	104	4	250	50		1705	
24	69	998.416	.02	.25	100	3	250	^		1705	END 0951

AVG. 73 (AVG SQ RT ΔP)

Filter: BFI-1
INIT WT 341.9
FINAL WT
PROBE

Impinger #1	562.6	595.7	grams
Impinger #2	555.7	558.2	
Impinger #3	449.0	445.6	
Impinger #4	669.6	674.6	

%CO_2 7.8%
%O_2 12%
%CO 10 ppm
%N_2

Plant BFI Sunshine
Run number 2 Part + HCL
Location Flare
Date 5/23/90
Operator PJ ML
Sample case number 6
Monitor unit number 3
Meter corr. factor .997
Pitot factor (C_p) .84
Leak check (PRE) <0.01 @ 12
Leak check (POST) <0.01 @ 6

CTL ENVIRONMENTAL SERVICES
2905 E. CENTURY BLVD.
SOUTH GATE, CALIF. 90280
(213) 564-2641

Ambient temp. 80°
Bar. pressure 29.3
Assumed moisture 10
Filter box temp. 250
Probe temp. 250
Pitobe tip diam. .685
Pitobe length 15
Pitobe liner material Quartz

Stack area 13' dia

K 32.97

Run 2

POINT #	CLOCK TIME (min)	DRY GAS METER (cu ft)	PITOT ΔP ("H_2O)	ORIFICE ΔH ("H_2O)	DRY GAS TEMP (°F)	PUMP VAC ("H_2O)	FILTER TEMP (°F)	IMPINGER TEMP (°F)	STACK PRESS. ("H_2O)	STACK TEMP (°F)	NOTES
1	0	000.411	.02	.66	108	2	250	45		1700	Start 11:00
2	2.5		.02	.66	109	2	250	45		1705	
3	5.0		.03	.99	108	2	250	45		1700	
4	7.5		.07	.99	110	2	270	50		1705	
5	10.0		.03	.99	110	2	270	50		1701	
6	12.5		.02	.66	111	2	270	50		1702	
7	15.0		.03	.99	111	2	270	50		1702	
8	17.5		.02	.66	112	2	270	50		1701	
9	20.0		.02	.66	112	2	270	50		1699	
10	22.5		.02	.66	112	3	260	50		1700	
11	25.0		.03	.99	113	3	260	50		1700	
12	27.5		.03	.99	113	3	260	50		1703	
13	30.0		.04	1.32	114	4	260	50		1704	
14	32.5		.04	1.32	116	4	260	50		1700	
15	35.0		.04	1.32	120	4	260	50		1716	
16	37.5		.04	1.32	120	4	260	50		1715	
17	40.0		.03	.99	121	4	260	50		1710	
18	42.5		.03	.99	121	4	260	50		1701	
19	45.0		.03	.99	121	4	260	50		1700	
20	47.5		.03	.99	121	3	260	50		1706	
21	50.0		.07	.99	122	3	260	50		1705	
22	52.5		.07	.99	122	3	260	50		1702	
23	55.0		.03	.99	124	3	260	50		1700	
24	57.5	037.115	.03	.99	124	3	260	50		1700	END 1200

AVG. .60 (AVG SQ RT ΔP)

Filter# BFI-2
INIT WT 343.0
FINAL WT
PROBE

Impinger#1	538.2	570.9 grams
Impinger#2	528.0	533.9
Impinger#3	434.3	436.5
Impinger#4	611.4	618.2

