AP42 Section: 11.1

Reference Number: 164

Title: Toxic Air Contaminant Emission Inventory Test At California Commercial Asphalt Corporation, San Diego, California,

Eureka Laboratories, Inc., Sacramento, CA,

January 29, 1991.

APPENDIX G
PLANT #501

TOXIC AIR CONTAMINANT EMISSION INVENTORY TEST AT

CALIFORNIA COMMERICAL ASPHALT CORPORATION
San Diego, California

Submitted to:

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Revised on:

January 29, 1991

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1.0 INTRODUCTION

On August 14-17 and September 17, 1990, the Eureka Laboratories Inc. Source Testing Group conducted an emissions evaluation test program for toxic air contaminants at an asphalt plant owned and operated by the California Commercial Asphalt Corporation Drum Mix Plant. The facility is located in San Diego, CA. The test program was conducted to determine toxic air contaminant emission for this source category as required by AB2588, "Air Toxic Hot Spot" regulation. A representative of the San Diego APDC was on site to observe the sampling program.

The purpose of the evaluation test is to determine emissions of toxic air contaminants from (1) the aggregate dryer exhaust during normal operation and (2) to evaluate emissions of toxic air contaminants from the asphalt drum mix process under normal operating conditions.

The following substances were the target compounds of interest: Trace Metals (Arsenic, Beryllium, Cadmium, Copper, Total and Hexavalent Chromium, Mercury, Nickel, Selenium, Zinc and Manganese), Polycyclic Aromatic Hydrocarbons (see list) , Benzene and Formaldehyde. All test methods used to sample for the target compounds were approved by the California Air Resource Board.

2.0 SOURCE TEST TEAM

The Eureka Laboratories Source Testing Team included one field engineer, one chemist and one technician. The group was under the supervision of Dr. Shao-Pin Yo. Dr. Yo is responsible for ensuring that all field activities related to testing are properly carried out and with ensuring the accuracy of the source testing data. Mr. George Lee served as the on-site technical consultant.

3.0 PROCESS DESCRIPTION

The asphalt drum-mix process involves the grading and storing of various rocks and sands for mixing and conveying to a rotary kiln for heating and additional mixing. The kiln uses backup oil as fuel during the test program. As the heated product leaves the kiln, it is combined with refined petroleum to form the finish product. This material is then conveyed to large overhead hopper bins for storage prior to being loaded into delivery trucks. A typical asphalt drum-mix plant is presented in Figure 1.

The emission control system consists fo a set of cyclones and a baghouse. Exhaust gases from the process are manifolded through a series of cyclones to remove the heavier particulates and then through a baghouse to remove the fine particulates before being vented to the atmosphere from a circular exhaust stack. A schematic of the emission control system is shown in Figure 2. The stack is 62 inches in diameter with 2 port holes at 90 degrees to each other.

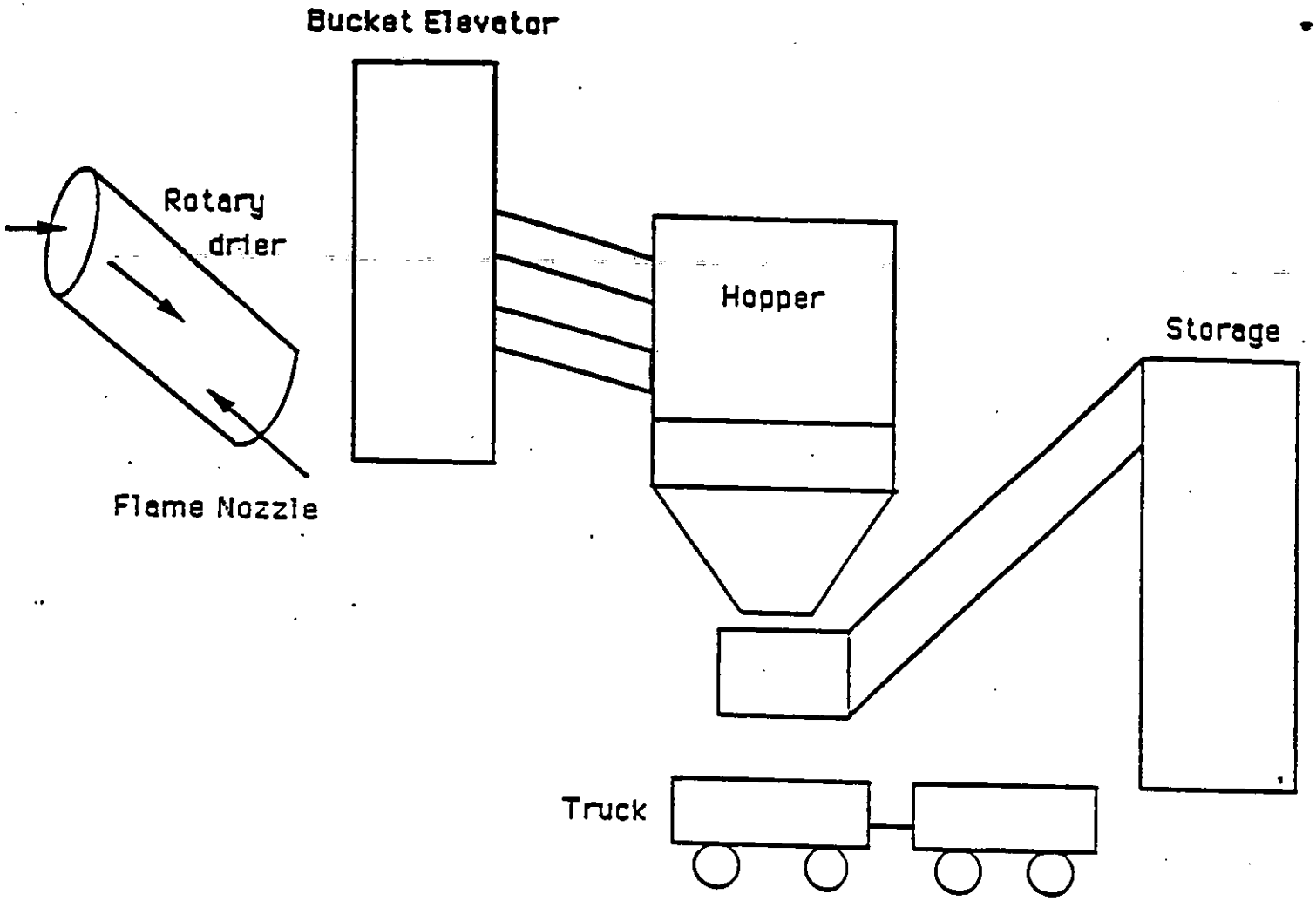

Figure 1. A Typical Asphalt Drum-Mix Plant

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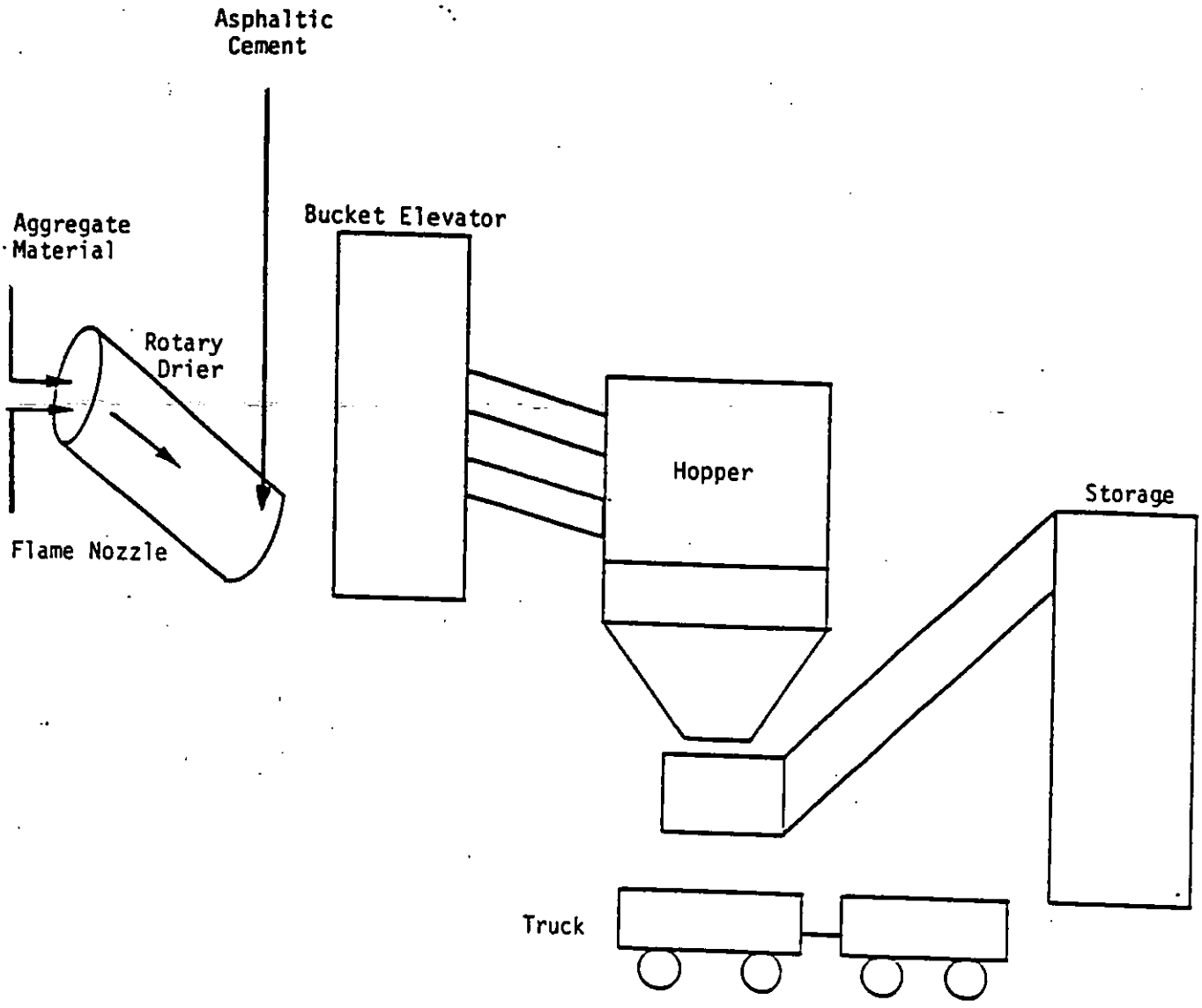


