AP-42 Section 11.6
Reference 62
Report Sect. 4
Reference 74

'108 455 [illegible]

EMISSIONS TESTING REPORT

CONDUCTED AT KAISER CEMENT
COUPERTINO, CALIFORNIA

FOR

KAISER CEMENT
P.O. BOX 8019
WALNUT CREEK, CALIFORNIA

ATTENTION: MR. JEFF WIEST

ON

FEBRUARY 22, 27 & MARCH 8, 9

Reference: TMA/Norcal C.N. 5428-(2-8)

No Chloroform data

R KILN EMISSIONS

- cover sheet
- TOC
- Tables emission
- notes

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APPENDICES

TMA
Thermo Analytical Inc.

TMA/Norcal
2030 Wright Avenue
P.O. Box 4040
Richmond, CA 94804-0040
(415) 235-2633

April 30, 1990

Mr. Jeff Wiest
Kaiser Cement
P.O. Box 8019
Walnut Creek, California 94596

Reference: TMA/Norcal C.N. 5428-(2-8)

Dear Mr. Wiest,

Subject:

Report on emissions testing performed on Kaiser Permanente Cement's Kiln Pyroprocessing system as required by the toxics "Hot-Spots" emission inventory assembly bill AB2588.

Test Dates: February 22nd, 27th and March 8th and 9th.

Test Location:

Testing was performed at the Kaiser Permanente Cement Plant, Steven's Creek Boulevard, Cupertino, California. The emissions test point was baghouse stack #14 from the kiln pyroprocessing system. Stack #14 was equipped with a continuous sulfur dioxide and nitrogen oxide emission analyzer.

Test Personnel: Guy Worthington, Scott Chesnut and Jim Stone of TMA/Norcal.

Process Description:

Testing was conducted on Kaiser Cement's pyroprocessing system. The system consists of a dual-string, four-stage suspension pre-heater system, a single precalciner and a 16' x 250' Allis Chalmers rotary kiln. Coal is the primary fuel, and petroleum coke is the secondary fuel. Natural gas is used as a back-up fuel. The combustion gases that pass through the rotary kiln are moved by dual 2250 Hp induced draft fans, one for each pre-heater string.

Kiln feed is measured by an impact flow meter, then split into two equal streams for each pre-heater string.

The exhaust gases from the pre-heater system is used for drying purposes in the Raw Mills and Coal Mills, before passing through fabric filter dust collectors and into the atmosphere.

At the request of the Bay Area Air Quality Management District (BAAQMD), the system was tested with the Raw Mill not operating to represent suspected worst case conditions. No material was processed through Raw Mill number 1 during testing. Hot gases from the pyroprocessing system passed through the empty Raw mill to the baghouse. The baghouse is a dual system consisting of 32 units (2 x 16) that separately handle the emissions from Raw Mill #1 and Raw Mill #2, and their respective pre-heater systems.

Process information is summarized in Table 7.

Test Parameters:

The following tests were performed on the dates indicated.

Test Date	Agency/Method	Parameter
All Days	CARB 1	Stack Gas Traverse Point Determination
All Days	CARB 2	Stack Gas Velocity & Volumetric Flowrate Determination
All Days	CARB 3	Stack Gas Oxygen & Carbon Dioxide Determination
All Days	CARB 4	Stack Gas Moisture Determination
2/22/90	CARB 410	Benzene
2/22/90	CARB 421	Hydrogen Chloride
2/22/90	CARB 430	Formaldehyde
2/27/90	CARB 425	Total and Hexavalent Chromium
2/27/90	EPA DRAFT	Hg, Zn, Ni, Pb, As, Be, Cd, Cu, Mn, Se, Cr
3/08/90	CARB 429	Polycyclic Aromatic Hydrocarbons (PAHs)
3/09/90	CARB 428	Dioxins (PCDD's) & Furans (PCDF's)

Test Protocols:

The test methods and protocols that were used are referenced from the following sources:

California Air Resources Board (CARB); Stationary Source Test Methods Volumes I, III and IV.

The U.S. Environmental Protection Agency (USEPA), 40 CFR Part 60, App. A.

A copy of the EPA draft metals method can be supplied if requested.

Test Procedure:

Each analyte was tested in three discrete, consecutive tests of one-hour duration each, with the exception of the benzene samples which were integrated over a ten-minute period per test.

DIOXINS AND FURANS were sampled using the modified Method 5 configuration, as described in CARB Method 428. Enseco Laboratories prepared the XAD-2 resin cartridges and spiked each one. All sample glassware was pre-cleaned according to prescribed procedures. Prior to beginning the first test the

sampling train was assembled with filter, XAD-resin cartridge and impingers containing 100 milliliters of deionized water. The sample train was leak-checked and then recovered in five separate fractions; (1) nozzle to condenser rinse; (2) filter; (3) XAD-2 resin cartridge; (4) impinger #1 and (5) impinger #2. The sample fractions were then extracted and combined for a single analysis by high resolution gas chromatography/high resolution mass spectrometry.