%CO_2 7.8
%O_2 12
%CO 10
%N_2 80.2

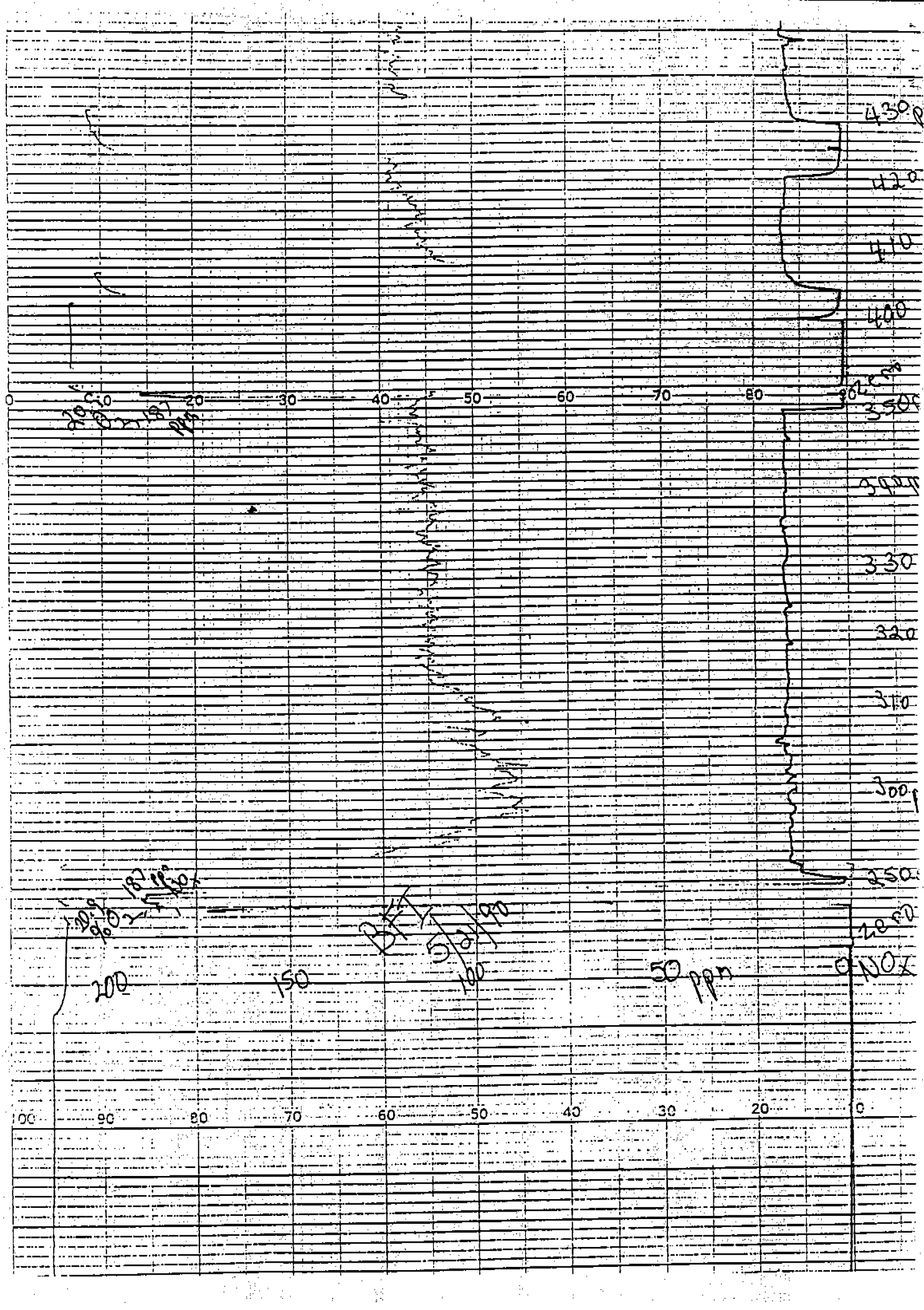
BFI 5/21/90

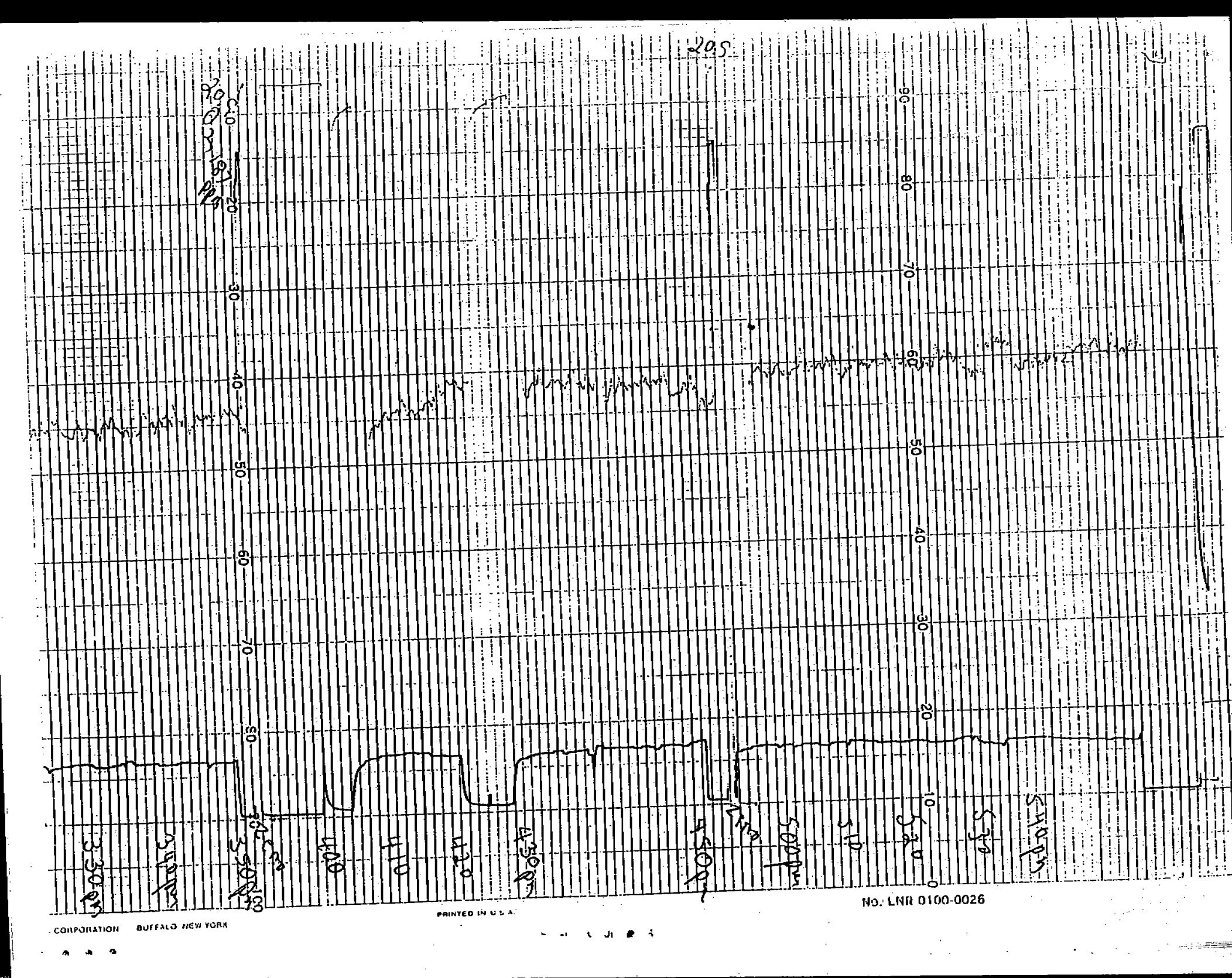
CO + CO2

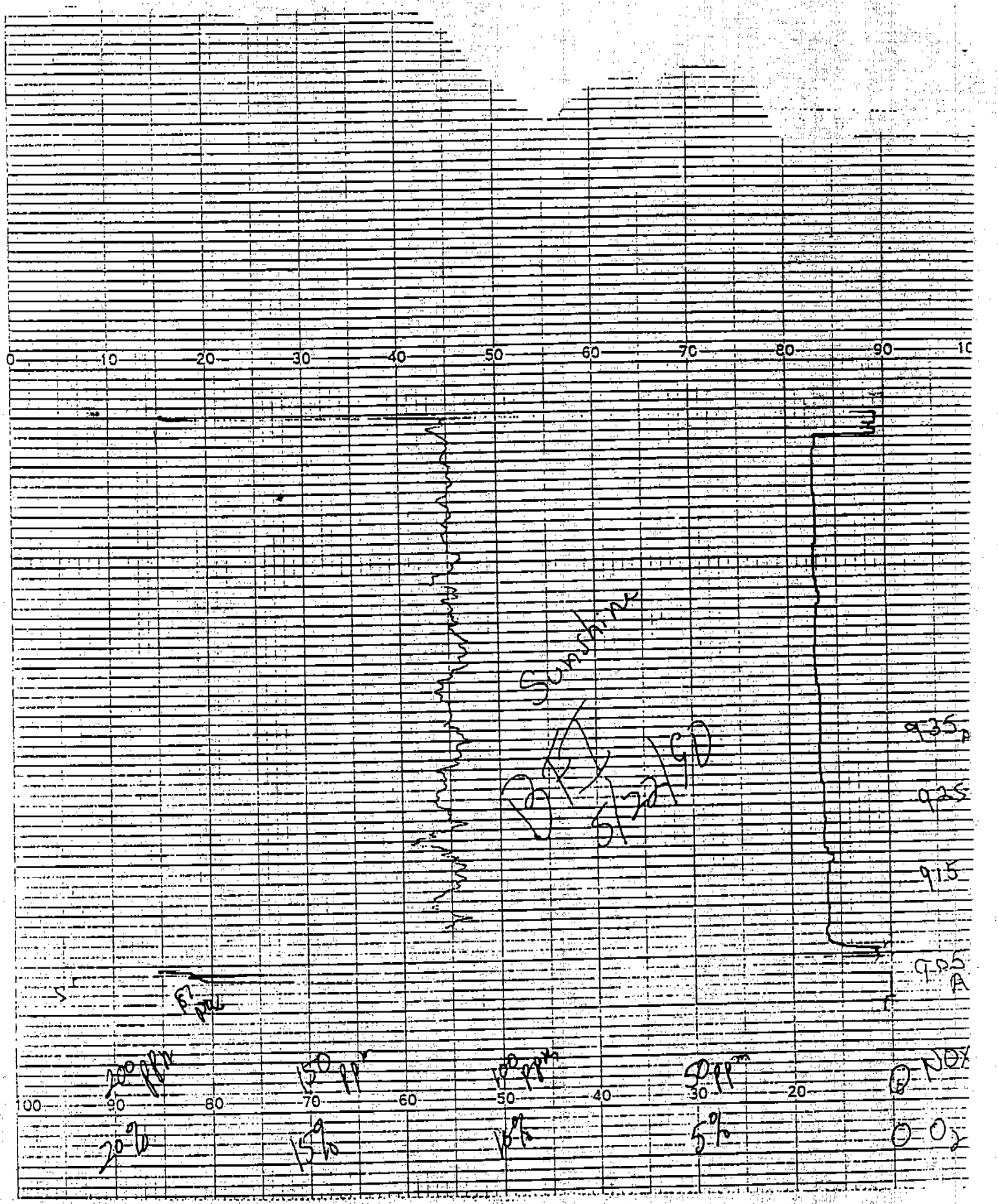
Time	CO	CO_2	Time	CO	CO_2		
255 pm	0 / 450	0 / 14.05	355 pm	0 / 450	0 / 14.05		
300 pm	8	8.0	400 pm	6	7.6		
3:05 pm	6	8.0	405	0	7.6		
310 pm	2	7.6	420	0	7.6		
315 pm	2	8.0	430	2	7.2		
320 pm	1	7.6	440	0	7.6		
325 pm	1	7.6	450	0	8.0		
330 pm	1	7.6	500	0	7.6		
335 pm	0	7.6	510	0	7.2		
340 pm	0	7.8	520	0	7.2		
345 pm	0	7.6	530	0	7.4		
350 pm	0	7.6	540	0	7.4		

BF1 3/27/17
CO + CO2

Time	CO	CO_2					
900 AM	0 / 450	0 / 14.05					
905 AM	20	7.6					
915 AM	15	7.2					
925 AM	10	7.8					
935 AM	5	7.8					
945 AM	5	7.6					
955 AM	0	7.1					
10:05 AM	0	7.6					
10:10	0 / +00	0 / 14.05					


430
420
410
400
350
330
320
310
300
250
200
150
100
50 ppm
0 NOx
0
10
20
30
40
50
60
70
80
90
100




0
10
20
30
40
50
60
70
80
90
100
Sunshine
9.35
9.25
9.15
9.05
200 ppm
150 ppm
100 ppm
50 ppm
0 NOX
20%
15%
10%
5%
0 O2

CLIENT: BFI JOB NUMBER: 90-0659

LOCATION: Sunshine Canyon DATE: 21, 1990

	Sample 1	Sample 2	Sample 3
	Ambient	inlet	Exhaust
Source Temperature (F):	75°	100°	1700
Ambient Temperature (F):	75°	75°	75°
Barometric Pressure (in Hg):	28.83	28.83	28.83
Sample Flow Rate (approx):	.1	.1	.1
Bag Number:	SC-1	SC-2	SC 3
Start Time:	250 pm	3:20 pm	350 pm
End Time:	320 pm	350 pm	420 pm

NOTES :

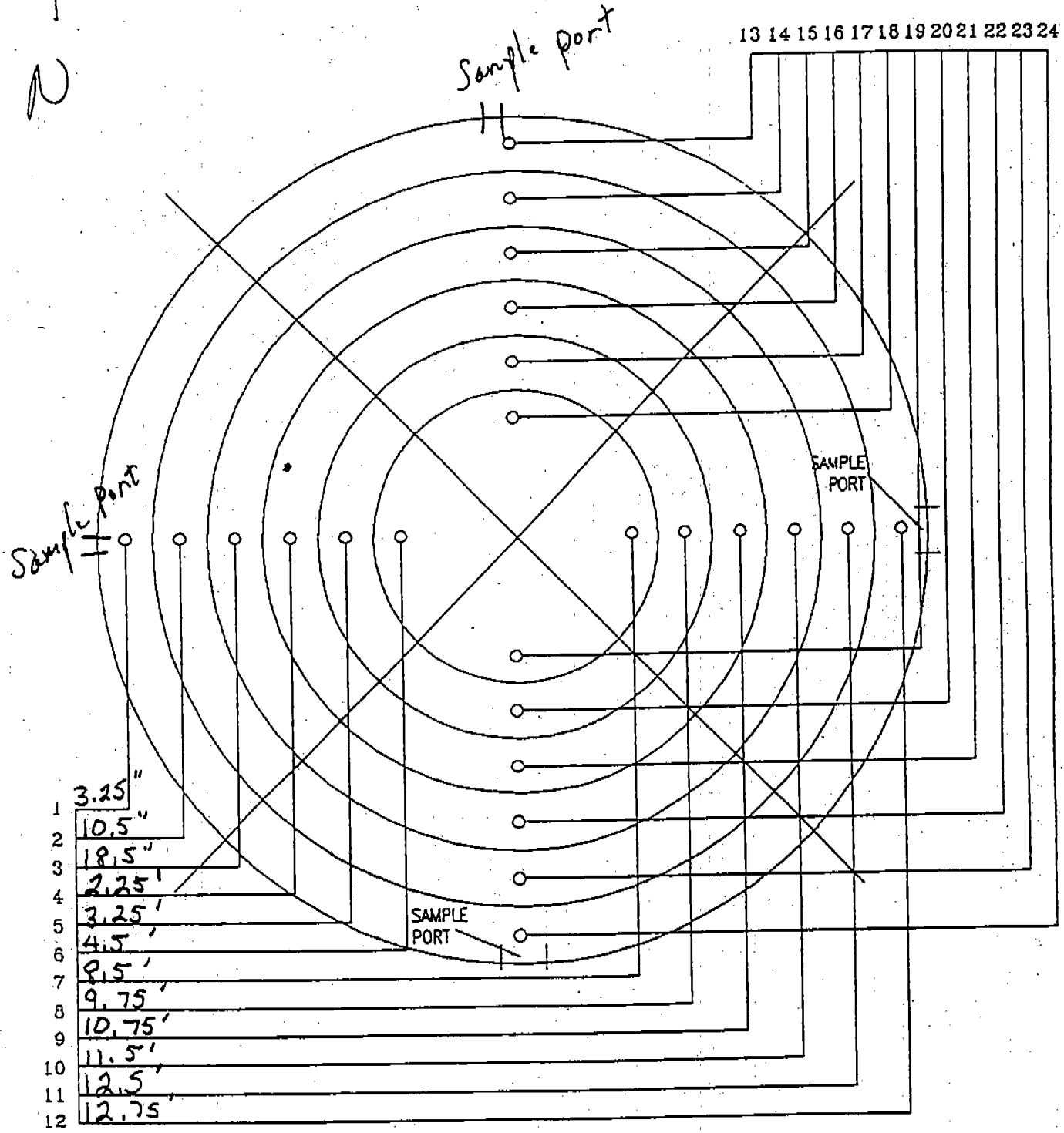
CLIENT: BFJ JOB NUMBER: 90-0659

LOCATION: Sunshine Canyon DATE: May 22 1990

	Sample 1	Sample 2	Sample 3
	Exhaust	Blank	
Source Temperature (F):	1700	—	
Ambient Temperature (F):	70	—	
Barometric Pressure (in Hg):	38.84	—	
Sample Flow Rate (approx):	.1	—	
Bag Number:	SC-4	SC-5	
Start Time:	9:35 am	—	
End Time:	1005 Am	—	

NOTES:

LOCATION OF TRAVERSE POINTS



CLIENT: BFI
JOB #: Sunshine Canyon
5/21/90

CERTIFIED TESTING LABORATORIES, INC.

2648 EAST 28TH STREET • SIGNAL HILL, CALIFORNIA 90806
(213) 424-9992

- SAN DIEGO
- HARBOR CITY
- BAKERSFIELD
- SOUTH GATE
- SAN FRANCISCO

CHAIN OF CUSTODY RECORD

Date 5/22/90 Page 1 of 1

CLIENT: XEON / BFI

ADDRESS:

PROJECT MANAGER: Paul Jordan

PHONE NUMBER: (213) 530-5006

PROJECT NAME: Sunshine Canyon

SAMPLERS: (Signature) PJ

SAMPLE NUMBER	LOCATION DESCRIPTION	DATE	TIME	SAMPLE TYPE: WATER Comp.	WATER Grab.	AIR	SOLID	NO. OF CONTAINERS	TESTS REQUIRED
1	Ambient	5/21/90				✓		1	See Attached
2	inlet	5/21/90				✓		1	
3	Exhaust	5/21/90				✓		1	
4	Exhaust	5/21/90				✓		1	
5	Blank	5/21/90				✓		1	
								5	

Special Instructions:
Within 72hrs

I hereby authorize the performance of the above indicated work.

Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received by: (Signature)	Date/Time

The Client is responsible for the disposal of unused portions of samples. CTL will store samples for 30 days. After 30 days, CTL will dispose of all nonaqueous and all hazardous samples for a fee.

1. Client will pick up _____ by _____
2. Lab Disposal _____ by _____

Received for Laboratory by: Julie A. Lopez

5/23/9:40AM Date/Time

SOURCE: Adapted from U.S. EPA, 1985

APPENDIX B

LABORATORY DATA

certified testing laboratories, inc.
2648 EAST 28TH STREET • SIGNAL HILL, CALIFORNIA 90806
PHONE: (213) 424-9992 • FAX (213) 492-1203

LABORATORY NO. 10459

REPORTED 06-14-90

RECEIVED 05-23-90

CLIENT Xeon / B F I
24404 S. Vermont Avenue
Suite #307
Harbor City, CA 90710
Attn: Paul Jordan

SAMPLE Air (tedlar bags)

MARKS Sunshine Canyon

BASED ON SAMPLE As received

RESULTS

Analyte	Analyses Results		Method	Detection Limits	
#1 Ambient 5/21/90					
Methane	7.2	Vppm	(GC/FID)	1	Vppm
Speciated Nonmenthane Hydrocarbons			(GC/MS Scan)		
Toluene	6.2	Vppb		2	Vppb
Total Xylene	trace	Vppb		5	Vppb
Other Compounds (tentatively identified with estimated concentration)					
Ethanol	6.5	Vppb			
2-Propanol	26	Vppb			
Butane	9.7	Vppb			
Phenol	84	Vppb			

TNMHC 670 ppb @5 METHANE

LABORATORY NO. 10459 REPORTED 06-14-90

CLIENT Xeon / B F I RECEIVED 05-23-90

SAMPLE Air (tedlar bags)