Figure 1. A Typical Asphalt Drum-Mix Plant

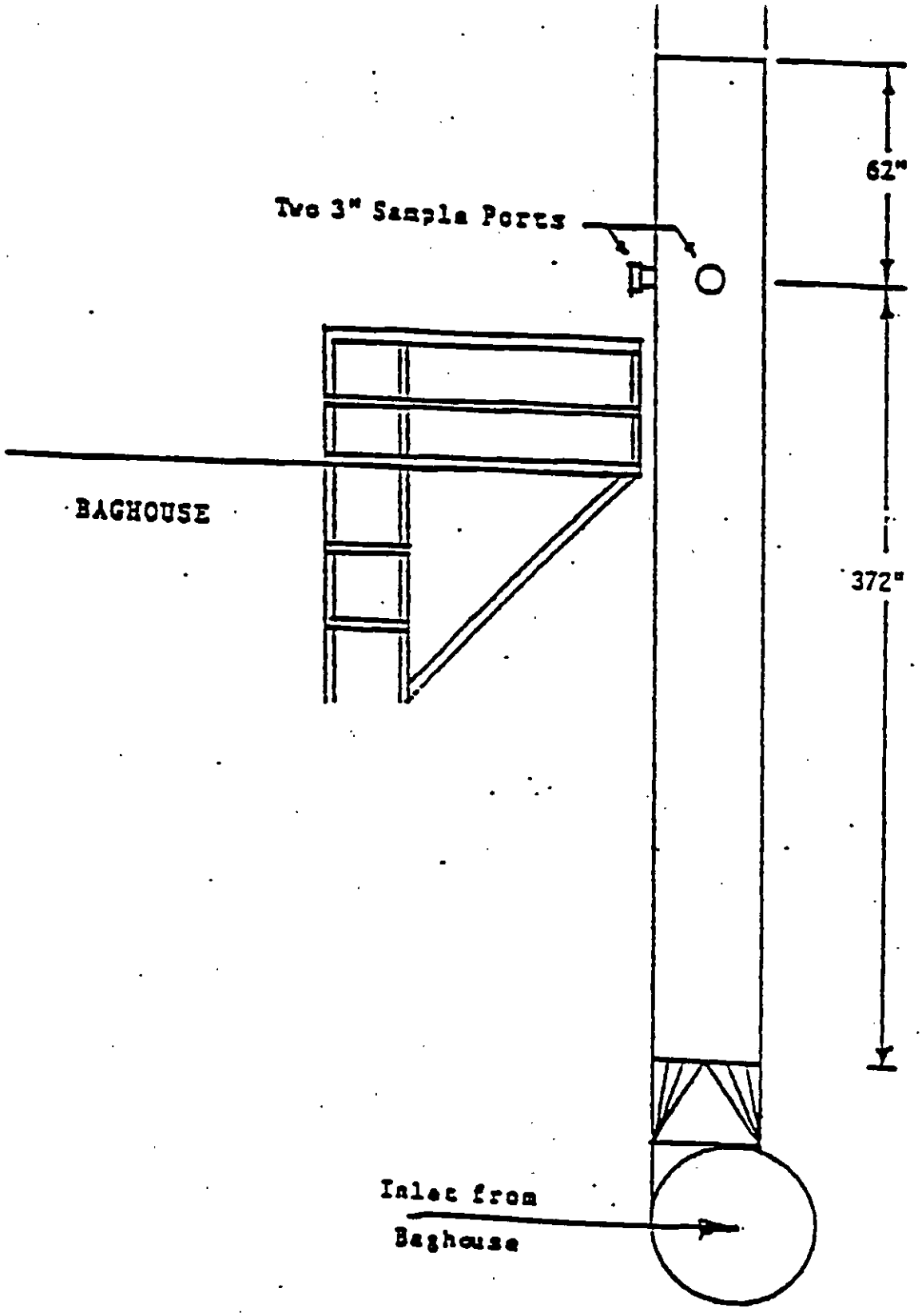


Figure 2. Sampling Port Configuration

4.0 TEST PROCEDURE:

4.1 Sample Location and Number of Traverse Points - CARB Method 1

CARB Method 1 was used to determine the sampling location and sample traverse points. The stack gas velocity was not uniform from point to point across the stack. Therefore, the minimum number and location of traverse points were determined based on the result of CARB Method 1 (See Figure 3). Each port hole consists of 6 traverse points. The port holes are 0.85 diameters upstream, and 4.1 diameters downstream, from the nearest flow disturbance. The absence of cyclonic flow was also verified; the differential pressure reading at each traverse point was null for appropriate pitot tube orientations.

4.2 Stack Velocity and Volumetric Flow Rate - CARB Method 2

CARB Method 2 was conducted to determine the average stack gas velocity and temperature using a precalibrate type S pitot tube and thermocouple simultaneously positioned at the traverse points specified by CARB Method 1. The static pressure of the stack was also measured at several traverse points, and the average value was added to the barometric pressure and recorded on the data sheet.

4.3 Stack Gas Molecular Weight - CARB Method 3

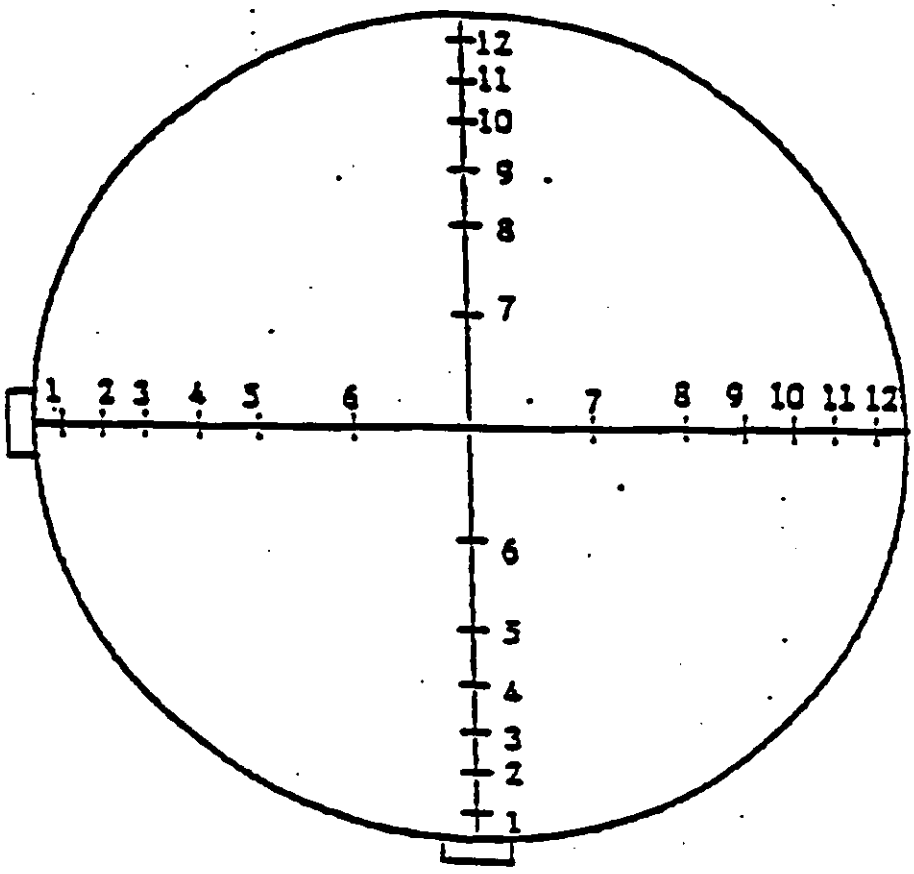
Based on CARB Method 3, multi-point grab sampling was used to extract gas sample from the stack. A precalibrated O2 and CO2 analyzer was used to determine the volume percent of carbon dioxide (CO2) and volume percent of oxygen (O2) in the stack. The CO2 and O2 measurement together with the moisture content in the stack gas were used to determine the molecular weight of the stack gas from the combustion source.

4.4 Stack Gas Moisture Content - CARB Method 4

A gas sample was extracted from the stack at a constant rate for a sufficient period of time. The total water vapor absorbed by silica gel and condensed in the impingers was measured. Dry gas meter volume and temperature were also measured during the sampling time. The gas moisture content was calculated using CARB Method 4. Leak check was performed before and after this test.