POLYCYCLIC AROMATIC HYDROCARBONS were sampled using CARB method 429, which has a virtually identical configuration to CARB Method 428. The same test procedure was used, with the exception of a variation in the XAD-2 resin spike compounds and the substitution of toluene for benzene in the sample recovery procedure. Analysis was performed by high resolution gas chromatography and low resolution mass spectrometry.

MULTIPLE METALS were sampled using an EPA draft method incorporating a Method 5 sampling train modified by adding a nitric acid/hydrogen peroxide reagent in #1 and #2 impingers and potassium permanganate/sulfuric acid reagent in impingers #3 and #4. The sample train was recovered into the following fractions; (1) probe rinse; (2) filter; (3) Impinger #1 and #2 and; (4) impingers #3 and #4. The samples were analyzed as individual fractions using the best combination of Graphite Furnace and Cold Vapor atomic absorption and inductively coupled argon plasma techniques.

HEXAVALENT CHROMIUM AND TOTAL CHROMIUM were sampled using CARB Method 425. This is a modified Method 5, with an unheated teflon coated filter situated after two Greenburg-Smith impingers containing a reagent of sodium hydroxide. Analysis for hexavalent chromium was performed by colorimetry and total chromium was analyzed using furnace atomic absorption. The separate sample fractions; (1) probe rinse; (2) impingers and; (3) filter were combined for a single analysis per train.

FORMALDEHYDE was sampled using CARB Method 430, using 25 milliliter midget impingers containing freshly purified 2-4 dinitrophenol hydrazine absorbing reagent. Sampling was conducted at a flowrate of approximately one liter per minute. The contents of the impingers were recovered after each test and stored in amber jars prior to analysis by high performance liquid chromatography.

HYDROGEN CHLORIDE was sampled using CARB Method 421. This is a Method 5 sampling train, modified by substituting sodium carbonate sodium bicarbonate reagent in place of deionized water. The impinger reagent was analyzed for chloride by ion chromatography with conductivity detection.

BENZENE was sampled using an evacuated rigid container as described in CARB Method 410. New tedlar bags and sample lines were used that had been purged with grade 5 nitrogen. Analysis was performed by GC/MS within 72 hours of sampling.

QA/QC:

All samples were handled using chain-of-custody documentation, copies of which are contained in the appendices.

Each sampling method included at least one sampling method quality control blank and or spike, which was handled in exactly the same manner as the corresponding samples. These blanks were in addition to blanks and internal QA/QC programs run by the laboratories.

Results:

The results are present in the following tables:

1, 1A, 1B, 1C: Summary of Dioxin and Furan Emission Tests
2, 2A, 2B, 2C: Summary of Polycyclic Aromatic Hydrocarbon Emission Tests
3, 3A, 3B, 3C: Summary of Multiple Metals Emissions Tests
4: Summary of Formaldehyde Emissions Tests
5: Summary of Hydrogen chloride Emissions Test
6: Summary of Benzene Emissions Tests

Comments:

In no cases have the emissions values been corrected for levels found in the sample method blanks, or for recovery efficiencies.

The following supporting documentation is located in the appendices: 1) Stack Gas Flowrate, Moisture and Isokenetic Calculations; 2) Stack Gas O_2 and CO_2 Strip Chart Records; 3) Field Data Sheets; 4) Sample Chain-of-Custody Forms; 5) Laboratory Reports; and 6) Kaiser Process Data.

Thank you for allowing us to be of service. If you have any questions, please call me or Scott Chesnut at (415) 235-2633.