MARKS Sunshine Canyon

BASED ON SAMPLE As received

RESULTS

Analyte	Analyses Results		Method	Detection Limits
#2 Inlet 5/21/90				
Methane	52.1	%	(GC/FID)	1 ppm
Speciated Nonmenthane Hydrocarbons			(GC/MS Scan)	
Trichloroethene	2.4	Vppm		5 Vppb
Benzene	2.2	Vppm		5 Vppb
Tetrachloroethene	13	Vppm		2 Vppb
Toluene	100	Vppm		2 Vppb
Ethyl Benzene	59	Vppm		2 Vppb
Total Xylenes	92	Vppm		5 Vppb
Other compounds (tentatively identified with estimated concentration)				
Ethanol	46	Vppm		
2-propanol	54	Vppm		
Butane	38	Vppm		
Other Hydrocabons (C_5 to C_7)	65	Vppm		
Other Hydrocarbons (C_8 to C_{10})	234	Vppm		
Oxygen	0.3	%	(GC/TCD)	
Nitrogen	4.7	%	(GC/TCD)	
Sulfur Gases			(GC/HECD)	
Hydrogen Sulfide	78	Vppm		0.5 Vppm
Methyl Mercaptan	12	Vppm		0.5 Vppm
Ethyl Mercaptan	ND	Vppm		0.5 Vppm
propyl mecaptan	ND	Vppm		0.5 Vppm
dimethyl sulfide	6.2	Vppm		0.5 Vppm
Carbon Monoxide	ND	Vppm	(GC/TCD)	5 Vppm
Carbon Dioxide	42.9	%	(GC/TCD)	
BTU Value per SCF	526		(ASTM 1946-82)	

TNMHC 4400 ppm as Methane

$\frac{4400}{6}$ = 733 as Propane

LABORATORY NO. 10459 REPORTED 06-14-90

CLIENT Xeon / B F I RECEIVED 05-23-90

SAMPLE Air (tedlar bags)

MARKS Sunshine Canyon

BASED ON SAMPLE As received

RESULTS

Analyte	Analyses Results		Method	Detection Limits	
#3 Exhaust 5/21/90					
Methane *	1.4	Vppm	(GC/FID)	1	Vppm
Speciated Nonmethane Hydrocarbons			(GC/MS Scan)		
Toluene	62	Vppb		2	Vppb
Total Xylenes	trace	Vppb		5	Vppb
Other compounds (tentatively identified with estimated concentration)					
Ethanol	6.5	Vppb			
2-propanol	16	Vppb			
Butane	52	Vppb			
Phenol	120	Vppb			
Nitrogen	80.1	%	(GC/TCD)		
Sulfur Gases			(GC/HECD)		
Hydrogen Sulfide	ND	Vppb		20	Vppb
Methyl Mecerptan	ND	Vppb		20	Vppb
Ethyl Mercaptan	ND	Vppb		20	Vppb
Propyl Mercaptan	ND	Vppb		20	Vppb
Dimethyl Sulfide	ND	Vppb		20	Vppb
Carbon Monoxide	ND	Vppb	(GC/TCD)	5	Vppm
Carbon Dioxide	7.1	%	(GC/TCD)		

TNMHC 1400 ppb as METHANE

LABORATORY NO. 10459

REPORTED 06-14-90

CLIENT Xeon / B F I

RECEIVED 05-23-90

SAMPLE Air (tedlar bags)

MARKS Sunshine Canyon

BASED ON SAMPLE As received

RESULTS

Analyte	Analyses Results		Method	Detection Limits	
#4 Exhaust 5/22/90					
Methane	1.1	Vppm	(GC/FID)	1	Vppm
Speciated Nonmethane Hydrocarbons			(GC/MS Scan)		
Toluene	200	Vppb		2	Vppb
Total Xylenes	7.4	Vppb		5	Vppb
Other compounds (tentativelty identified with estimated concentration)					
Ethanol	6.5	Vppb			
2-propanol	9.7	Vppb			
Butane	100	Vppb			
Phenol	110	Vppb			
Nitrogen	80.1	%	(GC/TCD) (GC/HECD)		
Sulfur Gases				20	Vppb
Hydrogen Sulfide	ND	Vppb		20	Vppb
Methyl Mercaptan	ND	Vppb		20	Vppb
Ethyl Mercaptan	ND	Vppb		20	Vppb
Propyl Mercaptan	ND	Vppb		20	Vppb
Dimethyl Sulfide	ND	Vppb		5	Vppm
Carbon Monoxide	12	Vppm	(GC/TCD)		
Carbon Dioxide	7.2	%	(GC/TCD)		

TNMHC 2200 ppb AS METHANE

avg NMHC = $\frac{2200+1400}{2}$ = 1800/6 = 300

LABORATORY NO. 10459

REPORTED 06-14-90

CLIENT Xeon / B F I

RECEIVED 05-23-90

SAMPLE Air (tedlar bags)

MARKS Sunshine Canyon

BASED ON SAMPLE As received

RESULTS

Analyte	Analyses Results		Method	Detection Limits	
#5 Blank 5/22/90					
Methane	<1	Vppm	(GC/FID)	1	Vppm
Speciated Nonemethane Hydrocarbons			(GC/MS Scan)		
Toluene	3.7	Vppb		2	Vppb
Other compounds (tentatively identified with estimated concentration)					
Phenol	41	Vppb			
TNMHC	260	ppb	As METHANE		

Attachment: Chain of Custody

Respectfully submitted,
CERTIFIED TESTING LABORATORIES, INC.

John A. Pettus, Ph.D.
Laboratory Director

COST: A-C D&E

RUSH 100% 50% TEST WITHIN 24 hours

CLIENT Xeon/BEI

ADDRESS

CONTACT PERSON & PHONE NO. Paul Jordan

P.O. #

SPECIAL INSTRUCTIONS:

REPORTED

INVOICED

NO.

AMOUNT

DATE RECEIVED 5-23-90

Time 9:40 am

(213) 530-5006

SAMPLE

Type: air

Container: tedlar bag

Amount: 5

Marks: Sunshine Canyon

	#1 5/21/90 Ambient	#2 5/21/90 inlet	#3 5/21/90 Exhaust	#4 5/22/90 Exhaust	#5 5/22/90 Blank
Methane					
TNMHC (As Methane)	670 ppb	4400 ppm	1400 ppb	2200 ppb	260 ppb
TNMHC (Speciated by GCMS)		↑			
O2					
N2					
H2S		78 ppm	ND <20 ppb	ND <20 ppb	
Methyl Mercaptan		12 ppm			
Ethyl Mercaptan		ND <0.5 ppm			
Propyl Mercaptan		ND <0.5 ppm			
CO					
Dimethyl sulfide		6.2 ppm			
CO2					
BTU Value (Per ASTM 1946-82)					

3

(White-Control) (Green-GC Lab) (Canary-Wet Lab) (Pink-Asbestos) (Golden Rod-Billing)

CUST. #_____ A-C DATE

☐ RUSH 100% 50% TEST WITHIN ~~24hrs~~ 48hrs

CLIENT Xeon/BFI

ADDRESS

CONTACT PERSON & PHONE NO. Paul Jordan (213) 530-5006

P.O. #

SPECIAL INSTRUCTIONS:

REPORTED

INVOICED

NO.

AMOUNT

DATE RECEIVED 5-23-90

Time 9.40 am

SAMPLE

Type: air

Container: tedlar bags

Amount: 5

Marks: Sunshine Canyon

	#1 5/21/90 Ambient	#2 5/21/90 inlet	#3 5/21/90 Exhaust	#4 5/22/90 Exhaust	#5 5/22/90 Blank
Methane		~~30.1%~~ 52.1%			
TNMHC (speciated by GCMS)					
O_2		0.3%			
N_2		4.7%	80.1%	80.1%	
5 Gases					
CO		<5ppm	<5ppm	12ppm	
CO_2		42.9%	7.1%	7.2%	
BTU Value (Per Anth A46-62)		526			

analyzed 5/24/90 Dave

rpd 5/24/90 KL

(White-Control) (Green-GC Lab) (Canary-Wet Lab) (Pink-Asbestos) (Golden Rod-Billing)

CUST. #

☐ RUSH 100% 50% TEST WITHIN 24hrs + 48hrs

CLIENT Xeon / BFI

ADDRESS

CONTACT PERSON & PHONE NO. Paul Jordan (213) 530-5006

P.O. #

SPECIAL INSTRUCTIONS:

REPORTED

INVOICED

NO.

AMOUNT

DATE RECEIVED 5-23-90

Time 9:40 Am

SAMPLE

Type: air

Container: tedlar bags

Amount: 5

Marks: Sunshine Canyon

	#1 5/21/90 Ambient	#2 5/21/90 inlet	#3 5/21/90 Exhaust	#4 5/22/90 Exhaust	#5 5/22/90 Blank
Methane DL=1ppm	7.2 ppm	~~50+~~% 52.1	1.4 ppm	1.1 ppm	<1 ppm
TNMHC (Speciated by GCMS)				run 24/5/90 rpd 5/29/90	
O_2					
N_2					
S Gases					
CO					
CO_2					
BTU Value (Per ASTM 1946-82)					

3

(White-Control) (Green-GC Lab) (Canary-Wet Lab) (Pink-Asbestos) (Golden Rod-Billing)

RUSH 100% 50% TEST WITHIN 24hrs + 48hrs (A-C / DAE)

CLIENT Xeon / BFI

ADDRESS

CONTACT PERSON & PHONE NO. Paul Jordan (213) 530-5006

P.O. #

SPECIAL INSTRUCTIONS:

DATE RECEIVED 5-23-90

Time 9:40 am

SAMPLE

Type: air

Container: tedlar bag

Amount: 5

REPORTED

INVOICED

NO.

AMOUNT

Marks: Sunshine Canyon [05/31/90 Ellis Final]

	A	B	C	D	E
	#1 5/21/90 Ambient	#2 5/21/90 inlet	#3 5/21/90 Exhaust	#4 5/22/90 Exhaust	#5 5/22/90 Blank
Methane	☆ [*	See the attached report & memo			*]
TNMHC (Speciated by GCMS)	✓	✓	✓	✓	✓
O_2					
N_2					
S Gases					
CO					
CO_2					
BTU Value (Per ASTM 1946-82)					

Analyst: Karl (Ellis)

Reviewed & validated 6/12/90

3

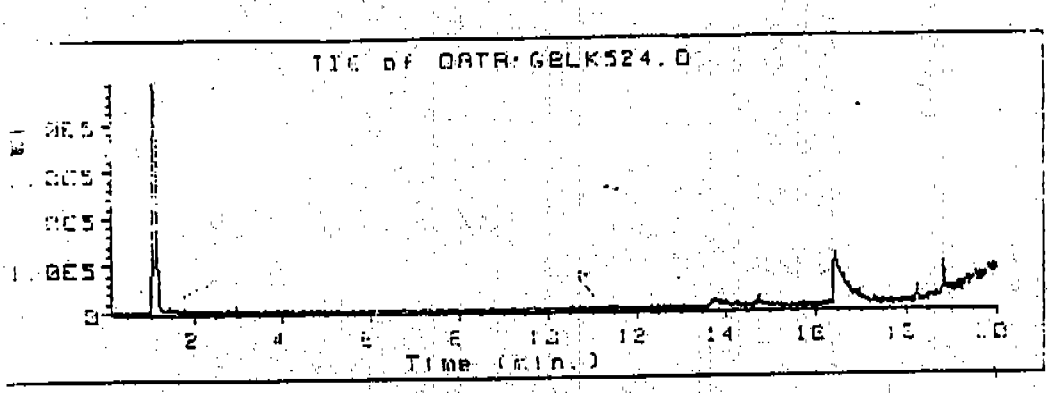
(White-Control) (Green-GC Lab) (Canary-Wet Lab) (Pink-Asbestos) (Golden Rod-Billing)

May 11 [illegible]

[Memo for case # 10459] (Xeon/BF

1) N-methyl formamide, N,N-Dimethyl formamide and N-ethyl formamide were the common compounds found, all from the five samples, including the blank one. They could be the contaminant in all the tedlar bags. The ~~amount~~ concentration from 25 ppb to 100 ppb for the blank ambient and the exhaust samples. Whileas the indoor sample contained approximately 3 to 5 ppb of the C_1-C_2 alkyl substituted formamide.

C. G. Edlin



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Y: null.
X: null.