5.0 SAMPLING AND ANALYTICAL PROCEDURE

CARB Method 423 was used as sampling method for Arsenic, CARB Method 425 for Chromium and Hexavalent Chromium, and EPA Mutiple Metals Draft Method as sampling method for trace metals. As requested by CARB, CARB Method 423 for arsenic was used in the multiple metals test method development and verification study. Modified CARB Method 5 was used to perform the CARB Method 429 (Polycyclic Aromatic Hydrocarbons) sampling. Grab samples were taken for CARB Method 410 (Benzene). Triplicate sampling runs were performed for each method.



STACK I.D. = 62"

POINT NUMBER	DISTANCE INTO PORT	POINT NUMBER	DISTANCE INTO PORT
1	1.3"	7	38.9"
2	4.1"	8	46.5"
3	7.3"	9	51.0"
4	10.9"	10	54.7"
5	15.5"	11	57.8"
6	22.1"	12	60.7"

Figure 3. Sampling Points Configuration

5.1 Trace Element - EPA Draft Method

EPA Multiple Metals Draft Method was used to collect the following trace elements: Arsenic, Beryllium, Cadmium, Copper, Mercury, Nickel, Lead, Selenium, Zinc and Manganese. Total and hexavalent chromium sample was taken by separate sampling train described later in this section.

The stack sample was withdrawn isokinetically from the source for a period of 72 minutes. The particulate emissions were collected in a glass probe line and on a heated filter, and gaseous emissions were collected in a series of chilled impingers containing 100 milliliters of diluted nitric acid in hydrogen peroxide in each of the second and third impingers.

The fourth and fifth impingers each contain 100 milliliters of acidic potassium permanganate solution. The first impinger was used as a water knockout, the last impinger contained 200 grams of dry silica gel.

The sampling train components were recovered and acid digested in separate front and back half fraction and then analyzed for mercury by cold vapor atomic absorption spectroscopy (CVAAS). The remainder of the trace elements were analyzed by inductively coupled argoplasma emission spectroscopy (ICAP).

5.2 Arsenic - CARB Method 423

CARB Method 423 was conducted for determination of arsenic. Similar CARB Method 5 sampling train was used to collect the sample (see Figure 4). Particulate and gaseous emissions are extracted isokinetically from the stack using glass nozzle attached to heated glass line probe. The heated filter holder was connected via teflon tubing to a series of impingers immersed in an ice water bath. The first two impingers contained 100 milliliters of deionized water, the third impinger remained empty and the fourth impinger contained 200 grams of silica gel. The absorption train was followed in series with an air tight pump used to maintain a controlled sample flow rate through the system, and a calibrated dry gas meter was used to ensure that a sufficient sample volume was taken. Stack velocity was measured using an S type pitot tube. Orifice differential pressure was adjusted accordingly to maintain sampling rate within 10% of isokinetic ratio variation.

The stack was traversed during the sampling run (72 min.). The stack velocity and temperature as well as orifice meter temperature was measured at each traverse point. The system train was leak checked before and after each run. The filter, rinse and impingers solution were acid digested and analyzed for Arsenic by Atomic Absorbtion.

5.3 Total and Hexavelent Chromium - CARB Method 425

Sampling and analysis for total and hexavalent chromium was conducted in accordance with CARB Method 425. Particulate emissions are collected from the source by use of CARB Method 5. The collected sample was divided into two equal portions. With one portion was acid digested and analyzed for

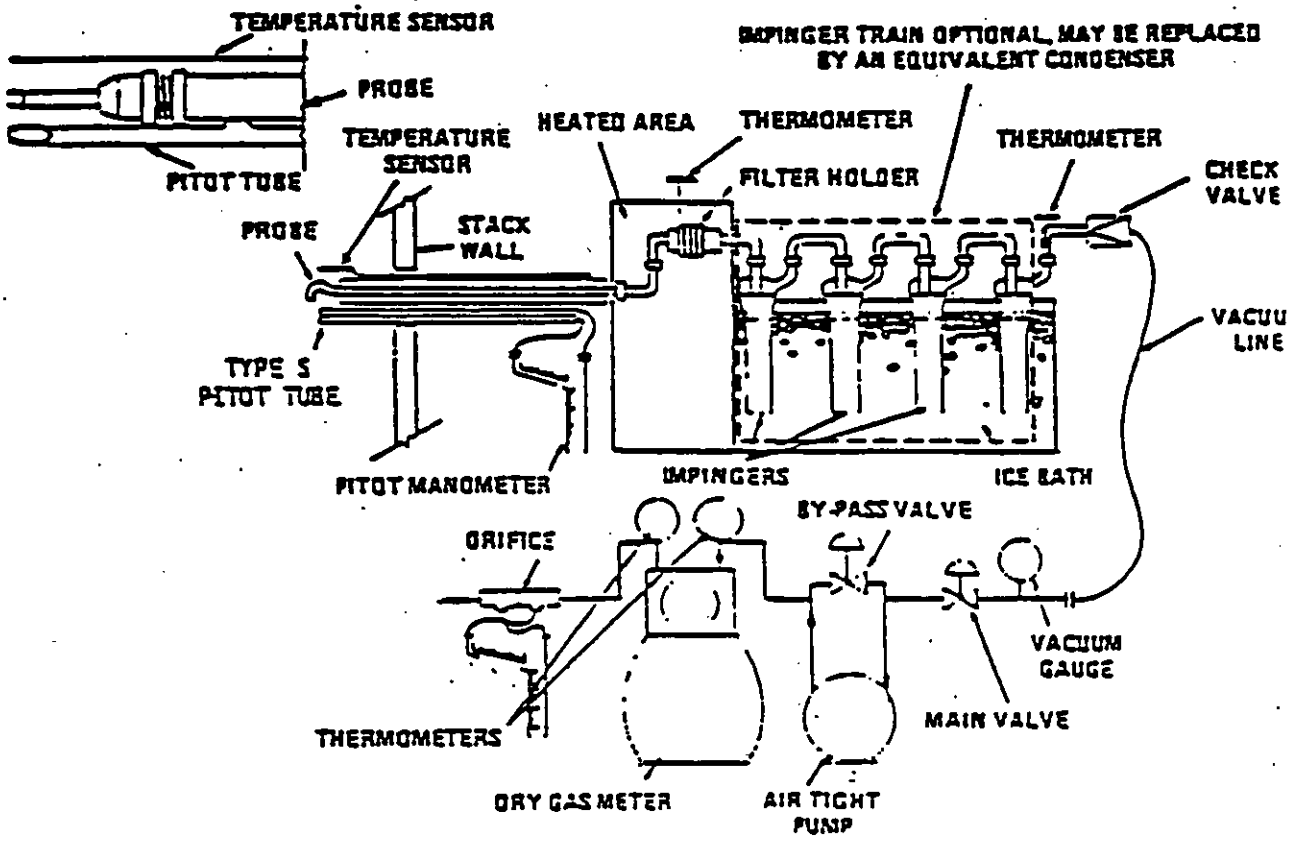


Figure 4. Schematic of Method 5 sampling train.

total chromium by graphite furnace atomic absorption spectrometry. The other portion of the sample was extracted with alkaline solution and analyzed for hexavalent chromium by colorimetric method.

5.4 Polycyclic Aromatic Hydrocarbons - CARB Method 429

The total amounts of Polycyclic Aromatic Hydrocarbons (PAH) emitted from the stack during the period of sampling time was collected and analyzed following the procedures outlined in CARB Method 429. A Modified Method 5 sampling train was used for collecting the sample (see Figure 5).

Particulate and gaseous phase PAH are extracted isokinetically from the stack and collected on the glass fiber filter, XAD-2 Resin, in the impingers and/or in upstream sampling train components. The PAH sampling train consisted of a heated glass fiber filter, an absorbent trap containing precleaned XAD-2 Resin; the glass trap was located in the sample line downstream of the filter holder and upstream of the first impinger, a glass Hempal-type condenser was located between the filter holder and the XAD-2 cartridge to ensure that cool stack gas entered the absorbent trap.

At the end of each test run, nozzle, probe line and transfer line were brushed and sequentially rinsed with methanol, toluene and methylene chloride several times. All the sampling train washes including impingers catches were stored in precleaned glass containers properly labelled and transported to the laboratory for analysis.

In order to estimate the precision and accuracy of the sampling train for collecting and recovering PAH in the stack gas sample, isotopic labelled PAH were spiked onto the filter (benzo[a]anthracene d12) and onto the XAD-2 resin (methyl-naphthalene-d10) prior to each test. Once in the laboratory, the samples were extracted with the appropriate organic solvent and then analyzed for PAH's by high resolution capillary column gas chromatography coupled with low resolution mass spectrometry (HRGC/LRMS).

The following polynuclear aromatic hydrocarbons (PAH's) were determined: Naphthalene, Acenaphthylene, Aunaphene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Benzo(g,h,i)perylene, Dibenzo(a,h)anthracene and Indeno(1,2,3-cd)pyrene.

