KOPPERS INDUSTRIES

Koppers Industries, Inc.
436 Seventh Avenue
Pittsburgh, PA 15219-1800

Telephone: (412) 227-2001
Fax: (412) 227-2423

May 8, 1997

AP-42 Section 10.8
Reference 15
Report Sect. ——
Reference ——

Rick Marinshaw
MRI
401 Harrison Oak Blvd.
Suite 350
Cary, NC 27513

Dear Rick:

Enclosed is a copy of the AB 2588 Air Toxics Emission Test Program report by Best Environmental, dated November 14, 1990. This was conducted at the Koppers Industries, Inc. (KII) Feather River plant in Oroville, CA. The data resulting from this report was used by AquEaTer to develop the emission factors for treated wood storage.

I hope you find this information satisfactory in your work developing the AP-42 package. Please call me at (412)227-2677 if you have questions.

Sincerely,

Stephen T. Smith
Environmental Program Manager

cc w/o attachment:
Shelly McCormic, AquAeTer, 215 Jamestown Park, Suite 204, Brentwood, TN 37027
George Parris, AWPI

KOPPERS INDUSTRIES, INC.
Oroville, CA
AB 2588 Emissions Test Program

Test Date: October 8 thru 12, 1990

BEST ENVIRONMENTAL
27343 Industrial Boulevard, Unit E
Hayward, California 94545
Tel. (415) 784-0706
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BEST ENVIRONMENTAL, INC.
27343 Industrial Boulevard, Unit E.
Hayward, California 94545
(415) 784-0706

November 14, 1990

Koppers Industries, Inc.
436 Seventh Avenue
Pittsburg, CA 15219-1800

To: Mr. Steve Smith

Subject: AB2588 Emissions Test Program

Test Date: October 8 thru October 12, 1990.

Sampling Location: Temporary storage shed located at the Koppers facility in Oroville, CA.

Sampling Personnel: Regan Best and Dan Cartner of BEST ENVIRONMENTAL.

Observing Personnel: Fred Cooper, McLaren Engineering
James Wagoner, Butte County APCD

Process Description: Koppers Industries operates a wood treatment facility in Oroville, CA where poles and railroad ties are treated with creosote. Typically, wood products are placed in Cylindars #3 and #4 in the late morning, receive a 24-hour treatment cycle, and are removed from the cylindars at approximately 0800 hours. Each of the two cylindars typically contains 90 forty-five foot poles representing 2,000 cubic feet of wood. Poles are generally stored in the storage yard for a period of at least 30 days before being shipped to customers.

Test Program: The purpose of the test program was to establish emission factors for fugitive storage yard emissions of volatile and semi-volatile organic compounds from poles of various ages stored on racks after the poles had been treated with creosote. Emissions from the storage yard area were quantified using source emission testing procedures. A temporary storage shed consisting of a lumber frame and wrapped in sheets of clear polyethylene was constructed and sized to accommodate 4 to 6 poles. The shed was ventilated at approximately 3,000 CFM to simulate a 2 mph wind. The fan exhaust outlet consisted of a 15-inch square duct.

Repetitive triplicate tests for PAH's, Benzene, Toluene, Formaldehyde, Phenols and Cresols, were performed at the shed outlet with the shed containing Fresh Logs, 1 Day Logs and 4 Day Logs. A single set of tests for the same contaminents was performed with the shed containing 7 Day Logs, 12 Day Logs and 30 Day Logs. A background test for all parameters was performed with the blower on and the shed empty before any treated logs were placed in the shed.

Sampling Methods: The following test methods from the California Air Resources Board (CARB) and the Environmental Protection Agency (EPA) were used:

CARB 429	PAH
CARB 430	Formaldehyde
CARB 410/422	Benzene & Toluene
EPA TO 8	Phenols & Cresols

Instrumentation & Equipment:

Modified Method 17 sampling trains
RAC 201009 Control Module
BEST ENVIRONMENTAL Integrated Bag Sampler with tedlar bags
Glass Nozzles, Glass Probe, Teflon Sample Line
HPLC Grade Reagents and HPLC Grade Water
XAD-2 Sorbent Traps
Midget impinger sampling trains
Hewlett Packard Calculators

Test Results: Tables 1 thru 4, presents the results of the PAH tests. Table 1A presents the sum of the reporting limits and the detected PAH's. Table 1B presents the sum of the detected compounds only. Naphthalene, acenaphthylene, acenapthene, fluorene, phenanthrene, anthracene, fluoranthene and pyrene were detected in all the test runs in steadily increasing values directly related to the age of the logs. Small amounts of naphthalene, acenapthene, fluorene, and phenanthrene were found in the background test. For the aged logs on which triplicate tests were performed, the values from the test runs performed in the morning were significantly lower than those performed later in the day. A suprising aspect of the PAH data was that the PAH values from the 7 Day Logs test run were somewhat higher than any of the three test runs for the 4 Day Logs.

Tables 5 thru 8 presents the results of the Method 430 formaldehyde tests. Test results were corrected using an average of the results from the blank train and reagent blank corrected to 30 mls (3.9 ug). This is somewhat arbitrary and produces an inconsistency in the data for the 30 Day Log run and Fresh Log Run 1. The total micrograms reported by the laboratory for these two runs are lower than that of the correction value. However the formaldehyde test results show the same pattern as the PAH data of increasing emissions related to log age and lower levels in the morning hours.

Tables 9 thru 12 presents the results of the integrated bag sample Method 410 tests for benzene and toluene. Toluene was the only compound detected during all the test runs and it was found in levels close to or under the background test level of 9 parts per billion. No benzene was detected in any of the test runs with the exception of the 12 Day Logs test run which also showed the highest toluene value. The values for this run are probably due to manufacturing, field or laboratory contamination and should probably be discounted. Emission rates and concentration for benzene were calculated using the laboratory detection limits.

Tables 13 thru 16 presents the Method T08 phenols and cresols test results. No phenols or cresols were detected at or above the laboratory detection limit. Concentrations and emission rates are calculated as "less than" values based on the Method Detection Limit.

Field data sheets, calculation sheets, equipment calibrations, chain of custody forms and lab reports are contained in the Appendix.

If there are any questions concerning this report, please contact Regan Best or Dan Cartner at (415) 784-0706.

Submitted by,

Regan Best

Regan Best
Environmental Consultant

Table 1
BACKGROUND, 30, 12 & 7 DAY LOGS
PAH Test Results
CARB Method 429

TEST DATE	BACKGROUND 10-08-90	30 DAY 10-08-90	12 DAY 10-09-90	7 DAY 10-09-90
TEST TIME	1039-1339	1424-1724	0759-1059	1159-1459
SAMPLE VOLUME (SDCF)	116.83	116.88	124.61	123.76
SAMPLE VOLUME (DSCM)	3.309	3.310	3.529	3.505
ISOKINETIC, (%)	96.23	96.47	98.91	98.97
FLOWRATE (SDCFM)	2,685	2,680	2,787	2,750
Napthalene, total ug	14.0	700.0	1200.0	1600.0
Napthalene, (ug/dscm)	4.2	211.5	340.0	456.5
Napthalene, (mg/hr)	19.3	962.9	1610.1	2132.9
Acenaphthylene, total ug	< 1.0	12.0	22.0	58.0
Acenaphthylene, (ug/dscm)	< 0.3	3.6	6.2	16.5
Acenaphthylene, (mg/hr)	< 1.4	16.5	29.5	77.3
Acenaphthene, total ug	3.8	330.0	500.0	1400.0
Acenaphthene, (ug/dscm)	1.1	99.7	141.7	399.4
Acenaphthene, (mg/hr)	5.2	453.9	670.9	1866.3
Fluorene, total ug	2.8	182.4	271.2	870.0
Fluorene, (ug/dscm)	0.8	55.1	76.8	248.2
Fluorene, (mg/hr)	3.9	250.9	363.9	1159.8
Phenanthrene, total ug	3.8	240.0	392.0	990.0
Phenanthrene, (ug/dscm)	1.1	72.5	111.1	282.5
Phenanthrene, (mg/hr)	5.2	330.1	526.0	1319.7
Anthracene, total ug	< 1.0	11.0	11.0	26.1
Anthracene, (ug/dscm)	< 0.3	3.3	3.1	7.4
Anthracene, (mg/hr)	< 1.4	15.1	14.8	34.8

Note: < denotes Not Detected at or above reporting limit

PAH Table 1 Continued 1-2
BACKGROUND, 30, 12 & 7 DAY LOGS

TEST#	BACKGROUND	30 DAY	12 DAY	7 DAY
Fluoranthene, total ug	< 1.00	6.80	23.00	61.00
Fluoranthene, (ug/dscm)	< 0.30	2.05	6.52	17.40
Fluoranthene, (mg/hr)	< 1.38	9.35	30.86	81.32
Pyrene, total ug	< 1.00	2.20	1.60	18.40
Pyrene, (ug/dscm)	< 0.30	0.66	0.45	5.25
Pyrene, (mg/hr)	< 1.38	3.03	2.15	24.53
Benzo(a)Anthracene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Benzo(a)Anthracene, (ug/dscm)	< 0.30	< 0.30	< 0.28	< 0.30
Benzo(a)Anthracene, (mg/hr)	< 1.38	< 1.38	< 1.34	< 1.37
Chrysene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Chrysene, (ug/dscm)	< 0.30	< 0.30	< 0.28	< 0.30
Chrysene, (mg/hr)	< 1.38	< 1.38	< 1.34	< 1.37
Benzo(b)Fluoranthene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Benzo(b)Fluoranthene, (ug/dscm)	< 0.30	< 0.30	< 0.28	< 0.30
Benzo(b)Fluoranthene, (mg/hr)	< 1.38	< 1.38	< 1.34	< 1.37
Benzo(k)Fluoranthene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Benzo(k)Fluoranthene, (ug/dscm)	< 0.30	< 0.30	< 0.28	< 0.30
Benzo(k)Fluoranthene, (mg/hr)	< 1.38	< 1.38	< 1.34	< 1.37

Note: < denotes Not Detected at or above reporting limit

PAH Table 1 Continued
BACKGROUND, 30, 12 & 7 DAY LOGS

TEST#	BACKGROUND	30 DAY	12 DAY	7 DAY
Benzo(a)Pyrene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Benzo(a)Pyrene, (ug/dscm)	< 0.30	< 0.30	< 0.28	< 0.30
Benzo(a)Pyrene, (mg/hr)	< 1.38	< 1.38	< 1.34	< 1.37
Indeno(1,2,3-cd)Pyrene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Indeno(1,2,3-cd)Pyrene, (ug/dscm)	< 0.30	< 0.30	< 0.28	< 0.30
Indeno(1,2,3-cd)Pyrene, (mg/hr)	< 1.38	< 1.38	< 1.34	< 1.37
Dibenzo(a,h)Anthracene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Dibenzo(a,h)Anthracene, (ug/dscm)	< 0.30	< 0.30	< 0.28	< 0.30
Dibenzo(a,h)Anthracene, (mg/hr)	< 1.38	< 1.38	< 1.34	< 1.37
Benzo(ghi)Perylene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Benzo(ghi)Perylene, (ug/dscm)	< 0.30	< 0.30	< 0.28	< 0.30
Benzo(ghi)Perylene, (mg/hr)	< 1.38	< 1.38	< 1.34	< 1.37
2-Aminoanthraquinone, total ug	< 5.00	< 5.00	< 5.00	< 5.00
2-Aminoanthraquinone, (ug/dscm)	< 1.51	< 1.51	< 1.42	< 1.48
2-Aminoanthraquinone, (mg/hr)	< 6.89	< 6.88	< 6.71	< 6.83

Note: < denotes Not Detected at or above reporting limit

TABLE 1A

Total = Sum of reporting limits and detected PAH's

TEST#	BACKGROUND	30 DAY	12 DAY	7 DAY
Total micrograms:	< 41	< 1,492	< 2,429	< 5,032
Total micrograms/dscm:	< 13	< 451	< 688	< 1,436
Total milligrams/hour:	< 57	< 2053	< 3259	< 6708

Note: < denotes Not Detected at or above reporting limit

TABLE 1B

Total = Sum of detected PAH's

TEST#	BACKGROUND	30 DAY	12 DAY	7 DAY
Total micrograms:	5.2	1484.4	2420.8	5023.5
Total micrograms/dscm:	1.6	448.4	686.0	1433.3
Total milligrams/hour:	33.6	2041.8	5290.0	6696.7

Where,

Velocity = Stack gas velocity in feet per second
SDCFM = Standard dry cubic feet per minute
ug/dscm = micrograms per dry standard cubic meter
mg/hr = Emission rate, milligrams per hour

Calculations,

$$mg/hr = 1.699 \times 10^{-3} \times SDCFM \times (ug/dscm)$$

Table 2
4 DAY LOGS
PAH Test Results
CARB Method 429

TEST DATE	1 10-10-90	2 10-10-90	3 10-10-90	AVERAGE
TEST TIME	0751-0951	1009-1209	1223-1433	
SAMPLE VOLUME (SDCF)	82.60	79.69	80.86	81.05
SAMPLE VOLUME (DSCM)	2.339	2.257	2.290	2.295
ISOKINETIC, (%)	100.25	98.21	102.38	100.28
FLOWRATE (SDCFM)	2,734	2,692	2,621	2,682
Napthalene, total ug	1500.0	1500.0	1700.0	1566.7
Napthalene, (ug/dscm)	641.2	664.7	742.4	682.8
Napthalene, (mg/hr)	2979	3040	3306	3108
Acenaphthylene, total ug	24.0	36.0	33.0	31.0
Acenaphthylene, (ug/dscm)	10.3	16.0	14.4	13.5
Acenaphthylene, (mg/hr)	47.7	73.0	64.2	61.6
Acenaphthene, total ug	650.0	920.0	951.6	840.5
Acenaphthene, (ug/dscm)	277.9	407.7	415.5	367.0
Acenaphthene, (mg/hr)	1290.7	1864.6	1850.5	1668.6
Fluorene, total ug	381.1	632.2	658.0	557.1
Fluorene, (ug/dscm)	162.9	280.1	287.3	243.5
Fluorene, (mg/hr)	756.8	1281.3	1279.5	1105.9
Phenanthrene, total ug	531.0	900.0	960.0	797.0
Phenanthrene, (ug/dscm)	227.0	398.8	419.2	348.3
Phenanthrene, (mg/hr)	1054.4	1824.0	1866.8	1581.7
Anthracene, total ug	15.0	49.0	24.8	29.6
Anthracene, (ug/dscm)	6.4	21.7	10.8	13.0
Anthracene, (mg/hr)	29.8	99.3	48.2	59.1

Note: < denotes Not Detected at or above reporting limit

PAH Table 2 Continued
4 DAY LOGS

TEST#	1	2	3	AVERAGE
Fluoranthene, total ug	31.60	54.30	45.00	43.63
Fluoranthene, (ug/dscm)	13.51	24.06	19.65	19.07
Fluoranthene, (mg/hr)	62.75	110.05	87.51	86.77
Pyrene, total ug	1.90	22.40	7.90	10.73
Pyrene, (ug/dscm)	0.81	9.93	3.45	4.73
Pyrene, (mg/hr)	3.77	45.40	15.36	21.51
Benzo(a)Anthracene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Benzo(a)Anthracene, (ug/dscm)	< 0.43	< 0.44	< 0.44	< 0.44
Benzo(a)Anthracene, (mg/hr)	< 1.99	< 2.03	< 1.94	< 1.99
Chrysene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Chrysene, (ug/dscm)	< 0.43	< 0.44	< 0.44	< 0.44
Chrysene, (mg/hr)	< 1.99	< 2.03	< 1.94	< 1.99
Benzo(b)Fluoranthene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Benzo(b)Fluoranthene, (ug/dscm)	< 0.43	< 0.44	< 0.44	< 0.44
Benzo(b)Fluoranthene, (mg/hr)	< 1.99	< 2.03	< 1.94	< 1.99
Benzo(k)Fluoranthene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Benzo(k)Fluoranthene, (ug/dscm)	< 0.43	< 0.44	< 0.44	< 0.44
Benzo(k)Fluoranthene, (mg/hr)	< 1.99	< 2.03	< 1.94	< 1.99

Note: < denotes Not Detected at or above reporting limit

PAH Table 2 Continued
4 DAY LOGS

TEST#	1	2	3	AVERAGE
Benzo(a)Pyrene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Benzo(a)Pyrene, (ug/dscm)	< 0.43	< 0.44	< 0.44	< 0.44
Benzo(a)Pyrene, (mg/hr)	< 1.99	< 2.03	< 1.94	< 1.99
Indeno(1,2,3-cd)Pyrene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Indeno(1,2,3-cd)Pyrene, (ug/dscm)	< 0.43	< 0.44	< 0.44	< 0.44
Indeno(1,2,3-cd)Pyrene, (mg/hr)	< 1.99	< 2.03	< 1.94	< 1.99
Dibenzo(a,h)Anthracene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Dibenzo(a,h)Anthracene, (ug/dscm)	< 0.43	< 0.44	< 0.44	< 0.44
Dibenzo(a,h)Anthracene, (mg/hr)	< 1.99	< 2.03	< 1.94	< 1.99
Benzo(ghi)Perylene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Benzo(ghi)Perylene, (ug/dscm)	< 0.43	< 0.44	< 0.44	< 0.44
Benzo(ghi)Perylene, (mg/hr)	< 1.99	< 2.03	< 1.94	< 1.99
2-Aminoanthraquinone, total ug	< 5.00	< 5.00	< 5.00	< 5.00
2-Aminoanthraquinone, (ug/dscm)	< 2.14	< 2.22	< 2.18	< 2.18
2-Aminoanthraquinone, (mg/hr)	< 9.93	< 10.13	< 9.72	< 9.93

Note: < denotes Not Detected at or above reporting limit

TABLE 2A

Total = Sum of reporting limits and detected PAH's

TEST#	1	2	3	AVERAGE
Total micrograms:	< 3,148	< 4,122	< 4,388	< 3,886
Total micrograms/dscm:	< 1,346	< 1,826	< 1,916	< 1,696
Total milligrams/hour:	< 6250	< 8354	< 8533	< 7712

Note: < denotes Not Detected at or above reporting limit

TABLE 2B

Total = Sum of detected PAH's

TEST#	1	2	3	AVERAGE
Total micrograms:	3135	4114	4380	3876
Total micrograms/dscm:	1340	1823	1913	1692
Total milligrams/hour:	6225	8338	8518	7694

Where,

Velocity = Stack gas velocity in feet per second
SDCFM = Standard dry cubic feet per minute
ug/dscm = micrograms per dry standard cubic meter
mg/hr = Emission rate, milligrams per hour

Calculations,

$$mg/hr = 1.699 \times 10^{-3} \times SDCFM \times (ug/dscm)$$

Table 3
1 DAY LOGS
PAH Test Results
CARB Method 429

TEST	1	2	3	AVERAGE
DATE	10-11-90	10-11-90	10-11-90	
TEST TIME	0745-0945	1001-1201	1213-1413	
SAMPLE VOLUME (SDCF)	82.02	83.64	79.37	81.67
SAMPLE VOLUME (DSCM)	2.323	2.369	2.248	2.313
ISOKINETIC, (%)	99.73	102.41	99.40	100.51
FLOWRATE (SDCFM)	2,728	2,709	2,649	2,695
Napthalene, total ug	630.0	1300.0	1400.0	1110.0
Napthalene, (ug/dscm)	271.2	548.8	622.9	481.0
Napthalene, (mg/hr)	1257	2526	2803	2196
Acenaphthylene, total ug	< 10.0	29.0	31.0	23.3
Acenaphthylene, (ug/dscm)	< 4.3	12.2	13.8	10.1
Acenaphthylene, (mg/hr)	< 20.0	56.4	62.1	46.1
Acenaphthene, total ug	280.0	740.0	800.0	606.7
Acenaphthene, (ug/dscm)	120.5	312.4	355.9	263.0
Acenaphthene, (mg/hr)	558.7	1437.9	1601.9	1199.5
Fluorene, total ug	160.0	510.0	542.6	404.2
Fluorene, (ug/dscm)	68.9	215.3	241.4	175.2
Fluorene, (mg/hr)	319.3	991.0	1086.5	798.9
Phenanthrene, total ug	230.5	806.3	840.0	625.6
Phenanthrene, (ug/dscm)	99.2	340.4	373.7	271.1
Phenanthrene, (mg/hr)	459.9	1566.8	1682.0	1236.2
Anthracene, total ug	221.0	45.0	72.0	112.7
Anthracene, (ug/dscm)	95.1	19.0	32.0	48.7
Anthracene, (mg/hr)	441.0	87.4	144.2	224.2

Note: < denotes Not Detected at or above reporting limit

PAH Table 3 Continued
1 DAY LOGS

TEST#	1	2	3	AVERAGE
Fluoranthene, total ug	3.90	56.10	57.00	39.00
Fluoranthene, (ug/dscm)	1.68	23.68	25.36	16.91
Fluoranthene, (mg/hr)	7.78	109.01	114.14	76.98
Pyrene, total ug	1.80	23.30	21.30	15.47
Pyrene, (ug/dscm)	0.77	9.84	9.48	6.70
Pyrene, (mg/hr)	3.59	45.28	42.65	30.51
Benzo(a)Anthracene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Benzo(a)Anthracene, (ug/dscm)	< 0.43	< 0.42	< 0.44	< 0.43
Benzo(a)Anthracene, (mg/hr)	< 2.00	< 1.94	< 2.00	< 1.98
Chrysene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Chrysene, (ug/dscm)	< 0.43	< 0.42	< 0.44	< 0.43
Chrysene, (mg/hr)	< 2.00	< 1.94	< 2.00	< 1.98
Benzo(b)Fluoranthene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Benzo(b)Fluoranthene, (ug/dscm)	< 0.43	< 0.42	< 0.44	< 0.43
Benzo(b)Fluoranthene, (mg/hr)	< 2.00	< 1.94	< 2.00	< 1.98
Benzo(k)Fluoranthene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Benzo(k)Fluoranthene, (ug/dscm)	< 0.43	< 0.42	< 0.44	< 0.43
Benzo(k)Fluoranthene, (mg/hr)	< 2.00	< 1.94	< 2.00	< 1.98

Note: < denotes Not Detected at or above reporting limit

PAH Table 3 Continued
1 DAY LOGS

TEST#	1	2	3	AVERAGE
Benzo(a)Pyrene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Benzo(a)Pyrene, (ug/dscm)	< 0.43	< 0.42	< 0.44	< 0.43
Benzo(a)Pyrene, (mg/hr)	< 2.00	< 1.94	< 2.00	< 1.98
Indeno(1,2,3-cd)Pyrene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Indeno(1,2,3-cd)Pyrene, (ug/dscm)	< 0.43	< 0.42	< 0.44	< 0.43
Indeno(1,2,3-cd)Pyrene, (mg/hr)	< 2.00	< 1.94	< 2.00	< 1.98
Dibenzo(a,h)Anthracene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Dibenzo(a,h)Anthracene, (ug/dscm)	< 0.43	< 0.42	< 0.44	< 0.43
Dibenzo(a,h)Anthracene, (mg/hr)	< 2.00	< 1.94	< 2.00	< 1.98
Benzo(ghi)Perylene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Benzo(ghi)Perylene, (ug/dscm)	< 0.43	< 0.42	< 0.44	< 0.43
Benzo(ghi)Perylene, (mg/hr)	< 2.00	< 1.94	< 2.00	< 1.98
2-Aminoanthraquinone, total ug	< 5.00	< 5.00	< 5.00	< 5.00
2-Aminoanthraquinone, (ug/dscm)	< 2.15	< 2.11	< 2.22	< 2.16
2-Aminoanthraquinone, (mg/hr)	< 9.98	< 9.72	< 10.01	< 9.90