1 ML INJECTION
HEXANE
AREA IN M 32.4
CON. 105.0 PPM

BENZENE	TOLUENE	
51.2	23.8	51
98.2	96.8	194
		26.2
		97.7

SAMPLE I.D.: G10459B
INJECTION VOLUME 1 ML

R.T.	AREA	PPM	ION	COMPOUND NAME
1.9	14.1	45.7 41	45	ETHANOL
2.4	16.6	53.8 54	45	2-PROPANOL
2.32	11.7	37.9 23	43	BUTANE
~~3.4~~		~~11~~	~~49~~	~~CH_2Cl_2~~
2.67	1.8	5.8	47	THIOBIS METHANE
3.86	2.6	8.4	42	?
5.08	4.1	13.3	57	BUTANE 2 METHYL
5.4	4.8	15.6	61	?
6.3	1.6	5.2	56	CYLCOBUTANE
TOTAL		~~48.3~~		
8.6	0.2	0.6	54	?
9.6	1.9	6.2	57	HEPTANE
10.5	3	9.7	55	CYCLOHEXANE METHYL
13.55	1.4	4.5	59	N METHYL FORMAMIDE
13.8	1.3	4.2	73	N,N DIMETHYL FORMAMIDE
---	12	38.9	57	C5 TO C7
TOTAL		64.2		
			87	N,N DIMETHYL ACETAMIDE
16.5	1.8	3.5		
16.9	7.7	14.8	57	?
17.7	29.6	56.8	93	?
18.24	15.4	29.5	57	HEPTANE 2,2,3,4,6,6,HEXAMETHYL
-----	69	132.3	57	C8 TO C10
TOTAL		~~236.9~~		

C4

Total C5 – C7 65 PPM

AREA	PPM		COMPOUND
1.14	2.2		BENZENE
1.3	2.4		TCE
24.9	101.3	100	TOLUENE
3.25	13.2	12	PCE
14.6	59.4	59	ETHYL BENZENE
18.3	69.6	92	M,P-XYLENE
6	22.4		O-XYLENE
3.4	11		CH_2Cl_2

(Trace)

⊛ See the memo
Redrawing of D. Nichols? (CSH)
5/31/90

1 ML INJECTION
HEXANE
AREA IN M 32.4
CON. 105.0 PPM

	BENZENE	TOLUENE	
→	70.1	78.3	145
—	98.2	96.8	194

SAMPLE I.D.: G459A
INJECTION VOLUME 100 ML

R.T.	AREA	PPB	ION	COMPOUND NAME
1.9	0.2	6.5	45	ETHANOL
2.4	0.8	~~25.9~~ > 6	45	2-PROPANOL
2.32	0.3	9.7	43	BUTANE
11.5	1	32.4		
13.55	2.8	90.7	59	N METHYL FORMAMIDE
13.8	1.5	48.6	73	N,N DIMETHYL FORMAMIDE
18.5	2.6	~~84.3~~ 84	94	PHENOL
12.3	0.5	6.2	91	TOLUENE
16.1	0.2	2.7	91	XYLENE

= 45
C6
(ambient)

* See the memo.

(Light)

1 ML INJECTION
HEXANE
AREA IN M 32.4
CON. 105.0 PPM

	BENZENE	TOLUENE	
	70.1	78.3	145
	98.2	96.8	194

SAMPLE I.D.: G459C
INJECTION VOLUME 100 ML

R.T.	AREA	PPB	ION	COMPOUND NAME
1.9	0.2	6.5	45	ETHANOL
2.4	0.5	16.2 16	45	2-PROPANOL
2.32	1.6	51.9 52	43	BUTANE
11.5	0.9	29.2	59	N METHYL FORMAMIDE
13.55	~~1.6~~	51.9	73	N,N DIMETHYL FORMAMIDE
13.8	~~0~~	0.0		
18.5	3.6	116.7 120	94	PHENOL
12.3	5	61.8 62	91	TOLUENE
16.1	0.28	3.7	91	XYLENE

(*) See the memo.

Exhaust (5/11)

1 ML INJECTION

			BENZENE	TOLUENE	
HEXANE			70.1	78.3	145
AREA IN M	32.4		98.2	96.8	194
CON.	105.0	PPM			

SAMPLE I.D.: G459D
INJECTION VOLUME 100 ML

R.T.	AREA	PPB	ION	COMPOUND NAME
1.9	0.2	6.5 ✓	45	ETHANOL
2.4	0.3	9.7 ✓	45	2-PROPANOL
2.32	3.2	~~103.7~~ 100 ✓	43	BUTANE
11.5	0.9	29.2		
~~13.05~~	0.8	25.9	59	N METHYL FORMAMIDE
~~13.8~~	0	0.0	73	N,N DIMETHYL FORMAMIDE
18.5	3.3	106.9 110 ✓	94	PHENOL
12.3	16.5	204.0 ✓ 200.	91	TOLUENE
16.1	0.55	7.4 ✓	91	XYLENE

Ethanol (5/22/90)

(*) See the memo.

1 ML INJECTION

HEXANE			BENZENE	TOLUENE	
AREA IN M	32.4		70.1	78.3	145
CON.	105.0 PPM		98.2	96.8	194

SAMPLE I.D.: G459E
INJECTION VOLUME 100 ML

R.T.	AREA	PPB	ION	COMPOUND NAME
1.9	0	0.0	45	ETHANOL
2.4	0	0.0	45	2-PROPANOL
2.32	0	0.0	43	BUTANE
11.5	1.2	38.9		
13.55	4.1	132.9	59	N METHYL FORMAMIDE
13.8	5.4	175.0	73	N,N DIMETHYL FORMAMIDE
18.5	1.27	41.2 4	94	PHENOL
12.3	0.3	3.7	91	TOLUENE
16.1	0	0.0	91	XYLENE

(Blank)

⊛ See the attached memo.

(Lgt!

Client _____

Lab No. 10459 A (Ambient) Date due _____

Volatile Organics GC/MS Scan	Tedlar bag ppb v/v	LIMITS OF DETECTION ppb v/v
* See the next page *		
Chloromethane	ND	5
Bromomethane		2
Vinyl Chloride		5
Chloroethane		5
Methylene Chloride		5
Acetone		5
Carbon Disulfide		5
Trichlorofluromethane		2
1,1-Dichloroethene		2
1,1-Dichloroethane		2
trans-1,2-Dichloroethene		5
Chloroform		2
1,2-Dichloroethane		2
2-Butanone (MEK)		5
1,1,1-Trichloroethane		2
Carbon Tetrachloride		2
Vinyl Acetate		5
Bromodichloromethane		2
1,2-Dichloropropane		5
cis-1,3-Dichloropropene		5
Trichloroethene		5
Benzene		5
Chlorodibromomethane		5
trans-1,3-Dichloropropene		5
1,1,2-Trichloroethane		5
2-Chloroethyl vinyl ether		5
Bromoform		5
4-Methyl-2-Pentanone (MIBK)		5
2-Hexanone (MBK)		5
Tetrachloroethene		2
1,1,2,2-Tetrachloroethane		5
Toluene	6.2	2
Chlorobenzene	ND	5
Ethyl Benzene		2
Styrene		5
m-Xylene	(2.7) True	5
o&p-Xylene J Total		5
1,3-Dichlorobenzene	ND	5
1,2-Dichlorobenzene		5
1,4-Dichlorobenzene Diane ✓		5

Analyzed by Karl Tsang date 05/22/90

Reviewed by Ellie Hsu date 05/31/90

Released by Ellie Hsu date 05/31/90

Note book # 37 page # _____

1045 K

PID (V/V)

AS number	Compound Name	Fraction	R T	Estimated Conc. ug/L ~~ug/kg~~
✓	Ethanol	VOA	1.9	6.5
✓	2-propanol		2.4	26
✓	Butanal		2.32	9.7
✓	phenol		18.5	84
	~~N-methyl formamide~~		13.6	90
	N,N-dimethyl formamide	↓	13.8	49

Client _____

Lab No. 10459B Loc: _____ Date due _____

Volatile Organics (Inlet) Tedlar bag LIMITS OF DETECTION
GC/MS Scan ppb v/v ppb v/v

* see the next page *

Chloromethane	M	5
Bromomethane		2
Vinyl Chloride		5
Chloroethane		5
Methylene Chloride		5
Acetone		5
Carbon Disulfide		2
Trichlorofluromethane		2
1,1-Dichloroethene		2
1,1-Dichloroethane		5
trans-1,2-Dichloroethene		2
Chloroform		2
1,2-Dichloroethane		5
2-Butanone (MEK)		2
1,1,1-Trichloroethane		2
Carbon Tetrachloride		5
Vinyl Acetate		2
Bromodichloromethane		5
1,2-Dichloropropane		5
cis-1,3-Dichloropropene		5
Trichloroethene	2400	5
Benzene	2200	5
Chlorodibromomethane	M	5
trans-1,3-Dichloropropene		5
1,1,2-Trichloroethane		5
2-Chloroethyl vinyl ether		5
Bromoform		5
4-Methyl-2-Pentanone (MIBK)		5
2-Hexanone (MBK)		5
Tetrachloroethene	13,000	2
1,1,2,2-Tetrachloroethane	M	5
Toluene	100,000	2
Chlorobenzene	M	5
Ethyl Benzene	59,000	2
Styrene	M	5
m-Xylene]	92,000	5
o&p-Xylene] →		5
1,3-Dichlorobenzene	M	5
1,2-Dichlorobenzene		5
1,4-Dichlorobenzene		5

Analyzed by Karl Tang & Diana date 05/14/90

Reviewed by Ellie Hand date 05/31/90

Released by Ellie Hand date 05/31/90

Note book # 37 page # _____

Table 1b (V.)

As number	Compound Name	Fraction	RT	Estimated Conc. ug/L to ug/Kg
✓	Ethanol	VOA	1.9	46,000
✓	2-propanol	↓	2.4	54,000
✓	Butanol		2.3	38,000
✓	Total hydrocarbons [C_5 to C_7]		3→10	65,000
✓	Total hydrocarbons [C_8 to C_{10}]	✓	15→20	≥34,000
	N-methyl formamide		13.6	4,500
	N,N-Dimethyl Formamide	↓	13.8	4,200

Client _____

Lab No. 10459C Loc: _____ Date due _____

Volatile Organics GC/MS Scan (Exhaust)	Tedlar bag ppb v/v	LIMITS OF DETECTION ppb v/v
* See the next page *		
Chloromethane	ND	5
Bromomethane		2
Vinyl Chloride		5
Chloroethane		5
Methylene Chloride		5
Acetone		5
Carbon Disulfide		5
Trichlorofluromethane		2
1,1-Dichloroethene		2
1,1-Dichloroethane		2
trans-1,2-Dichloroethene		5
Chloroform		2
1,2-Dichloroethane		2
2-Butanone (MEK)		5
1,1,1-Trichloroethane		2
Carbon Tetrachloride		2
Vinyl Acetate		5
Bromodichloromethane		2
1,2-Dichloropropane		5
cis-1,3-Dichloropropene		5
Trichloroethene		5
Benzene		5
Chlorodibromomethane		5
trans-1,3-Dichloropropene		5
1,1,2-Trichloroethane		5
2-Chloroethyl vinyl ether		5
Bromoform		5
4-Methyl-2-Pentanone (MIBK)		5
2-Hexanone (MBK)		5
Tetrachloroethene		2
1,1,2,2-Tetrachloroethane		5
Toluene	62	2
Chlorobenzene	ND	5
Ethyl Benzene		2
Styrene		5
m-Xylene] Total	0.37	5
o&p-Xylene]		5
1,3-Dichlorobenzene	ND	5
1,2-Dichlorobenzene		5
1,4-Dichlorobenzene		5

Diane K

Analyzed by Karl Tsang date 05/31/90

Reviewed by Tellie Hsu date 05/31/90

Released by Tellie Hsu date 05/31/90

Note book # 37 page # _____

CAS number	Compound Name	Fraction	RT	Estimated Conc. ug/L or ug/Kg
	Ethanol	VOA	1.9	6.5
	2-propanol		2.4	16
	Butanol		2.32	52.
	Phenol		18.5	120
	N-methyl formamide		13.6	52
	N,N-Dimethyl formamide	V	13.8	

Client _____

Lab No. 10459 D Loc: _____ Date due _____

Volatile Organics
GC/MS Scan (Exhaust)
See the next page *

	Tedlar bag ppb v/v	LIMITS OF DETECTION ppb v/v
Chloromethane	ND	5
Bromomethane		2
Vinyl Chloride		5
Chloroethane		5
Methylene Chloride		5
Acetone		5
Carbon Disulfide		5
Trichlorofluromethane		2
1,1-Dichloroethene		2
1,1-Dichloroethane		2
trans-1,2-Dichloroethene		5
Chloroform		2
1,2-Dichloroethane		2
2-Butanone (MEK)		5
1,1,1-Trichloroethane		2
Carbon Tetrachloride		2
Vinyl Acetate		5
Bromodichloromethane		2
1,2-Dichloropropane		5
cis-1,3-Dichloropropene		5
Trichloroethene		5
Benzene		5
Chlorodibromomethane		5
trans-1,3-Dichloropropene		5
1,1,2-Trichloroethane		5
2-Chloroethyl vinyl ether		5
Bromoform		5
4-Methyl-2-Pentanone (MIBK)		5
2-Hexanone (MBK)		5
Tetrachloroethene		2
1,1,2,2-Tetrachloroethane		5
Toluene	200	2
Chlorobenzene	MS	5
Ethyl Benzene		2
Styrene		5
m-Xylene] → Total	7.4	5
o&p-Xylene]		5
1,3-Dichlorobenzene	MS	5
1,2-Dichlorobenzene		5
1,4-Dichlorobenzene		5

Analyzed by Karl Tsay & Diana date 05/31/90

Reviewed by Felix Hsu date 05/31/90

Released by Felix Hsu date 05/31/90

Note book # 37 page # _____

Environmental Services 24404 S. Vermont Avenue #307 • Harbor City, CA 90710 • (213) 530-5006

JOB NO: 90-0659 REPORTED June 26, 1990

CLIENT: Browning Ferris Industries
1201 Gladstone
Azusa, California 91702

ATTN: Les Sakoda

Investigation

Conduct continuous emissions monitoring on the flare stack located at the Sunshine Canyon Landfill in Sylmar, California. The testing was conducted on May 21 and May 22, 1990, by Terry Wong, Mike Legerski, Mike Fukuda and Paul Jordan, employees of CTL Environmental Services. The monitoring was performed to comply with Permit to Construct Application Number 149462 of the South Coast Air Quality Management District.