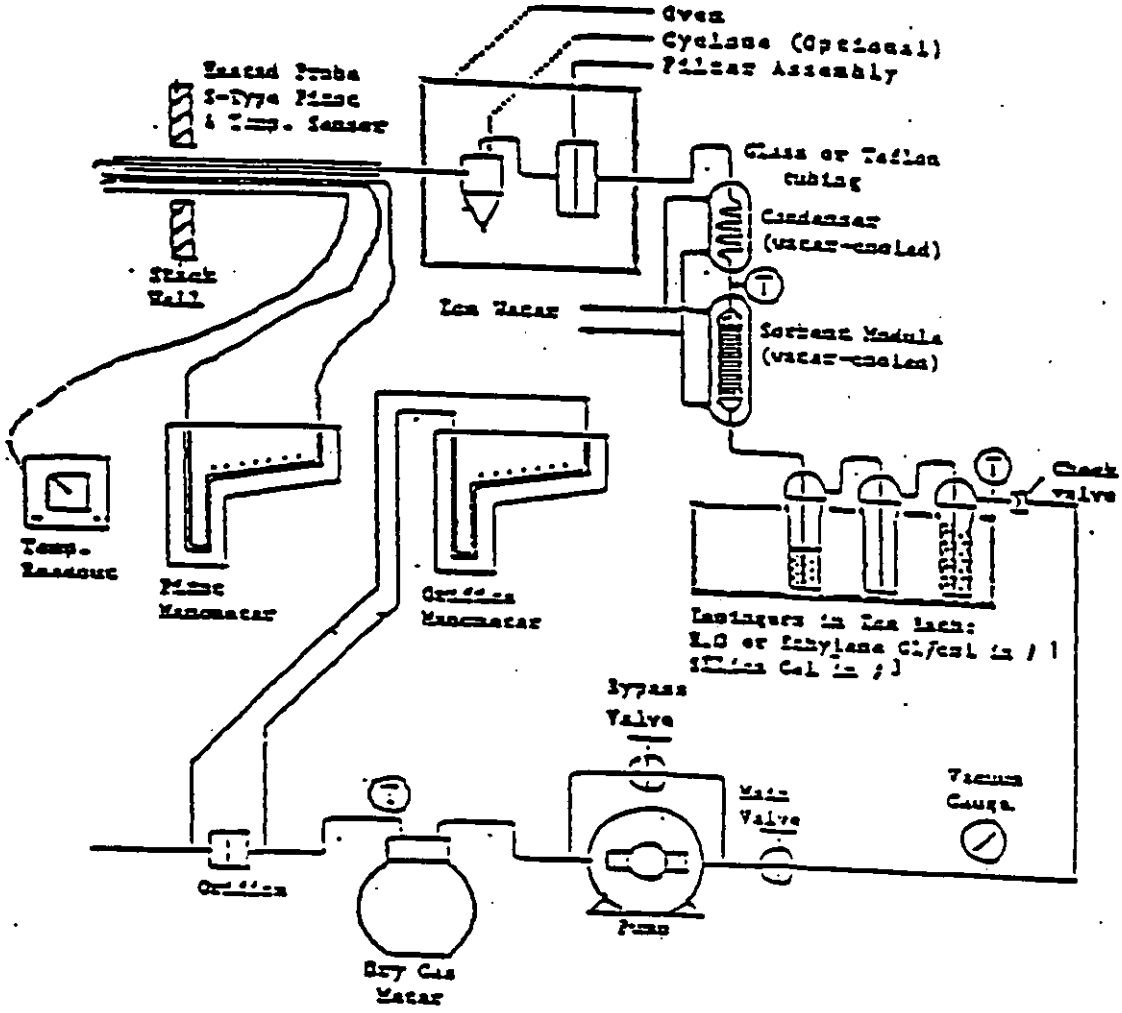
5.5 Formaldehyde - CARB Method 430

Sampling and analysis for Formaldehyde was conducted in accordance with CARB Method 430. The sampling train (see Figure 6) consisted of a glass probe equipped with a glass wool plug to remove particulate matter.

The probe was connected with a short teflon line to three midget impingers in series, all immersed in an ice water bath.

The first two impingers contained 15 milliliters of a fresh aqueous acidic solution of 2,4-dinitrophenylhydrazine (DNPH). The third impinger contained dry silica gel to prevent moisture from entering the pump. After organic solvent extraction of the collected sample, the DNPH-Formaldehyde

FIGURE 5 : PAH SAMPLING TRAIN



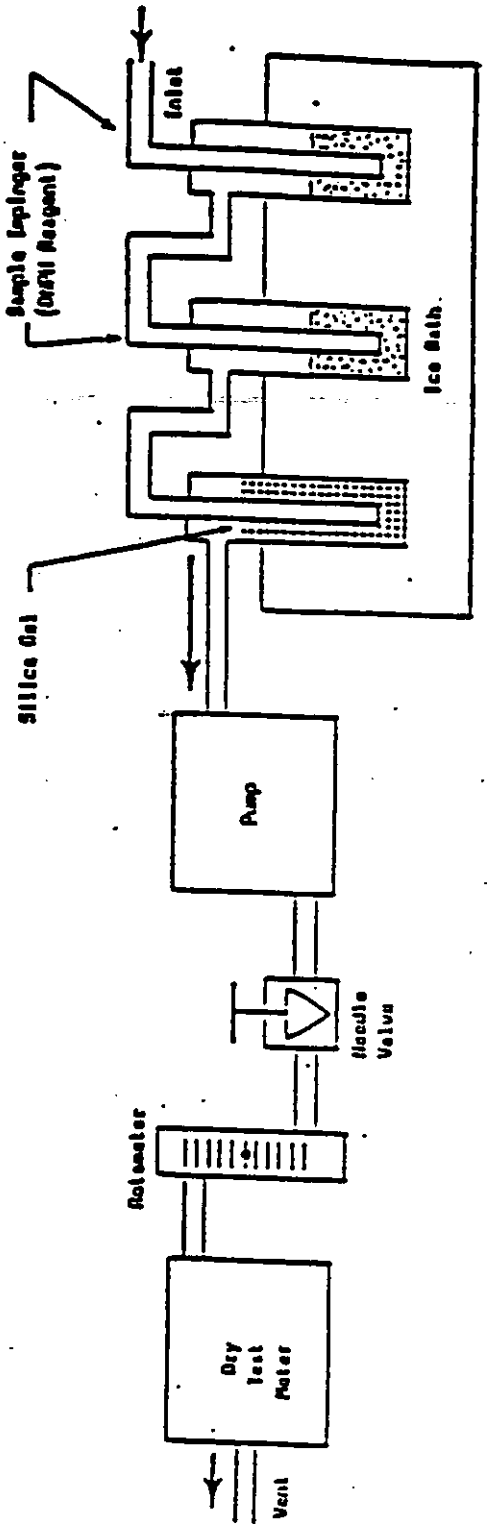


FIGURE 6 Formaldehyde Sampling Train

derivative was determined using reverse phase high performance liquid chromatography (HPLC) with an Ultraviolet (UV) absorption detector. Formaldehyde in the sample was identified and quantified by comparison of retention times and area count respectively with those of standard samples.

5.6 Benzene - Method 410A

Emission of Benzene was determined by CARB Method 410A. Gaseous stack emissions were collected by grab sampling method using a precleaned tedlar bag and a sample line which was first purged three times with the sample. The samples were labelled, kept out of direct sunlight before analysis, and analyzed within 48 hours after sample collection by gas chromatography/mass spectrometry (GC/MS).

6.0 FIELD AND LABORATORY QUALITY ASSURANCE

The sampling train was checked for leaks before and after each run by plugging the nozzle inlet, adjusting the vaccuum to 15 inches of mercury and reading the flow on the dry gas meter. The leakage rate was below 0.02 cubic feet per minute.

A leak check was also conducted on the pitot tube before and after each run by blowing and/or sucking through the pitot tube until 3 inches of water velocity pressure registered on the manometer remained stable for at least 15 seconds.

The dry gas meter, orifice meter, and thermocouple were calibrated before and after field sampling.

Prior to each test, all sampling equipment and glassware were thoroughly cleaned. After field testing, samples were carefully and properly recovered, correctly labelled for identification, and carefully sealed and stored for safe transportation.

A field blank train was set up prior to the run of each test. Then the train was leak checked, recovered, sealed and labelled like a sample. The samples including the field blank were logged in a chain of custody which contained proper sample identifications and specific tests required. This document was then used to insure that laboratory personnel from sample custodians who initially receive and store the samples from the field, the technicians who perform sample preprarations, the chemists who analyze the samples, and data processors who prepare the reports can safely track sample custody. Copies of the original chain of custodies is available upon request.

During sample preparation, a method blank, reagent spike, and reagent duplicate spike were prepared along with the samples and field blanks for analysis. All instruments - GC, HPLC, GC/MS, AA, ICAP/AES, and spectrophotometer were calibrated prior to each analysis following the ELI QA/QC manual. Analytical results including detection limit of the samples were reported.

7.0 SUMMARY OF RESULTS

All field data and detailed calculations to determine each parameter including % moisture, stack velocity, flow rate, standard dry air volume, percent of isokinetic variation and analytical results are presented in the appendices. Emission of the various pollutants tested are summarized in Tables 1 through 6.