Sincerely,

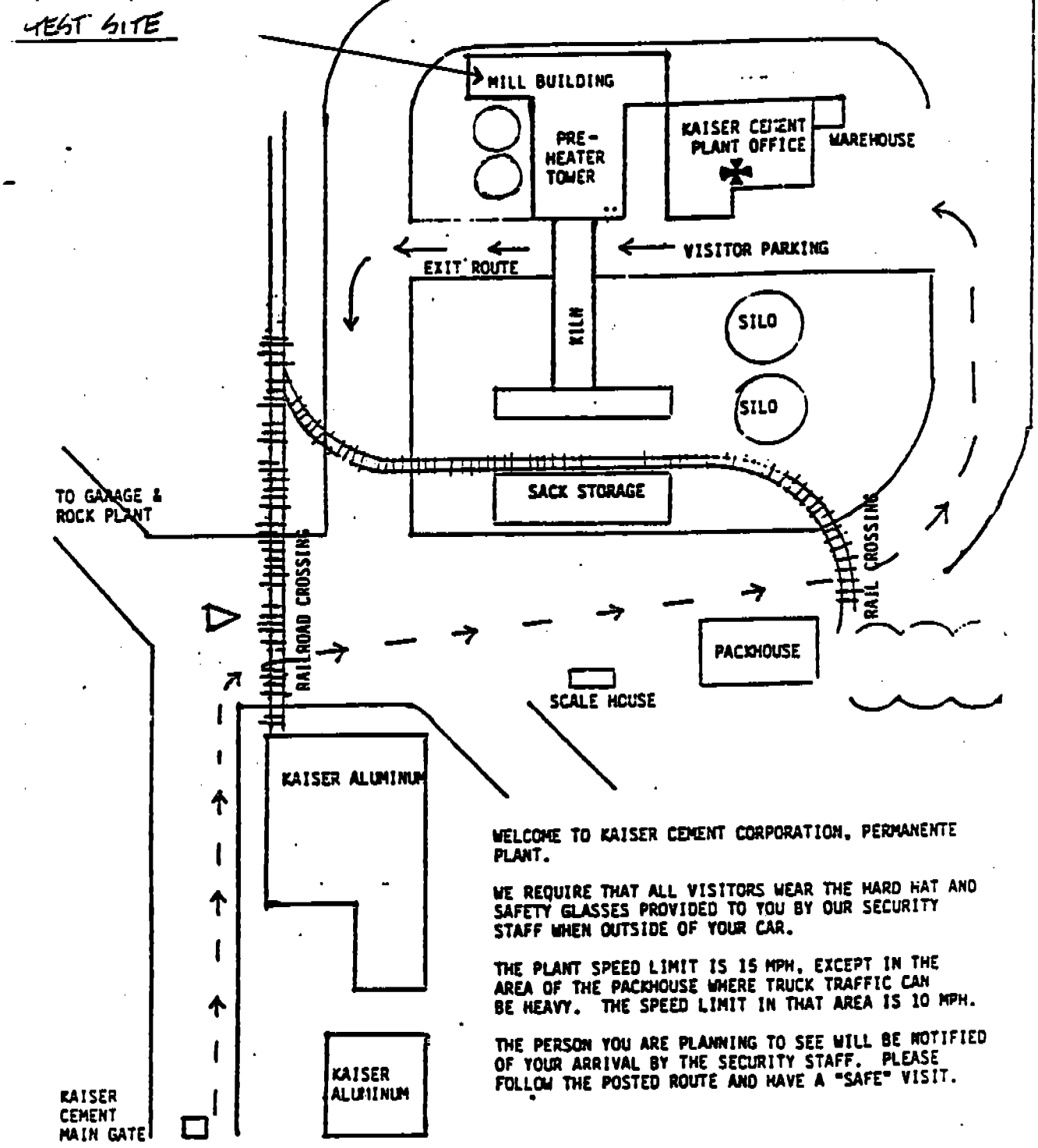
Guy Worthington
Project Manager
Environmental Field Services

Enclosure

GW/nl

KAISER CEMENT CORPORATION

PERMANENTE PLANT



WELCOME TO KAISER CEMENT CORPORATION, PERMANENTE PLANT.

WE REQUIRE THAT ALL VISITORS WEAR THE HARD HAT AND SAFETY GLASSES PROVIDED TO YOU BY OUR SECURITY STAFF WHEN OUTSIDE OF YOUR CAR.

THE PLANT SPEED LIMIT IS 15 MPH, EXCEPT IN THE AREA OF THE PACKHOUSE WHERE TRUCK TRAFFIC CAN BE HEAVY. THE SPEED LIMIT IN THAT AREA IS 10 MPH.

THE PERSON YOU ARE PLANNING TO SEE WILL BE NOTIFIED OF YOUR ARRIVAL BY THE SECURITY STAFF. PLEASE FOLLOW THE POSTED ROUTE AND HAVE A "SAFE" VISIT.