Note: < denotes Not Detected at or above reporting limit

TABLE 3A

Total = Sum of reporting limits and detected PAH's

TEST#	1	2	3	AVERAGE
Total micrograms:	< 1,550	< 3,518	< 3,772	< 2,947
Total micrograms/dscm:	< 667	< 1,485	< 1,678	< 1,277
Total milligrams/hour:	< 3093	< 6836	< 7553	< 5827

Note: < denotes Not Detected at or above reporting limit

TABLE 3B

Total = Sum of detected PAH's

TEST#	1	2	3	AVERAGE
Total micrograms:	1527	3510	3764	2934
Total micrograms/dscm:	657	1482	1675	1271
Total milligrams/hour:	3047	6820	7537	5801

Where,

Velocity = Stack gas velocity in feet per second
SDCFM = Standard dry cubic feet per minute
ug/dscm = micrograms per dry standard cubic meter
mg/hr = Emission rate, milligrams per hour

Calculations,

$$mg/hr = 1.699 \times 10^{-3} \times SDCFM \times (ug/dscm)$$

Table 4
FRESH LOGS
PAH Test Results
CARB Method 429

TEST DATE	1 10-12-90	2 10-12-90	3 10-12-90	AVERAGE
TEST TIME	0734-0934	0949-1149	1205-1405	
SAMPLE VOLUME (SDCF)	80.26	81.59	78.36	80.07
SAMPLE VOLUME (DSCM)	2.273	2.311	2.219	2.268
ISOKINETIC, (%)	100.40	99.70	98.96	99.69
FLOWRATE (SDCFM)	2,652	2,715	2,627	2,665
Napthalene, total ug	9202.4	10004	7702.6	8969.7
Napthalene, (ug/dscm)	4048.3	4329.6	3471.0	3949.7
Napthalene, (mg/hr)	18241	19972	15492	17902
Acenaphthylene, total ug	142.4	161.0	115.0	139.5
Acenaphthylene, (ug/dscm)	62.6	69.7	51.8	61.4
Acenaphthylene, (mg/hr)	282.3	321.4	231.3	278.3
Acenaphthene, total ug	3615.0	4716.0	3645.0	3992.0
Acenaphthene, (ug/dscm)	1590.3	2041.0	1642.5	1758.0
Acenaphthene, (mg/hr)	7165.6	9414.6	7331.1	7970.4
Fluorene, total ug	1078.0	2230.0	1790.0	1699.3
Fluorene, (ug/dscm)	474.2	965.1	806.6	748.7
Fluorene, (mg/hr)	2136.8	4451.8	3600.2	3396.3
Phenanthrene, total ug	970.0	2090.0	1720.0	1593.3
Phenanthrene, (ug/dscm)	426.7	904.5	775.1	702.1
Phenanthrene, (mg/hr)	1922.7	4172.3	3459.4	3184.8
Anthracene, total ug	221.0	45.0	72.0	112.7
Anthracene, (ug/dscm)	97.2	19.5	32.4	49.7
Anthracene, (mg/hr)	438.1	89.8	144.8	224.2

Note: < denotes Not Detected at or above reporting limit

PAH Table 4 Continued
FRESH LOGS

TEST#	1	2	3	AVERAGE
Fluoranthene, total ug	26.00	108.00	113.00	82.33
Fluoranthene, (ug/dscm)	11.44	46.74	50.92	36.37
Fluoranthene, (mg/hr)	51.54	215.60	227.28	164.80
Pyrene, total ug	10.00	20.00	24.00	18.00
Pyrene, (ug/dscm)	4.40	8.66	10.82	7.96
Pyrene, (mg/hr)	19.82	39.93	48.27	36.01
Benzo(a)Anthracene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Benzo(a)Anthracene, (ug/dscm)	< 0.44	< 0.43	< 0.45	< 0.44
Benzo(a)Anthracene, (mg/hr)	< 1.98	< 2.00	< 2.01	< 2.00
Chrysene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Chrysene, (ug/dscm)	< 0.44	< 0.43	< 0.45	< 0.44
Chrysene, (mg/hr)	< 1.98	< 2.00	< 2.01	< 2.00
Benzo(b)Fluoranthene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Benzo(b)Fluoranthene, (ug/dscm)	< 0.44	< 0.43	< 0.45	< 0.44
Benzo(b)Fluoranthene, (mg/hr)	< 1.98	< 2.00	< 2.01	< 2.00
Benzo(k)Fluoranthene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Benzo(k)Fluoranthene, (ug/dscm)	< 0.44	< 0.43	< 0.45	< 0.44
Benzo(k)Fluoranthene, (mg/hr)	< 1.98	< 2.00	< 2.01	< 2.00

Note: < denotes Not Detected at or above reporting limit

PAH Table 4 Continued
FRESH LOGS

TEST#	1	2	3	AVERAGE
Benzo(a)Pyrene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Benzo(a)Pyrene, (ug/dscm)	< 0.44	< 0.43	< 0.45	< 0.44
Benzo(a)Pyrene, (mg/hr)	< 1.98	< 2.00	< 2.01	< 2.00
Indeno(1,2,3-cd)Pyrene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Indeno(1,2,3-cd)Pyrene, (ug/dscm)	< 0.44	< 0.43	< 0.45	< 0.44
Indeno(1,2,3-cd)Pyrene, (mg/hr)	< 1.98	< 2.00	< 2.01	< 2.00
Dibenzo(a,h)Anthracene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Dibenzo(a,h)Anthracene, (ug/dscm)	< 0.44	< 0.43	< 0.45	< 0.44
Dibenzo(a,h)Anthracene, (mg/hr)	< 1.98	< 2.00	< 2.01	< 2.00
Benzo(ghi)Perylene, total ug	< 1.00	< 1.00	< 1.00	< 1.00
Benzo(ghi)Perylene, (ug/dscm)	< 0.44	< 0.43	< 0.45	< 0.44
Benzo(ghi)Perylene, (mg/hr)	< 1.98	< 2.00	< 2.01	< 2.00
2-Aminoanthraquinone, total ug	< 5.00	< 5.00	< 5.00	< 5.00
2-Aminoanthraquinone, (ug/dscm)	< 2.20	< 2.16	< 2.25	< 2.21
2-Aminoanthraquinone, (mg/hr)	< 9.91	< 9.98	< 10.06	< 9.98

Note: < denotes Not Detected at or above reporting limit

TABLE 4A

Total = Sum of reporting limits and detected PAH's

TEST#	1	2	3	AVERAGE
Total micrograms:	<15,278	<19,382	<15,190	<16,617
Total micrograms/dscm:	< 6,721	< 8,388	< 6,845	< 7,318
Total milligrams/hour:	< 30283	< 38693	< 30551	< 33176

Note: < denotes Not Detected at or above reporting limit

TABLE 4B

Total = Sum of detected PAH's

TEST#	1	2	3	AVERAGE
Total micrograms:	15265	19374	15182	16607
Total micrograms/dscm:	6715	8385	6841	7314
Total milligrams/hour:	30258	38677	30534	33156

Where,

Velocity = Stack gas velocity in feet per second
SDCFM = Standard dry cubic feet per minute
ug/dscm = micrograms per dry standard cubic meter
mg/hr = Emission rate, milligrams per hour

Calculations,

$$mg/hr = 1.699 \times 10^{-3} \times SDCFM \times (ug/dscm)$$

Table 5
BACKGROUND, 30 DAY, 12 DAY & 7 DAY LOGS
Formaldehyde Test Results

TEST DATE	BACKGROUND 10-08-90	30 DAY 10-08-90	12 DAY 10-09-90	7 DAY 10-09-90
TEST TIME	1128-1148	1449-1509	0842-0902	1332-1352
SAMPLE VOLUME (DSCF)	0.523	0.538	0.621	0.657
SAMPLE VOLUME (DSCM)	0.0148	0.0152	0.0176	0.0186
VELOCITY, (ft/sec)	29.98	29.96	29.94	30.48
FLOWRATE (SDCFM)	2,685	2,680	2,787	2,750
Formaldehyde, total ug	0.80	0.00	0.70	2.20
Formaldehyde, (ug/dscm)	54.0	0.0	39.8	118.2
Formaldehyde, (gm/hr)	0.245	0.000	0.187	0.550
Formaldehyde, (ppb)	43.24	0.00	31.87	94.66

Where,

Sample Volume = Standard dry cubic meters
Velocity = Stack gas velocity in feet per second
SDCFM = Standard dry cubic feet per minute
ug/dscm = micrograms per dry standard cubic meter
gm/hr = Emission rate, grams per hour
ppb = total micrograms per DSCF times 28.27

Calculations,

$$gm/hr = 1.699 \times 10^{-6} \times SDCFM \times (ug/dscm)$$

Table 6
4 DAY LOGS
Formaldehyde Test Results

TEST DATE	1 10-10-90	2 10-10-90	3 10-10-90	AVERAGE
TEST TIME	0910-0930	1014-1035	1259-1319	
SAMPLE VOLUME (DSCF)	0.599	0.654	0.611	0.621
SAMPLE VOLUME (DSCM)	0.0170	0.0185	0.0173	0.0176
VELOCITY, (ft/sec)	29.22	29.74	29.32	N.D.
FLOWRATE (SDCFM)	2,734	2,692	2,621	2,682
Formaldehyde, total ug	1.20	2.90	1.70	1.93
Formaldehyde, (ug/dscm)	70.7	156.6	98.2	108.5
Formaldehyde, (gm/hr)	0.327	0.712	0.435	0.491
Formaldehyde, (ppb)	56.63	125.36	78.66	86.88

Where,

Sample Volume = Standard dry cubic meters
Velocity = Stack gas velocity in feet per second
SDCFM = Standard dry cubic feet per minute
ug/dscm = micrograms per dry standard cubic meter
gm/hr = Emission rate, grams per hour
ppb = total micrograms per DSCF times 28.27

Calculations,

$$gm/hr = 1.699 \times 10^{-6} \times SDCFM \times (ug/dscm)$$

Table 7
1 DAY LOGS
Formaldehyde Test Results

TEST DATE	1 10-11-90	2 10-11-90	3 10-11-90	AVERAGE
TEST TIME	0830-0850	1003-1023	1258-1318	
SAMPLE VOLUME (DSCF)	0.643	0.616	0.623	0.627
SAMPLE VOLUME (DSCM)	0.0182	0.0174	0.0176	0.0178
VELOCITY, (ft/sec)	28.88	29.99	29.74	N.D.
FLOWRATE (SDCFM)	2,728	2,709	2,649	2,695
Formaldehyde, total ug	0.70	5.50	4.80	3.67
Formaldehyde, (ug/dscm)	38.4	315.3	272.1	208.6
Formaldehyde, (gm/hr)	0.177	1.443	1.218	0.946
Formaldehyde, (ppb)	30.78	252.41	217.81	167.00

Where,

Sample Volume = Standard dry cubic meters
Velocity = Stack gas velocity in feet per second
SDCFM = Standard dry cubic feet per minute
ug/dscm = micrograms per dry standard cubic meter
gm/hr = Emission rate, grams per hour
ppb = total micrograms per DSCF times 28.27

Calculations,

$$gm/hr = 1.699 \times 10^{-6} \times SDCFM \times (ug/dscm)$$

Table 8
FRESH LOGS
Formaldehyde Test Results

TEST DATE	1 10-12-90	2 10-12-90	3 10-12-90	AVERAGE
TEST TIME	0813-0833	1028-1048	1206-1226	
SAMPLE VOLUME (DSCF)	0.647	0.626	0.660	0.644
SAMPLE VOLUME (DSCM)	0.0183	0.0177	0.0187	0.0182
VELOCITY, (ft/sec)	29.15	30.49	29.86	N.D.
FLOWRATE (SDCFM)	2,652	2,715	2,627	2,665
Formaldehyde, total ug	0.00	2.20	4.50	2.23
Formaldehyde, (ug/dscm)	0.0	124.1	240.8	121.6
Formaldehyde, (gm/hr)	0.000	0.569	1.069	0.546
Formaldehyde, (ppb)	0.00	99.35	192.75	97.37

Where,

Sample Volume = Standard dry cubic meters
Velocity = Stack gas velocity in feet per second
SDCFM = Standard dry cubic feet per minute
ug/dscm = micrograms per dry standard cubic meter
gm/hr = Emission rate, grams per hour
ppb = total micrograms per DSCF times 28.27

Calculations,

$$gm/hr = 1.699 \times 10^{-6} \times SDCFM \times (ug/dscm)$$

Table 9
BACKGROUND, 30 DAY, 12 & 7 DAY LOGS
BTXE Test Results

TEST DATE	BACKGROUND 10-08-90	30 DAY 10-08-90	12 DAY 10-09-90	7 DAY 10-09-90
TEST TIME	1210-1230	1430-1450	0914-0924	1200-1210
VELOCITY, (ft/sec)	29.98	29.96	29.94	30.48
FLOWRATE (SDCFM)	2,685	2,680	2,787	2,750
Benzene, ppm	< 0.002	< 0.002	0.0085	< 0.002
Benzene, (gm/hr)	< 0.03	< 0.03	0.13	< 0.03
Toluene, ppm	0.009	0.011	0.018	0.007
Toluene, (gm/hr)	0.15	0.19	0.33	0.12

Where,

Velocity = Stack gas velocity in feet per second
SDCFM = Standard dry cubic feet per minute
gm/hr = Emission rate, grams per hour
ppm = part per million

Calculations,

$$gm/hr = 7.04 \times 10^{-5} \times SDCFM \times ppm \times Mol.\ Wt.$$

Table 10
4 DAY LOGS
BTXE Test Results

TEST	1	2	3	AVERAGE
TEST DATE	10-10-90	10-10-90	10-10-90	
TEST TIME	0840-0850	1139-1149	1312-1322	
VELOCITY, (ft/sec)	29.22	29.74	29.32	N.A.
FLOWRATE (SDCFM)	2,734	2,692	2,621	2,682
Benzene, ppm	< 0.002	< 0.002	< 0.002	< 0.002
Benzene, (gm/hr)	< 0.03	< 0.03	< 0.03	< 0.029
Toluene, ppm	0.006	0.006	0.007	0.006
Toluene, (gm/hr)	0.10	0.11	0.12	0.109

Where,

Velocity = Stack gas velocity in feet per second
SDCFM = Standard dry cubic feet per minute
gm/hr = Emission rate, grams per hour
ppm = part per million

Calculations,

$$gm/hr = 7.04 \times 10^{-5} \times SDCFM \times ppm \times Mol.\ Wt.$$

Table 11
1 DAY LOGS
BTXE Test Results

TEST TEST DATE	1 10-11-90	2 10-11-90	3 10-11-90	AVERAGE
TEST TIME	0857-0907	1104-1114	1214-1224	
VELOCITY, (ft/sec)	28.88	29.99	29.74	N.A.
FLOWRATE (SDCFM)	2,728	2,709	2,649	2,695
Benzene, ppm	< 0.002	< 0.002	< 0.002	< 0.002
Benzene, (gm/hr)	< 0.03	< 0.03	< 0.03	< 0.03
Toluene, ppm	0.0063	0.0072	0.0073	0.0069
Toluene, (gm/hr)	0.11	0.13	0.13	0.12

Where,

Velocity = Stack gas velocity in feet per second
SDCFM = Standard dry cubic feet per minute
gm/hr = Emission rate, grams per hour
ppm = part per million

Calculations,

$$gm/hr = 7.04 \times 10^{-5} \times SDCFM \times ppm \times Mol.\ Wt.$$

Table 12
FRESH LOGS
BTXE Test Results

TEST TEST DATE	1 10-12-90	2 10-12-90	3 10-12-90	AVERAGE
TEST TIME	0841-0851	1052-1102	1303-1313	
VELOCITY, (ft/sec)	29.15	30.49	29.86	N.A.
FLOWRATE (SDCFM)	2,652	2,715	2,627	2,665
Benzene, ppm	< 0.0025	< 0.0022	< 0.0023	< 0.0024
Benzene, (gm/hr)	< 0.04	< 0.03	< 0.03	< 0.03
Toluene, ppm	0.010	0.010	0.011	0.010
Toluene, (gm/hr)	0.17	0.18	0.19	0.17

Where,

Velocity = Stack gas velocity in feet per second
SDCFM = Standard dry cubic feet per minute
gm/hr = Emission rate, grams per hour
ppm = part per million

Calculations,

$$gm/hr = 7.04 \times 10^{-5} \times SDCFM \times ppm \times Mol.\ Wt.$$

Table 13
BACKGROUND, 30 DAY, 12 DAY, & 7 DAY LOGS
Phenols & Cresols Test Results

TEST DATE	BACKGROUND 10-08-90	30 DAY 10-08-90	12 DAY 10-09-90	7 DAY 10-09-90
TEST TIME	1039-1109	1518-1548	0800-0830	1221-1251
SAMPLE VOLUME (DSCF)	0.790	0.937	1.030	1.020
SAMPLE VOLUME (DSCM)	0.0224	0.0265	0.0292	0.0289
VELOCITY, (ft/sec)	29.98	29.96	29.94	30.48
FLOWRATE (SDCFM)	2,685	2,680	2,787	2,750
Phenol, total ug	< 1.80	< 1.40	< 1.50	< 1.60
Phenol, (ug/dscm)	< 80.5	< 52.8	< 51.4	< 55.4
Phenol, (gm/hr)	< 0.365	< 0.239	< 0.242	< 0.257
Phenol, (ppb)	< 20.90	< 13.71	< 13.36	< 14.39
Cresols, total ug	< 1.80	< 1.40	< 1.50	< 1.60
Cresols, (ug/dscm)	< 80.5	< 52.8	< 51.4	< 55.4
Cresols, (gm/hr)	< 0.365	< 0.239	< 0.242	< 0.257
Cresols, (ppb)	< 18.19	< 11.93	< 11.63	< 12.53

Where,

DSCM = Standard Dry cubic meters
DSCF = Standard dry cubic feet
ug/dscm = micrograms per dry standard cubic meter
gm/hr = Emission rate, grams per hour
ppb = total micrograms per DSCF times 28.27

Calculations,

$$gm/hr = 1.69 \times 10^{-8} \times SDCFM \times (ug/dscm)$$

Table 14
4 DAY LOGS
Phenols & Cresols Test Results

TEST		1		2		3	AVERAGE
DATE		10-10-90		10-10-90		10-10-90	
TEST TIME		0758-0828		1041-1111		1224-1254	
SAMPLE VOLUME (DSCF)		1.141		0.934		0.728	0.934
SAMPLE VOLUME (DSCM)		0.0323		0.0265		0.0206	0.0265
VELOCITY, (ft/sec)		29.22		29.74		29.32	24.21
FLOWRATE (SDCFM)		2,734		2,692		2,621	2,682
Phenol, total ug	<	2.30	<	2.20	<	2.40	< 2.30
Phenol, (ug/dscm)	<	71.2	<	83.2	<	116.4	< 90.3
Phenol, (gm/hr)	<	0.329	<	0.378	<	0.516	< 0.408
Phenol, (ppb)	<	18.49	<	21.61	<	30.24	< 23.45
Cresols, total ug	<	2.30	<	2.20	<	2.40	< 2.30
Cresols, (ug/dscm)	<	71.2	<	83.2	<	116.4	< 90.3
Cresols, (gm/hr)	<	0.329	<	0.378	<	0.516	< 0.408
Cresols, (ppb)	<	16.10	<	18.81	<	26.32	< 20.41

Where,

DSCM = Standard Dry cubic meters
DSCF = Standard dry cubic feet
ug/dscm = micrograms per dry standard cubic meter
gm/hr = Emission rate, grams per hour
ppb = total micrograms per DSCF times 28.27

Calculations,

$$gm/hr = 1.69 \times 10^{-8} \times SDCFM \times (ug/dscm)$$

Table 15
1 DAY LOGS
Phenols & Cresols Test Results

TEST	1	2	3	AVERAGE
DATE	10-11-90	10-11-90	10-11-90	
TEST TIME	0747-0817	1028-1158	1223-1253	
SAMPLE VOLUME (DSCF)	0.974	0.909	0.958	0.947
SAMPLE VOLUME (DSCM)	0.0276	0.0257	0.0271	0.0268
VELOCITY, (ft/sec)	28.88	29.99	29.74	24.21
FLOWRATE (SDCFM)	2,728	2,709	2,649	2,695
Phenol, total ug	< 2.50	< 2.20	< 2.00	< 2.23
Phenol, (ug/dscm)	< 90.6	< 85.5	< 73.7	< 83.3
Phenol, (gm/hr)	< 0.418	< 0.391	< 0.330	< 0.380
Phenol, (ppb)	< 23.55	< 22.20	< 19.15	< 21.63
Cresols, total ug	< 2.50	< 2.20	< 2.00	< 2.23
Cresols, (ug/dscm)	< 90.6	< 85.5	< 73.7	< 83.3
Cresols, (gm/hr)	< 0.418	< 0.391	< 0.330	< 0.380
Cresols, (ppb)	< 20.50	< 19.33	< 16.67	< 18.83

Where,

DSCM = Standard Dry cubic meters
DSCF = Standard dry cubic feet
ug/dscm = micrograms per dry standard cubic meter
gm/hr = Emission rate, grams per hour
ppb = total micrograms per DSCF times 28.27

Calculations,

$$gm/hr = 1.69 \times 10^{-8} \times SDCFM \times (ug/dscm)$$

Table 16
FRESH LOGS
Phenols & Cresols Test Results

TEST		1		2		3		AVERAGE
DATE		10-12-90		10-12-90		10-12-90		
TEST TIME		0737-0807		0950-1020		1230-1300		
SAMPLE VOLUME (DSCF)		1.087		1.034		0.929		1.017
SAMPLE VOLUME (DSCM)		0.0308		0.0293		0.0263		0.0288
VELOCITY, (ft/sec)		29.15		30.49		29.86		24.21
FLOWRATE (SDCFM)		2,652		2,715		2,627		2,665
Phenol, total ug	<	2.20	<	1.90	<	2.30	<	2.13
Phenol, (ug/dscm)	<	71.5	<	64.9	<	87.4	<	74.6
Phenol, (gm/hr)	<	0.320	<	0.298	<	0.388	<	0.335
Phenol, (ppb)	<	18.57	<	16.86	<	22.71	<	19.38
Cresols, total ug	<	2.20	<	1.90	<	2.30	<	2.13
Cresols, (ug/dscm)	<	71.5	<	64.9	<	87.4	<	74.6
Cresols, (gm/hr)	<	0.320	<	0.298	<	0.388	<	0.335
Cresols, (ppb)	<	16.16	<	14.67	<	19.77	<	16.87

Where,

DSCM = Standard Dry cubic meters
DSCF = Standard dry cubic feet
ug/dscm = micrograms per dry standard cubic meter
gm/hr = Emission rate, grams per hour
ppb = total micrograms per DSCF times 28.27

Calculations,

$$gm/hr = 1.69 \times 10^{-8} \times SDCFM \times (ug/dscm)$$

APPENDIX

BEST ENVIRONMENTAL
PAH EMISSION CALCULATIONS

DATE	10-08-90	TEST METHOD	CARB-429	CLIENT	KOPPERS
TEST No.	1	METER BOX	Rac2	LOCATION	SHEDBG
TEST TIME	1039-1339			FUEL	N.A

Pitot Factor (Kp)	0.840	Meter temp. (Tm)	93.6	Total condensate (Vw)	12.3
Barom. press. (Pbar)	29.48	Meter press. (^H)	1.5	Total particulate (mg)	0.0
Static Press.	-0.15	Vel.AvgSQRT(P)	0.522	Sample vol. uncorr. (Vm)	12[illegible]28
Stack press.	29.47	Stack Area (As)	1.56	Stack gas CO2%	0.0
Stack temp. (Ts)	82.7	Nozzle dia. (d)	0.269	Stack gas O2%	21.0
Sample time (O)	180.0	Meter factor (Y)	1.0157	Stack gas N2%	79.0