Table 1
Summary of Trace Metals Emissions Data
EPA Draft Method

CLIENT: Central Valley Rock, Sand & Gravel Association, Inc.
PROJECT: California Commercial Asphalt Plant of San Diego

Compound	RUN #1 08/14/90 (10-3)lb/hr	RUN #2 08/15/90 (10-3)lb/hr	RUN #3 08/16/90 (10-3)lb/hr
Arsenic	< 1.57	< 1.44	< 1.50
Beryllium	< 0.16	< 0.14	< 0.15
Cadmium	< 0.31	< 0.29	< 0.30
Copper	2.88	3.58	1.21
Mercury	2.05	1.92	2.22
Nickel	167.23	150.45	4.10
Lead	1.17	2.35	0.86
Selenium	< 1.57	< 1.44	< 1.50
Zinc	69.12	117.04	57.80
Manganese	2.33	14.84	15.44

"<" = less than

Table 2
Summary of Arsenic Emissions Data
CARB METHOD 423

CLIENT: Central Valley Rock, Sand & Gravel Association, Inc.
PROJECT: California Commercial Asphalt Plant of San Diego

Compound	RUN #1 08/14/90 (10-3)lb/hr	RUN #2 08/15/90 (10-3)lb/hr	RUN #3 08/16/90 (10-3)lb/hr
Arsenic	< 0.26	< 0.26	< 0.26

NOTE: "<" = less than

Table 3
Summary of Chromium & Hexavalent Chromium Emissions Data
CARB METHOD 425

CLIENT: Central Valley Rock, Sand & Gravel Associations, Inc.
PROJECT: California Commercial Asphalt Plant of San Diego

Compound	RUN #1 08/15/90 (10-3)lb/hr	RUN #2 08/16/90 (10-3)lb/hr	RUN #3 08/16/90 (10-3)lb/hr
Total Chromium	7.14	3.94	7.96
Hexavalent Chromium	< 0.25	< 0.25	< 0.27

NOTE: "<" = less than

Table 4
Summary of Polycylic Aromatic Hydrocarbons Emissions Data
CARB Method 429

CLIENT: Central Valley Rock, Sand & Gravel Association, Inc.
PROJECT: California Commercial Asphalt Plant of San Diego

Compound	RUN #1 09/17/90 (10-3)lb/hr	RUN #2 09/17/90 (10-3)lb/hr	RUN #3 09/17/90 (10-3)lb/hr
Naphthalene	176.30	34.68	101.30
Acenaphtlylene	< 0.17	< 0.16	< 0.10
Acenaphene	< 0.17	< 0.16	< 0.10
Fluorene	2.19	0.63	1.77
Phenanthrene	1.84	0.66	1.22
Anthracene	< 0.17	< 0.16	< 0.10
Fluoranthene	< 0.17	< 0.16	< 0.10
Pyrene	< 0.17	< 0.16	< 0.10
Benzo(a)anthracene	< 0.17	< 0.16	< 0.10
Chrysene	< 0.17	< 0.16	< 0.10
Benzo(a)fluoranthene	< 0.17	< 0.16	< 0.10
Benzo(k)fluoranthene	< 0.17	< 0.16	< 0.10
Benzo(a)pyrene	< 0.17	< 0.16	< 0.10
Benzo(g,h,i)perylene	< 0.17	< 0.16	< 0.10
Dibenzo(a,h)anthracene	< 0.17	< 0.16	< 0.10
Indeno(1,2,3-cd)pyrene	< 0.17	< 0.16	< 0.10

NOTE: "<" = less than

Table 5
Summary of Benzene Emissions Data
CARB METHOD 410A

CLIENT: Central Valley Rock, Sand & Gravel Association, Inc.
PROJECT: California Commercial Asphalt Company of San Diego

Compound	RUN #1 08/17/90	RUN #2 08/17/90	RUN #3 08/17/90	RUN #1 Duplicate 08/17/90
Benzene	0.212 lb/hr	0.128 lb/hr	0.082 lb/hr	0.191 lb/hr

Table 6
Summary of Formaldehyde Emissions Data
CARB METHOD 430

CLIENT: Central Valley Rock, Sand & Gravel Association, Inc.
PROJECT: California Commercial Asphalt Plant of San Diego

Compound	RUN #1 08/15/90	RUN #2 08/15/90	RUN #3 08/15/90
Formaldehyde	0.37 lb/hr	0.31 lb/hr	0.12 lb/hr

8.0 DISCUSSION OF RESULTS

Source test sampling was performed on August 14-17, 1990 except for CARB Method 429 (PAH) which was performed on September 17, 1990 due to material shortage. The length of the test was due to the batch production schedule at the facility. Sampling was conducted when the facility had accumulated sufficient material orders from customers to allow for extended production run times to accommodate the required 72 minutes of sampling time.

Nothing unusual was encountered during sampling in terms of equipment failure or procedural complications.

Triplicate runs of each test were performed under contractual agreement. The recovered samples of each run were sealed and labelled, logged in a chain of custody, and prepared and analyzed as soon as possible.

APPENDICES

APPENDIX A

Calculations

CALCULATIONS

Calculations are performed by computer based on the following equations:

Determination of Traverse Point Locations

- Circular Duct

$t.p.(1st\ half) = D/2 - (D/dk) * k(k+1-2n)$

$t.p.(2nd\ half) = D/2 + (D/2k) * k(2n-1)$

where $n = 1$ to $k/2$

- Rectangular

$t.p. = 1/2k + (n-1) * 1/k$

where $k = 1/L$ * (number of ports)
$n = 1$ to k

Determination of Particulate Emissions

- Stack Pressure

$$Ps = Patm + dHavg/13.6$$

- Volume of Water Collected at Standard Condition (grams)

$Vwstd = (W + \text{silica gel gain}) * 0.0464$

- Sampled Volume at Standard Condition

$$Vmstd = (17.38 * Vm * Ps)/Tm \quad (SCF)$$

- Percent of Moisture

$$Bws = (Vwstd)/(Vwstd + Vmstd) = Vwstd/Vtstd$$

- Stack Gas Velocity

$$Vs = 85.48 * CP * dP(avg) * Ts/(Ps * Ms)$$

- Percent of Isokinetic Sampling

$$\%\ I = 100 * (17.58 * Vtstd * Ts)/([Dn * Dn] * \theta * Ps * Vs)$$

• Volumetric Flow Rate

Qs = Vs • A • 60 = AFCM

Qstd = Qs • (Tstd/Tsavg) • (Ps/Pstd) = SFCM

Qstd(dry) = Qstd(wet) • (1-Bws) = SDCFM)

* Particulate Concentration

C's = 0.154 • (Mn/Vmstd) • (gain/SDCF)

• Emission Flow Rate (lb/hr)

Mm = 0.00857 • C's • Qs

Symbol	Identification
A	- cross sectional area of the stack (square feet)
C'	- particulate concentration, dry basis (grain/SDCF)
Cp	- pitot tube calibration coefficient (0.85)
D	- duct diameter (circular duct),inches
Dn	- nozzle diameter (in.)
dH	- pressure drop across orifice (in. H2O)
dP	- gas velocity pressure
I	- percent isokinetic
K	- number of traverse points on D or l
l	- second duct dimension (rectangular), inches
L	- duct dimension having ports (rectangular), inches
Mm	- particulate emission rate (lb/hr)
Mn	- particulate matter collected (mg)
Ms	- stack gas molecular weight (gram)
θ	- total sampling time (minutes)
Q	- volumetric flow rate CFM
Patm	- atmospheric pressure (in. Hg)
Ps	- absolute pressure in the stack (in. Hg)
Ts	- absolute temperature of stack gas
Vm	- dry gas volume through the meter (cubic feet)
Vmstd	- dry gas volume through the meter at standard conditions in cubic feet.
Vs	- velocity of gas stream (feet/second)
Vwet	- volume of water vapor collected at (cubic feet)
W	- volume of water vapor collected in the impingers (grams)

Subscripts

atm - atmosphere

avg - average

m - at meter

n - at nozzle

S - at stack

SCF - Standard cubic feet

std - standard conditions

APPENDIX B

Trace Metals Data and Calculations

FIELD BLANK

Analytical Data

C.C. San Diego Multimetal Field Blank

SUMMARY OF QUANTITATIVE ANALYSIS

Trace Metal	Mass (ug)
Arsenic	< 12.6
Beryllium	< 1.26
Cadmium	3.0
Chromium	23.3
Copper	4.17
Nickel	22.62
Lead	4.08
Selenium	< 12.6
Zinc	477.49
Manganese	7.60
Mercury	< 7.00

NOTE: "<" = less than

METALS
EPA MULTIMETAL METHOD

CLIENT : C. C. San Diego
PROJECT: shimmy Tra
SAMPLING DATE:
SAMPLE I.D.: Train M.M. Field BK.