APPENDIX I

Tables of Results

TABLE 1

SUMMARY OF DIOXIN (PCDD's) AND FURANS (PCDF's) EMISSION TEST RESULTS

Stack Gas and Sample Data

Client: Kaiser Cement
Date Tested: 03/09/90
Unit Tested: Kiln Baghouse Stack #14

Parameters	Test 1	Test 2	Test 3
Time of Sampling	0930-1030	1115-1215	1310-1410
Test Duration, mins	60	60	60
Stack Gas Temp., °F Avg.	234	232	231
Stack Gas Velocity, FPS Avg.	50.9	48.4	48.1
Stack Gas Flowrate, ACFM	11391	10831	10764
Stack Gas Flowrate, SDCFM	7551	7169	7131
Stack Gas Flowrate, DSCMS	3.56	3.38	3.37
Stack Gas, $\%O_2$ Dry	11.8	11.9	11.9
Stack Gas, $\%CO_2$ Dry	16.5	16.0	15.9
Stack Gas, $\%H_2O$ Vapor	11.5	11.9	11.9
Gas Sample Volume, SDCF	46.23	44.44	44.11
Gas Sample Volume, DSCM	1.31	1.26	1.25
Percent Isokinetic Sampling	101	103	102

ACFM - Actual Cubic Feet Per Minute
SDCFM - Standard Dry Cubic Feet Per Minute
DSCMS - Dry Standard Cubic Meters Per Second

TABLE 1A

TMA/Norcal

SUMMARY OF DIOXIN (PCDD's) AND FURANS (PCDF's) EMISSION TEST RESULTS

ng/Sample

Client: Kaiser Cement
Date Tested: 03/09/90
Unit Tested: Kiln Baghouse Stack #14

Parameters	Test 1	Test 2	Test 3	TRAIN BLANK
2,3,7,8 - TCDD	ND	ND	ND	ND
Total - TCDD	ND	ND	ND	ND
1,2,3,7,8 - PeCDD	ND	ND	ND	ND
Total - PeCDD	ND	ND	ND	ND
1,2,3,4,7,8 - HxCDD	ND	ND	ND	ND
1,2,3,6,7,8 - HxCDD	ND	ND	ND	ND
1,2,3,7,8,9 - HxCDD	ND	ND	ND	ND
Total - HxCDD	ND	ND	ND	ND
1,2,3,4,6,7,8 - HpCDD	.042	0.045	0.043	0.084
Total - HpCDD	.067	0.077	0.085	0.170
Total - OCDD	.480	0.340	0.400	0.420
**********				
Total - PCDD's	.589	0.463	.528	0.674
**********				
2,3,7,8, - TCDF	ND	ND	ND	ND
Total - TCDF	0.041	ND	0.074	ND
1,2,3,7,8 - PeCDF	ND	ND	ND	ND
2,3,4,7,8 - PeCDF	ND	ND	ND	ND
Total - PeCDF	ND	ND	ND	ND
1,2,3,4,7,8 - HxCDF	ND	ND	ND	ND
1,2,3,6,7,8 - HxCDF	ND	ND	ND	ND
1,2,3,7,8,9 - HxCDF	ND	ND	ND	ND
2,3,4,6,7,8 - HxCDF	ND	ND	ND	ND
Total - HxCDF	ND	ND	ND	ND
1,2,3,4,6,7,8 - HpCDF	ND	ND	ND	ND
1,2,3,4,7,8,9 - HpCDF	ND	ND	ND	ND
Total - HpCDF	ND	ND	ND	ND
Total - OCDF	ND	ND	ND	0.022
**********				
Total - PCDF's	0.041	ND	.074	0.022
**********				

TABLE 1C

SUMMARY OF DIOXIN (PCDD's) AND FURANS (PCDF's) EMISSION TEST RESULTS

ng/SEC

Client: Kaiser Cement
Date Tested: 03/09/90
Unit Tested: Kiln Baghouse Stack #14

Parameters	Test 1	Test 2	Test 3
2,3,7,8 - TCDD	ND	ND	ND
Total - TCDD	ND	ND	ND
1,2,3,7,8 - PeCDD	ND	ND	ND
Total - PeCDD	ND	ND	ND
1,2,3,4,7,8 - HxCDD	ND	ND	ND
1,2,3,6,7,8 - HxCDD	ND	ND	ND
1,2,3,7,8,9 - HxCDD	ND	ND	ND
Total - HxCDD	ND	ND	ND
1,2,3,4,6,7,8 - HpCDD	0.149	0.152	0.145
Total - HpCDD	0.238	0.260	0.286
Total - OCDD	1.709	1.149	1.348
**********			
Total - PCDD's	2.097	1.565	1.779
**********			
2,3,7,8, - TCDF	ND	ND	ND
Total - TCDF	0.146	ND	0.249
1,2,3,7,8 - PeCDF	ND	ND	ND
2,3,4,7,8 - PeCDF	ND	ND	ND
Total - PeCDF	ND	ND	ND
1,2,3,4,7,8 - HxCDF	ND	ND	ND
1,2,3,6,7,8 - HxCDF	ND	ND	ND
1,2,3,7,8,9 - HxCDF	ND	ND	ND
2,3,4,6,7,8 - HxCDF	ND	ND	ND
Total - HxCDF	ND	ND	ND
1,2,3,4,6,7,8 - HpCDF	ND	ND	ND
1,2,3,4,7,8,9 - HpCDF	ND	ND	ND
Total - HpCDF	ND	ND	ND
Total - OCDF	ND	ND	ND
**********			
Total - PCDF's	0.146	ND	0.249
**********			