A. Gas Volume (Vm)std =17.65 (Vm) Y ((Pbar+H/13.6)/Tm+460) = 116.833 Vm std

B. Volume H2O collected (Vw)std = 0.0471 (Vw) = 0.579 Vw std

C. Total Sample Volume (Vt) =(Vm)std + (Vw)std= 117.413 Vt std

D. Moisture Content (%H2O) = (Vw std/Vt std) x 100 = 0.493 %

E. Stack Gas Velocity (Vs) = 85.49 Kp (P) SQRT(Ts +460/Ms Ps) = 29.983 ft/sec

F. Stack Gas Molecular Wgt.= ((CO2%x0.44 + O2%x0.32 + N2%x0.28)(1-H2O%/100)) + 18 (H2O%/100) 28.787 M.W.s

G. Stack Gas Volumetric Flowrate = (Vs)(As) 1062.6(Ps/Ts + 460)(1-%H2O/100) = 2685 SDCFM

H. Particulate Concentration (Cs) = s/Vm std x 0.01543 = 0.0000 gr/dscf

I. Particulate Emission Rate = 0.00857 x Cs x SDCFM = 0.000 Lbs/hr

J. % Isokinetic (I) =17.38(Vt)(Ts+460)/(dxd)(O)(Ps)(Vs) = 96.231 %

K. ACFM = (Vs)(As) x 60 = 2806 ACFM

BEST ENVIRONMENTAL
PAH EMISSION CALCULATIONS

DATE	10-08-90	TEST METHOD	CARB-429	CLIENT	KOPPERS
TEST No.	1	METER BOX	Rac2	LOCATION	SHED30D
TEST TIME	1424-1724			FUEL	N.A

Pitot Factor (Kp)	0.840	Meter temp. (Tm)	101.3	Total condensate (Vw)	8.3
Barom. press. (Pbar)	29.48	Meter press. (^H)	1.5	Total particulate (mg)	0.0
Static Press.	-0.15	Vel.AvgSQRT(P)	0.521	Sample vol. uncorr. (Vm)	123.660
Stack press.	29.47	Stack Area (As)	1.56	Stack gas CO2%	0.0
Stack temp. (Ts)	84.3	Nozzle dia. (d)	0.269	Stack gas O2%	21.0
Sample time (0)	180.0	Meter factor (Y)	1.0157	Stack gas N2%	79.0

A. Gas Volume (Vm)std =17.65 (Vm) Y ((Pbar+H/13.6)/Tm+460) = 116.879 Vm std

B. Volume H2O collected (Vw)std = 0.0471 (Vw) = 0.391 Vw std

C. Total Sample Volume (Vt) =(Vm)std + (Vw)std= 117.270 Vt std

D. Moisture Content (%H2O) = (Vw std/Vt std) x 100 = 0.333 %

E. Stack Gas Velocity (Vs) = 85.49 Kp (P) SQRT(Ts +460/Ms Ps) = 29.960 ft/sec

F. Stack Gas Molecular Wgt.= ((CO2%x0.44 + O2%x0.32 + N2%x0.28)(1-H2O%/100)) + 18 (H2O%/100) 28.804 M.W.s

G. Stack Gas Volumetric Flowrate = (Vs)(As) 1062.6(Ps/Ts + 460)(1-%H2O/100) = 2680 SDCFM

H. Particulate Concentration (Cs) = s/Vm std x 0.01543 = 0.0000 gr/dscf

I. Particulate Emission Rate = 0.00857 x Cs x SDCFM = 0.000 Lbs/hr

J. % Isokinetic (I) =17.38(Vt)(Ts+460)/(dxd)(0)(Ps)(Vs) = 96.469 %

K. ACFM = (Vs)(As) x 60 = 2804 ACFM

BEST ENVIRONMENTAL
PAH EMISSION CALCULATIONS

DATE	10-09-90	TEST METHOD	CARB-429	CLIENT	KOPPERS
TEST No.	1	METER BOX	Rac2	LOCATION	SHED12D
TEST TIME	0759-1059			FUEL	N.A

Pitot Factor (Kp)	0.840	Meter temp. (Tm)	74.7	Total condensate (Vw)	7.7
Barom. press. (Pbar)	29.70	Meter press. (H)	1.6	Total particulate (mg)	0.0
Static Press.	-0.15	Vel.AvgSQRT(P)	0.531	Sample vol. uncorr. (Vm)	124.650
Stack press.	29.69	Stack Area (As)	1.56	Stack gas CO2%	0.0
Stack temp. (Ts)	67.2	Nozzle dia. (d)	0.269	Stack gas O2%	21.0
Sample time (O)	180.0	Meter factor (Y)	1.0157	Stack gas N2%	79.0

A. Gas Volume (Vm)std =17.65 (Vm) Y ((Pbar+H/13.6)/Tm+460) = 124.608 Vm std

B. Volume H2O collected (Vw)std = 0.0471 (Vw) = 0.363 Vw std

C. Total Sample Volume (Vt) =(Vm)std + (Vw)std= 124.970 Vt std

D. Moisture Content (%H2O) = (Vw std/Vt std) x 100 = 0.290 %

E. Stack Gas Velocity (Vs) = 85.49 Kp (P) SQRT(Ts +460/Ms Ps) = 29.938 ft/sec

F. Stack Gas Molecular Wgt.= ((CO2%x0.44 + O2%x0.32 + N2%x0.28)(1-H2O%/100)) + 18 (H2O%/100) 28.809 M.W.s

G. Stack Gas Volumetric Flowrate = (Vs)(As) 1062.6(Ps/Ts + 460)(1-%H2O/100) = 2787 SDCFM

H. Particulate Concentration (Cs) = s/Vm std x 0.01543 = 0.0000 gr/dscf

I. Particulate Emission Rate = 0.00857 x Cs x SDCFM = 0.000 Lbs/hr

J. % Isokinetic (I) =17.38(Vt)(Ts+460)/(dxd)(O)(Ps)(Vs) = 98.910 %

K. ACFM = (Vs)(As) x 60 = 2802 ACFM

BEST ENVIRONMENTAL
PAH EMISSION CALCULATIONS

DATE	10-09-90	TEST METHOD	CARB-429	CLIENT	KOPPERS
TEST No.	1	METER BOX	RAC 2	LOCATION	SHED7D
TEST TIME	1159-1459			FUEL	N.A.

Pitot Factor (Kp)	0.840	Meter temp. (Tm)	99.4	Total condensate (Vw)	20.0
Barom. press. (Pbar)	29.70	Meter press. (^H)	1.6	Total particulate (mg)	0.0
Static Press.	-0.15	Vel.AvgSQRT(P)	0.533	Sample vol. uncorr. (Vm)	128.759
Stack press.	29.69	Stack Area (As)	1.56	Stack gas CO2%	0.0
Stack temp. (Ts)	81.3	Nozzle dia. (d)	0.269	Stack gas O2%	21.0
Sample time (0)	180.0	Meter factor (Y)	1.0157	Stack gas N2%	79.0

A. Gas Volume (Vm)std =17.65 (Vm) Y ((Pbar+H/13.6)/Tm+460) = 123.044 Vm std

B. Volume H20 collected (Vw)std = 0.0471 (Vw) = 0.942 Vw std

C. Total Sample Volume (Vt) =(Vm)std + (Vw)std= 123.986 Vt std

D. Moisture Content (%H20) = (Vw std/Vt std) x 100 = 0.760 %

E. Stack Gas Velocity (Vs) = 85.49 Kp (P) SQRT(Ts +460/Ms Ps) = 30.477 ft/sec

F. Stack Gas Molecular Wgt.= ((CO2%x0.44 + O2%x0.32 + N2%x0.28)(1-H20%/100)) + 18 (H20%/100) = 28.758 M.W.s

G. Stack Gas Volumetric Flowrate = (Vs)(As) 1062.6(Ps/Ts + 460)(1-%H20/100) = 2750 SDCFM

H. Particulate Concentration (Cs) = s/Vm std x 0.01543 = 0.0000 gr/ds

I. Particulate Emission Rate = 0.00857 x Cs x SDCFM = 0.000 Lbs/h

J. % Isokinetic (I) =17.38(Vt)(Ts+460)/(dxd)(0)(Ps)(Vs) = 98.974 %

K. ACFM = (Vs)(As) x 60 = 2853 ACFM

BEST ENVIRONMENTAL Particulate Field Data Sheet

Run # ______ Method # 5/1

½ drying

Plant: Koopers	ΔH@: 1.753	%H2O Assum.: 1.0	Filter #: NA	F. Wt. (mg):
Date: 10-8-96	Meter Yd: 1.057	Pitot Cp: .84	Pitot #: 84	B.H. Wt. (mg):
Location: Storage yard shed	PBar.: 29.43	Noz. Diam.: .269	Net Imp Vol: -21	Gel Wt. (mg): 33.3
Port Dim.: 15" x 15"	Stat Press: -0.15	Noz I.D.: 2F	Tot Imp Vol:	%CO2 Actual:
Stack I.D.: ~~1.56 ft2~~	%O2 Assum: 21	Meter #: RAC 2	Sample Time: 180	%O2 Actual:
Stack Area: 1.56 ft2	%CO2 Assum: .04	Probe #: 5' BA	Sqrt ΔP Ave: .522	Tot. Moisture: 1.23
Personnel: DC/RB	Pre leak ck: .004 cfm 15 "Hg		Post leak ck: .004 cfm 10 "Hg	Std Vm:

shed Temp.s

	Sample Point	Clock Time	Vel. ΔP	M.R. cfm	Orif. ΔH	Gas Meter Volume ft2	Gas Meter In	Gas Meter Out	Temperatures F Stack	Imp.	Filter	Probe	Pump Vac.	Comments
1		~~1039~~				~~451,255~~								
2	1	1039	.30	.75	1.68	451.552	97	76	76	48	—	—	14	
3	2	1109	.23	.66	1.3		97	77	79	48	—	—	10	S — N
4	3	1124	.25	.69	1.4		98	78	81	48	—	—	11	82-84-86
5	4	1137	.24	.68	1.3		100	80	82	48	—	—	11	
6	5	1154	.30	.75	1.67	500.8	101	80	82	48	—	—	11	
7	6	1209	.29	.75	1.6		104	84	83	48	—	—	11	
8														
9	1	1224	.28	.73	1.57		106	86	84	48	—	—	11	
10	2	39	.28	.74	1.57		108	88	85	48	—	—	11	S — N
11	3	54	.30	.76	1.68		108	88	85	48	—	—	11	83-85-87
12	4	1309	.28	.74	1.57	552.9	108	88	85	48	—	—	10	
13	5	24	.25	.69	1.4		109	88	85	48	—	—	11	
14	6	1339	.27	.72	1.5	573.480	109	88	85	48	—	—	11	
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28	Average				1.5	121.928		93.6	82.7					

Notes:

Ms =

Ave. Vs =

Sample I.D. # =

	#1	#2
Final Imp Vol =		

BEST ENVIRONMENTAL Particulate Field Data Sheet

Run # 1 Method # 4.29

30 day

Plant Koppers
Date 10-8-90
Location Storage yard
Port Dia. 15 x 15 "
Stack I.D. — "
Stack Area 1.56 ft2
Personnel OC / RB

ΔH@ 1.753
Meter Yd 1.015.7
PBar. 29.48
Stat Press -0.15
%O2 Assum 20.9
%CO2 Assum .04
%H2O Assum. 1.0
Pitot Co .84
Noz. Diam. .269
Noz I.D. .27
Meter # RAC
Probe # BAS

Filter # N/A
Pitot # 845
Net Imp Vol -26
Tot Imp Vol 74
Sample Time 180
Sqrt ΔP Ave .521

F... wt. (mg) —
B.H. Wt. (mg)
Gel Wt. (mg) 343
%CO2 Actual .04
%O2 Actual 20.9
Tot. Moisture 8.3
Std Vm

Pre leak ck ✓ cfm ok "Hg Post leak ck .003 cfm 15 "hg

Sheet Temps

	Sample Point	Clock Time	Vel. ΔP	M.R. cfm	Orif. ΔH	Gas Meter Volume ft2	Gas Meter In	Gas Meter Out	Temperatures F Stack	Imp.	Filter	Probe	Pump Vac.	Comments °F
1	—	1424	—	—	—	575.101	—	—	—	—	—	—	—	—
2	T 1		.30	.73	1.7		110	91	90	49	—	—	10	S — N
3	2	1454	.27	.70	1.5	595.8	111	91	86	49	—	—	9	87-89-90
4	3		.27	.70	1.5		112	91	85	48	—	—	9	
5	4	1524	.27	.70	1.5	ie 16.1	112	92	84	49	—	—	9	
6	5		.25	.68	1.4		112	93	84	49	—	—	9	
7	6	1554	.25	.68	1.4	636.5	111	93			—	—		
8														
9	B 1		.28	.71	1.59		112	93	84	49	—	—	9	
10	2	1624	.29	.73	1.6	657.	110	92	84	49	—	—	9	
11	3		.29	.73	1.6		110	92	84	49	—	—	9	
12	4	1754	.29	.73	1.6	678.4	110	92	83	49	—	—	9	86-87-87
13	5		.25	.68	1.4	688.4	110	92	82	49	—	—	9	
14	6	1824	.25	.68	1.4	698.761	109	91	82	49	—	—	9	
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28	Average				1.54	123.660		101.3	84.3					

Notes:

Ms =
Ave. Vs = 29.98 — 2,702 scFM
Sample I.D. # =

#1 #2
Final Imp Vol =

BEST ENVIRONMENTAL Particulate Field Data Sheet

Run # 1 Method # 429

12 day logs

Plant Koppers
Date 10/9/90
Location Storage shed
Port Dim. 15 x 15 "
Stack I.D. — "
Stack Area ft2
Personnel DC/RB

ΔH@ 1.753
Meter Yd 1.0157
PBar. 29.70
Stat Press -0.15
%O2 Assum 20.9
%CO2 Assum .04
Pre leak ck ✓ cfm — "Hg

%H2O Assum. .44
Pitot Cp .84
Noz. Diam. .269
Noz I.D. 7F
Meter # RAC 2
Probe # 5'BA

Filter # NA
Pitot # SBA
Net Imp Vol -.23
Tot Imp Vol 31
Sample Time 180
Sqrt ΔP Ave .531
Post leak ck .003 cfm 10 "Hg

F. wt. (mg) NA
B.H. Wt. (mg) NA
Gel Wt. (mg) 30.7
%CO2 Actual .04
%O2 Actual 20.9
Tot. Moisture 7.7
Std Vm

Shed Temp.

	Sample Point	Clock Time	Vel. ΔP	M.R. cfm	Orif. ΔH	Gas Meter Volume ft2	Gas Meter In	Gas Meter Out	Temperatures F Stack	Temperatures F Imp.	Temperatures F Filter	Temperatures F Probe	Pump Vac.	Comments
1	—	759	—	—	—	700.147	—	—	—	—	—	—	—	
2	1		.27	.67	1.51	710.3	69	50	54	43	—	—	6.5	
3	2		.26	.66	1.45	720.2	71	51	56	43	—	—	6	
4	3		.26	.66	1.45	730.1	75	52	60	43	—	—	6	
5	4	859	.25	.65	1.40	740.0	78	55	61	43	—	—	6	
6	5		.26	.67	1.46	750.1	83	60	64	43	—	—	6	
7	6		.25	.66	1.41	760.4	86	63	66	43	—	—	6	
8														
9	1		.30	.72	1.68	770.8	88	67	69	45	—	—	7	
10	2	959	.30	.72	1.69	781.8	90	69	70	46	—	—	7	
11	3		.32	.75	1.8	#	93	72	74	46	—	—	7	
12	4		.32	.75	1.8	803.6	96	75	76	47	—	—	7	
13	5		.30	.73	1.69		96	76	77	47	—	—	7	76-76-76
14	6	1059	.30	.73	1.69	825.397	98	78	79	47	—	—	7	
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28	Average				1.58	124.650		74.7	67.2					

Notes:

Ms =
Ave. Vs = 29.94 ft/s = 2,799 scFM
Sample I.D. # =

#1 #2

Final Imp Vol =

BEST ENVIRONMENTAL Particulate Field Data Sheet

Run # 1 Method # 4.29

7 day logs

#5

Plant	Koppers	ΔH@	1.75	%H2O Assum.	.4	Filter #	NA	F. Wt.(mg) NA
Date	10-7-90	Meter Yd	1.0157	Pitot Cp	.84	Pitot #	5BA	B.H. Wt.(mg) NA
Location	Storage wood shed	PBar.	29.7	Noz. Diam.	.267	Net Imp Vol	-21	Gel Wt.(mg) 41.0
Port Dim.		Stat Press	-.15	Noz I.D.	.267	Tot Imp Vol		%CO2 Actual .04
Stack I.D.	NA	%O2 Assum	20.9	Meter #	Rac 2	Sample Time	180	%O2 Actual 20.9
Stack Area	.56 ft2	%CO2 Assum	.04	Probe #	5'BA	Sqrt ΔP Ave	.533	Tot. Moisture (200)
Personnel	DC/RD	Pre leak ck	✓ cfm ✓ "Hg	Post leak ck	.003 cfm 10 "Hg			Std Vm

Shed Temps

	Sample Point	Clock Time	Vel. ΔP	M.R. cfm	Orif. ΔH	Gas Meter Volume ft2	Gas Meter In	Gas Meter Out	Temperatures F Stack	Imp.	Filter	Probe	Pump Vac.	Comments
1	4	1159				829.021								
2	1		.28	.71	1.59		104	82	79	48	–	–	8	
3	2	1229	.30	.77	1.71	850.3	106	85	79	48	–	–	8	
4	3	44	.30	.77	1.72	860.8	108	87	79	48	–	.	8	
5	4	1259	.26	.69	1.49	87[illegible]8	110	88	80	48	–	...	7	85-88-91
6	5		.27	.72	1.55		110	89	80	48	–	–	7	
7	6	1329	.27	.7	1.6		11	90	81	48	–	–	7	
8														
9	1	1344	.31	.75	1.8		11	90	82	48	–	–	9	
10	2	1359	.30	.74	1.7	914.99	111	90	83	48	–	–	9	
11	3	14	.28	.72	1.6		111	91	83	48	–	–	8	
12	4	1429	.27	.71	1.55		112	92	83	48	–	–	8	
13	5	44	.29	.72	1.66		112	92	83	48	–	–	8	
14	6	1459	.28	.72	1.60	957.780	112	92	84	48	–	–	8	87-88-89
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28	Average				1.62	128.759		99.4	81.3					

Notes:

Ms =

Ave. Vs = 30.45 ft/s + 2,773 scfm

Sample I.D. # =

	#1	#2
Final Imp Vol =		

BEST ENVIRONMENTAL Particulate Field Data Sheet

Background

Run # ______ Method # ZC...

Plant Conners
Date 10-28-90
Location Storage Yard Shed
Port Dim. 3"
Stack I.D. 15"
Stack Area 1.56 ft2
Personnel RB

ΔH@ ____
Meter Yd 1.002
PBar. 29.92
Stat Press ____
%O2 Assum 21.0
%CO2 Assum ____
Pre leak ck <.001 cfm 5 "Hg
(2) <.001 5

%H2O Assum. ____
Pitot Cp ____
Noz. Diam. ____
Noz I.D. ____
Meter # 58214
Probe # Teflon

Filter # ____
Pitot # ____
Net Imp Vol ____
Tot Imp Vol ____
Sample Time 30
Sq. ΔP Ave ____
Post leak ck <.001 cfm 5 "Hg

F.H. Wt.(mg) ____
B.H. Wt.(mg) ____
Gel Wt.(mg) ____
%CO2 Actual ____
%O2 Actual ____
Tot. Moisture ____
Std Vm 60 (.770)
30 Day (.937)

	Sample Point	Clock Time	Vel. ΔP	M.R. cfm	Orif. ΔH	Gas Meter Volume ft2	Gas Meter In	Gas Meter Out	Temperatures F Stack	Imp.	Filter	Probe	Pump Vac.	Comments
1	Dust	1039				123.244	82	80						Background
2		1049					83	81						
3		1059				123.74	85	82						
4	End	1109				124.067	85	82						
5						(0.823)	(82.5)							30 Day log
6		1518				125.285	95	98						
7		1528				125.61	95	98						
8		1538				125.94	95	98						
9	End	1548				126.287	96	99						
10						(1.002)	(96.8)							
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28	Average													

Notes:

Ms =
Ave. Vs =
Sample I.D. # =

#1 #2

Final Imp Vol =

BEST ENVIRONMENTAL Particulate Field Data Sheet

Run # 192 Method # 108

Plant Koppers
Date 10-9-90
Location Storage Yard Shed
Port Dia. 3"
Stack I.D. 15"
Stack Area 1.5 C ft2
Personnel R.B

ΔH —
Meter Yd 1.000
PBar. 29.7
Stat Press -0.15
%O2 Assum 21
%CO2 Assum 0
Pre leak ck .001 cfm 5 "Hg
(2) .001 5"

%H2O Assum. 0
Pitot Cp —
Noz. Diam. —
Noz I.D. —
Meter # 8816
Probe # Teflon line
Sqrt ΔP Ave —
Post leak ck .001 cfm 5 "Hg
<

Filter # —
Pitot # —
Net Imp Vol —
Tot Imp Vol —
Sample Time 30

F. Wt. (mg) —
B.H. Wt. (mg) —
Gel Wt. (mg) —
%CO2 Actual —
%O2 Actual —
Tot. Moisture —
Std Vm 121 (1.030)
7D (1.030)

	Sample Point	Clock Time	Vel. ΔP	M.R. cfm	Orif. ΔH	Gas Meter Volume ft2	Gas Meter In	Gas Meter Out	Temperatures F Stack	Imp.	Filter	Probe	Pump Vac.	Comments
1	0	0820		.10		124.305	50	46						12 day 1gs
2		10				124.64	52	47						
3		20				126.96	57	48						
4	End	0830				127.309	59	50						
5						(1.004)	(51.1)							
6	0	1221		.10		129.181	96	93						7 Day 1gs
7		31				129.85	97	93						
8		41				129.97	98	94						
9	End	1251				130.262	100	96						
10						(1.081)	(95.9)							
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28	Average													

Notes:

Ms =
Ave. Vs =
Sample I.D. # =

#1 #2

Final Imp Vol =

BEST ENVIRONMENTAL Particulate Field Data Sheet
Background

Run # ______ Method # *430*

Plant *Koppers*
Date *10-8-92*
Location *Storage Yard*
Port Dia. *Ø 2"*
Stack I.D. *15"*
Stack Area *1.56* ft2
Personnel *RB*

ΔH *~2.002*
Meter Yd *.9210*
PBar. *29.45*
Stat Press ______
%O2 Assum *.21*
%C Assum *0*
Pre leak ck *<.001* cfm *5* "Hg
(1) <.001 5

%H2O Assum. ___
Pitot Cp ___
Noz. Diam. ___
Noz I.D. ___
Meter # *5516*
Probe # *Teflon*
Post leak ck *<.006* cfm *5"* "Hg
<.001 5"

Filter # ______
Pitot # ______
Net Imp Vol ______
Tot Imp Vol ______
Sample Time *30*
Sqrt ΔP Ave ______

F. Wt. (mg) ______
B.H. Wt. (mg) ______
Gel Wt. (mg) ______
%CO2 Actual ______
%O2 Actual ______
Tot. Moisture ______
Std Vm ~~BG~~ *(.523)*
30D (.538)

	Sample Point	Clock Time	Vel. ΔP	M.R. cfm	Orif. ΔH	Gas Meter Volume ft2	Gas Meter In	Gas Meter Out	Temperatures F Stack	Imp.	Filter	Probe	Pump Vac.	Comments
1		*1128*				*124.090*	*87*	*88*						*~1 Lpm*
2		*1138*				*124.31*	*87*	*90*						*Background*
3	*End*	*1148*				*124.642*	*87*	*90*						
4						*(.552)*	*(88.8)*							
5														*30 day / loc*
6	*30 day*	*1449*				*124.652*	*74*	*95*						
7		*59*				*124.94*	*75*	*99*						
8	*End*	*1509*				*125.227*	*75*	*98*						
9						*(.575)*	*(96.5)*							
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28	Average													