COMPOUND	D/L ppm	F_1 Filter + Rinse µg/ml	F_1 µg	F_2 Imp + Rinse µg/ml	F_2 µg	Total µg
Arsenic	0.1	<0.1	<6	<0.1	<6.67	<12.
Beryllium	0.01	<0.01	<0.6	<0.01	<0.66	<1.2
Cadmium	0.02	~~0.05~~	3.0	<0.02	<1.3	~~3.~~
Chromium	0.02	0.385	23.1	<0.02	<1.3	~~23.~~
Copper	0.01	0.0508	3.04	0.017	1.13	4.17
Nickel	0.1	0.377	22.62	~~<0.1~~ Hb ~~0.015~~	~~<6.67~~ <100	~~28.6~~
Lead	0.05	0.068	4.08	<0.05	<3.33	4.08
Selenium	0.1	<0.1	<6	<0.1	<6.67	<12.
Zinc	0.01	7.506	468.36	0.137	9.13	477.4
Manganese	0.01	0.06	3.6	0.06	4.0	7.6
Mercury	0.001	<0.001 ~~<0.006~~	<3	~~0.001~~ 0.001 ~~<0.004~~	<4 <0.102	<7 <0.10

Hg^{DF_1} Hg^{DF_2}

$DF_1 = 50 * \frac{300}{250} = 60$

$DF_2 = 50 * \frac{200}{150} = 66.67$

Hg $DF_1 = 50 * \frac{50}{5} * \frac{300}{50} = 3000$

Hg $DF_2 = \left[50 * \frac{200}{5}\right] + \left[50 * \frac{200}{5}\right] = 2000 + 2000 = 4000$

RUN #1

Metals - August 14, 1990

Calculation Data

C.C.Metal 1

Sample I.D.: California Commercial Asphalt Plant EPA Multimetal 1
Section I: Particulate Sampling Data

Point #	Delta P	Delta H	T S	T i	T in	T out	VAC	Filter Temp.	VEL (FPS)
A-12	0.50	0.75	282	76	76	76	2.0	245	49.5
A-11	0.45	0.65	282	62	77	76	2.0	215	47.0
A-10	0.55	0.85	284	59	79	77	3.0	215	52.0
A-9	0.65	0.95	286	59	81	77	3.0	188	56.6
A-8	0.81	1.21	286	57	83	77	3.0	237	63.2
A-7	0.77	1.15	286	57	84	76	3.0	274	61.6
A-6	0.60	0.90	289	59	85	78	3.0	286	54.5
A-5	0.55	0.80	287	60	86	78	3.0	282	52.1
A-4	0.40	0.60	286	60	86	79	2.5	291	44.4
A-3	0.40	0.60	286	61	88	80	2.5	289	44.4
A-2	0.35	0.52	282	61	87	80	2.0	293	41.4
A-1	0.28	0.44	282	61	87	80	2.0	285	37.1
B-12	0.42	0.62	280	62	86	80	2.0	272	45.3
B-11	0.45	0.68	288	62	86	81	2.5	272	47.2
B-10	0.50	0.74	288	61	87	81	3.0	278	49.7
B-9	0.56	0.84	286	61	88	81	3.0	276	52.5
B-8	0.66	1.00	283	61	90	82	3.0	276	56.9
B-7	0.80	1.20	281	61	90	82	3.5	280	62.6
B-6	0.80	1.20	279	61	90	82	3.5	278	62.5
B-5	0.70	1.10	277	61	89	82	3.5	285	58.4
B-4	0.55	0.75	276	63	89	82	3.0	278	51.7
B-3	0.49	0.72	275	63	89	83	4.0	279	48.8
B-2	0.30	0.45	275	64	89	84	2.0	288	38.2
B-1	0.22	0.32	275	65	89	83	2.0	284	32.7
AVG	0.53	0.79	283	62	86	80	2.8	269	50.4

NOMENCLATURE

Delta P = Stack gas velocity head at each sample point (in. H2O)

Delta H = Pressure differentital across orifice meter (in. H2O)

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condensor (oF)

Tin = Dry gas meter inlet temperature

Tout = Dry gas meter outlet temperature

Vac = Sample pump vacuum (in. Hg)

Filter Temp. = Temperature of front-end filter enclosure (oF)

VEL (FPS) = Actual stack velocity at each sample point

C.C.Metal 1

FIELD DATA SHEET

VOLUME OF CONDENSED MOISTURE

Impinger #	Gross	Tare	Net
1	170 ml	0 ml	170 ml
2 & 3	200 ml	200 ml	0 ml
4 & 5	210 ml	200 ml	10 ml
6	209 gram	200 gram	9 gram
	TOTAL CONDENSED MOISTURE		189 ml

STACK GAS MOLECULAR WEIGHT

PERCENT CARBON DIOXIDE	=	6.00
PERCENT OXYGEN	=	15.00
PERCENT CARBON MONOXIDE	=	0.00
PERCENT NITROGEN & INERTS	=	79.00

COMPONENT	VOLUME%	• MOISTURE CORR	• MOLWT =	MASS FRACTI
WATER	20.67	1.00	18.00	3.72
CARBON DIOXIDE	6.00	0.79	44.00	2.09
OXYGEN	15.00	0.79	32.00	3.81
CARBON MONOXIDE	0.00	0.79	28.00	0.00
NITROGEN & INERTS	79.00	0.79	28.00	17.55
		AVERAGE MOLECULAR WEIGHT =		27.17

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	838.864	CFT
Dry gas meter, final reading	=	874.610	CFT
Dry gas meter calibration factor	=	1.000	
Meter volume uncorrected for Temp & Press	=	35.746	CFT
Barometric pressure at site	=	29.20	in Hg
Meter pressure (barometer + average delta H)	=	29.40	in Hg
Average meter temperature during test	=	82.9	DEG F
Dry sample volume at standard conditions	=	33.648	CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	282.5	DEG F
Volume of condensed water	=	189	ml
Percent moisture of stack gas	=	20.67	%
Pitot tube correction factor	=	0.85	
Stack gas molecular weight	=	27.17	
Stack gas velocity at stack conditions	=	50.42	FT/SEC
Duration of sampling	=	72	Minute
Nozzle diameter	=	0.233	in
Percent isokinetic variation	=	95.5	%
Area of stack	=	20.97	SQ FEET
Stack flow rate, standard conditions	=	34628	DSCFM

SECTION IV SUMMARY OF QUANTITATIVE ANALYSIS
EMISSION RATE OF TRACE METALS

Compound		Mass (ug)		Emission rate (10-3 lb/hr)
Arsenic	<	11.54	<	1.57
Beryllium	<	1.15	<	0.16
Cadmium	<	2.31	<	0.31
Copper		21.21		2.88
Mercury		15.10		2.05
Nickel		1231.23		167.23
Lead		8.63		1.17
Selenium	<	11.54	<	1.57
Zinc		508.89		69.12
Manganese		17.12		2.33

Field Data

EUREKA LABORATORIES, INC.

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FAX (916) 381-4013

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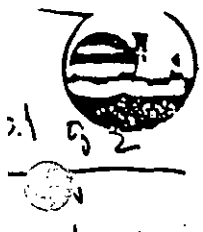
Chemical Analysis
Research & Testing
Environmental Studies
Products
Toxicology



FIELD TEST DATA FORM

p = 29.95

Site: Asphalt Hot plant C.C. Spoils Date: 8/14/90 Test No. 1 (Metal)

Nozzle I.D. E1 Diameter .233 Filter No. #1

LEAK CHECKS: Pitot tubes -- Initial Y O.K. Final Y O.K

Initial Meter Reading = 838.364

Sample train -- Initial Y O.K. Final Y O.K. (87 cfm)
838.556 838.711

Heated box

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
7:11	SE-12	.50	.75	282	76	76	76	2	245
								840.385	
7:47	SE-11	.45	.65	282	62	77	76	2	215
								841.482	
7:50	SE-10	.55	.85	294	59	79	77	2	215
								842.891	
2	SE-9	.65	.95	286	59	81	77	3	188
								844.510	
7:56	SE 8	.81	1.21	293	57	83	77	3	237
								846.311	
7:59	SE 7	.71	1.15	286	57	84	76	3	274
								848.111	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
8:02	SE 6	.60	.90	289	59	85	78	3	286
								849.785	
8:05	SE 5	.55	.50	287	60	86	78	3	282
								851.375	
8:08	SE 4	.40	.60	286	60	86	79	2.5	291
								853.075	
8:11	SE 3	.40	.60	286	61	88	80	2.5	259
								854.915	
4	SE 2	.35	.52	282	B-12 1	87	80	2	293
								856.215	
8:17	SE 1	.28	.44	282	61	87	80	2	285
								858.414	

G37

B-12

EUREKA LABORATORIES, INC.