Method

See Appendices C and E.

Results

Test results are found in the following section. Table 1 contains flow rates for the intake and exhaust as well as the emission rate of oxides of nitrogen and exhaust gas content of carbon monoxide. Table 2 contains test data for particulates, oxides of sulfur and heat output. The remaining three tables contain test data for total non-methane inorganics as well as listing breakdowns of the hydrocarbons found.

Summary

Testing was conducted on May 21 and May 22, 1990 and was performed for compliance with the South Coast Air Quality Management District's Permit to Construct Application #149462. Limits are established for the following: a) inlet gas flow rate, b) oxides of nitrogen, c) total particulate emissions, d) carbon monoxide emissions, e) total non-methane, organic emissions, f) oxides of sulfur and g) heat output of the flare. Results of the testing are listed below:

a) The inlet gas flow rate was maintained at 88 (KSCFH) or 1467 (SCFM), well below the permit limit 4,167 DSCFM.

b) The results indicate the emissions of oxides of nitrogen are not in excess of 6.03 pounds per hour.

Assumed Number	Compound Name	Fraction	RT	Estimated Conc. ug/l or ug/kg
	Ethanol	VOA	1.9	6.0
	2-Propanol		2.4	9.7
	Butanal		2.32	100
	Phenol	B	18.5	110
	~~N-Methyl formamide~~		~~13.6~~	~~16~~
	~~N,N-Dimethyl formamide~~		~~13.8~~	

Client _____

Lab No. 10459 E Loc: _____ Date due _____

Volatile Organics
GC/MS Scan (Blank)

	Tedlar bag ppb v/v	LIMITS OF DETECTION ppb v/v
Chloromethane	ND	5
Bromomethane		2
Vinyl Chloride		5
Chloroethane		5
Methylene Chloride		5
Acetone		5
Carbon Disulfide		2
Trichlorofluromethane		2
1,1-Dichloroethene		2
1,1-Dichloroethane		5
trans-1,2-Dichloroethene		2
Chloroform		2
1,2-Dichloroethane		5
2-Butanone (MEK)		2
1,1,1-Trichloroethane		2
Carbon Tetrachloride		5
Vinyl Acetate		2
Bromodichloromethane		5
1,2-Dichloropropane		5
cis-1,3-Dichloropropene		5
Trichloroethene		5
Benzene		5
Chlorodibromomethane		5
trans-1,3-Dichloropropene		5
1,1,2-Trichloroethane		5
2-Chloroethyl vinyl ether		5
Bromoform		5
4-Methyl-2-Pentanone (MIBK)		5
2-Hexanone (MBK)		2
Tetrachloroethene		5
1,1,2,2-Tetrachloroethane		2
Toluene	3.7	5
Chlorobenzene	ND	2
Ethyl Benzene		5
Styrene		5
m-Xylene		5
o&p-Xylene		5
1,3-Dichlorobenzene		5
1,2-Dichlorobenzene		5
1,4-Dichlorobenzene		5

Analyzed by Karl Tsang & Diana date 05/21/90

Reviewed by Tellie Tsang date 05/31/90

Released by Tellie Tsang date 05/31/90

Note book # 39 page # _____

E

PPDL (V.)

CAS number	Compound Name	Fraction	RT	Estimated Conc. ~~ug/l or ug/kg~~
✓	phenol	V/A	18.5	41
	~~N-methyl formamide~~		13.6	~~130~~
	N,N-Dimethyl formamide	V	13.8	180

APPENDIX C

SCOPE OF WORK

AND VARIANCE CONDITIONS

February 20, 1990

Mr. Marcus Penn
Browning-Ferris Industries
1201 Gladstone
Azuza, CA 91702

RE: Protocol to perform Landfill Gas Flaring System Source Testing at the Sunshine Canyon Landfill, Sylmar, California

Dear Mr. Penn:

CTL Environmental Services is pleased to present this protocol to conduct source testing of the Landfill Gas Flaring System at the Sunshine Canyon Landfill in Sylmar, California. Testing will be conducted as follows:

CONSTITUENTS

1. Methane and Non-Methane Hydrocarbons (speciated by GC/MS) and Nitrogen concentrations in the inlet landfill and exhaust gas streams as per ARB Method 22.

2. Nitrogen Oxides, Carbon Monoxide, Carbon Dioxide, and Oxygen concentrations in the inlet landfill and exhaust gas streams as per SCAQMD Method 100.1.

3. Flow Rate, Temperature, and Moisture concentrations of the inlet landfill and exhaust gas streams as per SCAQMD Methods 1.1 - 4.1.

4. Total Particulate concentrations of the inlet air to the flaring system and in the inlet landfill and exhaust air streams as per SCAQMD Method 5.1.

5. Total Sulfur Compounds (SO_x, H_2S, and H_2SO_4) concentrations in the inlet landfill gas stream as per SCAQMD Methods 6.1 and 6.2.

6. Hydrogen Chloride concentration of the exhaust air stream as per ARB Method 421.

7. BTU Value of the inlet landfill air stream as per ASTM Method D 1946 - 82.

SAMPLE PORTS

Sample ports will be located as per EPA requirements and agreed upon conditions.

DESCRIPTION OF TEST METHODS

CONTINUOUS ANALYZER METHODS

Oxides of Nitrogen:

NO_X is determined utilizing a Thermo Electron Corporation Model 10A NO-NO_X Analyzer. The analyzer operates on the chemiluminescent principle.

The sample is taken from the stack via a Teflon line to a knock-out trap consisting of an iced impinger train modified by shortening the impinger stems by 4". The cooled gases then pass through a fiberglass filter and proceed to the source testing van via another Teflon line. The filtered gas sample is split at the instrumentation panel.

The sample entering the NO_X analyzer passes through a heated stainless steel tube to convert any NO2 present to NO. The sample then proceeds to a reaction chamber in the NO_X analyzer where it is combined with ozone. The NO-ozone reaction produces light proportional to the amount of NO present. The resulting light is measured with a photomultiplier tube and an amplified signal is fed to the strip chart recorder.

Calibration of the NOx analyzer is conducted as follows: An NBS traceable span gas was purchased from Scott-Marrin, Riverside, California. This gas is certified to + or - 1% of stated concentrations of NO in oxygen-free nitrogen. The gas is traceable to NBS Standard 1685b, Zero is set using ultra pure nitrogen.

The span gas and zero gas are introduced into the system by a second Teflon line running from the source testing van to the inlet of the knock-out trap. Two valves at the knock-out trap are set to select either stack gas or span gas.

Oxygen:

The continuous oxygen analyzer is a Teledyne Analytical Instrument, Model 320A Portable Oxygen Detector. The unit operates on the Polarographic principle. Oxygen at the sensor is converted to an electric current proportional to the oxygen concentration. The oxygen analyzer is operated on the 0-25% scale. Ultra pure air with an oxygen content of 20.9% is used to span the instrument. Ultra Pure Nitrogen is used to zero the instrument.

CO, CO_2:

Carbon Dioxide and Carbon Monoxide are continuously monitored by a Custom Automated Systems Model 3400 Non Dispersible Infrared Analyzer. Ultra pure nitrogen is used to set zero and appropriate span gas for CO and CO_2 will be used.

WET TEST METHODS

Total Particulate and Moisture:

Total Particulate and Moisture will be determined utilizing a Method 5.1 Sample Train. The samples will be collected isokinetically and analyzed gravimetrically.

Total Sulfur Compounds:

Total Sulfur Compounds concentrations will be determined utilizing an SCAQMD Method 6.1 and 6.2 sampling train. The samples will be collected isokinetically and by colorimetric and idometric methods.

Hydrogen Chloride:

Hydrogen chloride content will be determined using ARB Method 421 sampling train. The samples will be collected isokinetically and identified by ion chromatography with conductivity detection.

GC/MS-TEDLAR BAG METHODS

Methane, Non-Methane Hydrocarbons and Nitrogen:

Samples will be collected as per the protocol of ARB Method 22 in Tedlar Bags utilizing a rigid steel box. A stainless steel and/or teflon probe will carry the sample from the collection port to the Tedlar Bag. The sample will subsequently be analyzed by GC/MS. Nitrogen content will be reported with the total hydrocarbons.

Heating Value:

The BTU content of the landfill gas entering the flaring system will be determined as per ASTM Method D 1946 - 82. The sample will be analyzed by gas chromatography to identify C_1 - C_{5+} isomers, Hydrogen Sulfide, Carbon Monoxide, Carbon Dioxide, Oxygen, Hydrogen and Nitrogen content.

Respectfully submitted,
CTL Environmental Services

Paul Jordan
Vice President of Operations

PJ/RF/jlc

South Coast
AIR QUALITY MANAGEMENT DISTRICT

HEADQUARTERS, 9150 FLAIR DR., EL MONTE, CA 91731

Application Number:
149462

PERMIT TO CONSTRUCT

Granted as of NOVEMBER 30, 1988

Legal Owner
or Operator

BROWNING-FERRIS INDUSTRIES
14747 SAN FERNANDO ROAD
SYLMAR, CA 91342
Attn: JAMES T. AIDUKAS

Equipment Location: SAME AS ABOVE

The equipment described below and as shown on the approved plans and specifications are subject to the special condition, or conditions listed.

Equipment Description and Conditions:

LANDFILL GAS FLARING SYSTEM, AS SHOWN IN GSF ENERGY DRAWING NUMBER 53-D2-5A, REVISION 3, CONSISTING OF:

1. CONDENSATE KNOCKOUT DRUM, V-400, 6'-0" DIAMETER BY 12'-0" SEAM TO SEAM HEIGHT.

2. THREE(3) BLOWERS, C-400A, C-400B AND C-400C, EACH 2292 SCFM AT 3.3" HG SUCTION AND 1.7 PSIG DISCHARGE, EACH DRIVEN BY A 40 HP ELECTRIC MOTOR, RECOVERING LANDFILL GAS THROUGH THE LANDFILL GAS CONTROL COLLECTION SYSTEM (APPLICATION NUMBER 149496), ONE(1) BLOWER IN STANDBY SERVICE.

3. DRY SCRUBBER, V-401, VERTICAL, CYCLONE TYPE, PEERLESS, 3'-0" DIAMETER BY 10'-6" SEAM TO SEAM HEIGHT.

4. LANDFILL GAS FLOW RECORDER STATION, FR-401.

5. LANDFILL GAS EMERGENCY SHUT-OFF VALVE, FV-401.

6. FLAME ARRESTOR, FA-401.

7. FLARE (INCINERATOR), TX-400, McGILL, MODEL ECF 125, 13'-0" DIAMETER BY 50'-0" HEIGHT, WITH LANDFILL GAS BURNERS, A PROPANE PILOT ASSEMBLY, AN UV FLAME SCANNER, AUTOMATICALLY ADJUSTED AIR DAMPERS, A TEMPERATURE CONTROL SYSTEM WITH TEMPERATURE INDICATOR AND RECORDER, SAFETY SYSTEMS, AND SOURCE TEST PORTS.

South Coast
AIR QUALITY MANAGEMENT DISTRICT

HEADQUARTERS. 9150 FLAIR DR., EL MONTE, CA 91731

Application Number:
149462

-CONDITIONS-

1. CONSTRUCTION AND OPERATION OF THIS EQUIPMENT SHALL BE CONDUCTED IN COMPLIANCE WITH ALL DATA AND SPECIFICATIONS SUBMITTED WITH THE APPLICATION, AND THE REVISED PROPOSAL SUBMITTED WITH BROWNING-FERRIS INDUSTRIES' LETTERS DATED JUNE 16, 1988, JULY 19, 1988, AND OCTOBER 28, 1988, UNDER WHICH THIS PERMIT TO CONSTRUCT IS ISSUED UNLESS OTHERWISE NOTED BELOW.