Notes:

Ms =
Ave. Vs =
Sample I.D. # =

#1 #2

Final Imp Vol =

BEST ENVIRONMENTAL Particulate Field Data Sheet

Run # 1+2 Method # 4-3C

Plant Koppers
Date 11-9-90
Location Storage Shed Yard
Port Dia. 3
Stack I.D. 15"
Stack Area 1.56 ft2
Personnel R B

Ave ___
Meter Yd 1.0002
PBar. 29.7
Stat Press -.15
%O2 Assum 21
%CO2 Assum 0
Pre leak ck (2) <.001 cfm 5 "Hg
(1) <.001 5

%H2O Assum. ___
Pitot Cp ___
Noz. Diam. ___
Noz I.D. ___
Meter # 5816
Probe # Teflon line
Post leak ck <.001 cfm 5 "Hg
<.001 5

Filter # ___
Pitot # ___
Net Imp Vol ___
Tot Imp Vol ___
Sample Time 20
Sqrt ΔP Ave ___

F... Wt. (mg) ___
B.H. Wt. (mg) ___
Gel Wt. (mg) ___
%CO2 Actual ___
%O2 Actual ___
Tot. Moisture ___
Std Vm (2) .621
(1) .657

	Sample Point	Clock Time	Vel. ΔP	M.R. cfm	Orif. ΔH	Gas Meter Volume ft2	Gas Meter In	Gas Meter Out	Temperatures F Stack	Imp.	Filter	Probe	Pump Vac.	Comments
1	(2)	0842		.23		127.314	69	58						(2) 12 dg
2		0852				127.62	74	61						105
3	End	0902				127.939	79	64						
4						(.625)	(67.5)							
5	(1)	1332				130.309	98	97						(3) 7 dg
6		42				130.659	100	100						
7	End	1352				131.010	99	100						
8						(.701)	(99.0)							
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28	Average													

Notes:

Ms =
Ave. Vs =
Sample I.D. # =

	#1	#2
Final Imp Vol =		

BEST ENVIRONMENTAL
PAH EMISSION CALCULATIONS

DATE	10-10-90	TEST METHOD	CARB-429	CLIENT	KOPPERS
TEST No.	1	METER BOX	Rac2	LOCATION	SHED 4D
TEST TIME	0751-0951			FUEL	N.A

Pitot Factor (Kp)	0.840	Meter temp. (Tm)	70.0	Total condensate (Vw)	10.0
Baro. press. (Pbar)	29.78	Meter press. (^H)	1.5	Total particulate (mg)	0.0
Stat. Press.	-0.15	Vel.AvgSQRT(P)	0.520	Sample vol. uncorr. (Vm)	81.702
Stack press.	29.77	Stack Area (As)	1.56	Stack gas CO2%	0.0
Stack temp. (Ts)	64.4	Nozzle dia. (d)	0.269	Stack gas O2%	21.0
Sample time (0)	120.0	Meter factor (Y)	1.0157	Stack gas N2%	79.0

A. Gas Volume (Vm)std =17.65 (Vm) Y ((Pbar+H/13.6)/Tm+460) = 82.599 Vm std

B. Volume H2O collected (Vw)std = 0.0471 (Vw) = 0.471 Vw std

C. Total Sample Volume (Vt) =(Vm)std + (Vw)std= 83.070 Vt std

D. Moisture Content (%H2O) = (Vw std/Vt std) x 100 = 0.567 %

E. Stack Gas Velocity (Vs) = 85.49 Kp (P) SQRT(Ts +460/Ms Ps) = 29.215 ft/sec

F. Stack Gas Molecular Wgt.= ((CO2%x0.44 + O2%x0.32 + N2%x0.28)(1-H2O%/100)) + 18 (H2O%/100) 28.779 M.W.s

G. Stack Gas Volumetric Flowrate = (Vs)(As) 1062.6(Ps/Ts + 460)(1-%H2O/100) = 2734 SDCFM

H. Particulate Concentration (Cs) = s/Vm std x 0.01543 = 0.0000 gr/dscf

I. Particulate Emission Rate = 0.00857 x Cs x SDCFM = 0.000 Lbs/hr

J. % Isokinetic (I) =17.38(Vt)(Ts+460)/(dxd)(0)(Ps)(Vs) = 100.252 %

K. ACFM = (Vs)(As) x 60 = 2735 ACFM

BEST ENVIRONMENTAL
PAH EMISSION CALCULATIONS

DATE	10-10-90	TEST METHOD	CARB-429	CLIENT	KOPPERS
TEST No.	2	METER BOX	Rac2	LOCATION	SHED(4)
TEST TIME	1009-1209			FUEL	N.A

Pitot Factor (Kp)	0.840	Meter temp. (Tm)	91.0	Total condensate (Vw)	14.0
Barom. press. (Pbar)	29.78	Meter press. (^H)	1.5	Total particulate (mg)	0.0
Static Press.	-0.15	Vel.AvgSQRT(P)	0.521	Sample vol. uncorr. (Vm)	81.930
Stack press.	29.77	Stack Area (As)	1.56	Stack gas CO2%	0.0
Stack temp. (Ts)	80.6	Nozzle dia. (d)	0.269	Stack gas O2%	21.0
Sample time (0)	120.0	Meter factor (Y)	1.0157	Stack gas N2%	79.0

A. Gas Volume (Vm)std =17.65 (Vm) Y ((Pbar+H/13.6)/Tm+460) = 79.685 Vm std

B. Volume H20 collected (Vw)std = 0.0471 (Vw) = 0.659 Vw std

C. Total Sample Volume (Vt) =(Vm)std + (Vw)std= 80.344 Vt std

D. Moisture Content (%H20) = (Vw std/Vt std) x 100 = 0.821 %

E. Stack Gas Velocity (Vs) = 85.49 Kp (P) SQRT(Ts +460/Ms Ps) = 29.735 ft/sec

F. Stack Gas Molecular Wgt.= ((CO2%x0.44 + O2%x0.32 + N2%x0.28)(1-H20%/100)) + 18 (H20%/100) 28.751 M.W.s

G. Stack Gas Volumetric Flowrate = (Vs)(As) 1062.6(Ps/Ts + 460)(1-%H20/100) = 2692 SDCFM

H. Particulate Concentration (Cs) = s/Vm std x 0.01543 = 0.0000 gr/dscf

I. Particulate Emission Rate = 0.00857 x Cs x SDCFM = 0.000 Lbs/hr

J. % Isokinetic (I) =17.38(Vt)(Ts+460)/(dxd)(0)(Ps)(Vs) = 98.213 %

K. ACFM = (Vs)(As) x 60 = 2783 ACFM

BEST ENVIRONMENTAL
PAH EMISSION CALCULATIONS

DATE	10-10-90	TEST METHOD	CARB-429	CLIENT	KOPPERS
TEST No.	3	METER BOX	Rac2	LOCATION	SHED 4/0
TEST TIME	1223-1433			FUEL	N.A

Pitot Factor (Kp)	0.840	Meter temp. (Tm)	100.4	Total condensate (Vw)	9.[illegible]
Barom. press. (Pbar)	29.78	Meter press. (^H)	1.6	Total particulate (mg)	0.0
Static Press.	-0.15	Vel.AvgSQRT(P)	0.510	Sample vol. uncorr. (Vm)	84.555
Stack press.	29.77	Stack Area (As)	1.56	Stack gas CO2%	0.0
Stack temp. (Ts)	89.3	Nozzle dia. (d)	0.269	Stack gas O2%	21.0
Sample time (0)	120.0	Meter factor (Y)	1.0157	Stack gas N2%	79.0

A. Gas Volume (Vm)std =17.65 (Vm) Y ((Pbar+H/13.6)/Tm+460) = 80.860 Vm std

B. Volume H20 collected (Vw)std = 0.0471 (Vw) = 0.424 Vw std

C. Total Sample Volume (Vt) =(Vm)std + (Vw)std= 81.284 Vt std

D. Moisture Content (%H2O) = (Vw std/Vt std) x 100 = 0.522 %

E. Stack Gas Velocity (Vs) = 85.49 Kp (P) SQRT(Ts +460/Ms Ps) = 29.324 ft/sec

F. Stack Gas Molecular Wgt.= ((CO2%x0.44 + O2%x0.32 + N2%x0.28)(1-H20%/100)) + 18 (H20%/100) 28.783 M.W.s

G. Stack Gas Volumetric Flowrate = (Vs)(As) 1062.6(Ps/Ts + 460)(1-%H2O/100) = 2621 SDCFM

H. Particulate Concentration (Cs) = s/Vm std x 0.01543 = 0.0000 gr/dscf

I. Particulate Emission Rate = 0.00857 x Cs x SDCFM = 0.000 Lbs/hr

J. % Isokinetic (I) =17.38(Vt)(Ts+460)/(dxd)(0)(Ps)(Vs) = 102.376 %

K. ACFM = (Vs)(As) x 60 = 2745 ACFM

BEST ENVIRONMENTAL Particulate Field Data Sheet

Run # 1 Method # 429

4 day logs

Plant Koppers
Date 10-10-90
Location yard shed
Port Dim. /
Stack I.D. 15x15
Stack Area 1.56 ft2
Personnel DC/RB

ΔH@ 1.753
Meter Yd 1.0157
PBar. 29.78
Stat Press -.15
%O2 Assum 20.9
%CO2 Assum .04
%H2O Assum .4
Pitot Co .84
Noz. Diam. .269
Noz I.D. 7F
Meter # RAC 2
Probe # 5'BA
Pre leak ck ✓ cfm ✓ "Hg

Filter # 30/CT1205 F... Wt. (mg) NA
Pitot # 5'BA B.H. Wt. (mg) NA
Net Imp Vol -5 Gel Wt. (mg) 15
Tot Imp Vol ____ %CO2 Actual .04
Sample Time 120 %O2 Actual 20.9
Sqrt ΔP Ave .520 Tot. Moisture (10)
Post leak ck .004 cfm 10 "Hg Std Vm 82.599

	Sample Point	Clock Time	Vel. ΔP	M.R. cfm	Orif. ΔH	Gas Meter Volume ft2	Gas Meter In	Gas Meter Out	Temperatures F Stack	Imp.	Filter	Probe	Pump Vac.	Comments
1		~~750~~				~~950.857~~								
2		751				958.804								
3	1	801	.27	C	1.50		70	51	55	43	C	C	6	54-53-54
4	2	811	.28		1.6	972.9	72	52	58	43			6	
5	3	821	.26		1.45	978.3	74	52	59	43			6	
6	4	831	.29		1.62	985.2	76	53	61	44			6	
7	5	841	.26		1.44		77	54	63	44			6	
8	6	851	.25		1.4	998.1	81	58	65	44			6	
9														
10	1	901	.29		1.62	005.7	84	59	67	45			7	
11	2	11	.29		1.62	013.6	85	61	67	45			7	
12	3	21	.25		1.4	020.5	86	64	67	46			6	
13	4	31	.25		1.4	27.1	88	66	69	46			6	
14	5	41	.28		1.6		90	67	70	46				
15	6	951	.28		1.6	1040.506	92	68	72	46				73-74-75
16														
17														
18														
19														
20														
21														
22														
23														102% ISO
24														
25														
26														
27														
28	Average				1.48	81,702		70.0	64.4					

Notes: VSS: .520

Ms =
Ave. Vs = 28.98 → 2,724 SCFM
Sample I.D. # =

BEST ENVIRONMENTAL Particulate Field Data Sheet

Run # 2 Method # 429

Plant Koppers
Date 10-10-90
Location
Port Dia. "
Stack I.D. "
Stack Area ft2
Personnel DC/RB

ΔH R1
Meter Yd R1
PBar. R1
Stat Press -.15
%O2 Assum R1
%CO2 Assum R1
%H2O Assum
Pitot Co
Noz. Diam.
Noz I.D.
Meter #
Probe #
Pre leak ck ✓ cfm ✓ "Hg Post leak ck ✓ cfm 10 "Hg

Filter # 31/CT1085
Pitot #
Net Imp Vol -8
Tot Imp Vol
Sample Time
Sqrt ΔP Ave .1521
F. wt. (mg) —
B.H. Wt. (mg) —
Gel Wt. (mg) 22
%CO2 Actual
%O2 Actual
Tot. Moisture (14)
Std Vm 79.748

	Sample Point	Clock Time	Vel. ΔP	M.R. cfm	Orif. ΔH	Gas Meter Volume ft2	Gas Meter In	Gas Meter Out	Temperatures F Stack	Imp.	Filter	Probe	Pump Vac.	Comments
1		1009½				042.932								
2	1	14	.31		1.7		95	75	73	47			6	74-75-76
3	2	29	.28		1.6	56.7	97	76	73	47			5	
4	3	39	.25		1.4	62.9	98	77	73	47			5	
5	4	49	.25		1.4	070.15	98	78	75	47			5	
6	5	59	.25		1.4	76.83	99	78	75	47				
7	6	1109	.25		1.4	83.6	102	81	74	47				
8														
9	1	1119	.30		1.71	83.6	102	81	74	47			5	78-80-85
10	2	19	.30		1.71	90.6	104	82	79	47			5	
11	3	29	.29		1.65	97.5	104	83	76	47			5	
12	4	39	.28		1.60		105	84	76	47			5	Stack Temp. 5
13	5	49	.25		1.45		107	84	77	47			5	are 7% low
14	6	59	.25		1.42		107	85	79					
15	End	1209				124.862								
16														
17														
18														
19														
20														
21														
22														
23														78% iso
24														
25														
26														
27														
28	Average				1.54	81.930		91.0	75.0					

(80.6)

Notes:

Ts =
Ave. Vs = 29.59 ft/s = 2,721 SCFM
Sample I.D. # =

#1 #2

BEST ENVIRONMENTAL Particulate Field Data Sheet

Run # 3 Method # 429

4 day logs

Plant	Koppers	Cp	R1	%H2O Assum.	R1	Filter # 25/ [illegible]	
Date	10-10-90	Meter Yd	R1	Pitot Cp	R1	Pitot # R1	[illegible] Wt. (mg) NA
Location	R1	PBar.	R1	Noz. Diam.	R1	Net Imp Vol - 6	B.H. Wt. (mg) NA
Port Dia.	R1	Stat Press -.10		Noz I.D.	R1	Tot Imp Vol	Gel Wt. (mg) 15
Stack I.D.	R1	%O2 Assum	R1	Meter #	R1	Sample Time 120	%CO2 Actual .04
Stack Area	R1 ft2	%CO2 Assum	R1	Probe #	R1	Sqrt ΔP Ave .510	%O2 Actual 20.9
Personnel	R1	Pre leak ck ✓ cfm ✓ "Hg		Post leak ck .004 cfm 10 "Hg			Tot. Moisture (9)
							Std Vm

	Sample Point	Clock Time	Vel. ΔP	M.R. cfm	Orif. ΔH	Gas Meter Volume ft2	Gas Meter In	Gas Meter Out	Temperatures F Stack	Imp.	Filter	Probe	Pump Vac.	Comments
1		1223				127,026								
2	1	33	.30		1.70		107	87	86	48	NA	NA	5	86-88-91
3	2	43	.29		1.64		109	88	87	48			5	
4	3	53	.29		1.64		109	88	87	48			5	
5	4	1303	.27		1.53		110	89	88	48			5	
6	5	13	.23		1.4		111	90	89	48			5	
7	6	1323	.23		1.4	169.2	111	90	90	48			5	
8									[illegible]					
9	1	33	.27		1.5		111	91	90	49			5	
10	2	43	.27		1.6		112	91	91	50			5	90-92-96
11	3	53	.24		1.5		112	92	92	50			5	
12	4	1403	.24		1.5		112	92	91	50			5	
13	5	1423	.25		1.6		112	92	90	50			5	
14	6	1433	.25		1.6	211.581	112	92	91				5	
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28	Average				1.55	84.555		100.4	89.3					

Notes:

Ms =

Ave. Vs = 29.59 ft/s + 2,721 SCFM

Sample I.D. # =

#1 #2

BEST ENVIRONMENTAL Particulate Field Data Sheet

Run # 1,2,3 Method # 208

Plant Koppers
Date 10-10-90
Location Coppers Yard Shed
Port Dia. 3"
Stack I.D. 15"
Stack Area 1.56 ft2
Personnel RB

Dia —
Meter Yd 1.0002
PBar. 29.78
Stat Press -0.15
%O2 Assum 21
%CO2 Assum 0
Pre leak ck ① <.001 cfm 5 "Hg
② <.001 5
③ <.001 5

%H2O Assum. —
Pitot Co —
Noz. Diam. —
Noz I.D. —
Meter # 8816
Probe # Rb Line
Post leak ck <.001 cfm 5 "Hg
<.001 5
<.001 5

Filter # —
Pitot # —
Net Imp Vol
Tot Imp Vol
Sample Time 30
Sqrt ΔP Ave

F. Wt. (mg)
B.H. Wt. (mg)
Gel Wt. (mg)
%CO2 Actual
%O2 Actual
Tot. Moisture
Std Vm ① 1.141
② .934
③ .728

	Sample Point	Clock Time	Vel. ΔP	M.R. cfm	Orif. ΔH	Gas Meter Volume ft2	Gas Meter In	Gas Meter Out	Temperatures F Stack	Imp.	Filter	Probe	Pump Vac.	Comments
1	①	0758		.03		131.047	53	48					-3	Y day fixer
2		0808				131.40	91	50						
3		18				131.75	68	56						
4	End	0828				132.150	68	56						
5						(1.123)	(57.5)						-3	
6	②	1041		.03		134.008	97	82						
7		51				134.32	72	83						
8		1101				134.66	95	86						
9	End	1111				134.984	97	88						
10						(.976)	(89.3)						3	
11	③	1229		.03		135.006	98	98						
12		39				135.37	100	98						
13		44				135.52	101	98						
14	End	1259				135.780	101	90						
15						(.774)	(99.1)							
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28	Average													

Notes:

Ms =
Ave. Vs =
Sample I.D. # =

BEST ENVIRONMENTAL Particulate Field Data Sheet

Run # 1,2,3 Method # 430

Plant: Koppers
Date: 10-10-90
Location: Storage Yard Shed
Port Dia.: 3/8
Stack I.D.: 15"
Stack Area: 1.56 ft2
Personnel: RB

ΔH@:
Meter Yo: 1.0023
PBar.: 29.78
Stat Press: -0.15
%O2 Assum: 21
%CO2 Assum: 0
Pre leak ck: ① <.001 cfm, 5 "Hg; ② <.001, 5; ③ <.001, 5

%H2O Assum.:
Pitot Cp:
Noz. Diam.:
Noz I.D.:
Meter #: 88.16
Probe #: Teflon line

Filter #:
Pitot #:
Net Imp Vol:
Tot Imp Vol:
Sample Time: 20
Sqrt ΔP Ave:
Post leak ck: <.001 cfm, 5 "Hg; <.001, .5

F... Wt. (mg):
B.H. Wt. (mg):
Gel Wt. (mg):
%CO2 Actual:
%O2 Actual:
Tot. Moisture:
Std Vm: ① .599; ② .654; ③ .611

	Sample Point	Clock Time	Vel. ΔP	M.R. cfm	Orif. ΔH	Gas Meter Volume ft2	Gas Meter In	Gas Meter Out	Temperatures F Stack	Imp.	Filter	Probe	Pump Vac.	Comments
1	①	0910		.03		132.712	75	66					-3	① [illegible]
2		20				133.06	77	67						
3	End	0930				133.318	80	69						
4						(.606)	(72.3)							
5	②	1014		.03		133.347	87	79					3	②
6		24				133.66	91	80						
7	End	34				133.998	91	82						
8						(.671)	(85.3)							
9	③	1259		.03		135.787	102	100					5	③
10		1309				136.10	102	101						
11	End	1319				136.432	103	102						
12						(.645)	(101.7)							
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28	Average													

Notes:

Ms =
Ave. Vs =
Sample I.D. # =

#1 #2

BEST ENVIRONMENTAL
PAH EMISSION CALCULATIONS

DATE	10-11-90	TEST METHOD	CARB-429	CLIENT	KOPPERS
TEST No.	1	METER BOX	Rac2	LOCATION	SHED1D
TEST TIME	0745-0945			FUEL	N.A

Pitot Factor (Kp)	0.840	Meter temp. (Tm)	65.7	Total condensate (Vw)	15.0
Barom. press. (Pbar)	29.80	Meter press. (^H)	1.5	Total particulate (mg)	0.0
Static Press.	-0.10	Vel.AvgSQRT(P)	0.517	Sample vol. uncorr. (Vm)	80.410
Stack press.	29.79	Stack Area (As)	1.56	Stack gas CO2%	0.0
Stack temp. (Ts)	58.3	Nozzle dia. (d)	0.269	Stack gas O2%	21.0
Sample time (O)	120.0	Meter factor (Y)	1.0157	Stack gas N2%	79.0

A. Gas Volume (Vm)std =17.65 (Vm) Y ((Pbar+H/13.6)/Tm+460) = 82.017 Vm std

B. Volume H2O collected (Vw)std = 0.0471 (Vw) = 0.707 Vw std

C. Total Sample Volume (Vt) =(Vm)std + (Vw)std= 82.723 Vt std

D. Moisture Content (%H2O) = (Vw std/Vt std) x 100 = 0.854 %

E. Stack Gas Velocity (Vs) = 85.49 Kp (P) SQRT(Ts +460/Ms Ps) = 28.882 ft/sec

F. Stack Gas Molecular Wgt.= ((CO2%x0.44 + O2%x0.32 + N2%x0.28)(1-H2O%/100)) + 18 (H2O%/100) 28.747 M.W.s

G. Stack Gas Volumetric Flowrate = (Vs)(As) 1062.6(Ps/Ts + 460)(1-%H2O/100) = 2728 SDCFM

H. Particulate Concentration (Cs) = s/Vm std x 0.01543 = 0.0000 gr/dscf

I. Particulate Emission Rate = 0.00857 x Cs x SDCFM = 0.000 Lbs/hr

J. % Isokinetic (I) =17.38(Vt)(Ts+460)/(dxd)(O)(Ps)(Vs) = 99.734 %

K. ACFM = (Vs)(As) x 60 = 2703 ACFM

BEST ENVIRONMENTAL
PAH EMISSION CALCULATIONS

DATE	10-11-90	TEST METHOD	CARB-429	CLIENT	KOPPERS
TEST No.	2	METER BOX	Rac2	LOCATION	SHED1D
TEST TIME	1001-1201			FUEL	N.A

Pitot Factor (Kp)	0.840	Meter temp. (Tm)	86.5	Total condensate (Vw)	26.0
Barom. press. (Pbar)	29.80	Meter press. (^H)	1.6	Total particulate (mg)	0.0
Static Press.	-0.10	Vel.AvgSQRT(P)	0.526	Sample vol. uncorr. (Vm)	85.224
Stack press.	29.79	Stack Area (As)	1.56	Stack gas CO2%	0.0
Stack temp. (Ts)	78.8	Nozzle dia. (d)	0.269	Stack gas O2%	21.0
Sample time (O)	120.0	Meter factor (Y)	1.0157	Stack gas N2%	79.0