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Air Pollution
Chemical Analysis
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Environmental Studies
Hazardous
Toxicology

P. 2 of 2

FIELD TEST DATA FORM

$CO_2 = 6\%$
$O_2 = 15\%$

Site: Ambit Hot plant C.C. Date: 8/14 Test No. 1 (Metals)

Nozzle I.D. E1 Diameter .233 Filter No. 1

LEAK CHECKS: Pitot tubes -- Initial Y O.K Final Y O.K

Initial reading = 2.5 cu ft

Sample train -- Initial ____ Final ____

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
8:20	NW-12	.42	.62	240	62	86	80	2	272
								857.755	
8:23	NW 11	.45	.68	286	62	86	81	2.5	272
								859.275	
8:26	NW 10	.50	.74	288	61	87	81	3	278
								860.615	
8:29	NW 9	.56	.84	286	61	93	81	3	276
								862.145	
8:32	NW 8	.66	1.00	253	61	90	82	3	276
								863.675	
8:35	NW 7	.80	1.20	281	61	90	92	3.5	280
								865.745	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
8:38	NW 6	.60	1.20	1279	61	90	82	3.5	278
								867.541	
8:41	NW 5	.70	1.10	277	61	89	92	3.5	255
								869.325	
8:44	NW 4	.55	.75	276	63	89	82	3	278
								871.091	
8:47	NW 3	.49	.72	275	63	89	93	4	279
								872.333	
8:50	NW 2	.30	.45	275	64	91	94	2	283
								873.507	
8:53	NW 1	.22	.32	275	.65	91	92	2	284
					B-13	G38		874.610	

PLANT [illegible]

Date/Time 8/14/90 — Barometric Pressure (in. Hg.) 29.20

Test Location Asphalt Hot plant — Static Pressure (in. wg.) _____

Run Number #1 Multi metals — Probe Type/Length 6 Feet

Stack Diameter 5'2" — Pitot Coefficient 0.85

Operator Shao-Pin YU — Meter Box No./Y _____

Filter No. _____ — Nozzle No./Size (in.) .233

Filter Temp (°F) 250 — Probe Heater Setting (%) _____

Metal (1)

Impinger Volumes/Weights				Gas Composition			
Contents	Final	Initial	Net	Time	CO_2	O_2	CO
Imp 1	170	0	170				
Imp 2	100	100	0				
Imp 3	110	109	1?				
S.G.	208.8g	200g	8.8g	Leak Rate		cfm	"Hg
		Total	189ml				
Filter Weight	Final	Initial	Net	Initial			
				Final			

Sample Point	Sampling Time (min.)	Δ P (in wg)	Δ H (in wg)	Gas Meter Volume (Ft³)	Temperature (°F) Stack	Imp.	Gas Meter In	Gas Meter Out	Pump Vacuum (in Hg)	√Δ
	Total		Avg.	Total	Avg.	Avg.	Avg.		Avg.	Avg

Analytical Data

METALS
EPA MULTIMETAL METHOD

CLIENT :
PROJECT: c c Asphalt plant 90-08-192
SAMPLING DATE:
SAMPLE I.D.: Train 1

COMPOUND	D/L ppm	F1 Filter+Rinse	F1 µg	F2 Impinger+Rinse	F2 µg	total µg
Arsenic	0.1	<0.1 * 60	<6	<0.1	< 5.54	< 11.54
Beryllium	0.01	<0.01 *60	<0.6	< 0.01	<0.55	< 1.15
Cadmium	0.02	<0.02 *60	<1.2	< 0.02	<1.11	< 2.31
Chromium	0.02	0.082 *60	4.92	0.1115	6.178	11.098
Copper	0.01	0.073 *60	4.39	0.3037	16.828	21.218
Nickel	0.1	19.86 *60	1191.6	0.7152	39.630	1231.23
Lead	0.05	0.0977 *60	5.86	< 0.05	<2.77	8.63
Selenium	0.1	<0.1 *60	<6.00	< 0.1	<5.54	< 11.54
Zinc	0.01	7.988 *60	479.28	0.5324	29.61	508.89
Manganese	0.01	0.23 *60	13.8	0.06	3.32	17.12
Mercury	0.001	~~<0.00[illegible] *6~~	~~<0.006~~	~~<0.20~~	~~<0.1024~~	~~<0.1054~~
		0.001	3.0	0.0017	12.10	15.10
		Hg^{DF_1}		Hg^{DF_2}		

$F1 = 50 * \frac{300}{250} = 60$

$F2 = 50 * \frac{512}{462} = 55.41$

$Hg: DF_1 = 50 * \frac{50}{5} * \frac{300}{50} = 3.000$

$DF_2 = \left[50 * \frac{50}{5} * \frac{512}{50}\right] + \left[50 * \frac{200}{5}\right] = 5120 + 2000 = 7120$

110

TREE

METHOD: EPA 6010 WATER mg/L

SAMPLE NO.	Ag	As	Ba	Be	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Sb	Se	Tl	V	Zn
FILTER BK	<.0002	.0339	11.51	.0005	.0510	.0059	.3856	.0508	.0128	.0092	.3769	.0685	.0404	.0184	.0506	.0142	7.80
FIELD BK	<.0002	.0041	.0089	<.0004	.0023	<.0002	.0008	.0178	<.0010	<.0002	.0151	<.0020	<.0010	<.0020	.0096	<.0002	.137
METALS 1-IMP	<.0002	<.00224 .0156	.1250	<.0004	.0098	<.0002	.1115	.3037	.0019	.0027	.7152	<.0020	<.0010	.0106	.0202	<.0002	.534
METALS 2-IMP.	<.0002	<.00224 .0117	.1056	<.0004	.0061	<.0002	.0871	.0620	.0063	.0064	.1070	<.0020	<.0010	.0130	.0156	.0106	.259
METALS 3-IMP.	<.0002	.0351	.1133	<.0004	.0045	<.0002	.0090	.1219	.0072	.0093	.0484	.0555	.0060	.0262	.0453	.0095	.310
METALS FILTER 1-WASH	<.0002	.0395	8.759	<.0005	.0122	.0486	.0820	.0731	.0402	.0044	19.86	.0977	.0196	.0064	.0411	.0041	7.9
METALS FILTER 2-WASH	<.0003	.0516	13.30	<.0011	.0269	.0577	1.998	.4159	.0466	.0238	19.77	.2646	.0447	.0465	.1215	.0929	15.2
METALS FILTER 3-WASH	<.0002	.0357	9.636	<.0005	.0036	.0032	.3064	.0437	.0390	.0189	.4323	.0595	.0331	.0121	.0579	.0254	7.08
G42																	
Method BK	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
R (s)	110%	99	95	99	100	100	99	103	96	99	97	98	103	104	102	101	98
R (ds)	109	98	95	98	99	98	98	102	95	98	95	97	100	103	103	99	9
MDL		0.0224		0.0044	0.0202		0.0059	0.0043			0.0555	0.0445		0.0493			0.02
D/L		0.1	0.02	0.01													

Date: 9/15/90 Company: Shining Method: EPA 6010 WATER mg/L

110.

IPLE IO.	AL		Ca		Mg		Fe		Na		Mn		K		B		
ILTER																	
BK											0.06						
ILTER																	
BK											0.06						
sparger																	
bbl-1											0.06						
Impinger																	
bbl-2											1.74						
Impinger																	
bbl-3											2.10						
ilter	B-18																
Wash-	G43										0.23						
bbl 1																	
bbl 2											0.38						
bbl 3																	
											0.06						

Client: SHINING TREE (90-08-192)

ANALYSIS: CV. Hg • Water Samples

METHOD: EPA 7470

ELI NO.	SAMPLE ID.	LOCATION	UNITS: mg/L (ppm)
	Impinger-Hg 1 4,5	50 to 5/200	0.0140 ✓
	Impinger-Hg 2		0.0130
	Impinger-Hg 3		0.0150
	Impinger-Metals 1	50/512	0.0030 ✓
	Impinger-Metals 2		0.0020
	Impinger-Metals 3		0.0020
	Filter & Wash -1		0.0100 ✓
	Filter & Wash -2		0.0100
	Filter & Wash -3		0.0110
	Impinger-Hg 3 - (S)		116%
	Impinger-Hg 3 - (DS)		116%
	Method Blank		0.0006
	Detection Limit		

Did you remember to include QA data?, duplicate?, blank?, spike recovery? detection limits? Thank You!

NOTE: Values of results already multiplied by a factor of 10 ($DF = \frac{50}{5}$)

Analyst: Benjamin Hedges

Extraction Date: 8/28/90

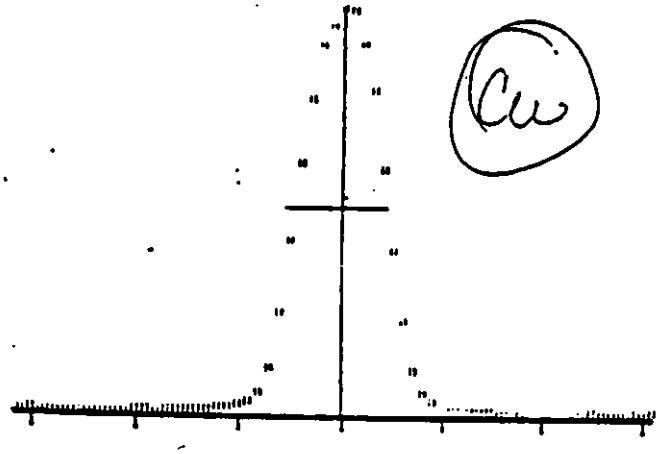
Date Reported: 9/19/90

B-19
G44

Calibration Data

9/12/90

PROFILE FOR PHYSICAL CHANNEL 13
12-SEP-90 07:07



Cu

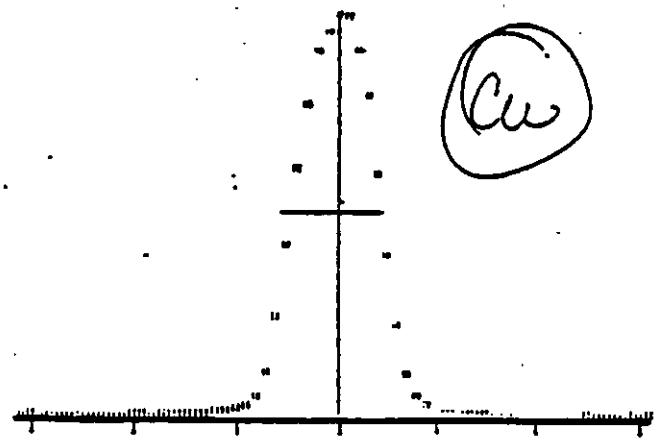
-30 -20 -10 0 +10 +20 +30

PEAK IS AT POSITION 0
PEAK HAS A WIDTH OF 10.4

MAX = 187 MIN = 16

9/12/90

PROFILE FOR PHYSICAL CHANNEL 13
12-SEP-90 07:07



-30 -20 -10 0 +10 +20 +30

PEAK IS AT POSITION 0
PEAK HAS A WIDTH OF 10.4

MAX = 137 MIN = 1

ACT NAME : M-21 TIME:12-SEP-90 08:44 STANDARD NAME : STD1

	I.S.	AG	AS	BA	BE	CD	CO	CR	CU	HG
EXP# 1	1000	.1430	.2840	.0130	.0200	.0610	.2950	.1510	.1410	.096
EXP# 2	1000	.1440	.2820	.0160	.0200	.0600	.2940	.1490	.1410	.100
AVERAGE	1000	.1435	.2830	.0180	.0200	.0605	.2945	.1500	.1410	.098