TABLE 1B

TMA/Norcal

SUMMARY OF DIOXIN (PCDD's) AND FURANS (PCDF's) EMISSION TEST RESULTS

ng/DSCM

Client: Kaiser Cement
Date Tested: 03/09/90
Unit Tested: Kiln Baghouse Stack #14

Parameters	Test 1	Test 2	Test 3
2,3,7,8 - TCDD	ND	ND	ND
Total - TCDD	ND	ND	ND
1,2,3,7,8 - PeCDD	ND	ND	ND
Total - PeCDD	ND	ND	ND
1,2,3,4,7,8 - HxCDD	ND	ND	ND
1,2,3,6,7,8 - HxCDD	ND	ND	ND
1,2,3,7,8,9 - HxCDD	ND	ND	ND
Total - HxCDD	ND	ND	ND
1,2,3,4,6,7,8 - HpCDD	.032	.036	.034
Total - HpCDD	.051	.061	.068
Total - OCDD	.366	.270	.320
**********			
Total - PCDD's	.449	.367	.422
**********			
2,3,7,8, - TCDF	ND	ND	ND
Total - TCDF	.031	ND	.059
1,2,3,7,8 - PeCDF	ND	ND	ND
2,3,4,7,8 - PeCDF	ND	ND	ND
Total - PeCDF	ND	ND	ND
1,2,3,4,7,8 - HxCDF	ND	ND	ND
1,2,3,6,7,8 - HxCDF	ND	ND	ND
1,2,3,7,8,9 - HxCDF	ND	ND	ND
2,3,4,6,7,8 - HxCDF	ND	ND	ND
Total - HxCDF	ND	ND	ND
1,2,3,4,6,7,8 - HpCDF	ND	ND	ND
1,2,3,4,7,8,9 - HpCDF	ND	ND	ND
Total - HpCDF	ND	ND	ND
Total - OCDF	ND	ND	ND
**********			
Total - PCDF's	.031	ND	.059
**********			

TABLE 2

SUMMARY OF POLYCYCLIC AROMATIC HYDROCARBON EMISSION TEST RESULTS

Stack Gas and Sample Data

Client: Kaiser Cement
Date Tested: 03/08/90
Unit Tested: Kiln Baghouse Stack #14

Parameters	Test 1	Test 2	Test 3
Time of Sampling	1250-1350	1441-1541	1630-1730
Test Duration, mins	60	60	60
Stack Gas Temp., °F Avg.	244	245	258
Stack Gas Velocity, FPS Avg.	52.8	51.6	54.2
Stack Gas Flowrate, ACFM	11816	11548	12129
Stack Gas Flowrate, SDCFM	7779	7528	7801
Stack Gas Flowrate, DSCMS	3.67	3.55	3.68
Stack Gas, $\%O_2$ Dry	12.5	12.6	12.1
Stack Gas, $\%CO_2$ Dry	15.0	14.7	15.5
Stack Gas, $\%H_2O$ Vapor	10.9	11.6	11.2
Gas Sample Volume, SDCF	46.72	46.19	47.8
Gas Sample Volume, DSCM	1.32	1.31	1.35
Percent Isokinetic Sampling	99	102	101

ACFM = Actual Cubic Feet Per Minute
SDCFM = Standard Dry Cubic Feet Per Minute
DSCMS = Dry Standard Cubic Meters Per Second

TABLE 2A

SUMMARY OF POLYCYCLIC AROMATIC HYDROCARBON EMISSION TEST RESULTS

ng/Sample

Client: Kaiser Cement
Date Tested: 03/08/90
Unit Tested: Kiln Baghouse Stack #14

Parameters	Test 1	Test 2	Test 3	Train Blank
Naphthalene	270000	990000	40000	41000
Acenaphthylene	8400	78000	2600	180
Acenaphthene	5300	<2000	<420	3.3
Fluorene	570	5100	8400	100
Phenanthrene	64000	220000	14000	790
Anthracene	<62	3300	ND	<9.0
Fluoranthene	860	2500	3200	41
Pyrene	400	1200	1700	32
Benzo (a) anthracene	13	10	9.7	16
Chrysene	28	42	51	21
Benzo (b) fluoranthene	56	33	<650	25
Benzo (k) fluoranthene	48	31	<75	<69
Benzo (a) pyrene	45	30	24	29
Dibenz (a,h) anthracene	12	20	16	170
Benzo (g,h,i) perylene	13	22	23	16
Indeno (1,2,3-cd) Pyrene	12	31	22	11