A. Gas Volume (Vm)std =17.65 (Vm) Y ((Pbar+H/13.6)/Tm+460) = 83.635 Vm st

B. Volume H2O collected (Vw)std = 0.0471 (Vw) = 1.225 Vw st

C. Total Sample Volume (Vt) =(Vm)std + (Vw)std= 84.860 Vt s

D. Moisture Content (%H2O) = (Vw std/Vt std) x 100 = 1.443 %

E. Stack Gas Velocity (Vs) = 85.49 Kp (P) SQRT(Ts +460/Ms Ps) = 29.993 ft/s

F. Stack Gas Molecular Wgt.= ((CO2%x0.44 + O2%x0.32 + N2%x0.28)(1-H2O%/100)) + 18 (H2O%/100) 28.684 M.W.

G. Stack Gas Volumetric Flowrate = (Vs)(As) 1062.6(Ps/Ts + 460)(1-%H2O/100) = 2709 SDCF

H. Particulate Concentration (Cs) = s/Vm std x 0.01543 = 0.0000 gr/d

I. Particulate Emission Rate = 0.00857 x Cs x SDCFM = 0.000 Lbs/

J. % Isokinetic (I) =17.38(Vt)(Ts+460)/(dxd)(O)(Ps)(Vs) = 102.414 %

K. ACFM = (Vs)(As) x 60 = 2807 ACFM

BEST ENVIRONMENTAL
PAH EMISSION CALCULATIONS

DATE	10-11-90	TEST METHOD	CARB-429	CLIENT	KOPPERS
TEST No.	3	METER BOX	Rac2	LOCATION	SHED1D
TEST TIME	1213-1413			FUEL	N.A

Pitot Factor (Kp)	0.840	Meter temp. (Tm)	98.0	Total condensate (Vw)	15.0
Barom. press. (Pbar)	29.80	Meter press. (^H)	1.5	Total particulate (mg)	0.0
Static Press.	-0.10	Vel.AvgSQRT(P)	0.517	Sample vol. uncorr. (Vm)	82.589
Stack press.	29.79	Stack Area (As)	1.56	Stack gas CO2%	0.0
Stack temp. (Ts)	89.6	Nozzle dia. (d)	0.269	Stack gas O2%	21.0
Sample time (O)	120.0	Meter factor (Y)	1.0157	Stack gas N2%	79.0

A. Gas Volume (Vm)std =17.65 (Vm) Y ((Pbar+H/13.6)/Tm+460) = 79.365 Vm std

B. Volume H2O collected (Vw)std = 0.0471 (Vw) = 0.707 Vw std

C. Total Sample Volume (Vt) =(Vm)std + (Vw)std= 80.072 Vt std

D. Moisture Content (%H2O) = (Vw std/Vt std) x 100 = 0.882 %

E. Stack Gas Velocity (Vs) = 85.49 Kp (P) SQRT(Ts +460/Ms Ps) = 29.743 ft/sec

F. Stack Gas Molecular Wgt.= ((CO2%x0.44 + O2%x0.32 + N2%x0.28)(1-H2O%/100)) + 18 (H2O%/100) 28.744 M.W.s

G. Stack Gas Volumetric Flowrate = (Vs)(As) 1062.6(Ps/Ts + 460)(1-%H2O/100) = 2649 SDCFM

H. Particulate Concentration (Cs) = s/Vm std x 0.01543 = 0.0000 gr/dscf

I. Particulate Emission Rate = 0.00857 x Cs x SDCFM = 0.000 Lbs/hr

J. % Isokinetic (I) =17.38(Vt)(Ts+460)/(dxd)(O)(Ps)(Vs) = 99.404 %

K. ACFM = (Vs)(As) x 60 = 2784 ACFM

RESI ENVIRONMENTAL Particulate Field Data Sheet

Run # 1 Method # 429

one day logs

Plant Koppers
Date 10-11-90
Location Storage yard shed
Port Dia. 15 x 15
Stack I.D. —
Stack Area 1.56 ft2
Personnel DC/RB

cfm 1.753
Meter Yd 1.0157
Pbar. 29.8
Stat Press -.1
%O2 Assum 20.7
%CO2 Assum .04
Pre leak ck ✓ cfm ✓ "Hg

Nozzle Number 4
Pitot Cp .84
Noz. Diam. .269
Noz I.D. .TF
Meter # RAC 2
Probe # 5'S

Filter # 20
Pitot # 5'BA
Net Imp Vol -6
Tot Imp Vol
Sample Time 120
Sqrt ΔP Ave .517
Post leak ck .003 cfm 8 "Hg

F. Wt. (mg) NA
B.H. Wt. (mg) NA
Gel Wt. (mg) 2
%CO2 Actual .04
%O2 Actual 20.9
Tot. Moisture (15)
Std Vm

	Sample Point	Clock Time	Vel. ΔP	M.R. cfm	Orif. ΔH	Gas Meter Volume ft2	Gas Meter In	Gas Meter Out	Temperatures F Stack	Temperatures F Imp.	Temperatures F Filter	Temperatures F Probe	Pump Vac.	Comments
1		745				213.026								
2	1		.28		1.57		66	47	49	43	—	—	7	
3	2		.29		1.63	226.3	68	48	49	43			7	
4	3		.28		1.57	233.1	70	48	51	43			7	
5	4		.29		1.63	239.95	71	49	53	43			7	
6	5		.23		1.3		74	51	56	43			6	
7	6	845	.23		1.3	253.0	76	53	58	43			6	
8														
9	1		.29		1.62		78	55	60	43			7	
10	2		.29		1.62	266.6	79	56	61	43			7	58-59-60
11	3		.26		1.45	273.3	82	58	64	44			7	
12	4		.27		1.52	280.1	84	61	65					
13	5		.25		1.40		86	63	66					
14	6		.25		1.4	293.436	88	65	68					
15														
16														
17														
18														
19														
20														10 1/2 150
21														
22														
23														
24														
25														
26														
27					1.50	80.410		65.7	58.3					
28	Average													

Notes:

Ms =
Ave. Vs = 28.86 , 2,743 SCFM
Sample I.D. # =

#1 #2

Final Imp Vol =

REST ENVIRONMENTAL Particulate Field Data Sheet

Run # 2 Method # 429

on day logs

Plant Koppers
Date 10-11-90
Location R1
Port Dia. R1
Stack I.D. R1
Stack Area R1 ft2
Personnel R1

CM# R1
Meter Yd RT
PBar. R1
Stat Press 10
%O2 Assum R1
%CO2 Assum RT
Pre leak ck — cfm — "Hg

%H2O Assum 4
Pitot Cp R1
Noz. Diam. R1
Noz I.D. R1
Meter # R1
Probe # R1

Filter # 12
Pitot # R1
Net Imp Vol -13
Tot Imp Vol
Sample Time 120
Sqrt ΔP Ave .526
Post leak ck .003 cfm 9 "Hg

F. Wt. (mg) —
R.H. Wt. (mg) —
Gel Wt. (mg) 39
%CO2 Actual 0
%O2 Actual 21
Tot. Moisture 26
Std Vm 83.862

	Sample Point	Clock Time	Vel. ΔP	M.R. cfm	Orif. ΔH	Gas Meter Volume ft2	Gas Meter In	Gas Meter Out	Temperatures F Stack	Imp.	Filter	Probe	Pump Vac.	Comments
1		1001	—		—	295.060								
2	1	11	.28		1.58		92	69	71	45			7	
3	2	21	.29		1.63	309.0	92	70	73	45			7	
4	3	31	.27		1.52	315.8	93	71	74	45			7	
5	4	41	.27		1.51		94	72	76					
6	5	51	.25		1.40		95	74	78					
7	6	11 01	.25		1.40	336.3	96	75	79					
8														
9	1	11	.32		1.80		97	76	80					74-79-79
10	2	21	.32		1.80	351.2	100	78	80					
11	3	31	.30		1.69		102	79	81					
12	4	41	.30		1.69	365.95	102	80	83					
13	5	41	.24		1.58		102	81	84					
14	6	1201	.24		1.36	380.284	104	82	86					
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28	Average				1.58	85.224		86.5	78.8					

Notes:

Ms =
Ave. Vs = 29.95 · 2,741 SCFM
Sample I.D. # =

+80

01 02

Final Imp Vol =

BEST ENVIRONMENTAL Particulate Field Data Sheet

Run # 3 Method # 429

lay logs

Plant Koppers
Date 10/ /80
Location R1
Port Dim. R1
Stack I.D. R
Stack Area R ft2
Personnel R1

O2m R1
Meter Yd R1
PBar. R1
Stat Press -.11
%O2 Assum R1
%CO2 Assum R1
Pre leak ck ✓ cfm ✓ "Hg

%H2O Assum. R1
Pitot Co R1
Noz. Diam. R1
Noz I.D. R1
Meter # R1
Probe # R1
Post leak ck .003 cfm 10 "Hg

Filter # 6
Pitot # R1
Net Imp Vol -7
Tot Imp Vol
Sample Time 120
Sqrt ΔP Ave .517

F. Wt. (mg) —
B.H. Wt. (mg) —
Gel Wt. (mg) 22
%CO2 Actual
%O2 Actual
Tot. Moisture (15)
Std Vm 79.581

	Sample Point	Clock Time	Vel. ΔP	M.R. cfm	Orif. ΔH	Gas Meter Volume ft2	Gas Meter In	Gas Meter Out	Temperatures F Stack	Temperatures F Imp.	Temperatures F Filter	Temperatures F Probe	Pump Vac.	Comments
1		1213				381.493	105	84	87	48			7	
2	1		.31		1.74		106	85	88	48			7	
3	2		.29		1.63	395.1	107	85	88	48			7	
4	3		.31		1.74	402.4	107	86	89	48			7	
5	4		.31		1.74	409.8	108	87	90	48			7	
6	5		.27		1.52		109	87	90	48			7	
7	6	1313	.26		1.46									
8							110	88	90	48			6	
9	1		.24		1.36		110	88	90	48			6	90-93-94
10	2		.25		1.41		110	89	90	48			6	
11	3		.24		1.35	443.5	110	89	91	48			7	
12	4		.28		1.57		110	90	91	48			6	
13	5		.24		1.35		111	90	91	48			6	
14	6	1413	.22		1.26	464.082								
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28	Average				1.51	82.589		98.0	89.6					

Notes:

Ms =
Ave. Vs = 29.74 + 2,668 SCFM
Sample I.D. # =

#1 #2

Final Imp Vol =

BEST ENVIRONMENTAL Particulate Field Data Sheet

Run # 1,2,3 Method # TO8

Plant Koppers
Date 10-11-90
Location Storage Yard Shed
Port Dim. 3/8
Stack I.D. 15"
Stack Area 1.56 ft2
Personnel RB

Ctm —
Meter Yd 1.002
PBar. 29.8
Stat Press -.100
%O2 Assum 21
%CO2 Assum 6
Pre leak ck (1) <.001 cfm 5 "Hg
(2) <.001 5
(3) <.001 5

%H2O Assum. 6
Pitot Cp —
Noz. Diam. —
Noz I.D. —
Meter # 8816
Probe # Teflon line

Filter # —
Pitot # —
Net Imp Vol
Tot Imp Vol
Sample Time 30
Sqrt ΔP Ave
Post leak ck <.001 cfm 5 "Hg
<.001 5
<.001 5

F... Wt. (mg) —
B.H. Wt. (mg) —
Gel Wt. (mg)
%CO2 Actual
%O2 Actual
Tot. Moisture
Std Vm (1) .976
(2) .909
(3) .958

	Sample Point	Clock Time	Vel. ΔP	M.R. cfm	Orif. ΔH	Gas Meter Volume ft2	Gas Meter In	Gas Meter Out	Temperatures F Stack	Imp.	Filter	Probe	Pump Vac.	Comments
						136.924	48	45					-3	
1	(1)	0747		.03		137.24	50	45						1 day logs
2		57				137.56	56	48						
3		0807				137.868	62	52						
4	End	0817				(.944)	(50.8)							
5						139.162	87	79					-3	
6	(2)	1028		.03		139.47	90	82						
7		38				139.80	91	83						
8		48				140.104	91	84						
9	End	1058				(.942)	(85.9)							
10						140.111	95	91					-3	
11	(3)	1223		.03		140.45	94	91						
12		33				140.79	95	92						
13		43				141.107	95	92						
14	End	53				(.996)	(92.9)							
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28	Average													

Notes:

Ms =
Ave. Vs =
Sample I.D. # =

#1 #2

Final Imp Vol =

REST ENVIRONMENTAL Particulate Field Data Sheet

Run # 1, 2, 3 Method # 430

Plant Koppers
Date 10-11-96
Location Storage Yard Shed
Port Dia. 3"
Stack I.D. 15"
Stack Area 1.56 ft2
Personnel RPS

ΔH@ ____
Meter Yd 1.0002
Pbar. 29.80
Stat Press -.10
%O2 Assum 21
%CO2 Assum 0
Pre leak ck (1) <.001 cfm 5 "Hg
(2) <.001 5
(3) <.001 5

%H2O Assum. ____
Pitot Cp ____
Noz. Diam. ____
Noz I.D. ____
Meter # 88 16
Probe # Teflon line

Filter # ____
Pitot # ____
Net Imp Vol ____
Tot Imp Vol ____
Sample Time 20
Sqrt ΔP Ave ____
Post leak ck <.001 cfm 5 "Hg
<.001 5
<.001 5

F. wt. (mg) ____
F.H. wt. (mg) ____
Gel Wt. (mg) ____
%CO2 Actual ____
%O2 Actual ____
Tot. Moisture ____
Std Vm (1) .643
(2) .616
(3) .623

	Sample Point	Clock Time	Vel. ΔP	M.R. cfm	Orif. ΔH	Gas Meter Volume ft2	Gas Meter In	Gas Meter Out	Temperatures F Stack	Imp.	Filter	Probe	Pump Vac.	Comments
1	(1)	0830		.03		137.878	66	59					-3	Hay Kegs
2		40				138.19	72	62						
3	End	0850				138.519	73	64						
4						(.641)	(65.7)						-3	
5	(2)	1003		.05		138.524	85	78						
6		13				138.84	86	78						
7	End	23				139.157	86	79						
8						(.633)	(82.0)						-3	
9	(3)	1258		.03		141.113	95	92						
10		1308				141.42	97	94						
11	End	1318				141.769	97	95						
12						(.656)	(95.0)							
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28	Average													

Notes:

Ms =
Ave. Vs =
Sample I.D. # =

#1 #2

Final Imp Vol =

BEST ENVIRONMENTAL
PAH EMISSION CALCULATIONS

DATE	10-12-90	TEST METHOD	CARB-429	CLIENT	KOPPERS
TEST No.	1	METER BOX	Rac2	LOCATION	SHEDFRESH
TEST TIME	0734-0934			FUEL	N.A

Pitot Factor (Kp)	0.840	Meter temp. (Tm)	69.2	Total condensate (Vw)	35.0
Barom. press. (Pbar)	29.80	Meter press. (^H)	1.5	Total particulate (mg)	0.0
Static Press.	-0.10	Vel.AvgSQRT(P)	0.514	Sample vol. uncorr. (Vm)	79.223
Stack press.	29.79	Stack Area (As)	1.56	Stack gas CO2%	0.0
Stack temp. (Ts)	71.8	Nozzle dia. (d)	0.269	Stack gas O2%	21.0
Sample time (O)	120.0	Meter factor (Y)	1.0157	Stack gas N2%	79.0

A. Gas Volume (Vm)std =17.65 (Vm) Y ((Pbar+H/13.6)/Tm+460) = 80.264 Vm std

B. Volume H20 collected (Vw)std = 0.0471 (Vw) = 1.649 Vw std

C. Total Sample Volume (Vt) =(Vm)std + (Vw)std= 81.912 Vt std

D. Moisture Content (%H20) = (Vw std/Vt std) x 100 = 2.013 %

E. Stack Gas Velocity (Vs) = 85.49 Kp (P) SQRT(Ts +460/Ms Ps) = 29.149 ft/sec

F. Stack Gas Molecular Wgt.= ((CO2%x0.44 + O2%x0.32 + N2%x0.28)(1-H20%/100)) + 18 (H20%/100) 28.622 M.W.s

G. Stack Gas Volumetric Flowrate = (Vs)(As) 1062.6(Ps/Ts + 460)(1-%H20/100) = 2652 SDCFM

H. Particulate Concentration (Cs) = s/Vm std x 0.01543 = 0.0000 gr/dscf

I. Particulate Emission Rate = 0.00857 x Cs x SDCFM = 0.000 Lbs/hr

J. % Isokinetic (I) =17.38(Vt)(Ts+460)/(dxd)(0)(Ps)(Vs) = 100.398 %

K. ACFM = (Vs)(As) x 60 = 2728 ACFM

BEST ENVIRONMENTAL
PAH EMISSION CALCULATIONS

DATE	10-12-90	TEST METHOD	CARB-429	CLIENT	KOPPERS
TEST No.	2	METER BOX	Rac2	LOCATION	SHEDFRESH
TEST TIME	0949-1149			FUEL	N.A

Pitot Factor (Kp)	0.840	Meter temp. (Tm)	90.2	Total condensate (Vw)	27.0
Barom. press. (Pbar)	29.80	Meter press. (^H)	1.6	Total particulate (mg)	0.0
Static Press.	-0.10	Vel.AvgSQRT(P)	0.531	Sample vol. uncorr. (Vm)	83.704
Stack press.	29.79	Stack Area (As)	1.56	Stack gas CO2%	0.0
Stack temp. (Ts)	86.0	Nozzle dia. (d)	0.269	Stack gas O2%	21.0
Sample time (0)	120.0	Meter factor (Y)	1.0157	Stack gas N2%	79.0

A. Gas Volume (Vm)std =17.65 (Vm) Y ((Pbar+H/13.6)/Tm+460) = 81.589 Vm std

B. Volume H20 collected (Vw)std = 0.0471 (Vw) = 1.272 Vw std

C. Total Sample Volume (Vt) =(Vm)std + (Vw)std= 82.861 Vt std

D. Moisture Content (%H20) = (Vw std/Vt std) x 100 = 1.535 %

E. Stack Gas Velocity (Vs) = 85.49 Kp (P) SQRT(Ts +460/Ms Ps) = 30.485 ft/sec

F. Stack Gas Molecular Wgt.= ((CO2%x0.44 + O2%x0.32 + N2%x0.28)(1-H20%/100)) + 18 (H20%/100) 28.674 M.W.s

G. Stack Gas Volumetric Flowrate = (Vs)(As) 1062.6(Ps/Ts + 460)(1-%H20/100) = 2715 SDCFM

H. Particulate Concentration (Cs) = s/Vm std x 0.01543 = 0.0000 gr/dscf

I. Particulate Emission Rate = 0.00857 x Cs x SDCFM = 0.000 Lbs/hr

J. % Isokinetic (I) =17.38(Vt)(Ts+460)/(dxd)(0)(Ps)(Vs) = 99.703 %

K. ACFM = (Vs)(As) x 60 = 2853 ACFM

BEST ENVIRONMENTAL
PAH EMISSION CALCULATIONS

DATE	10-12-90	TEST METHOD	CARB-429	CLIENT	KOPPERS
TEST No.	3	METER BOX	Rac2	LOCATION	SHEDFRESH
TEST TIME	1205-1405			FUEL	N.A

Pitot Factor (Kp)	0.840	Meter temp. (Tm)	99.0	Total condensate (Vw)	27.0
Barom. press. (Pbar)	29.80	Meter pre . (^H)	1.5	Total particulate (mg)	0.0
Static Press.	-0.10	Vel.AvgSQRT(P)	0.517	Sample vol. uncorr. (Vm)	81.688
Stack press.	29.79	Stack Area (As)	1.56	Stack gas CO2%	0.0
Stack temp. (Ts)	92.3	Nozzle dia. (d)	0.269	Stack gas O2%	21.0
Sample time (O)	120.0	Meter factor (Y)	1.0157	Stack gas N2%	79.0

A. Gas Volume (Vm)std =17.65 (Vm) Y ((Pbar+H/13.6)/Tm+460) = 78.357 Vm std

B. Volume H2O collected (Vw)std = 0.0471 (Vw) = 1.272 Vw std

C. Total Sample Volume (Vt) =(Vm)std + (Vw)std= 79.629 Vt std

D. Moisture Content (%H2O) = (Vw std/Vt std) x 100 = 1.597 %

E. Stack Gas Velocity (Vs) = 85.49 Kp (P) SQRT(Ts +460/Ms Ps) = 29.856 ft/sec

F. Stack Gas Molecular Wgt.= ((CO2%x0.44 + O2%x0.32 + N2%x0.28)(1-H2O%/100)) + 18 (H2O%/100) 28.667 M.W.s

G. Stack Gas Volumetric Flowrate = (Vs)(As) 1062.6(Ps/Ts + 460)(1-%H2O/100) = 2627 SDCFM

H. Particulate Concentration (Cs) = s/Vm std x 0.01543 = 0.0000 gr/dscf

I. Particulate Emission Rate = 0.00857 x Cs x SDCFM = 0.000 Lbs/hr

J. % Isokinetic (I) =17.38(Vt)(Ts+460)/(dxd)(O)(Ps)(Vs) = 98.963 %

K. ACFM = (Vs)(As) x 60 = 2794 ACFM

BEST ENVIRONMENTAL Particulate Field Data Sheet

Run # 1 Method # 29

Fresh logs

Plant Koppers
Date 10-12-90
Location Storage yard shed
Port Dim. RE -
Stack I.D. 15x15
Stack Area 1.56 ft2
Personnel DC/RB

Cp# 1.753
Meter Yd 1.0157
PBar. 29.80
Stat Press -.1
%O2 Assum 20.9
%CO2 Assum .04
Pre leak ck ✓ cfm ✓ "Hg

%H2O Assum .4
Pitot Cp .84
Noz. Diam. .269
Noz I.D. 7F
Meter # RAC 2
Probe # 5'SA

Filter # 3
Pitot # 5'3A
Net Imp Vol -3
Tot Imp Vol
Sample Time 120
Sort ΔP Ave .514
Post leak ck .005 cfm 9 "Hg

F. Wt. (mg) NA
B.H. Wt. (mg) NA
Gel Wt. (mg) 38
%CO2 Actual .04
%O2 Actual 20.9
Tot. Moist. (35)
Std Vm

	Sample Point	Clock Time	Vel. ΔP	M.R. cfm	Orif. ΔH	Gas Meter Volume ft2	Gas Meter In	Gas Meter Out	Temperatures F Stack	Imp.	Filter	Probe	Pump Vac.	Comments
1		734				465.582								
2	1	744	.28		1.53	472.2	70	51	67	44			6	
3	2	754	.28		1.53	478.7	71	51	66	44			6	
4	3	804	.26		1.43	485.0	72	51	65	44			6	
5	4	814	.25		1.38		73	52	65	44			6	
6	5	24	.23		1.27		76	53	66	44			6	
7	6	834	.23		1.27	504.15	79	56	69	44			6	
8														
9	1	844	.28		1.55		81	57	72	44			6	
10	2	54	.30		1.65		84	61	74	44			7	
11	3	904	.25		1.40	524.05	86	63	75	44			6	68-70-72
12	4	14	.28		1.56		88	65	78	44			7	
13	5	24	.26		1.48	537.9	90	67	81	44			6	
14	6	934	.28		1.57	544.805	93	70	83	44			6	
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28	Average				1.46	79.223		69.2	71.8					

Notes:

Ms =
Ave. Vs = 29.08 2,697 SCFM
Sample I.D. # =

#1 #2

Final Imp Vol =

BEST ENVIRONMENTAL Particulate Field Data Sheet

Run # 2 Method # 4/29

Fresh logs

Plant Koppers
Date 10-12-90
Location SR1
Port Dia. ___"
Stack I.D. ___"
Stack Area ___ ft2
Personnel ___

ΔH@ SR1
Meter Yd ↓
ΔPBar. ___
Stat Press -.1
%O2 Assum R1
%CO2 Assum R1
Pre leak ck ✓ cfm ✓ "Hg

%H2O Assum. SR1
Pitot Cp ___
Noz. Diam. ___
Noz I.D. ___
Meter # ___
Probe # ↓

Filter # 22
Pitot # R1
Net Imp Vol 9
Tot Imp Vol ___
Sample Time 120
Sqrt ΔP Ave .531
Post leak ck .002 cfm 9 "Hg