2. THIS EQUIPMENT SHALL BE PROPERLY MAINTAINED AND KEPT IN GOOD OPERATING CONDITION AT ALL TIMES.

3. THIS EQUIPMENT SHALL BE OPERATED AND MAINTAINED BY PERSONNEL PROPERLY TRAINED IN ITS OPERATION.

4. PRIOR TO OPERATION, THIS FLARE SHALL BE EQUIPPED WITH A TEMPERATURE INDICATOR AND RECORDER WHICH MEASURES AND RECORDS THE GAS TEMPERATURE IN THE FLARE STACK. THE TEMPERATURE INDICATOR AND RECORDER SHALL OPERATE CONTINUOUSLY. PRIOR TO INSTALLATION, THE TEMPERATURE INDICATOR, RECORDER AND THE LOCATION OF THE TEMPERATURE INDICATOR SHALL BE APPROVED BY THE EXECUTIVE OFFICER.

5. WHENEVER THE FLARE IS IN OPERATION, A TEMPERATURE OF NOT LESS THAN 1600 DEGREES F. AS MEASURED BY THE TEMPERATURE INDICATOR SHALL BE MAINTAINED IN THE FLARE STACK EXCEPT THAT A TEMPERATURE DROP OF UP TO 100 DEGREES F. IS ALLOWED FOR NO MORE THAN THREE (3) MINUTES IN ANY ONE HOUR.

6. PRIOR TO OPERATING THIS EQUIPMENT, A FLOW INDICATING AND RECORDING DEVICE SHALL BE INSTALLED IN THE LANDFILL GAS SUPPLY LINE TO THE FLARE TO MEASURE AND RECORD THE QUANTITY OF LANDFILL GAS BEING BURNED IN THE FLARE. THIS FLOW INDICATING AND RECORDING DEVICE SHALL OPERATE CONTINUOUSLY.

7. THE TOTAL VOLUME OF LANDFILL GAS BURNED IN THE FLARE SHALL NOT EXCEED 4,167 DRY STANDARD CUBIC FEET PER MINUTE (6.0 MILLION DRY STANDARD CUBIC FEET PER DAY).

8. ALL RECORDING DEVICES SHALL BE SYNCHRONIZED WITH RESPECT TO TIME OF DAY.

South Coast
AIR QUALITY MANAGEMENT DISTRICT

HEADQUARTERS. 9150 FLAIR DR., EL MONTE, CA 91731

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149462

9. PRIOR TO OPERATING THIS EQUIPMENT, THE FOLLOWING FLARING SYSTEM FAILURE ALARMS WHICH SHALL INCLUDE AN AUTOMATIC TELEPHONE NOTIFICATION SYSTEM, AUTOMATIC BLOWER SHUT-OFF SYSTEM AND AUTOMATIC LANDFILL GAS INLET VALVE SHUT-OFF SYSTEM APPROVED BY THE EXECUTIVE OFFICER SHALL BE INSTALLED AND OPERATIONAL:

   A. FLARE FLAME OUT
   B. LOW FLARE STACK TEMPERATURE
   C. HIGH FLARE STACK TEMPERATURE
   D. HIGH BLOWER DISCHARGE TEMPERATURE
   E. EXCESSIVE BLOWER VIBRATION

10. THE SAFETY SYSTEMS SPECIFIED IN CONDITION NUMBER 9 SHALL BE TESTED AND THE RESULTS RECORDED WITHIN SEVEN DAYS OF THE FLARE COMMENCING NORMAL STABLE OPERATION PER SPECIFICATIONS BUT NOT LATER THAN 30 DAYS AFTER INITIAL START UP AND THEREAFTER ONCE EVERY SIX MONTHS OR AT A MORE FREQUENT INTERVAL TO COINCIDE WITH FLARE SHUTDOWNS TO CONFIRM PROPER OPERATION.

11. PRIOR TO OPERATING THIS EQUIPMENT, A PRESSURE DIFFERENTIAL INDICATOR SHALL BE INSTALLED ACROSS THE DRY SCRUBBER (V-401).

12. PRIOR TO OPERATING THIS EQUIPMENT, A PRESSURE DIFFERENTIAL INDICATOR SHALL BE INSTALLED ACROSS THE FLAME ARRESTOR (FA-400).

13. PRIOR TO OPERATING THIS EQUIPMENT, ALL OF THE EQUIPMENT AND SYSTEMS SHOWN IN DRAWING NUMBER 53-D2-5a, REVISION 3, SHALL BE INSTALLED AND OPERATIONAL.

14. THE FLAME IN THE FLARE SHALL REMAIN AT LEAST TWO FEET BELOW THE TEMPERATURE SENSOR AT ALL TIMES.

15. PRIOR TO OPERATION, FOUR SAMPLING PORTS SHALL BE PROVIDED IN THE FLARE STACK AT LEAST TWO (2) FEET ABOVE THE FLAME ZONE AND SIX AND ONE HALF (6-1/2) FEET BELOW THE TOP OF THE FLARE STACK 90 DEGREES APART. EACH SAMPLING PORT SHALL CONSIST OF A FOUR (4) INCH COUPLING WITH A PLUG. ADEQUATE AND SAFE ACCESS TO ALL SOURCE TEST PORTS SHALL BE PROVIDED BY THE APPLICANT WITHIN FOUR (4) NORMAL WORKING HOURS OF A REQUEST BY THE DISTRICT TO CONDUCT A TEST.

South Coast
AIR QUALITY MANAGEMENT DISTRICT

HEADQUARTERS, 9150 FLAIR DR., EL MONTE, CA 91731

Application Number:
149462

16. PRIOR TO OPERATION, A SAMPLE PORT SHALL BE INSTALLED IN THE LANDFILL GAS HEADER TO THE FLARE TO ALLOW THE COLLECTION OF A LANDFILL GAS SAMPLE. THIS SAMPLE PORT SHALL BE POSITIONED IN A LOCATION WHICH ALLOWS A PARTICULATE SAMPLE TO BE COLLECTED IN ACCORDANCE WITH DISTRICT METHODS. THE SAMPLE PORT SIZE AND LOCATION SHALL BE APPROVED BY THE EXECUTIVE OFFICER PRIOR TO INSTALLATION.

17. THE SKIN TEMPERATURE OF THE FLARE SHROUD WITHIN FOUR FEET OF ALL OF THE SOURCE TEST PORTS SHALL NOT EXCEED 250 DEGREES F. IF A HEAT SHIELD IS REQUIRED TO MEET THIS REQUIREMENT, ITS DESIGN SHALL BE APPROVED BY THE EXECUTIVE OFFICER PRIOR TO CONSTRUCTION. THE HEAT SHIELD, IF REQUIRED TO MEET THE TEMPERATURE REQUIREMENT, SHALL BE IN PLACE WHENEVER A SOURCE TEST IS CONDUCTED BY THE DISTRICT.

18. ANY BREAKDOWN OR MALFUNCTION OF THE LANDFILL GAS FLARING SYSTEM RESULTING IN THE EMISSION OF RAW LANDFILL GAS SHALL BE REPORTED TO THE SCAQMD DIRECTOR OF ENFORCEMENT WITHIN ONE HOUR AFTER OCCURRENCE AND IMMEDIATE REMEDIAL MEASURES SHALL BE UNDERTAKEN TO CORRECT THE PROBLEM AND PREVENT FURTHER EMISSIONS INTO THE ATMOSPHERE.

19. THE EMISSIONS OF OXIDES OF NITROGEN FROM THE FLARE SHALL NOT EXCEED 6.03 POUNDS PER HOUR.

20. THE EMISSIONS OF TOTAL PARTICULATE MATTER FROM THE FLARE RESULTING FROM THE COMBUSTION OF LANDFILL GAS SHALL NOT EXCEED 0.75 POUNDS PER HOUR.

21. THE EMISSIONS OF CARBON MONOXIDE FROM THE FLARE SHALL NOT EXCEED 30.0 POUNDS PER HOUR.

22. THE EMISSIONS OF TOTAL NON-METHANE ORGANICS FROM THE FLARE SHALL NOT EXCEED 0.63 POUNDS PER HOUR.

23. THE EMISSIONS OF OXIDES OF SULFUR FROM THE FLARE SHALL NOT EXCEED 1.35 POUNDS PER HOUR.

24. LANDFILL GAS ENTERING THE FLARE SHALL BE ANALYZED WEEKLY FOR HEATING VALUE AND METHANE CONCENTRATION. RESULTS SHALL BE RECORDED AND PROVIDED TO THE DISTRICT UPON REQUEST.

25. THE HEAT RELEASE OF LANDFILL GAS BURNED IN THIS FLARE SHALL NOT EXCEED 105 MILLION BTU/HOUR.

South Coast
AIR QUALITY MANAGEMENT DISTRICT

HEADQUARTERS, 9150 FLAIR DR., EL MONTE, CA 91731

Application Number:
149462

26. WITHIN FORTY-FIVE (45) CALENDAR DAYS OF ACHIEVING NORMAL OPERATION TO SPECIFICATIONS BUT NOT TO EXCEED 90 DAYS FROM INITIAL OPERATION AND AT LEAST ANNUALLY THEREAFTER, BROWNING-FERRIS INDUSTRIES SHALL CONDUCT PERFORMANCE TESTS IN ACCORDANCE WITH SCAQMD TEST PROCEDURES AND FURNISH THE SCAQMD A WRITTEN RESULT OF SUCH PERFORMANCE TESTS WITHIN THIRTY (30) DAYS AFTER THE TESTS ARE CONDUCTED. WRITTEN NOTICE OF THE PERFORMANCE TESTS SHALL BE PROVIDED TO THE SCAQMD SEVEN (7) DAYS PRIOR TO THE TESTS SO THAT AN OBSERVER MAY BE PRESENT. ALL SOURCE TESTING AND ANALYTICAL METHODS SHALL BE SUBMITTED TO THE DISTRICT FOR APPROVAL AT LEAST SIXTY (60) DAYS PRIOR TO THE START OF THE TESTS.

THE PERFORMANCE TESTS SHALL INCLUDE, BUT MAY NOT BE LIMITED TO, A TEST OF INLET AIR TO THE FLARE FOR TOTAL PARTICULATES AND TOTAL SUSPENDED PARTICULATES (PM 10) AND A TEST OF THE INLET LANDFILL GAS TO THE FLARE AND THE FLARE EXHAUST FOR:

A. METHANE
B. TOTAL NON-METHANE ORGANICS
C. NON-METHANE ORGANICS (SPECIATED AND QUANTIFIED) (SPECIATION SHALL BE PERFORMED USING GC/MS, FULL SCAN TOTAL ION CHROMATOGRAM PRESENTATION) (QUANTIFICATION SHALL BE TO LOWER DETECTABLE LIMITS APPROVED BY THE DISTRICT)
D. OXIDES OF NITROGEN (EXHAUST ONLY)
E. CARBON MONOXIDE (EXHAUST ONLY)
F. TOTAL PARTICULATES
G. TOTAL SUSPENDED PARTICULATES (PM10)
H. HYDROGEN SULFIDE (INLET ONLY)
I. TOTAL SULFUR COMPOUNDS (INLET ONLY)
J. HYDROGEN CHLORIDE (EXHAUST ONLY)
R. CARBON DIOXIDE
L. OXYGEN
M. NITROGEN
N. MOISTURE CONTENT
O. BTU CONTENT (INLET ONLY)
P. FLOW RATE

27. ALL RECORDS SHALL BE KEPT FOR A PERIOD OF AT LEAST TWO (2) YEARS IN A FORM APPROVED BY THE DIRECTOR OF ENFORCEMENT AND SHALL BE MADE AVAILABLE TO THE EXECUTIVE OFFICER UPON REQUEST.

South Coast
AIR QUALITY MANAGEMENT DISTRICT

HEADQUARTERS, 9150 FLAIR DR., EL MONTE, CA 91731

Application Number:
149462

28. BROWNING-FERRIS INDUSTRIES SHALL PERFORM A FULL REVISED AIR QUALITY MODELING AND RISK ASSESSMENT ON THE EMISSIONS FROM THE FLARE WITHIN SIXTY (60) DAYS AFTER A REQUEST FROM THE DISTRICT IF THE SOURCE TEST RESULTS SHOW THE EMISSIONS ARE GREATER THAN CALCULATED UNDER THE PERMIT TO CONSTRUCT EVALUATION OR THE TEST RESULTS SHOW THAT ANY OF THE PARAMETERS USED IN THE MODELING CONDUCTED FOR THE PERMIT TO CONSTRUCT ARE NOT APPROPRIATE AND WOULD RESULT IN A GREATER GROUND LEVEL CONCENTRATION.