TABLE 2B

SUMMARY OF POLYCYCLIC AROMATIC HYDROCARBON EMISSION TEST RESULTS

ng/DSCM

Client: Kaiser Cement
Date Tested: 03/08/90
Unit Tested: Kiln Baghouse Stack #14

Parameters	Test 1	Test 2	Test 3
Naphthalene	204545	755725	29630
Acenaphthylene	6364	59542	1926
Acenaphthene	4015	<1527	<311
Fluorene	432	3893	6222
Phenanthrene	48485	167939	10370
Anthracene	<47	2519	ND
Fluoranthene	652	1908	2370
Pyrene	303	916	1259
Benzo (a) anthracene	9.8	7.6	7.2
Chrysene	21	32	38
Benzo (b) fluoranthene	42	25	<481
Benzo (k) fluoranthene	36	24	<56
Benzo (a) pyrene	34	23	18
Dibenz (a,h) anthracene	9.1	15	11.9
Benzo (g,h,i) perylene	9.8	17	17
Indeno (1,2,3-cd) Pyrene	9.1	24	16

TABLE 2C

A SUMMARY OF POLYCYCLIC AROMATIC HYDROCARBON EMISSION TEST RESULTS

ug/sec

Client: Kaiser Cement
Date Tested: 03/08/90
Unit Tested: Kiln Baghouse Stack #14

Parameters	Test 1	Test 2	Test 3
Naphthalene	689	2683	109
Acenaphthylene	21.4	211	7.09
Acenaphthene	13.5	<5.4	<1.14
Fluorene	1.46	13.8	22.9
Phenanthrene	163	596.2	38.2
Anthracene	<0.158	8.94	ND
Fluoranthene	2.20	6.77	8.72
Pyrene	1.02	3.25	4.63
Benzo (a) anthracene	0.033	0.027	0.026
Chrysene	0.071	0.114	0.140
Benzo (b) fluoranthene	0.142	0.089	<1.77
Benzo (k) fluoranthene	0.121	0.085	<0.206
Benzo (a) pyrene	0.115	0.082	0.066
Dibenz (a,h) anthracene	0.031	0.053	0.044
Benzo (g,h,i) perylene	0.033	0.060	0.063
Indeno (1,2,3-cd) Pyrene	0.031	0.085	0.059

TABLE 3

SUMMARY OF AB2588 METALS EMISSION TEST RESULTS
STACK GAS AND SAMPLE DATA

Client: Kaiser Cement
Date Tested: 02/27/90
Unit Tested: Kiln Baghouse Stack #14

EPA MULTI METALS Parameters	Test 1	Test 2	Test 3
Time of Sampling	1130-1230	1415-1515	1623-1723
Test Duration, mins	60	60	60
Stack Gas Temp., °F Avg.	236	240	240
Stack Gas Velocity, FPS Avg.	45.8	47.1	45.4
Stack Gas Flowrate, CFM	10250	10540	10160
Stack Gas Flowrate, SDCFM	6739	6961	6610
Stack Gas, $\%O_2$ Dry	10.3	10.3	10.3
Stack Gas, $\%CO_2$ Dry	19.6	19.6	19.6
Stack Gas, $\%H_2O$ Vapor	12.4	12.4	12.9
Gas Sample Volume, SDCF	26.0	34.22	33.35

CARB 425 Parameters	Test 1	Test 2	Test 3
Time of Sampling	1130-1230	1415-1515	1623-1725
Test Duration, mins	60	60	60
Stack Gas Temp., °F Avg.	237	238	239
Stack Gas Velocity, FPS Avg.	47	46.8	46
Stack Gas Flowrate, CFM	10518	10473	10294
Stack Gas Flowrate, SDCFM	6844	6847	6870
Stack Gas, $\%O_2$ Dry	10.3	9.5	9.9
Stack Gas, $\%CO_2$ Dry	19.6	18.5	20.1
Stack Gas, $\%H_2O$ Vapor	13.2	13.0	10.7
Gas Sample Volume, SDCF	25.86	38.61	38.17