F. Wt. (mg) NA
B.K. Wt. (mg) NA
Gel Wt. (mg) 36
%CO2 Actual .04
%O2 Actual 20.9
Tot. Moisture 27
Std Vm 81.867

	Sample Point	Clock Time	Vel. ΔP	M.R. cfm	Orif. ΔH	Gas Meter Volume ft2	Gas Meter In	Gas Meter Out	Temperatures F Stack	Temperatures F Imp.	Temperatures F Filter	Temperatures F Probe	Pump Vac.	Comments
1		949				545.833								
2		59	.30		1.67		98	76	83	44			6	
3		01	.29		1.62		100	78	85	47			6	
4		1019	.25		1.39	566.3	100	78	85	47			5	
5		1029	.25		1.39		100	78	85	47			5	
6		39	.23		1.28		100	79	85	47			5	
7		1044	.23		1.29	586.8	100	79	85	47			5	
8														
9		1059	.35		1.95	594.2	100	79	86	47			6	
10		1109	.36		2.00	602.08	100	80	87	47			6	
11		19	.33		1.84	~~608.28~~	102	80	87	47			6	80-85-88
12		29	.33		1.84	616.76	102	82	88	47			6	
13		39	.25		1.40	623.40	104	82	88	47			6	
14		1149	.24		1.34	629.537	105	83	88	47			5	
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														100.3% ISC
25														
26														
27														
28	Average		.282	.7	1.57	83.704		90.2	86.0					

Notes:

@

Ms =
Ave. Vs = 30.42 2,748 SCFM
Sample I.D. # =

#1 #2

Final Imp Vol =

BEST ENVIRONMENTAL Particulate Field Data Sheet

Run # 3 Method # 429

Fresh logs

Plant Koppers
Date 10-12-90
Location SR1
Port Dim. "
Stack I.D. "
Stack Area ft2
Personnel

Nozzle SR1 | Meter Yd 1 | PBar. V | Stat Press -.11 | %O2 Assum R1 | %CO2 Assum R1 | Pre leak ck ✓ cfm ✓ "Hg

%H2O Assum SR1 | Pitot Cp | Noz. Diam. | Noz I.D. | Meter # | Probe # | Post leak ck .003 cfm 10 "Hg

Filter # 8 | Pitot # SR1 | Net Imp Vol -7 | Tot Imp Vol | Sample Time | Part ΔP Ave .517

F. wt. (mg) — | B.H. wt. (mg) — | Gel Wt. (mg) 34 | %CO2 Actual | %O2 Actual | Tot. Moisture 27 | Std Vm

	Sample Point	Clock Time	Vel. ΔP	M.R. cfm	Orif. ΔH	Gas Meter Volume ft2	Gas Meter In	Gas Meter Out	Temperatures F Stack	Imp.	Filter	Probe	Pump Vac.	Comments
1	↑	1205	.33	(	1.8	630.626	103	85	91	46	(	(	10	
2		1215	.32		1.8		108	86	91	46			10	
3		1225	.29		1.62	645.1	108	86	91	46			9	
4		1235	.29		1.62		108	87	91	46			9	
5		45	.22		1.23		109	87	91	46			8	
6		55	.23		1.29		109	88	91	46			8	
7		1305	.30		1.68	671.8	110	88	91	47			10	86-90-95
8		15	.29		1.62	679.0	112	90	93	47			10	
9		25	.26		1.46		111	90	93	48			9	
10		35	.25		1.40	693.2	111	90	94	48			9	
11		45	.22		1.23	700.2	111	90	95	48			8	
12		55	.22	)	1.23		112	91	96	48	)	)	8	
13	Stop	1405		)		712.314								
14														
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28	Average				1.50	81.688		99.0	92.3					

Notes:

Ms =
Ave. Vs = 29.77
Sample I.D. # =

#1 #2

Final Imp Vol =

517

BEST ENVIRONMENTAL Particulate Field Data Sheet

Run # 1, 2, 3 Method # 108

Plant Toppers
Date 10-12-90
Location Storage Yard Shed
Port Dia. 8
Stack I.D. 15"
Stack Area 1.56 ft2
Personnel RB

Orifice
Meter Yd 1.0002
PBar. 27.80
Stat Press -.10
%O2 Assum 21
%CO2 Assum 0
Pre leak ck <.001 cfm 5 "Hg
(2) <.001 5
(3) <.001 5

%H2O Assum.
Pitot Co.
Noz. Diam.
Noz I.D.
Meter # 8816
Probe # Teflon Line
Post leak ck <.001 cfm 5 "Hg
<.001 5
<.001 5

Filter #
Pitot #
Net Imp Vol
Tot Imp Vol
Sample Time 30
Sqrt ΔP Ave

Filter Wt. (mg)
B.K. Wt. (mg)
Gel Wt. (mg)
%CO2 Actual
%O2 Actual
Tot. Moisture
Std Vm (1) 1.087
(2) 1.034
(3) .929

	Sample Point	Clock Time	Vel. ΔP	M.R. cfm	Orif. ΔH	Gas Meter Volume ft2	Gas Meter In	Gas Meter Out	Temperatures F Stack	Imp.	Filter	Probe	Pump Vac.	Comments
1	(1)	0757		.03		141.773	50	46					~3	fresh leaks
2		47				142.14	52	47						
3		57				142.48	55	48						
4	End	0807				142.826	59	50						
5						(1.053)	(50.6)							
6	(2)	0950		.03		143.977	93	81					~3	
7		1000				143.84	94	84						
8		10				144.19	95	86						
9	End	1020				144.555	94	87						
10						(1.078)	(89.6)							
11	(3)	1230		.03		145.920	100	97					~3	
12		40				146.24	100	98						
13		50				146.57	100	99						
14	End	1380				146.906	101	99						
15						(.786)	(99.3)							
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28	Average													

Notes:

Ms =
Ave. Vs =
Sample I.D. # =

#1 #2

Final Imp Vol =

BEST ENVIRONMENTAL Particulate Field Data Sheet

Run # 1, 2, 3 Method # 430

Plant Koppers
Date 10-12-90
Location Storage Yard Shed
Port Dia. 3
Stack I.D. 15"
Stack Area 1.56 ft2
Personnel RB

ΔH@ —
Meter Yd 1.0002
PBar. 29.5
Stat Press —
%O2 Assum 21
%CO2 Assum 0
Pre leak ck <.001 cfm 5 "Hg
(2) <.001 5
(3) <.001 5

%H2O Assum. —
Pitot Cp —
Noz. Diam. —
Noz I.D. —
Meter # 8816
Probe # Teflon 1/4"

Filter # —
Pitot # —
Net Imp Vol —
Tot Imp Vol —
Sample Time 20
Sqrt ΔP Ave —
Post leak ck <.001 cfm 5 "Hg
<.001 5
<.001 5

F. Wt. (mg) —
B.H. Wt. (mg) —
Gel Wt. (mg) —
%CO2 Actual —
%O2 Actual —
Tot. Moisture —
Std Vm (1) .647
(2) .626
(3) .660

	Sample Point	Clock Time	Vel. ΔP	M.R. cfm	Orif. ΔH	Gas Meter Volume ft2	Gas Meter In	Gas Meter Out	Temperatures F Stack	Imp.	Filter	Probe	Pump Vac.	Comments
1	(1)	0813		.03		142.851	61	53					~5	Fresh
2		23				143.16	68	56						1995
3	End	0833				143.471	72	60						
4						(.620)	(61)							
5	(2)	1028		.03		144.559	93	86					~3	
6		38				144.89	93	86						
7	End	1048				145.21	93	87						
8						(.653)	(89)							
9	(3)	1206		.03		145.217	100	96					~3	
10		16				145.57	98	94						
11	End	1220				145.916	99	97						
12						(.691)	(97.8)							
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28	Average													

Notes:

Ms =
Ave. Vs =
Sample I.D. # =

#1 #2

Final Imp Vol =

INDUSTRIAL HYGIENE SUMMARY SHEET

CLIENT Kopoers
LOCATION Storage Yard Shed

TEST PARAMETER Benzene & Solvent
COLLECTION MEDIA Tedlar Bag

TEST	EMPLOYEE S.S. # JOB/ACTIVITY	AREA ROOM #	TEST DATE	TIME START	TIME STOP	Δ time min	SAMPLE VOLUME liters	TEMP. °F / Rel.Hum. %	ANALYSIS	COMMENTS
1			10-8-90	1210	1230	20	10			Background
2			10-8-90	1430	1450	20	10			30 Day logs
3			10-9-90	0914	0924	10	10			10 day logos
4			10-9-90	1200	1210	10				4day logs
B1			10-10-90	0840	0850	10				4day logs
B2			10-10-90	1139	1149	10				" "
B3			10-10-90	1312	1322	10				" "

SAMPLING PERSONNEL R.B

PREPARED BY
DATE

INDUSTRIAL HYGIENE SUMMARY SHEET

CLIENT Kopers
LOCATION Storage Yard Shed

TEST PARAMETER Benzene Toluene
COLLECTION MEDIA Tedlar Bags

TEST	EMPLOYEE S.S. # JOB/ACTIVITY	AREA ROOM #	TEST DATE	TIME START	TIME STOP	Δ time min	SAMPLE VOLUME liters	TEMP. °F / Rel. Hum. %	ANALYSIS	COMMENTS
1		Storage Shed	10-11-90	0857	0907	10	10			1day logs
2		" "	10-11-90	1104	1114	10	10			" "
3		" "	10-11-90	1214	1224	10	10			" "
1		Storage Shed	10-12-90	0841	0851	10	10			Fresh logs
2		"	10-12-90	1052	1102	10	10			" "
3		"	10-12-90	1303	1313	10	10			" "

SAMPLING PERSONNEL RB

PREPARED BY
DATE

Curtis & Tompkins, Ltd., Analytical Laboratories. Since 1878
2323 Fifth Street, Berkeley, CA 94710. Phone (415) 486-0900

DATE RECEIVED: 10/15/90
DATE REPORTED: 11/09/90

LAB NUMBER: 101922

CLIENT: BEST ENVIRONMENTAL

REPORT ON: 13 SOURCE TRAIN SAMPLES

PROJECT #: 1061
LOCATION: KOPPERS

RESULTS: SEE ATTACHED

QA/QC Approval

Final Approval

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922
CLIENT: BEST ENVIRONMENTAL
PROJECT #: 1061
PROJECT: KOPPERS

DATE RECEIVED: 10/15/90
DATE REPORTED: 11/12/90

CASE NARRATIVE

The following samples were accidentally concentrated to dryness during the extraction procedure and resulted in low or no recovery for the surrogate standard, 2-fluorobiphenyl.

Sample ID:	Laboratory ID:
1d-1-1-1061-429	101922-1
1d-2-1-1061-429	101922-4
7d-1-1-1061-429	101922-10

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-1
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: 1d-1-1-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/27/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	ND	1.0
Acenaphthylene	ND	1.0
Acenaphthene	ND	1.0
Fluorene	ND	1.0
Phenanthrene	8.5	1.0
Anthracene	ND	1.0
Fluoranthene	3.9	1.0
Pyrene	1.8	1.0
Benzo(a)anthracene	ND	1.0
Chrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	21
Terphenyl-d14	64

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-2 RESIN
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: 1d-1-2-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 11/01/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions
from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	630	10
Acenaphthylene	ND	10
Acenaphthene	280	10
Fluorene	160	10
Phenanthrene	220	10
Anthracene	ND	10
Fluoranthene	ND	10
Pyrene	ND	10
Benzo(a)anthracene	ND	10
Chrysene	ND	10
Benzo(b)fluoranthene	ND	10
Benzo(k)fluoranthene	ND	10
Benzo(a)pyrene	ND	10
Indeno(1,2,3-cd)pyrene	ND	10
Dibenzo(a,h)anthracene	ND	10
Benzo(g,h,i)perylene	ND.	10

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	100
Terphenyl-d14	81

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-3 IMPINGER
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: 1d-1-3-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/29/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions
from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	ND	1.0
Acenaphthylene	ND	1.0
Acenaphthene	ND	1.0
Fluorene	ND	1.0
Phenanthrene	ND	1.0
Anthracene	ND	1.0
Fluoranthene	ND	1.0
Pyrene	ND	1.0
Benzo(a)anthracene	ND	1.0
Chrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	57
Terphenyl-d14	64

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-4
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: 1d-2-1-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/27/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	ND	1.0
Acenaphthylene	ND	1.0
Acenaphthene	ND	1.0
Fluorene	ND	1.0
Phenanthrene	6.3	1.0
Anthracene	ND	1.0
Fluoranthene	5.1	1.0
Pyrene	2.3	1.0
Benzo(a)anthracene	ND	1.0
Chrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

Terphenyl-d14	62

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-5 RESIN
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: 1d-2-2-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 11/01/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions
from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	1,300	10
Acenaphthylene	29	10
Acenaphthene	740	10
Fluorene	510	10
Phenanthrene	800	10
Anthracene	33	10
Fluoranthene	51	10
Pyrene	21	10
Benzo(a)anthracene	ND	10
Chrysene	ND	10
Benzo(b)fluoranthene	ND	10
Benzo(k)fluoranthene	ND	10
Benzo(a)pyrene	ND	10
Indeno(1,2,3-cd)pyrene	ND	10
Dibenzo(a,h)anthracene	ND	10
Benzo(g,h,i)perylene	ND	10

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	98
Terphenyl-d14	77

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-6 IMPINGER
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: 1d-2-3-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/29/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	ND	1.0
Acenaphthylene	ND	1.0
Acenaphthene	ND	1.0
Fluorene	ND	1.0
Phenanthrene	ND	1.0
Anthracene	ND	1.0
Fluoranthene	ND	1.0
Pyrene	ND	1.0
Benzo(a)anthracene	ND	1.0
Chrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	87
Terphenyl-d14	88

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-7
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: 1d-3-1-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/27/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	ND	1.0
Acenaphthylene	ND	1.0
Acenaphthene	ND	1.0
Fluorene	2.6	1.0
Phenanthrene	30	1.0
Anthracene	1.0	1.0
Fluoranthene	14	1.0
Pyrene	5.3	1.0
Benzo(a)anthracene	ND	1.0
Chrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	58
Terphenyl-d14	71

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-8 RESIN
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: 1d-3-2-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 11/01/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	1,400	10
Acenaphthylene	31	10
Acenaphthene	800	10
Fluorene	540	10
Phenanthrene	810	10
Anthracene	22	10
Fluoranthene	43	10
Pyrene	16	10
Benzo(a)anthracene	ND	10
Chrysene	ND	10
Benzo(b)fluoranthene	ND	10
Benzo(k)fluoranthene	ND	10
Benzo(a)pyrene	ND	10
Indeno(1,2,3-cd)pyrene	ND	10
Dibenzo(a,h)anthracene	ND	10
Benzo(g,h,i)perylene	ND	10

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	90
Terphenyl-d14	71

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-9 IMPINGER
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: 1d-3-3-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/29/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	ND	1.0
Acenaphthylene	ND	1.0
Acenaphthene	ND	1.0
Fluorene	ND	1.0
Phenanthrene	ND	1.0
Anthracene	ND	1.0
Fluoranthene	ND	1.0
Pyrene	ND	1.0
Benzo(a)anthracene	ND	1.0
Chrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	65
Terphenyl-d14	66

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-10
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: 7d-1-1-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/27/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	ND	1.0
Acenaphthylene	1.0	1.0
Acenaphthene	ND	1.0
Fluorene	ND	1.0
Phenanthrene	110	1.0
Anthracene	4.1	1.0
Fluoranthene	25	1.0
Pyrene	6.4	1.0
Benzo(a)anthracene	ND	1.0
Chrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

Terphenyl-d14	65

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-11 RESIN
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: 7d-1-2-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 11/01/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	1,600	10
Acenaphthylene	57	10
Acenaphthene	1,400	10
Fluorene	870	10
Phenanthrene	880	10
Anthracene	22	10
Fluoranthene	36	10
Pyrene	12	10
Benzo(a)anthracene	ND	10
Chrysene	ND	10
Benzo(b)fluoranthene	ND	10
Benzo(k)fluoranthene	ND	10
Benzo(a)pyrene	ND	10
Indeno(1,2,3-cd)pyrene	ND	10
Dibenzo(a,h)anthracene	ND	10
Benzo(g,h,i)perylene	ND	10

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	97
Terphenyl-d14	76

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-12 IMPINGER
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: 7d-1-3-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/30/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	ND	1.0
Acenaphthylene	ND	1.0
Acenaphthene	ND	1.0
Fluorene	ND	1.0
Phenanthrene	ND	1.0
Anthracene	ND	1.0
Fluoranthene	ND	1.0
Pyrene	ND	1.0
Benzo(a)anthracene	ND	1.0
Chrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	88
Terphenyl-d14	97

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-13
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: 4d-1-1-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/27/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	ND	1.0
Acenaphthylene	ND	1.0
Acenaphthene	ND	1.0
Fluorene	1.1	1.0
Phenanthrene	11	1.0
Anthracene	ND	1.0
Fluoranthene	3.6	1.0
Pyrene	1.9	1.0
Benzo(a)anthracene	ND	1.0
Chrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	54
Terphenyl-d14	72

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 101922-14 RESIN
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: 4d-1-2-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 11/01/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions
from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	1,500	10
Acenaphthylene	24	10
Acenaphthene	650	10
Fluorene	380	10
Phenanthrene	520	10
Anthracene	15	10
Fluoranthene	28	10
Pyrene	ND	10
Benzo(a)anthracene	ND	10
Chrysene	ND	10
Benzo(b)fluoranthene	ND	10
Benzo(k)fluoranthene	ND	10
Benzo(a)pyrene	ND	10
Indeno(1,2,3-cd)pyrene	ND	10
Dibenzo(a,h)anthracene	ND	10
Benzo(g,h,i)perylene	ND	10

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	101
Terphenyl-d14	84

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-15 IMPINGER
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: 4d-1-3-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/30/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	ND	1.0
Acenaphthylene	ND	1.0
Acenaphthene	ND	1.0
Fluorene	ND	1.0
Phenanthrene	ND	1.0
Anthracene	ND	1.0
Fluoranthene	ND	1.0
Pyrene	ND	1.0
Benzo(a)anthracene	ND	1.0
Chrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	79
Terphenyl-d14	92

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-16
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: 4d-2-1-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/27/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	ND	1.0
Acenaphthylene	ND	1.0
Acenaphthene	ND	1.0
Fluorene	2.2	1.0
Phenanthrene	20	1.0
Anthracene	ND	1.0
Fluoranthene	6.3	1.0
Pyrene	2.4	1.0
Benzo(a)anthracene	ND	1.0
Chrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	43
Terphenyl-d14	58

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-17 RESIN
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: 4d-2-2-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 11/01/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	1,500	10
Acenaphthylene	36	10
Acenaphthene	920	10
Fluorene	630	10
Phenanthrene	880	10
Anthracene	49	10
Fluoranthene	48	10
Pyrene	20	10
Benzo(a)anthracene	ND	10
Chrysene	ND	10
Benzo(b)fluoranthene	ND	10
Benzo(k)fluoranthene	ND	10
Benzo(a)pyrene	ND	10
Indeno(1,2,3-cd)pyrene	ND	10
Dibenzo(a,h)anthracene	ND	10
Benzo(g,h,i)perylene	ND	10

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	98
Terphenyl-d14	79

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-18 IMPINGER
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: 4d-2-3-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/30/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	ND	1.0
Acenaphthylene	ND	1.0
Acenaphthene	ND	1.0
Fluorene	ND	1.0
Phenanthrene	ND	1.0
Anthracene	ND	1.0
Fluoranthene	ND	1.0
Pyrene	ND	1.0
Benzo(a)anthracene	ND	1.0
Chrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	83
Terphenyl-d14	94

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-19
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: 4d-3-1-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/27/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	ND	1.0
Acenaphthylene	2.0	1.0
Acenaphthene	1.6	1.0
Fluorene	48	1.0
Phenanthrene	370	1.0
Anthracene	6.8	1.0
Fluoranthene	27	1.0
Pyrene	7.9	1.0
Benzo(a)anthracene	ND	1.0
Chrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	45
Terphenyl-d14	54

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-20 RESIN
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: 4d-3-2-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 11/01/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	1,700	10
Acenaphthylene	31	10
Acenaphthene	950	10
Fluorene	610	10
Phenanthrene	590	10
Anthracene	18	10
Fluoranthene	21	10
Pyrene	ND	10
Benzo(a)anthracene	ND	10
Chrysene	ND	10
Benzo(b)fluoranthene	ND	10
Benzo(k)fluoranthene	ND	10
Benzo(a)pyrene	ND	10
Indeno(1,2,3-cd)pyrene	ND	10
Dibenzo(a,h)anthracene	ND	10
Benzo(g,h,i)perylene	ND	10

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	96
Terphenyl-d14	76

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-21 IMPINGER
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: 4d-3-3-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/30/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	ND	1.0
Acenaphthylene	ND	1.0
Acenaphthene	ND	1.0
Fluorene	ND	1.0
Phenanthrene	ND	1.0
Anthracene	ND	1.0
Fluoranthene	ND	1.0
Pyrene	ND	1.0
Benzo(a)anthracene	ND	1.0
Chrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	56
Terphenyl-d14	62

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-22
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: F-1-1-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/27/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	2.4	1.0
Acenaphthylene	2.4	1.0
Acenaphthene	15	1.0
Fluorene	78	1.0
Phenanthrene	400	1.0
Anthracene	21	1.0
Fluoranthene	26	1.0
Pyrene	10	1.0
Benzo(a)anthracene	ND	1.0
Chrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	38
Terphenyl-d14	48

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-23 RESIN
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: F-1-2-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 11/01/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	9,200	10
Acenaphthylene	140	10
Acenaphthene	3,600	10
Fluorene	1,000	10
Phenanthrene	570	10
Anthracene	200	10
Fluoranthene	ND	10
Pyrene	ND	10
Benzo(a)anthracene	ND	10
Chrysene	ND	10
Benzo(b)fluoranthene	ND	10
Benzo(k)fluoranthene	ND	10
Benzo(a)pyrene	ND	10
Indeno(1,2,3-cd)pyrene	ND	10
Dibenzo(a,h)anthracene	ND	10
Benzo(g,h,i)perylene	ND	10

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	81
Terphenyl-d14	63

Curtis & Tompkins, Ltd.