THIS PERMIT TO CONSTRUCT SUPERSEDES PERMIT TO CONSTRUCT ISSUED OCTOBER 18, 1988.

Approval or denial of this application for permit to operate the above equipment will be made after an inspection to determine if the equipment has been constructed in accordance with the approved plans and specifications and if the equipment can be operated in compliance with all Rules of the South Coast Air Quality Management District.

Please notify J. CHEN at 818/572-6193 when construction of equipment is complete.

This Authority to Construct is based on the plans, specifications, and data submitted as it pertains to the release of air contaminants and control measures or reduce air contaminants. No approval or opinion concerning safety and other factors in design, construction or operation of the equipment is expressed or implied.

South Coast
AIR QUALITY MANAGEMENT DISTRICT

HEADQUARTERS, 9150 FLAIR DR., EL MONTE, CA 91731

Application Number:
149462

This Permit to Construct shall serve as a temporary Permit to Operate provided the Executive Officer is given prior notice of such intent to operate.

This Permit to Construct will become invalid if the Permit to Operate is denied or if this application is cancelled. THIS PERMIT TO CONSTRUCT SHALL EXPIRE TWO YEARS FROM THE DATE OF FILING OF APPLICATION unless an extension is granted by the Executive Officer.

By
RAQUEL M. PUERTA
Principal Office Assistant

RMP/lvf

MAY 7 1990

South Coast
AIR QUALITY MANAGEMENT DISTRICT
9150 FLAIR DRIVE, EL MONTE, CA 91731 (818) 572-6200

May 4, 1990

Mr. James Aidukas
Browning-Ferris Industries
14747 San Fernando Road
Sylmar, CA 91342

Dear Mr. Aidukas:

The District staff have reviewed the source test protocol prepared by CTL Environmental Services for the compliance tests of the flare at the Sunshine Canyon Landfill as required by the permit conditions under Application No. 149462.

Please be advised that this test protocol is acceptable provided that the following items are incorporated:

1. Methane and total non-methane hydrocarbons (inlet and outlet) should use SCAQMD "draft" Method 25.2 - Tedlar bag sample with TCA/FID. In addition, a blank and an ambient air sample should be run during the tests.

2. The ARB Method 22 cited for speciated non-methane hydrocarbons may be a typographical error for Method 422 and/or Method 18. The speciated halogenated hydrocarbons and BTX should use Tedlar bag and analyzed with GC and appropriate detectors for minimum detection limits at low ppb levels.

3. All particulates sampling should be run with duplicate samples (two consecutive runs).

4. In addition to District Methods 6.1 & 6.2 for H_2S, ARB Method 15 should also be used for sulfonated compounds.

5. The final source test report should include the following data:

   A. A summary of the source test results, including applicable rules and permit conditions and source test data computed so as to satisfy these requirements.

   B. A brief process description. Indicate equipment operation conditions during testing as well as other information that may influence the final report.

C. A simple schematic diagram of the process, showing the sampling location, with respect to the upstream and downstream flow disturbances. Also include a cross-sectional diagram of the stack at the sampling location, depicting the sampling points with respect to compass direction.

D. The sampling and analytical procedures. Be specific about all aspects of sampling and analysis. Include diagrams of test equipment and methods.

E. Complete raw field data, including production data indicative of the testing interval, lab analyses, and the test results (show all calculations).

F. Calibration data regarding all sampling and measuring equipment utilized during testing.

G. A detailed chain-of-custody sheet containing all pertinent test equipment documentation from lab to field and back to the lab, including any change of hand in between.

Please proceed accordingly and advise us of the test schedule one week prior to the tests. If you have any questions, please call Mr. Jay Chen of my staff at (818) 572-6193.

Very truly yours,

William J. Dennison
Director of Engineering

for Mohsen Nazemi, P.E.
Supervising A.Q. Engineer

JC

APPENDIX D

QA/QC DATA

State of California
AIR RESOURCES BOARD

Executive Order G-469

WHEREAS, the Air Resources Board ("Board"), pursuant to Section 41512 of the California Health and Safety Code, has established the procedures contained in Section 91200-91220, Title 17, California Code of Regulations, to allow the use of independent testers for compliance tests required by the Board; and

WHEREAS, pursuant to Sections 91200-91220, Title 17, California Code of Regulations, the Executive Officer has determined that CTL Environmental Services, Inc. meets the requirements of the Board for conducting ARB Test Methods 1-1, 1-2, 1-3, 1-4, 1-5, 1-6, 1-8, 1-100 (NOx, O2), Visible Emissions Evaluations, Gas Chromatograph for Total and Methane/Nonmethane Hydrocarbons, and Grab Sample for Ambient Vinyl Chloride when the following conditions are met:

1. CTL Environmental Services, Inc. uses a power generator when necessary.

2. The person performing VEE being certified to conduct VEE at the time of the test and having the certification on file with the Compliance Division of the Air Resources Board.

NOW, THEREFORE, BE IT ORDERED that CTL Environmental Services, Inc. is granted an approval, from the date of execution of this order, until June 30, 1990 to conduct the tests listed above, subject to compliance with Section 91200-91220, Title 17, California Code of Regulations.

BE IT FURTHER ORDERED that during the approved period the Executive Officer or his or her authorized representative may field audit one or more tests conducted pursuant to this order for each type of testing listed above.

Executed at Sacramento, California, this 9th day of May 1989.

James J. Morgester, Chief
Compliance Division

Scott Specialty Gases

a division of Scott Environmental Technology, Inc.

PLUMSTEADVILLE, PA 18949 PHONE: (215) 766-8861 TWX: 510-665-8344

Date: July 5,1988

Our Project No.: 412656-1

Your P.O. No.: 7587

CTL ENVIRONMENTAL
24404 South Vermont Ave. Suite 307
Harbor City, CA 90710

ATTN: ROGER FURMAN

Gentlemen:

Thank you for choosing Scott for your Specialty Gas needs. The analyses for the gases ordered, as reported by our laboratory, are listed below. Results are in volume percent, unless otherwise indicated.

ANALYTICAL REPORT

Cyl. No. BAL1055 Analytical Accuracy ±2%

Component	Concentration
NITRIC OXIDE	185 ppm
NOX	187 ppm
NBS TRACEABLE TO CRM 1685	
NITROGEN	BALANCE

Cyl. No. _____ Analytical Accuracy _____

Component	Concentration

Cyl. No. _____ Analytical Accuracy _____

Component	Concentration

Cyl. No. _____ Analytical Accuracy _____

Component	Concentration

Analyst _____

Approved By _____

TELEX: 510-100-8831 (ScotGas)
FAX: 714-887-0549
PHONE: 714-887-2571

Scott Specialty Gases a division of

Scott Environmental Technology Inc. 2600 CAJON BLVD., SAN BERNARDINO, CA 92405

CTL ENVIRONMENTAL
24404 SOUTH VERMONT AVE., SUITE 307
HARBOR CITY, CA 90710
ATTN: LERRIE WYATT

Date: 1--13-89
Our Project No.: 3702
Your P.O. No.: 1217

Gentlemen:

Thank you for choosing Scott for your Specialty Gas needs. The analyses for the gases ordered, as reported by our laboratory, are listed below. Results are in volume percent, unless otherwise indicated.

ANALYTICAL REPORT

Cyl. No. CAL 909 Analytical Accuracy ±1%

Component	Concentration
CARBON DIOXIDE	14.05%
NBS TRACEABLE TO SRM 1675	14.08%
CARBON MONOXIDE	450.5 PPM
NBS TRACEABLE TO SRM 1680B	470 PPM
NITROGEN	BALANCE

Cyl. No. _____ Analytical Accuracy _____

Component	Concentration

Cyl. No. _____ Analytical Accuracy _____

Component	Concentration

Cyl. No. _____ Analytical Accuracy _____

Component	Concentration

Analyst _____

Approved By R. Shelly

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

CTL Environmental Services

Dry Gas Meter Calibration Data (English Units)

Date: 27 DEC 1989. *Meter Box Number:* NUTECH #2

Barometric Pressure, Pb = 30.04 *in. Hg* *Calibrated By:* M. FURUYA

Orifice manometer setting (ΔH), in H_2O	Gas Volume		Temperatures				Time (θ), min	Y_i	ΔH@i, in. H_2O
	Wet test meter (V_w), ft^3	Dry gas meter (V_d), ft^3	Wet test meter (t_w), °F	Dry gas meter Inlet (t_{di}), °F	Dry gas meter Outlet (t_{do}), °F	Dry gas meter Average[a] (t_d), °F			
0.5	5	5.177	67.10	—	—	94.5	13.30	1.02	1.58
1.0	5	5.180	67.28	—	—	92.0	9.59	1.01	2.04
1.5	10	9.959	67.37	—	—	94.0	15.63	1.11	1.94
2.0	10	10.572	67.64	—	—	96.0	13.69	0.94	1.98
3.0	10	10.711	67.82	—	—	97.5	11.32	0.97	2.03
4.0	10	11.105	68.00	—	—	98.0	10.25	0.94	2.22
							Avg.	1.01	2.02

ΔH, (in.) H_2O	$\frac{\Delta H}{13.6}$	$Y_i = \frac{V_w P_b (t_d + 460)}{V_d (P_b + \frac{\Delta H}{13.6})(t_w + 460)}$	$H@i = \frac{0.0317\ \Delta H}{P_b (t_d + 460)} \left[\frac{(t_w + 460)\,\theta}{V_w}\right]^2$
0.5	0.0368	$\frac{(5)(30.04)(97.5+460)}{(5.177)(30.04+0.0368)(67.1+460)}$	$\frac{(0.0317)(0.5)}{(30.04)(94.5+460)}\left[\frac{(67.10+460)(13.30)}{5}\right]^2$
1.0	0.0737	$Y_i = \frac{(5)(30.04)(92+460)}{(5.180)(30.04+0.0737)(67.28+460)}$	$= \frac{(0.0317)(1)}{(30.04)(92.0+460)}\left[\frac{(67.28+460)(9.59)}{5}\right]^2$
1.5	0.110	$= \frac{(10)(30.04)(94.0+460)}{(9.959)(30.04+0.110)(67.37+460)}$	$= \frac{(0.0317)(1.5)}{(30.04)(94+460)}\left[\frac{(67.37+460)(15.63)}{10}\right]^2$
2.0	0.147	$= \frac{(10)(30.04)(96.0+460)}{(10.572)(30.04+0.147)(67.64+460)}$	$= \frac{(0.0317)(2.0)}{(30.04)(96.0+460)}\left[\frac{(67.64+460)(13.69)}{10}\right]^2$
3.0	0.221	$= \frac{(10)(30.04)(97.5+460)}{(10.711)(30.04+0.221)(67.82+460)}$	$= \frac{(0.0317)(3)}{(30.04)(97.5+460)}\left[\frac{(67.82+460)(11.32)}{10}\right]^2$
4.0	0.294	$= \frac{(10)(30.04)(98.0+460)}{(11.105)(30.04+0.294)(68.0+460)}$	$= \frac{(0.0317)(4.0)}{(30.04)(98+460)}\left[\frac{(68.0+460)(10.25)}{10}\right]^2$

[a] If there is only one thermometer on the dry gas meter, record the temperarture under t_d.