TABLE 3A

SUMMARY OF AB2588 METALS EMISSION TEST RESULTS

ug/Sample

Client: Kaiser Cement
Date Tested: 02/27/90
Unit Tested: Kiln Baghouse Stack #14

EPA MULTI METALS TRAIN Parameter	Test 1	Test 2	Test 3	Train Blank
Arsenic	<2.5	<2.5	<2.9	<1.5
Beryllim	<4.9	<4.9	<5.5	<2.9
Cadmium	0.48(1)	0.14(1)	0.2(1)	<3.2
Chromium	<5.2	<5.2	<5.6	6.0(3)
Copper	3.9(1,3)	2.98(1,3)	4.6(1,3)	2.87(1,3)
Lead	2.0(1,2)	0.55(1)	1.0(1)	1.0(1)
Manganese	<8.9	<8.9	<9.0	<5.9
Mercury	4.22(1,4)	3.66(2,4)	3.59(2,4)	1.56(3,4)
Nickel	<25	<25	<29	<15
Selenium	4.0(3)	3.4(2,3)	4.0(3)	<1.5
Zinc	6.6(1,3)	9.3(1,3)	16.0(1)	6.4(1,3)
CARB METHOD 425 TRAIN				
Total Chromium	<2	<2	<2	<1
Hexavalent Chromium	<3	<3	<3	<2

*Detection levels represent the sum of the probe rinse, filter and impinger detection limits.

(1) Probe rinse
(2) Filter
(3) Impingers 1 and 2
(4) Impingers 3 and 4

TABLE 3B

SUMMARY OF AB2588 METALS EMISSION TEST RESULTS

(gr/SDCF) x 10^{-6}

Client: Kaiser Cement
Date Tested: 02/27/90
Unit Tested: Kiln Baghouse Stack #14

EPA MULTI METALS TRAIN Parameters	Test 1	Test 2	Test 3
Arsenic	<14.8	<11.3	<13.4
Beryllim	<29.1	<22.1	<25.5
Cadmium	2.85	0.63	0.93
Chromium	<30.9	<23.5	<25.9
Copper	23.2	13.5	21.3
Lead	11.9	2.48	4.63
Manganese	<52.9	<40.2	<41.7
Mercury	25.1	16.5	16.6
Nickel	<149	<113	<134
Selenium	23.8	15.3	18.5
Zinc	39.2	42.0	74.1
CARB METHOD 425 TRAIN			
Total Chromium	<11.9	<8.0	<8.09
Hexavalent Chromium	<17.9	<12.0	<12.1

gr/SDCF = (ug/sample x 15.45 x 10^{-5})/DSCF

TABLE 3C

SUMMARY OF AB2588 METALS EMISSION TEST RESULTS

(lbs/hr) x 10^{-3}

Client: Kaiser Cement
Date Tested: 02/27/90
Unit Tested: Kiln Baghouse Stack #14

EPA MULTI METALS TRAIN Parameters	Test 1	Test 2	Test 3
Arsenic	<.855	<0.674	<0.759
Beryllim	<1.68	<1.32	<1.44
Cadmium	0.165	0.038	0.053
Chromium	<1.78	<1.40	<1.47
Copper	1.34	0.81	1.21
Lead	0.687	0.148	0.262
Manganese	<3.05	<2.40	<2.36
Mercury	1.45	0.984	0.941
Nickel	<8.61	<6.74	<7.59
Selenium	1.37	0.913	1.05
Zinc	2.26	2.51	4.20
CARB METHOD 425 TRAIN			
Total Chromium	<0.698	<0.469	<0.476
Hexavalent Chromium	<1.05	<0.704	<0.713

lbs/hr = (gr/DSCF x DSCFM x 60) / 7000

TABLE 4

SUMMARY OF FORMALDEHYDE EMISSION TEST RESULTS

Client: Kaiser Cement
Date Tested: 02/22/90
Unit Tested: Kiln Baghouse Stack #14

Parameters	Test 1	Test 2	Test 3	Train Blank
Time of Sampling	1155-1255	1346-1446	1513-1613	
Test Duration, mins	60	60	60	
Stack Gas Temp., °F Avg.	241	241	246	
Stack Gas Velocity, FPS Avg.	50.5	51.0	50.0	
Stack Gas Flowrate, CFM	11574	11689	11460	
Stack Gas Flowrate, SDCFM	7397	7536	7393	
Stack Gas, $\%O_2$ Dry	10	10	10	
Stack Gas, $\%CO_2$ Dry	19	19	19	
Stack Gas, $\%H_2O$ Vapor	14.4	13.6	12.9	
Gas Sample Volume, Liters	60	60	60	0
Impinger Sample Volume, ml	38	41	40	34
*Impinger HCHO Conc., ug/L	170	120	120	70
HCHO, ug/sample	6.46	4.92	4.80	2.38
Gas Sample HCHO Conc., ppmv	0.0866	0.0660	0.0644	---
HCHO Emissions, lbs/hr	0.0030	0.0023	0.0022	---