ABORATORY NUMBER: 101922-24 IMPINGER
LIENT: BEST ENVIRONMENTAL
ROJECT ID #: 1061/KOPPERS
AMPLE ID: F-1-3-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/30/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions
from Stationary Sources
Method: CARB 429

OMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
aphthalene	ND	1.0
cenaphthylene	ND	1.0
cenaphthene	ND	1.0
luorene	ND	1.0
henanthrene	ND	1.0
nthracene	ND	1.0
luoranthene	ND	1.0
yrene	ND	1.0
Benzo(a)anthracene	ND	1.0
hrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	69
Terphenyl-d14	81

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-25
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: F-2-1-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/27/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	4.2	1.0
Acenaphthylene	11	1.0
Acenaphthene	16	1.0
Fluorene	130	1.0
Phenanthrene	690	1.0
Anthracene	20	1.0
Fluoranthene	86	1.0
Pyrene	20	1.0
Benzo(a)anthracene	ND	1.0
Chrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	66
Terphenyl-d14	87

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-26 RESIN
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: F-2-2-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 11/01/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	10,000	10
Acenaphthylene	150	10
Acenaphthene	4,700	10
Fluorene	2,100	10
Phenanthrene	1,400	10
Anthracene	25	10
Fluoranthene	22	10
Pyrene	ND	10
Benzo(a)anthracene	ND	10
Chrysene	ND	10
Benzo(b)fluoranthene	ND	10
Benzo(k)fluoranthene	ND	10
Benzo(a)pyrene	ND	10
Indeno(1,2,3-cd)pyrene	ND	10
Dibenzo(a,h)anthracene	ND	10
Benzo(g,h,i)perylene	ND	10

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	87
Terphenyl-d14	69

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-27 IMPINGER
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: F-2-3-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/30/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	ND	1.0
Acenaphthylene	ND	1.0
Acenaphthene	ND	1.0
Fluorene	ND	1.0
Phenanthrene	ND	1.0
Anthracene	ND	1.0
Fluoranthene	ND	1.0
Pyrene	ND	1.0
Benzo(a)anthracene	ND	1.0
Chrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	75
Terphenyl-d14	91

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-28
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: F-3-1-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/27/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	2.6	1.0
Acenaphthylene	21	1.0
Acenaphthene	45	1.0
Fluorene	290	1.0
Phenanthrene	800	1.0
Anthracene	39	1.0
Fluoranthene	85	1.0
Pyrene	24	1.0
Benzo(a)anthracene	ND	1.0
Chrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	52
Terphenyl-d14	85

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-29 RESIN
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: F-3-2-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 11/01/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions
from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	7,700	10
Acenaphthylene	94	10
Acenaphthene	3,600	10
Fluorene	1,500	10
Phenanthrene	920	10
Anthracene	33	10
Fluoranthene	28	10
Pyrene	ND	10
Benzo(a)anthracene	ND	10
Chrysene	ND	10
Benzo(b)fluoranthene	ND	10
Benzo(k)fluoranthene	ND	10
Benzo(a)pyrene	ND	10
Indeno(1,2,3-cd)pyrene	ND	10
Dibenzo(a,h)anthracene	ND	10
Benzo(g,h,i)perylene	ND	10

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	84
Terphenyl-d14	69

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-30 IMPINGER
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: F-3-3-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/30/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	ND	1.0
Acenaphthylene	ND	1.0
Acenaphthene	ND	1.0
Fluorene	ND	1.0
Phenanthrene	ND	1.0
Anthracene	ND	1.0
Fluoranthene	ND	1.0
Pyrene	ND	1.0
Benzo(a)anthracene	ND	1.0
Chrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	75
Terphenyl-d14	92

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-31 RINSE
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: FB-1-1-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/29/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions
from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	ND	1.0
Acenaphthylene	ND	1.0
Acenaphthene	ND	1.0
Fluorene	ND	1.0
Phenanthrene	1.2	1.0
Anthracene	ND	1.0
Fluoranthene	ND	1.0
Pyrene	ND	1.0
Benzo(a)anthracene	ND	1.0
Chrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	44
Terphenyl-d14	55

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-32 RESIN
CLIENT: BEST ENVIRONMENTAL
PROJECT ID #: 1061/KOPPERS
SAMPLE ID: FB-1-2-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/31/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	1.0	1.0
Acenaphthylene	ND	1.0
Acenaphthene	ND	1.0
Fluorene	ND	1.0
Phenanthrene	ND	1.0
Anthracene	ND	1.0
Fluoranthene	ND	1.0
Pyrene	ND	1.0
Benzo(a)anthracene	ND	1.0
Chrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	98
Terphenyl-d14	93

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-33 IMPINGER
CLIENT: BEST ENVIRONMENTAL
PROJECT ID: 1061/KOPPERS
SAMPLE ID: FB-1-3-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/30/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	ND	1.0
Acenaphthylene	ND	1.0
Acenaphthene	ND	1.0
Fluorene	ND	1.0
Phenanthrene	ND	1.0
Anthracene	ND	1.0
Fluoranthene	ND	1.0
Pyrene	ND	1.0
Benzo(a)anthracene	ND	1.0
Chrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	72
Terphenyl-d14	95

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-34
CLIENT: BEST ENVIRONMENTAL
PROJECT ID: 1061/KOPPERS
SAMPLE ID: BG-1-1-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/27/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	ND	1.0
Acenaphthylene	ND	1.0
Acenaphthene	ND	1.0
Fluorene	ND	1.0
Phenanthrene	ND	1.0
Anthracene	ND	1.0
Fluoranthene	ND	1.0
Pyrene	ND	1.0
Benzo(a)anthracene	ND	1.0
Chrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	51
Terphenyl-d14	90

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-35 RESIN
CLIENT: BEST ENVIRONMENTAL
PROJECT ID: 1061/KOPPERS
SAMPLE ID: BG-1-2-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/31/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions
from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	14	1.0
Acenaphthylene	ND	1.0
Acenaphthene	3.8	1.0
Fluorene	2.8	1.0
Phenanthrene	3.8	1.0
Anthracene	ND	1.0
Fluoranthene	ND	1.0
Pyrene	ND	1.0
Benzo(a)anthracene	ND	1.0
Chrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	101
Terphenyl-d14	97

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-36 IMPINGER
CLIENT: BEST ENVIRONMENTAL
PROJECT ID: 1061/KOPPERS
SAMPLE ID: BG-3-1-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/30/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	ND	1.0
Acenaphthylene	ND	1.0
Acenaphthene	ND	1.0
Fluorene	ND	1.0
Phenanthrene	ND	1.0
Anthracene	ND	1.0
Fluoranthene	ND	1.0
Pyrene	ND	1.0
Benzo(a)anthracene	ND	1.0
Chrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	62
Terphenyl-d14	100

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-37
CLIENT: BEST ENVIRONMENTAL
PROJECT ID: 1061/KOPPERS
SAMPLE ID: 12d-1-1-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/27/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	ND	1.0
Acenaphthylene	ND	1.0
Acenaphthene	ND	1.0
Fluorene	1.2	1.0
Phenanthrene	12	1.0
Anthracene	ND	1.0
Fluoranthene	4.0	1.0
Pyrene	1.6	1.0
Benzo(a)anthracene	ND	1.0
Chrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	42
Terphenyl-d14	53

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-38 RESIN
CLIENT: BEST ENVIRONMENTAL
PROJECT ID: 1061/KOPPERS
SAMPLE ID: 12d-1-2-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 11/01/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	1,200	10
Acenaphthylene	22	10
Acenaphthene	500	10
Fluorene	270	10
Phenanthrene	380	10
Anthracene	11	10
Fluoranthene	19	10
Pyrene	ND	10
Benzo(a)anthracene	ND	10
Chrysene	ND	10
Benzo(b)fluoranthene	ND	10
Benzo(k)fluoranthene	ND	10
Benzo(a)pyrene	ND	10
Indeno(1,2,3-cd)pyrene	ND	10
Dibenzo(a,h)anthracene	ND	10
Benzo(g,h,i)perylene	ND	10

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	90
Terphenyl-d14	69

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-39 IMPINGER
CLIENT: BEST ENVIRONMENTAL
PROJECT ID: 1061/KOPPERS
SAMPLE ID: 12d-1-3-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/30/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	ND	1.0
Acenaphthylene	ND	1.0
Acenaphthene	ND	1.0
Fluorene	ND	1.0
Phenanthrene	ND	1.0
Anthracene	ND	1.0
Fluoranthene	ND	1.0
Pyrene	ND	1.0
Benzo(a)anthracene	ND	1.0
Chrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	79
Terphenyl-d14	112

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-40
CLIENT: BEST ENVIRONMENTAL
PROJECT ID: 1061/KOPPERS
SAMPLE ID: 30-1-1-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/28/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions
from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	ND	1.0
Acenaphthylene	ND	1.0
Acenaphthene	ND	1.0
Fluorene	2.4	1.0
Phenanthrene	20	1.0
Anthracene	ND	1.0
Fluoranthene	6.8	1.0
Pyrene	2.2	1.0
Benzo(a)anthracene	ND	1.0
Chrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	45
Terphenyl-d14	49

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-41 RESIN
CLIENT: BEST ENVIRONMENTAL
PROJECT ID: 1061/KOPPERS
SAMPLE ID: 30d-1-2-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 11/01/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	700	10
Acenaphthylene	12	10
Acenaphthene	330	10
Fluorene	180	10
Phenanthrene	220	10
Anthracene	11	10
Fluoranthene	ND	10
Pyrene	ND	10
Benzo(a)anthracene	ND	10
Chrysene	ND	10
Benzo(b)fluoranthene	ND	10
Benzo(k)fluoranthene	ND	10
Benzo(a)pyrene	ND	10
Indeno(1,2,3-cd)pyrene	ND	10
Dibenzo(a,h)anthracene	ND	10
Benzo(g,h,i)perylene	ND	10

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	84
Terphenyl-d14	65

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101922-42 IMPINGER
CLIENT: BEST ENVIRONMENTAL
PROJECT ID: 1061/KOPPERS
SAMPLE ID: 30d-1-3-1061-429

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/30/90
DATE REPORTED: 11/09/90

Determination of Polycyclic Aromatic Hydrocarbons (PAH) Emissions from Stationary Sources
Method: CARB 429

COMPOUND	RESULT ug/fraction	REPORTING LIMIT ug/fraction
Naphthalene	ND	1.0
Acenaphthylene	ND	1.0
Acenaphthene	ND	1.0
Fluorene	ND	1.0
Phenanthrene	ND	1.0
Anthracene	ND	1.0
Fluoranthene	ND	1.0
Pyrene	ND	1.0
Benzo(a)anthracene	ND	1.0
Chrysene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
Benzo(a)pyrene	ND	1.0
Indeno(1,2,3-cd)pyrene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Fluorobiphenyl	76
Terphenyl-d14	106

101 122

BEST ENVIRONMENTAL
27343 Industrial Blvd. #E
Hayward, CA 94545

P.O. #=

Phone # (415)784-0700
Fax # (415)784-0597

Project Manager: Regan Best

Lab Name: C+T

Client: Koppers (1061)

location:

Sampler Name (Print):

I attest that the proper field sampling procedures were used during the collection of these samples.

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Pg. ___ of ___

ANALYSIS REQUEST

CARB 429 (PAHs); CARB 428 (Dioxins); CARB 410A / 410B (Benzene); CARB 430 (Aldehydes); CARB 421 (HCl); CARB 425 (Cr); CARB 422 (Halog. Hyd.); CARB 106 (Vinyl Chloride); EPA Determination of metals emissions [illegible]; Exhaust vapors (HAAs?); EPA 600 [Pet.] (Ether metals chlorides); CARB 426 (Cyanide); CARB 423 (Ammonia); CARB 427 (P[illegible])

Field Sample ID	Volume	# Containers	Matrix	CARB 429
1d-1-1-1061-429		1	CH_2Cl_2, CH_3OH, Toluene	X
1d-1-2-1061-429		2	XAD-2	X
1d-1-3-1061-429		3	Water (Imp.)	X
1d-2-1-1061-429		4	CH_2Cl_2, CH_3OH, Toluene	X
1d-2-2-1061-429		5	XAD-2	X
1d-2-3-1061-429		6	Water (Imp.)	X
1d-3-1-1061-429		7	CH_2Cl_2, CH_3OH, Toluene	X
1d-3-2-1061-429		8	XAD-2	X
1d-3-3-1061-429		9	Water (Imp.)	X

Run 1 (samples 1–3); Run 2 (samples 4–6); Run 3 (samples 7–9)

Method Preserved: HCl | HNO_3 | H_2SO_4 | ICE | NONE | OTHER

Sampling: DATE | TIME

CUSTODY RECORD

Received by: | Time | Date | Relinquished by Sampler:
Received by: | Time | Date | Relinquished by:
Received by Laboratory: Mary E. White (signature) 10/15/90 | Way bill # | Time | Date | Relinquished by:

SPECIAL HANDLING

24 HOURS ☐
EXPEDITED 48 Hours ☐
NTAT ☐
OTHER ______ (#) BUSINESS DAYS

Return tedlars ____
Return cooler ____
Return bottles X

SPECIAL DETECTION LIMITS (Specify): Low Res.

SPECIAL REPORTING REQUIREMENTS: Air samples- total qty. to be reported

REMARKS:

Lab Use Only — Lot #: — Storage Location — Work Order #:

BEST ENVIRONMENTAL
27343 Industrial Blvd. #E
Hayward, CA 94545

P.O.#=

Phone (415)784-0700
Fax (415)784-0397

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Pg. ___ of ___

Project Manager: Regan Best

Lab Name: C&T

Client: Koppers (1061)

location:

I attest that the proper field sampling procedures were used during the collection of these samples.

Sampler Name (Print):

ANALYSIS REQUEST: CARB 429 (PAH); CARB 428 (Dioxins); CARB 410A / 410B; CARB 430 (Aldehydes); CARB 421 (HCl); CARB 425; CARB 422; CARB 106; EPA Determination of metals emissions; EPA 600; CARB 426; CARB 423; CARB 427

Field Sample ID		Volume	# Containers	Matrix: Water Imp.	Matrix: XAD-2	Matrix: Air	Matrix: ethyl, ethyl Toluene	Matrix: Other	Method Preserved: HCl	HNO₃	H₂SO₄	ICE	NONE	OTHER	Sampling Date	Sampling Time	CARB 429
7d-1-1-1061-429	10						X										X
7d-1-2-1061-429	11				X												X
7d-1-3-1061-429	12				X												X
4d-1-1-1061-429	13						X										X
4d-1-2-1061-429	14				X												X
4d-2-1-1061-429	16						X										X
4d-2-2-1061-429	17				X												X
4d-2-3-1061-429	18			X													X
4d-1-3-1061-429	15			X													X
4d-3-1-1061-429	19						X										X
4d-3-2-1061-429	20				X												X
4d-3-3-1061-429	21			X													X

Run 1 / Run 3

SPECIAL HANDLING

24 HOURS ☐
EXPEDITED 48 Hours ☐
NTAT ☐
OTHER ______ (#) BUSINESS DAYS

Return tedlars ____
Return cooler ____
Return bottles X

SPECIAL DETECTION LIMITS (Specify): Low Res,

SPECIAL REPORTING REQUIREMENTS: Air samples- total qty. to be reported

REMARKS:

Lab Use Only — Lot #:
Storage Location — Work Order #:

CUSTODY RECORD

Relinquished by Sampler	Date	Time	Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by Laboratory: Mary [illegible] Brown bill's 10/15/90

CUSTODY RECORD AND ANALYSIS REQUEST Pg. ___ of ___

Project Manager: Regan Best

Lab Name: C&T

Phone: (415)784-07[illegible]
Fax: (415)784-059[illegible]

Client: Koppers (1061)

location: Storage yard shed

Sampler Name (Print):

I attest that the proper field sampling procedures were used during the collection of these samples

ANALYSIS REQUEST: CARB 429 (PAH's); CARB 428 (Dioxins); CARB 410A / 410B (Benzene); CARB 430 (Aldehydes); CARB 421; CARB 425; CARB 422; CARB 106; EPA (Determination of metals emissions); Ethylene oxide (?); EPA 600 [illegible] (Filter metals [illegible]); CARB 426; CARB 423; CARB 42[illegible]

Field Sample ID	Volume	# Containers	Water	Air	XAD-2	Other (CH_3Cl + col)	HCl	HNO_3	H_2SO_4	Ice	None	Other	Date	Time	CARB 429
FB-1-1-1061-429	31					X									X
FB-1-2-1061-429	32				X										X
FB-1-3-1061-429	33		X												X
BG-1-1-1061-429	34					X									X
BG-1-2-1061-429	35				X										X
BG-3-1061-429	36		X												X
12d-1-1-1061-429	37					X									X
12d-1-2-1061-429	38				X										X
12d-1-3-1061-429	39		X												X
30-1-1061-429	40					X									X
30d-1-2-1061-429	41				X										X
30d-1-3-1061-429	42	X													X

Margin notes: FB Run; BG Run; 12d Run; 30d Run

Matrix notes: Imp.; XAD-2

SPECIAL HANDLING
24 HOURS ☐
EXPEDITED 48 Hours ☐
NTAT ☐
OTHER ______ (#) BUSINESS DAYS

Return tedlars ____
Return cooler ____
Return bottles X

SPECIAL DETECTION LIMITS (Specify): Low Resolution

SPECIAL REPORTING REQUIREMENTS: Air samples- total qty. to be reported

REMARKS:

Lab Use Only — Lot #: | Storage Location | Work Order #:

CUSTODY RECORD

Relinquished by Sampler:	Date	Time	Received by
Relinquished by:	Date	Time	Received by
Relinquished by:	Date	Time	Received by Laboratory: [signature] 10/[illegible]

OCT-9-98 TUE 1[illegible]:55 BEST ENVIRONMENTAL

Curtis & Tompkins, Ltd., Analytical Laboratories. Since 1878.
2323 Fifth Street Berkeley, CA 94710 Phone (415) 486-0900

DATE RECEIVED: 10/15/90
DATE REPORTED: 10/26/90

LAB NUMBER: 101924

CLIENT: BEST ENVIRONMENTAL

REPORT ON: 14 AIR SAMPLES

PROJECT #: 1061
LOCATION: KOPPERS

RESULTS: SEE ATTACHED

QA/QC Approval

Final Approval

Curtis & Tompkins Ltd.

LABORATORY NUMBER: 101924
CLIENT: BEST ENVIRONMENTAL
JOB NUMBER: 1061
JOB LOCATION: KOPPERS

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/24/90
DATE REPORTED: 10/26/90

Phenol, m,p-Cresol, o-Cresol
Method: EPA T08

LAB ID	CLIENT ID	PHENOL	m,p-CRESOL	o-CRESOL	REPORTING LIMIT *
		<---------- ug/sample ---------->			
101924-1	BG-1061-T08	ND	ND	ND	1.8
101924-2	1-1061-T08-30 DAY	ND	ND	ND	1.4
101924-3	12D-1-1061-T08	ND	ND	ND	1.5
101924-4	7D-1-1061-T08	ND	ND	ND	1.6
101924-5	4D-1-1061-T08	ND	ND	ND	2.3
101924-6	4D-2-1061-T08	ND	ND	ND	2.2
101924-7	4D-3-1061-T08	ND	ND	ND	2.4
101924-8	1D-1-1061-T08	ND	ND	ND	2.5
101924-9	1D-2-1061-T08	ND	ND	ND	2.2
101924-10	1D-3-1061-T08	ND	ND	ND	2.0
101924-11	F-1-1061-T08	ND	ND	ND	2.2
101924-12	F-2-1061-T08	ND	ND	ND	1.9
101924-13	F-3-1061-T08	ND	ND	ND	2.3
101924-14	F-B-1061-T08	ND	ND	ND	1.9

ND = Not detected at or above reporting limit.

* Reporting Limit applies to all analytes.

QA/QC SUMMARY

RPD, %	1
RECOVERY, %	96

BEST ENVIRONMENTAL
27343 Industrial Blvd. #E
Hayward, CA 94545

P.O. #=

(415)784-07…
(415)784-03…

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Pg. 2 of 2

Project Manager: R. Best

Lab Name: C&T

Shed

Client: Koggey (1061)

location: Berkeley

Sampler Name (Print)

I attest that the proper field sampling procedures were used during the collection of these samples

ANALYSIS REQUEST

CARB 429; CARB 432; CARB 410A; CARB 410; CARB 421; CARB 425; CARB 422; CARB 106; EPA (…); (…); F (…); CARB 426; CARB 423; CARB 708

Field Sample ID	Volume	Matrix: Other	Analysis: CARB 708
BG-1061-708	1	✓	✓
1-1061-708-30Day	2	✓	✓
12D-1-1061-708	3	✓	✓
7D-1-1061-708	4	✓	✓
4D-1-1061-708	5	✓	✓
4D-2-1061-708	6		✓
4D-3-1061-708	7		✓
1D-1-1061-708	8		✓
1D-2-1061-708	9		✓
1D-3-1061-708	10		✓
F-1-1061-708	11		✓

Other form columns (left blank on the form): # CONTAINERS; Matrix: WATER, AIR; Method Preserved: HCl, HNO3, H2SO4, ICE, NONE, OTHER; Sampling: DATE, TIME.

CUSTODY RECORD

Relinquished by Sampler — Date 10-8-90 — Time — Received by

Relinquished by — Date — Time — Received by

Relinquished by — Date — Time — Received by Laboratory: Mary Prueter 10/15/90 — Way bill #

SPECIAL HANDLING
24 HOURS ☐
EXPEDITED 48 Hours ☐
NTAT ☐
OTHER ____ (#) BUSINESS DAYS

Return tedlars ____
Return cooler ____
Return bottles ____

SPECIAL DETECTION LIMITS (Specify)

SPECIAL REPORTING REQUIREMENTS
Air samples- total qty. to be reported

REMARKS: Phenols & cresols

Lab Use Only
Lot #:
Storage Location
Work Order #:

BEST ENVIRONMENTAL
27343 Industrial Blvd. #E
Hayward, CA 94545

P.O.#=

(415)784-0756
(415)784-0597

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Pg. 2 of 4

Project Manager: R. Best

Lab Name: C&T

Client: Koggen

location:

Sampler Name (Print):

I attest that the proper field sampling procedures were used during the collection of these samples

ANALYSIS REQUEST

CARB 429 (PAH)
CARB 428 (Dioxin)
CARB 410A / 410B (Benzene)
CARB 430 (Aldehydes)
CARB 421 (HCl)
CARB 425
CARB 422 (Halog...)
CARB 106 (Vinyl Chl...)
EPA (Determination of metals emissions)
Exhaust vapors (Mmm5)
EPA 0030 (Vost) (Total metals emissions)
CARB 436
CARB 425
CARB 42
708

Field Sample ID	Volume	# CONTAINERS	WATER	AIR	OTHER	HCl	HNO₃	H₂SO₄	ICE	NONE	OTHER	DATE	TIME
F-2-1061-708	12												
F-3-1061-708	13												
F-B-1061-708	14												

SPECIAL HANDLING

24 HOURS ☐
EXPEDITED 48 Hours ☐
NTAT ☐
OTHER ______ (#) BUSINESS DAYS

Return tedlars ______
Return cooler ______
Return bottles ______

SPECIAL DETECTION LIMITS (Specify)

SPECIAL REPORTING REQUIREMENTS
Air samples- total qty. to be reported

REMARKS: Carola Kosol

Lab Use Only
Lot #:

Storage Location
Work Order #:

CUSTODY RECORD

Relinquished by	Date	Time	Received by
Relinquished by Sampler:	10-8-90		Received by
Relinquished by			Received by
Relinquished by			Received by Laboratory

Waybill #

Curtis & Tompkins, Ltd., Analytical Laboratories Since 1878
2323 Fifth Street Berkeley, CA 94710 Phone: (415) 486-0900

DATE RECEIVED: 10/15/90
DATE REPORTED: 10/26/90

LAB NUMBER: 101925

CLIENT: BEST ENVIRONMENTAL

REPORT ON: 15 STACK SAMPLES

PROJECT #: 1061
LOCATION: KOPPERS

RESULTS: SEE ATTACHED

QA/QC Approval

Final Approval

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101925
CLIENT: BEST ENVIRONMENTAL
JOB ID: KOPPERS

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/21/90
DATE REPORTED: 10/26/90

Analysis: Determination of Formaldehyde-DNPH Derivative Emissions from Stationary Sources
Analysis Method: CARB 430

SAMPLE ID	CLIENT ID	RESULT	UNITS	REPORTING LIMIT
101925-1	FB-1-1061-430	3.42 3.40	ug/sample	0.20
101925-2	BG-1-1061-430 3.7 3.8	4.7	ug/sample	0.20
101925-3	30D-1-1061-430 0.0	2.1	ug/sample	0.26
101925-4	12D-1-1061-430 3.9 0.7	4.6	ug/sample	0.20
101925-5	7D-1-1061-430 3.9 2.2	6.1	ug/sample	0.20
101925-6	4D-1-1061-430	5.1	ug/sample	0.26
101925-7	4D-2-1061-430	6.8	ug/sample	0.27
101925-8	4D-3-1061-430	5.6	ug/sample	0.26
101925-9	1D-1-1061-430	4.6	ug/sample	0.31
101925-10	1D-2-1061-430	9.4	ug/sample	0.26
101925-11	1D-3-1061-430	8.7	ug/sample	0.26
101925-12	F1-1-1061-430	3.8	ug/sample	0.24
101925-13	F1-2-1061-430	6.1	ug/sample	0.24
101925-14	F1-3-1061-430	8.4	ug/sample	0.30
101925-15A	DNPH SOLUTION A	6.0	ug/41ml	0.20 4.4 at 30ml
101925-15B	DNPH SOLUTION B	6.3	ug/50ml	0.20 3.8 at 30ml

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

RPD, %	3

101925

BEST ENVIRONMENTAL
27343 Industrial Blvd. #E
Hayward, CA 94545

P.O.#=

(415)784-0700
(415)784-0597

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Pg. 1 of 2

Project Manager: R. Best

Lab Name: C&T

Client: Koppers

Location: Berkeley, Shed

I attest that the proper field sampling procedures were used during the collection of these samples.