CTL Environmental Services

Dry Gas Meter Calibration Data (English Units)

Date: 27 Dec. 1989 *Meter Box Number:* NUTECH #3

Barometric Pressure, Pb = 30.04 *in. Hg* *Calibrated By:* M. FULDA

Orifice manometer setting (ΔH), in H_2O	Gas Volume: Wet test meter (V_w), ft^3	Gas Volume: Dry gas meter (V_d), ft^3	Temperatures: Wet test meter (t_w), °F	Temperatures: Dry gas meter: Inlet (t_{di}), °F	Temperatures: Dry gas meter: Outlet (t_{do}), °F	Temperatures: Dry gas meter: Average[a] (t_d), °F	Time (θ), min	Yi	ΔH@, in. H_2O
0.5	5	4.997	69.71	/	/	73.5	12.45	1.61	1.72
1.0	5	5.145	70.80	/	/	82.0	9.20	0.94	1.86
1.5	10	10.524	71.33	/	/	86.0	15.55	0.97	1.98
2.0	10	10,630	70.61	/	/	88.0	13.60	0.97	2.01
3.0	10	10,729	69.08	/	/	89.0	11.47	0.96	2.82
4.0	10	11.113	68.81	/	/	91.0	10.12	0.93	2.19
							Avg.	0.97	1.98

ΔH, (in.) H_2O	$\frac{\Delta H}{13.6}$	$Y_i = \frac{V_w P_b (t_d + 460)}{V_d (P_b + \frac{\Delta H}{13.6})(t_w + 460)}$	$\Delta H@_i = \frac{0.0317\ \Delta H}{P_b (t_d + 460)} \left[\frac{(t_w + 460)\,\theta}{V_w}\right]^2$
0.5	0.0368	$= \frac{(5)(30.04)(71.5+460)}{(4.997)(30.04+0.0368)(69.71+460)}$	$= \frac{(0.0317)(0.5)}{(30.04)(71.5+460)}\left[\frac{(69.71+460)(12.45)}{5}\right]^2$
1.0	0.0737	$= \frac{(5)(30.04)(82.0+460)}{(5.145)(30.04+0.0737)(70.80+460)}$	$= \frac{(0.0317)(1.0)}{(30.04)(82.0+460)}\left[\frac{(70.80+460)(9.20)}{5}\right]^2$
1.5	0.110	$= \frac{(10)(30.04)(86+460)}{(10.524)(30.04+0.110)(71.33+460)}$	$= \frac{(0.0317)(1.5)}{(30.04)(86.0+460)}\left[\frac{(71.33+460)(15.55)}{10}\right]^2$
2.0	0.147	$= \frac{(10)(30.04)(88+460)}{(10.630)(30.04+0.147)(70.61+460)}$	$= \frac{(0.0317)(2.0)}{(30.04)(88+460)}\left[\frac{(70.61+460)(13.60)}{10}\right]^2$
3.0	0.221	$= \frac{(10)(30.04)(89+460)}{(10.729)(30.04+0.221)(69.08+460)}$	$= \frac{(0.0317)(3.0)}{(30.04)(89+460)}\left[\frac{(69.08+460)(11.47)}{10}\right]^2$
4.0	0.294	$= \frac{(10)(30.04)(91+460)}{(11.113)(30.04+0.294)(68.81+460)}$	$= \frac{(0.0317)(4.0)}{(30.04)(91+460)}\left[\frac{(68.81+460)(10.12)}{10}\right]^2$

[a] If there is only one thermometer on the dry gas meter, record the temperarture under t_d.

DIFFERENTIAL PRESSURE GAUGE CALIBRATION DATA FORM

Gauge type Magnahelic Serial or ID number Dwtech #3

Scale 0 - 10" H_2O

Gauge-oil manometer Δp	Differential pressure gauge Δp	Pressure difference %
1.5	1.53	2
3.0	3.05	2
4.5	4.6	2
7.0	7.1	1
9.5	9.3	2

Calibration: ✓ initial _____ posttest

Date calibrated 6/5/89 by PJ

DIFFERENTIAL PRESSURE GAUGE CALIBRATION DATA FORM

Gauge type Magnahelic Serial or ID number Nutech #3

Scale 0 - 0.5 "H_2O

Gauge-oil manometer Δp	Differential pressure gauge Δp	Pressure difference %
.10	.10	0
.25	.25	0
.35	.36	3
.45	.46	2
.49	.50	2

Calibration: ✓ initial _____ posttest

Date calibrated 6/5/89 by PJ

DIFFERENTIAL PRESSURE GAUGE CALIBRATION DATA FORM

Gauge type magnehelic Serial or ID number Dwyer #3

Scale 0-2" H_2O

Gauge-oil manometer Δp	Differential pressure gauge Δp	Pressure difference %
.35	.35	0
.50	.51	2
1.00	1.01	1
1.50	1.52	1
2.00	2.05	3

Calibration: ✓ initial _____ posttest

Date calibrated 6/5/85 by PJ

6/19/89

TYPE S PITOT TUBE INSPECTION DATA FORM

Pitot Tube #

Pitot tube assembly level? ✓ yes _____ no

Pitot tube openings damaged? _____ yes (explain below) ✓ no

α_1 = 0° (<10°), α_2 = 0° (<10°), β_1 = 0° (<5°),

β_2 = 0° (<5°)

γ = 1°, θ = 0°, A = 1.1 ~~cm~~ (in.)

z = A sin γ = .02 ~~cm~~ (in.); <0.32 cm (<1/8 in.),

w = A sin θ = 0 ~~cm~~ (in.); <.08 cm (<1/32 in.)

P_A .55 cm (in.) P_b .55 cm (in.)

D_t = .29 cm (in.)

Comments: _____

_____

_____

Calibration required? _____ yes X no

APPENDIX E

EQUIPMENT AND METHOD DESCRIPTION

CLIENT BFI Azusa
Job No 90-0660

METHODS

O_2, NO_x, CO, CO_2	Method 100 Continuous Analyzer
CO, CO_2, O_2, N_2	Tedlar Bag GC FID & GC TCD
Methane, Total Non-Methane Hydrocarbons	Method 18 Tedlar Bag (GC FID) (GC/MS)
C_1,-C_3 Mercaptans & Sulfur Gases	Tedlar Bag (GC/HECD)
Moisture, flowrate, temperature, Particulates, SO_x	EPA Methods 1 thru 8
HCℓ	ARB 421 Alternate NIOSH 7903

Method Sampling Trains

Sampling trains were manufactured by Nutech Corporation, Durham, North Carolina. Each train consisted of the following components:

1. Control box
2. Sample case
3. Heated filter box
4. Iced impinger box
5. Sampling probe
6. Sampling nozzle
7. Umbilical cord
8. Glass filter holder
9. Glass impingers
10. Condensor
11. Sorbant traps

A brief description of the operation of the sampling equipment follows:

1. Stack gases enter the pitobe nozzle at or near isokinetic conditions. The gases then flow through the inner liner of the electrically heated sampling pitobe.

2. A pitot tube is located on the probe sheath to measure the stack differential pressure in the area of the pitobe nozzle, Using the differential pressure, stack temperature, nozzle diameter, estimated water content of the stack gases, estimated molecular weight of the stack gases, temperature of the dry gas meter and the orifice calibration data the desired nozzle flow rate is found in terms of differential pressure across the meter orifice plate.

3. The stack gases continue to flow from the probe liner through a glass fiber filter contained in the hot side of the sample case. Impingers in the iced impinger box cool the gases before they enter the umbilical cord.

4. The umbilical cord carries the filtered, cooled stack gases from the sample case to the control box.

5. The control box utilizes a fiber vane vacuum pump to draw the stack gases through the sampling train. A dry gas meter records the volume of gas sampled. Sampling rates are controlled by a course and fine valve adjustment as indicated by the calibrated orifice and a differential manometer or magnehelic differential pressure gauges.

These sampling trains are modified for use in methods 4, 5, 6, 8, 421, 425, 429, 430, and the ARB multimetal train.

List of major equipment

Atomic Absorption Spectrophotometers:

1 Perkin-Elmer Model 460 1977

1 Perkin-Elmer Model 2380 1988

1 Perkin-Elmer Graphite Furnace HGA 2100 1977

Gas Chromatographs:

3 Varian Model 3700 1980

1 Varian Model 3400 1985

1 Varian Model 4600 1983

1 Varian Model 6000 1983

1 Shimadzu Model GC-8A 1985

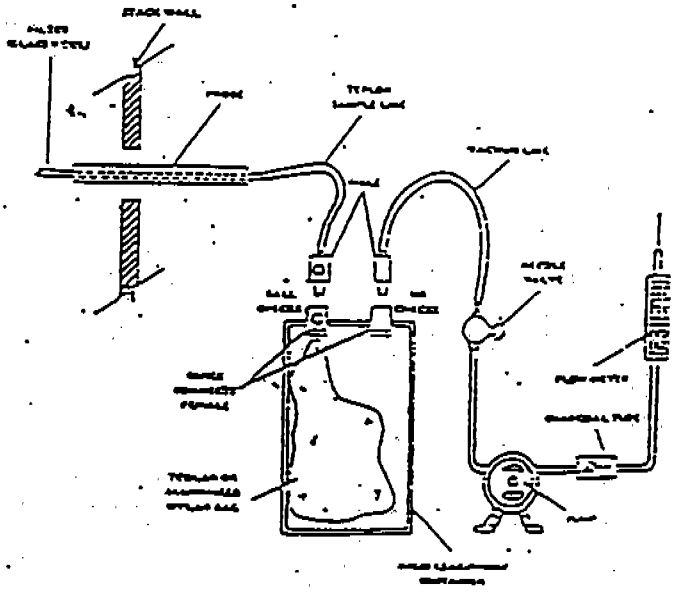
1 Hewlett-Packard Model 5890 1984

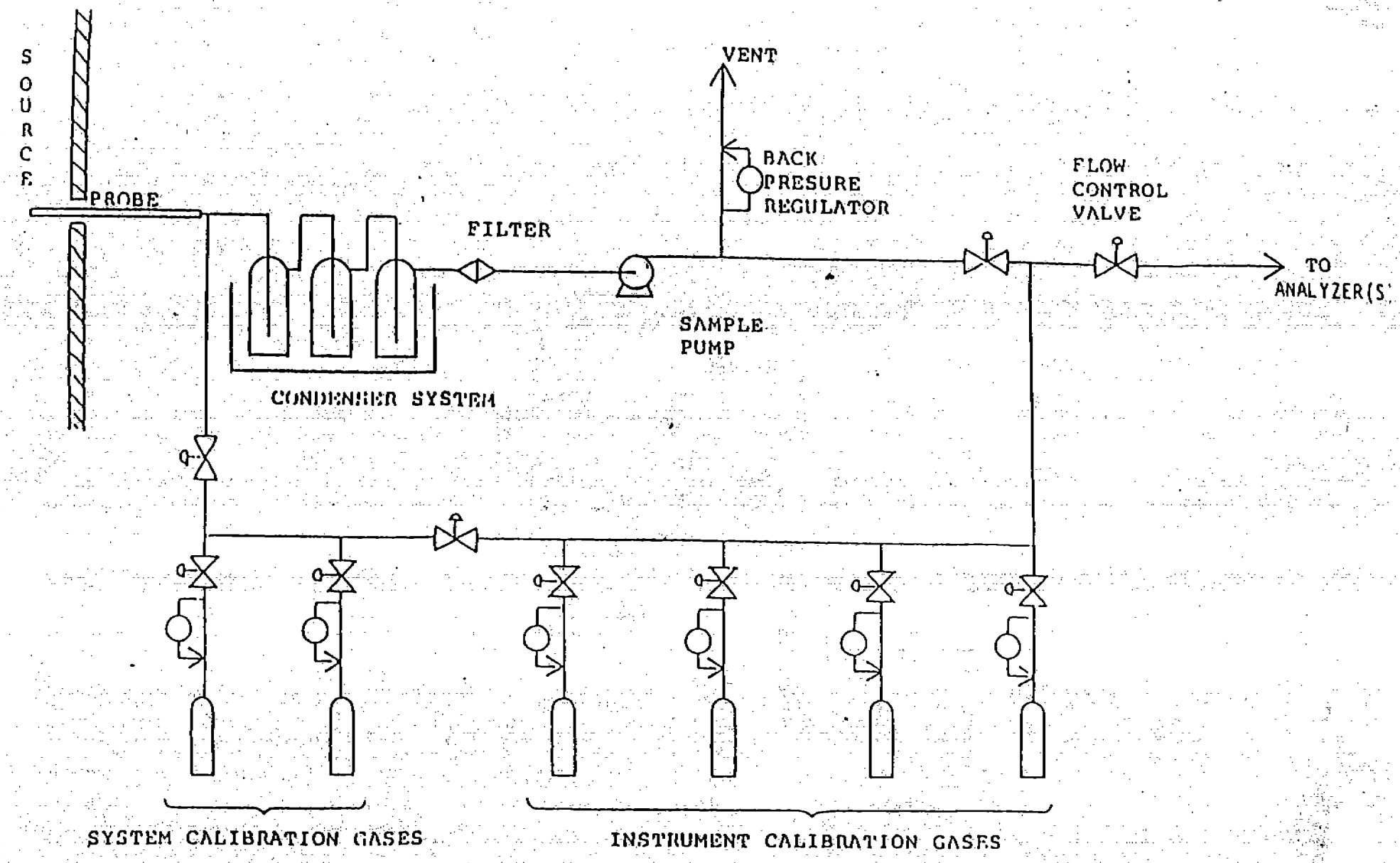
Gas Chromatograph/Mass Spectrometer System

2 Hewlett-Packard Model 5890/5970 1984

Varian Model 5000 Liquid Chromatograph 1982

EPA 18 ARB 410





SYSTEM AND INSTRUMENT CALIBRATION