* Detection Limit: 70 ug/L

TABLE 5

SUMMARY OF HYDROGEN CHLORIDE EMISSION TEST RESULTS

Client: Kaiser Cement
Date Tested: 02/22/90
Unit Tested: Kiln Baghouse Stack #14

Parameters	Test 1	Test 2	Test 3	Train Blank
Time of Sampling	1342-1447	1505-1608	1630-1734	
Test Duration, mins	60	60	60	
Stack Gas Temp., °F Avg.	241	241	246	
Stack Gas Velocity, FPS Avg.	50.5	51.0	50.0	
Stack Gas Flowrate, CFM	11574	11689	11460	
Stack Gas Flowrate, SDCFM	7397	7536	7393	
Stack Gas, $\%O_2$ Dry	10	10	10	
Stack Gas, $\%CO_2$ Dry	19	19	19	
Stack Gas, $\%H_2O$ Vapor	14.4	13.6	12.9	
Gas Sample Volume, SDCF	24.55	25.02	23.97	0
Impinger Sample Volume, ml	344	384	329	200
Impinger HCl Conc., ug/L	740	820	1300	490
HCl, ug/sample	254.6	314.9	427.7	
Gas Sample HCl Conc., ppmvd	0.2388	0.2898	0.4109	---
HCl Emissions, lbs/hr	0.0101	0.0125	0.0174	---
Percent Isokinetic Sampling	107	97	98	

* Detection Limit: 70 ug/L

$$ppmvd = \frac{ug/sample}{SDCF} \times \frac{852}{MW} \times 10^{-3}$$

$$lbs/hr = ppmvd \times MW \times SDCFM \times 1.55 \times 10^{-7}$$

MW = Molecular Weight, HCL = 37

TABLE 6

SUMMARY OF BENZENE EMISSION TEST RESULTS

Client: Kaiser Cement
Date Tested: 02/22/90
Unit Tested: Kiln Baghouse Stack #14

Parameters	Test 1	Test 2	Test 3	Train Blank
Time of Sampling	1145-1155	1321-1331	1500-1510	
Test Duration, mins	10	10	10	
Stack Gas Temp., °F Avg.	241	241	246	
Stack Gas Velocity, FPS Avg.	50.5	51.0	50.0	
Stack Gas Flowrate, CFM	11574	11689	11460	
Stack Gas Flowrate, SDCFM	7397	7536	7393	
Stack Gas, $\%O_2$ Dry	10	10	10	
Stack Gas, $\%CO_2$ Dry	19	19	19	
Stack Gas, $\%H_2O$ Vapor	14.4	13.6	12.9	
*Benzene Concentration, ppbv	1100	1100	690	2.6
Benzene Emissions, lbs/hr	0.0984	0.1002	0.0617	

*Detection Limit = 1.2 ppb

TABLE 7
KAISER CEMENT PRODUCTION PROCESS SUMMARY

DATE: 2/22

TIME	KILN FEED TPH	MILL #1 TPH	MILL #2 TPH	COAL, TPH PC	KN	GAS, CFM PC	KN	COKE, TPH PC	KN
1204	296	0	200	13.3	0	200	100	5.2	1.3
1304	294	0	196	13.1	0	200	100	5.2	1.3
1404	274	0	199	13.6	0	200	100	5.2	1.3
1504	296	0	199	13.3	0	200	100	5.2	1.3
1604	289	0	200	13.1	0	200	100	5.2	1.3
1704	295	0	185	13.2	0	200	100	5.2	1.3

DATE: 2/27

1104	283	0	185	8.9	0	200	100	0	1.3
1200	301	0	184	9.2	0	367	100	0	1.3
1304	290	0	184	9.5	0	200	100	0	1.3
1400	295	0	185	9.4	0	200	100	0	1.3
1504	298	0	185	8.6	0	200	100	0	1.3
1604	294	0	185	8.4	0	200	100	0	1.3
1704	297	0	188	8.6	0	200	100	0	1.3

DATE: 3/08

1232	281	0	189	10.2	0	200	100	0	1.3
1315	289	0	189	10.3	0	200	100	0	1.3
1432	299	0	189	10.4	0	200	100	0	1.3
1513	289	0	189	10.8	0	200	100	0	1.3
1619	290	?	?	0	6.6	200	100	0	1.3
1712	289	0	190	0	6.2	200	100	0	1.3

DATE: 3/09

0932	292	0	187	0	6.3	200	100	0	2.6
1018	293	0	191	0	4.3	200	996	0	3.9
1132	291	0	190	0	4.0	200	987	0	3.9
1216	289	0	174	0	4.8	200	999	0	3.9
1332	286	0	184	0	6.2	200	100	0	3.9

TPH - Tons Per Hour
TPH - Pre-Calciner
KN - Kiln