Sampler Name (Print): R. Best

ANALYSIS REQUEST

- CARB 429 (PAHs)
- CARB 428 (Dioxins)
- CARB 410A 410B (Benzene)
- CARB 430 (Aldehydes)
- CARB 421 (HCl)
- CARB 425 (Chrome)
- CARB 422 (Halog. Hyd.)
- CARB 106 (Vinyl chloride)
- EPA Determination of metals emissions - Exhaust vents (DRAFT)
- EPA 600 [...] (Filter metals, chlorides)
- CARB 426 (Cyanide)
- CARB 423 (Arsenic)
- CARB 42[illegible] (P[illegible])

#	Field Sample ID	Volume	# Containers	Matrix: Water	Matrix: Air	Matrix: Other	Preserved: HCl	Preserved: HNO_3	Preserved: H_2SO_4	Preserved: Ice	Preserved: None	Preserved: Other	Sampling Date	Sampling Time	CARB 430 (Aldehydes)
1	FB-1-1061-430														✓
2	BG-1-1061-430														✓
3	30D-1-1061-430														✓
4	12D-1-1061-430														✓
5	7D-1-1061-430														✓
6	9D-1-1061-430														✓
7	9D-2-1061-430														✓
8	4D-3-1061-430														✓
9	1D-1-1061-430														✓
10	1D-2-1061-430														✓
11	1D-3-1061-430														✓

SPECIAL HANDLING

24 HOURS ☐
EXPEDITED 48 Hours ☐
NTAT ☐
OTHER ___ (#) BUSINESS DAYS

Return tedlars ____
Return cooler ____
Return bottles ____

SPECIAL DETECTION LIMITS (Specify)

SPECIAL REPORTING REQUIREMENTS

Air samples- total qty. to be reported

REMARKS:

Lab Use Only

Lot #:

Storage Location

Work Order #:

CUSTODY RECORD

Relinquished by	Date	Time	Received by
Relinquished by Sampler: R. Best	10-2-90		Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by Laboratory:

Way bill #

(10172)

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Pg. 2 of 2

BEST ENVIRONMENTAL
27343 Industrial Blvd. #E
Hayward, CA 94545

P.O.#=

Project Manager:

(415)784-0700
(415)784-0597

Lab Name: C&T

Client: Koppers

location: Berkeley

Sampler Name (Print):

I attest that the proper field sampling procedures were used during the collection of these samples:

Field Sample ID	Volume	# CONTAINERS	Matrix: WATER	Matrix: AIR	Matrix: OTHER	Method Preserved: HCl	Method Preserved: HNO3	Method Preserved: H2SO4	Method Preserved: ICE	Method Preserved: NONE	Method Preserved: OTHER	Sampling: DATE	Sampling: TIME
F-1-1061-430 12													
F-2-1061-430 13													
F-3-1061-430 14													
F-B-1061-430 - not received same as #1													
DNPH Soln.													

ANALYSIS REQUEST

- CARB 429 (PAH)
- CARB 428 (Dioxins)
- CARB 410A 410B (Benzene)
- CARB 430 (Aldehydes) ✓
- CARB 421 (HCl)
- CARB 425 (Chrome)
- CARB 422 (Halog. Hyd.)
- CARB 106 (Vinyl Chl.)
- EPA Determination of metals emissions – Exhaust vents (DRAFT)
- EPA 6010 [Pb] (Other metals, [illegible])
- CARB 426 (Cyanide)
- CARB 423 ([illegible])
- CARB 42[illegible] ([illegible])

SPECIAL HANDLING

24 HOURS ☐
EXPEDITED 48 Hours ☐
NTAT ☐
OTHER ___ (#) BUSINESS DAYS

Return tedlars ___
Return cooler ___
Return bottles ___

SPECIAL DETECTION LIMITS (Specify)

SPECIAL REPORTING REQUIREMENTS
Air samples- total qty. to be reported

REMARKS:

Lab Use Only
Lot #:
Storage Location
Work Order #:

CUSTODY RECORD

Relinquished by	Date	Time	Received by
Relinquished by Sampler: R. Best	10-4-90		Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by Laboratory

Way bill #

Curtis & Tompkins, Ltd., Analytical Laboratories Since 1878
2323 Fifth Street Berkeley CA 94710 Phone: 415/486-0900

DATE RECEIVED: 10/08/90
DATE REPORTED: 10/17/90

LAB NUMBER: 101881

CLIENT: BEST ENVIRONMENTAL

REPORT ON: 2 AIR SAMPLES

PROJECT #: 1061
LOCATION: KOPPERS

RESULTS: SEE ATTACHED

QA/QC Approval

Final Approval

LABORATORY NUMBER: 101881
CLIENT: BEST ENVIRONMENTAL
PROJECT ID: KOPPERS/1061

DATE RECEIVED: 10/08/90
DATE ANALYZED: 10/09/90
DATE REPORTED: 10/17/90

Analysis: Determination of Benzene from Stationary Sources
Analysis Method: CARB 410

SAMPLE ID	CLIENT ID	BENZENE RESULT	TOLUENE RESULT	UNITS	REPORTING LIMIT
101881-1	RUN 1 10/8/90	ND	8.5	nL/L	2
101881-2	30 DAY LOGS 1-1061-410	ND	11	nL/L	2

QA/QC SUMMARY: SURROGATE RECOVERIES

1,2-Dichloroethane	95
Toluene	111
Bromofluorobenzene	140

LABORATORY NUMBER: 101896
CLIENT: BEST ENVIRONMENTAL
PROJECT: OROVILLE - SHED

DATE RECEIVED: 10/09/90
DATE ANALYZED: 10/12/90
DATE REPORTED: 10/19/90

Analysis: Determination of Benzene from Stationary Sources
Analysis Method: CARB 410

SAMPLE ID	CLIENT ID	BENZENE RESULT	TOLUENE RESULT	UNITS	REPORTING LIMIT
101896-1	7d-1-1061-410	ND	7.0	nL/L	2.0
101896-2	12d-1-1061-410	8.5	18	nL/L	2.0

QA/QC SUMMARY: SURROGATE RECOVERIES

1,2-Dichloroethane-d4	92
Toluene-d8	100

LABORATORY NUMBER: 101917
CLIENT: BEST ENVIRONMENTAL
PROJECT ID: KOPPERS/1061

DATE RECEIVED: 10/12/90
DATE ANALYZED: 10/13/90
DATE REPORTED: 10/22/90

Analysis: Determination of Benzene from Stationary Sources
Analysis Method: CARB 410

SAMPLE ID	CLIENT ID	BENZENE RESULT	TOLUENE RESULT	UNITS	REPORTING LIMIT
101917-1	1D-1-1061-410	ND	6.3	nL/L	2.0
101917-2	1D-2-1061-410	ND	7.2	nL/L	2.0
101917-3	1D-3-1061-410	ND	7.3	nL/L	2.0

QA/QC SUMMARY: SURROGATE RECOVERIES

1,2-Dichloroethane-d4	101
Toluene-d8	90

Curtis & Tompkins, Ltd., Analytical Laboratories. Since 1878
2323 Fifth Street Berkeley CA 94710 Phone (415) 486-0900

DATE RECEIVED: 10/08/90
DATE REPORTED: 10/17/90

LAB NUMBER: 101926

CLIENT: BEST ENVIRONMENTAL

REPORT ON: 2 AIR SAMPLES

PROJECT #: 1061
LOCATION: KOPPERS

RESULTS: SEE ATTACHED

QA/QC Approval

Final Approval

Curtis & Tompkins Ltd.

LABORATORY NUMBER: 101926
CLIENT: BEST ENVIRONMENTAL

DATE RECEIVED: 10/15/90
DATE ANALYZED: 10/16/90
DATE REPORTED: 10/18/90

Analysis: Determination of Benzene from Stationary Sources
Analysis Method: CARB 410

SAMPLE ID	CLIENT ID	BENZENE RESULT	TOLUENE RESULT	UNITS	REPORTING LIMIT
101926-1	F-1-1061-410	2.5	10	nL/L	2.0
101926-2	F-2-1061-410	2.2	10	nL/L	2.0
101926-3	F-3-1061-410	2.3	11	nL/L	2.0

QA/QC SUMMARY: SURROGATE RECOVERIES

1,2-Dichloroethane	111%
Toluene	93%
Bromofluorobenzene	128%

LABORATORY NUMBER: 102011
CLIENT: BEST ENVIRONMENTAL
JOB NUMBER: 1061
JOB LOCATION: KOPPERS

DATE RECEIVED: 10/19/90
DATE ANALYZED: 10/26/90
DATE REPORTED: 10/31/90

Benzene, Toluene, and, Xylenes in Air Samples
Method: GC/PID Direct Injection

LAB ID	CLIENT ID	BENZENE	TOLUENE	TOTAL XYLENES	REPORTING LIMIT *
		<----------	ug/L	----------	>
102011-1	RUN 4-GCMS	ND	ND	ND	5.0

ND = Not detected at or above reporting limit.

* Reporting Limit applies to all analytes.

QA/QC SUMMARY

RECOVERY, %	99

101 896

BEST ENVIRONMENTAL
27343 Industrial Blvd. #E
Hayward, CA 94545

P.O.#=

Project Manager: R. Best

Lab Name: C&T

Client: Koppers

I attest that the proper field sampling procedures were used during the collection of these samples

(415) 784-0700
(415) 784-0599

Oroville

Location: Shed

Sampler Name (Print): R. Best

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Pg. 1 of 1

ANALYSIS REQUEST

- CARB 429 (PAHs)
- CARB 428 (Dioxins)
- CARB 410A 410B (Benzene)
- CARB 430 (Aldehydes)
- CARB 421 (HCl)
- CARB 425 ([illegible])
- CARB 422 ([illegible])
- CARB 106 (Vinyl Chloride)
- EPA Determination of metals emissions — Exhaust vents (DRAFT)
- EPA 600 [illegible] (Exhaust metals, chlorides)
- CARB 426 (Cyanide)
- CARB 423 ([illegible])
- CARB 421 ([illegible])

Field Sample ID	Volume	# Containers	Matrix: Water	Matrix: Air	Matrix: Other	Method Preserved: HCl	Method Preserved: HNO_3	Method Preserved: H_2SO_4	Method Preserved: Ice	Method Preserved: None	Method Preserved: Other	Sampling: Date	Sampling: Time	Analysis Request
12d-1-1061-410														✓ (CARB 410A)
12Cl-1-1061-410														✓ (CARB 410A)

Sampled 10/9/90

SPECIAL HANDLING

24 HOURS ☐
EXPEDITED 48 Hours ☐
NTAT ☐
OTHER ____ (#) BUSINESS DAYS

Return tedlars ✓
Return cooler ____
Return bottles ____

SPECIAL DETECTION LIMITS (Specify)

SPECIAL REPORTING REQUIREMENTS
Air samples- total qty. to be reported

REMARKS: Benzene & Toluene

Lab Use Only
Lot #:
Storage Location
Work Order #:

CUSTODY RECORD

	Date	Time	
Relinquished by Sampler: R. Best	10-9-91	15 00	Received by
Relinquished by:	Date	Time	Received by
Relinquished by:	Date	Time	Received by Laboratory:

Way bill #

101(11)

BEST ENVIRONMENTAL
27343 Industrial Blvd. #E
Hayward, CA [illegible]

P.O.#

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Pg. 1 of 1

Project Manager: R Best

(415)784-07[illegible]
(415)784-0[illegible]

Lab Name: C&T

Client: Koppers

Location: Shed Outlet

I attest that the proper field sampling procedures were used during the collection of these samples

Sampler Name (Print): R. Best

Field Sample ID	Volume	# CONTAINERS	Matrix: WATER	AIR	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	NONE	OTHER	Sampling: DATE	TIME	CARB 410A (Benzene)
1D-1-1061-410														✓
1D-2-1061-410														✓
1D-3-1061-410														✓

ANALYSIS REQUEST

- CARB 429 (PAH)
- CARB 428 (Dioxins)
- CARB 410A 410B (Benzene)
- CARB 430 (Aldehydes)
- CARB 421 (HCl)
- CARB 425 (Chrome)
- CARB 422 ([illegible])
- CARB 106 (Vinyl Chloride)
- EPA Determination of metals emissions [illegible] exhaust vents (DRAFT)
- EPA 600 [illegible] ([illegible] metals [illegible])
- CARB 426 (Cyanide)
- CARB 423 ([illegible])
- CARB 42[illegible] ([illegible])

SPECIAL HANDLING
24 HOURS ☐
EXPEDITED 48 Hours ☐
NTAT ☐
OTHER ___ (#) BUSINESS DAYS

Return tedlars ___
Return cooler ___
Return bottles ___

SPECIAL DETECTION LIMITS (Specify)

SPECIAL REPORTING REQUIREMENTS
Air samples- total qty. to be reported

REMARKS: Benzene & Toluene

Lab Use Only
Lot #:
Storage Location
Work Order #:

CUSTODY RECORD

Relinquished by Sampler:	Date	Time	Received by:
R. Best	10-11-90	13:00	[signature] 10/12/90 12:04
Relinquished by:	Date	Time	Received by:
Relinquished by:	Date	Time	Received by Laboratory:

Way bill #

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Pg. 2 of 2

BEST ENVIRONMENTAL
27343 Industrial Blvd. #E
Hayward, CA 94545

P.O.#=

Phone (415)784-0730
Fax (415)784-0397

Project Manager

Lab Name CAT

Client: Koppers

location: Berkeley

I attest that the proper field sampling procedures were used during the collection of these samples

Sampler Name (Print)

Field Sample ID	Volume	# CONTAINERS	Matrix: WATER	AIR	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	NONE	OTHER	Sampling: DATE	TIME
F-1-1061-430 12													
F-2-1061-430 13													
F-3-1061-430 14													
F-B-1061-430 - not received same as #1													
DNPH Soln.													

ANALYSIS REQUEST

- CARB 429 (PAH's)
- CARB 428 (Dioxins)
- CARB 410A 410B (Benzene)
- CARB 430 (Aldehydes)
- CARB 421 (HCl)
- CARB 425 (Cr [illegible])
- CARB 422 (Halog. org.)
- CARB 106 (Vinyl chloride)
- EPA Determination of metals emissions in Exhaust gases (DRAFT)
- EPA 600 [illegible] (Other metals, chlorides)
- CARB 426 (Cyanide)
- CARB 423 (Arsenic)
- CARB 421 [illegible]

SPECIAL HANDLING

24 HOURS ☐
EXPEDITED 48 Hours ☐
NTAT ☐
OTHER ________ (#) BUSINESS DAYS

Return tedlars ____
Return cooler ____
Return bottles ____

SPECIAL DETECTION LIMITS (Specify)

SPECIAL REPORTING REQUIREMENTS
Air samples- total qty. to be reported

REMARKS:

Lab Use Only
Lot #:

Storage Location
Work Order #:

CUSTODY RECORD

Relinquished by	Date	Time	Received by
Relinquished by Sampler: R. Best	10-4-90		
Relinquished by:			
Relinquished by:			Received by Laboratory: Way bill #

METER BOX FULL TEST CALIBRATION

DATE: 10/1/90

OPERATOR: Scott C

METER BOX Yd: 1.0157

METER BOX ΔH@: 1.853

ΔH@: _____

METER BOX: RAC #2

BAROMETRIC PRESSURE (Pb): 29.84 / 10

Q	1 ΔH	2 ΔP	3 Yds	Standard Meter Gas Volume (ft³) Initial	Final	4 (Vds) Net	Meter Box Gas Volume (ft³) Initial	Final	5 (Vd) Net	Standard Meter Temperature In	Out	6 Tds Avg	Meter Box Temperature In	Out	7 Td Avg	8 θ	ΔH@	Yd
	.49	-.09	1.0038	91.943	103.278	11.335	220.658	232.428	11.770	75	76	75½	120	82	101	30.00	1.794	1.0113
	.50	-.09		103.278	109.028	5.750	232.428	238.418	5.990	75	76	75½	122	83	102.5	15.00	1.743	1.0074
	1.5	-.29		116.934	128.123	11.189	246.648	258.380	11.732	75	76	75½	132	86	109	17.00	1.905	1.0149
	1.5	-.29		128.123	139.308	11.185	258.380	270.138	11.758	75	76	75½	132	86	109	17.00	1.907	1.0117
	3.0	-.51		148.306	163.008	14.702	279.518	294.888	15.370	73	76	74½	139	88	113½	16.00	1.847	1.0251
	3.0	-.51		163.008	177.723	14.715	294.888	310.227	15.339	73	76	74½	139	88	113½	16.00	1.921	1.0240

Q = Flow Rate (cfm)

ΔH = Orifice Pressure Differential (in. H O)

ΔP = Inlet Pressure Differential Standard Meter (in. H O)

Yds = Standard Meter Correction Factor (Unitless)

Yd = Meter Box Correction Factor (Unitless)

ΔH@ = Orifice Pressure Differential that gives 0.75 cfm of air at 70°F and 29.92" Hg (in. H O)

$$Yd = (Yds)\left(\frac{Vds}{Vd}\right)\left(\frac{Td + 460}{Tds + 460}\right)\left(\frac{Pb + \Delta P/13.6}{Pb + \Delta H/13.6}\right)$$

$$\Delta H@ = \frac{0.0317\ \Delta H}{Pb\ (Td + 460)}\left[\frac{(Tds + 460)\ \theta}{Vds \cdot Yds}\right]^2$$

$$Q = \frac{17.64 \cdot Vds \cdot Pb}{(Tds + 460)}$$

METER BOX FULL TEST CALIBRATION

DATE: 4/25/90

OPERATOR: SP

METER BOX Yd: 1.0002

METER BOX ΔH@: 2.068

ΔH@: _____

METER BOX: 88/6

BAROMETRIC PRESSURE (Pb): 30.28

Q	1 ΔH	2 ΔP	3 Yds	Standard Meter Gas Volume (ft³) Initial	Final	4 (Vds) Net	Meter Box Gas Volume (ft³) Initial	Final	5 (Vd) Net	Standard Meter Temperature In	Out	6 Tds Avg	Meter Box Temperature In	Out	07 Td Avg	08 Time (Min.) θ	ΔH@	Yd
.35	.48	-.14	1.038	295.693	310.693	17.000	554.193	566.263	12.070	62½	66	64	65½	64	64.5	35.00	2.221	.9974
.36	.5	-.14		310.693	327.936	17,243	566.263	583.571	17.308	64½	68	66	66½	64½	65.5	48	2.121	.9975
.64	1.5	-.50		329.672	351.074	21,462	585.317	606.822	21.505	66½	70	68	69	66½	68	34.00	2.077	.9942
.64	1.5	-.50		351.074	395.529	44,455	606.822	651.441	44,619	67	71½	69	71½	66½	69	70.00	2.044	.9953
~~.41~~	~~3.0~~	~~-1.62~~		~~399,467~~	~~417,562~~	~~18,095~~	~~655,352~~	~~673,253~~	~~17,901~~	~~67~~	~~72~~	~~69½~~	~~73½~~	~~67~~	~~70~~	~~2000~~	~~2.014~~	~~1.0058~~
~~.46~~	~~3.0~~	~~-1.62~~	⇐	~~417,562~~	~~436,693~~	~~19,131~~	~~673.253~~	~~692,087~~	~~18,834~~	~~67~~	~~72~~	~~69½~~	~~75~~	~~67~~	~~71~~	~~21.00~~	~~1.814~~	~~1.0084~~
.92	3.0	-1.02		475.613	475.808	39,195	692,087	730.838	38,751	67	72	69½	75½	67	71	43.00	1.981	1.0083
.92	3.0	-1.02		475,808	504.197	28,389	730,838	758,893	28,055	68	72	70	76	67	71½	31.00	1.965	1.0086

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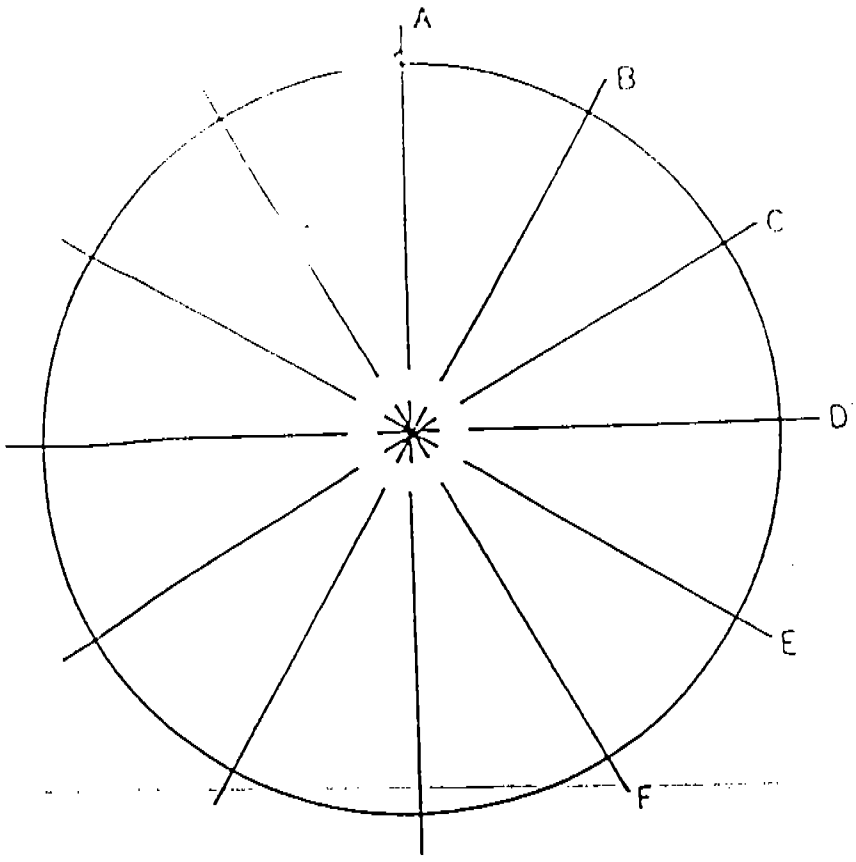
$$\Delta H@ = \frac{0.0317\ \Delta H}{Pb\ (Td + 460)}\left[\frac{(Tds + 460)\ \theta}{Vds \cdot Yds}\right]^2$$

$$Q = \frac{17.64 \cdot Vds \cdot Pb}{(Tds + 460)}$$

NOZZLE MEASUREMENT



DIAMETER DIMENSION

A	0.269
B	0.268
C	0.268
D	0.269
E	0.270
F	0.269

AVG 0.269

NOZZLE SERIAL 7F

DATE 8/15/90

RECORDED BY MW

BA

Date: 11/03/84 Pitot Number: C1

TYPE S PITOT TUBE INSPECTION DATA

Pitot tube assembly level? ✓ yes _____ no

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

α_1 = 1 ° (<10°), α_2 = 1 ° (< 10°), β_1 = 1.5 ° (< 5°)

β_2 = 0 ° (< 5°)

Y = 4 °, θ = 1 °, A = .375 ~~cm~~ (in.)

Z = A sin Y = .026 ~~cm~~ (in.); < 0.32 cm (< 1/8 in.), (< .125)

W = A sin θ = .006 ~~cm~~ (in.); < 0.08 cm (< 1/32 in.) (< .031)

P_a .548 ~~cm~~ (in.) P_b .542 ~~cm~~ (in.)

D_t = 1.100 ~~cm~~ (in.) $\frac{\ddot{P}}{D_t} = \frac{}{P_a - P_b - P}$ (≥1.05 and≤ 1.50)

COMMENTS: Brand new

Calibration required? ____ yes ✓ no

Calibrated by: Craig Thiry