	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	.2440	.1380	.8830	.6950	.5430	.1260	.1290	.0500	1.524	.420
EXP# 2	.2440	.1380	.8800	.6950	.5270	.1210	.1310	.0500	1.532	.420
AVERAGE	.2440	.1380	.8815	.6950	.5350	.1235	.1300	.0500	1.528	.420

	CA	MG
EXP# 1	1.729	1.298
EXP# 2	1.731	1.300
AVERAGE	1.730	1.299

ACT NAME : M-21 TIME:12-SEP-90 08:56 STANDARD NAME : STD2

	I.S.	BA	CD	CO	CU	PB	ZN
EXP# 1	1000	12.37	19.67	29.76	25.42	14.37	12.27
EXP# 2	1000	12.39	19.88	29.96	25.48	14.46	12.40
AVERAGE	1000	12.38	19.77	29.86	25.45	14.41	12.34

ACT NAME : M-21 TIME:12-SEP-90 09:09 STANDARD NAME : STD3

	I.S.	BE	MO	NI	SE	TL
EXP# 1	1000	18.23	31.81	14.35	16.34	4.213
EXP# 2	1000	18.36	32.11	14.47	16.56	4.236
AVERAGE	1000	18.30	31.96	14.39	16.40	4.224

ACT NAME : M-21 TIME:12-SEP-90 09:03 STANDARD NAME : STD4

	I.S.	AS	CR	SE
EXP# 1	1000	6.604	13.00	11.05
EXP# 2	1000	6.648	13.10	11.22
AVERAGE	1000	6.626	13.05	11.14

ACT NAME : M-21 TIME:12-SEP-90 09:04 STANDARD NAME : STD5

	I.S.	HG	V
EXP# 1	1000	9.228	15.38
EXP# 2	1000	9.302	15.42
AVERAGE	1000	9.265	15.40

ACT NAME : M-21 TIME:12-SEP-90 09:07 STANDARD NAME : STD6

	I.S.	AG
EXP# 1	1000	14.19
EXP# 2	1000	14.36
AVERAGE	1000	14.27

ACT NAME : M-21 TIME:12-SEP-90 09:09 STANDARD NAME : STD7

	I.S.	AL	FE	CA	MG
EXP# 1	1000	23.92	19.65	11.55	18.69
EXP# 2	1000	24.04	19.76	11.61	18.80
AVERAGE	1000	23.98	19.71	11.58	18.75

ACT NAME : M-21 TIME : 12-SEP-90 09:15 SAMPLE NAME: CAL.CK-1 ICV
CAL.CK

	I.S.	AG	AS	BA	BE	CD	CO	CR	CU	HG
EXP# 1	1000	1.791	1.726	1.657	1.702	1.737	1.723	1.696	1.667	1.6
EXP# 2	1000	1.802	1.721	1.653	1.699	1.755	1.734	1.706	1.664	1.6
AVERAGE	1000	1.797	1.724	1.655	1.701	1.746	1.729	1.701	1.665	1.6

	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	1.474	1.646	1.696	1.733	1.775	1.687	1.719	1.648	1.832	1.6
EXP# 2	1.485	1.602	1.719	1.733	1.778	1.741	1.725	1.661	1.836	1.6
AVERAGE	1.480	1.624	1.708	1.733	1.776	1.714	1.722	1.654	1.834	1.6

	CA	MG
EXP# 1	1.180	1.678
EXP# 2	1.195	1.676
AVERAGE	1.188	1.677

ACT NAME : M-21 TIME : 12-SEP-90 09:19 SAMPLE NAME: CAL.CK-2 ICB
CAL.CK

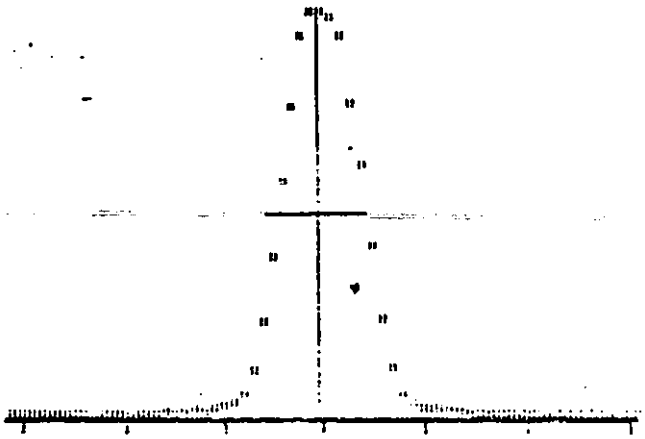
	I.S.	AG	AS	BA	BE	CD	CO	CR	CU	HG
EXP# 1	1000	.0011	<.0020	<.0004	<.0004	<.0002	<.0002	<.0004	<.0002	.00
EXP# 2	1000	.0039	<.0020	<.0004	<.0004	.0033	<.0002	<.0004	.0004	.00
AVERAGE	1000	.0025	<.0020	<.0004	<.0004	.0008	<.0002	<.0004	<.0002	.00

	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	.0013	.0049	<.0020	<.0010	<.0020	.0086	<.0002	<.0002	.0013	.00
EXP# 2	<.0002	.0021	<.0020	<.0010	<.0020	.0036	<.0002	<.0002	<.0000	.00
AVERAGE	.0003	.0035	<.0020	<.0010	<.0020	.0061	<.0002	<.0002	.0002	.00

	CA	MG
EXP# 1	<.0000	<.0000
EXP# 2	<.0000	<.0000
AVERAGE	<.0000	<.0000

9/15/90

PROFILE FOR PHYSICAL CHANNEL 13
15-SEP-90 08:56



-30 -20 -10 0 +10 +20 +30

PEAK IS AT POSITION -.1
PEAK HAS A WIDTH OF 10.6

MAX = 182 MIN = 16

ACT NAME : CAM TIME:15-SEP-90 09:48 STANDARD NAME : STD1

	I.S.	AG	AS	BA	BE	CD	CO	CR	CU	HG
EXP# 1	1000	.1510	.2760	.0170	.0200	.0570	.2970	.1570	.1460	.092(
EXP# 2	1000	.1510	.2720	.0160	.0200	.0570	.3040	.1580	.1470	.095(
AVERAGE	1000	.1510	.2740	.0165	.0200	.0570	.3005	.1575	.1465	.093!

	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	.2370	.1500	.8920	.[illegible]	.5210	.1260	.1360	.1030	1.362	.264(
EXP# 2	.2380	.1530	.8950	.[illegible]	.5340	.1300	.1370	.1030	1.381	.264(
AVERAGE	.2375	.1515	.8935	.[illegible]	.5275	.1280	.1365	.1030	1.372	.264!

	CA	MG	NA	MN
EXP# 1	.9800	1.176	1.087	.0360
EXP# 2	.9840	1.192	1.130	.0370
AVERAGE	.9820	1.184	1.109	.0365

ACT NAME : CAM TIME:15-SEP-90 09:51 STANDARD NAME : STD2

	I.S.	BA	CD	CO	CU	PB	ZN
EXP# 1	1000	10.62	18.84	27.10	21.88	13.42	11.30
EXP# 2	1000	10.68	18.97	27.32	22.09	13.52	11.40
AVERAGE	1000	10.65	18.91	27.21	21.99	13.47	11.35

ACT NAME : CAM TIME:15-SEP-90 09:54 STANDARD NAME : STD3

	I.S.	BE	MO	NI	SB	TL
EXP# 1	1000	15.63	28.35	13.11	16.17	3.805
EXP# 2	1000	15.76	28.56	13.24	16.34	3.987
AVERAGE	1000	15.70	28.41	13.19	16.31	3.896

ACT NAME : CAM TIME:15-SEP-90 09:57 STANDARD NAME : STD4

	I.S.	AS	CR	SE
EXP# 1	1000	5.822	11.9[illegible]	.[illegible]20
EXP# 2	1000	5.870	11.9[illegible]	9.[illegible]14
AVERAGE	1000	5.846	11.92	9.517

ACT NAME : CAM TIME:15-SEP-90 10:00 STANDARD NAME : STD5

	I.S.	HG	V
EXP# 1	1000	8.292	13.74
EXP# 2	1000	8.330	13.82
AVERAGE	1000	8.311	13.78

ACT NAME : CAM TIME:15-SEP-90 10:03 STANDARD NAME : STD6

	I.S.	AG
EXP# 1	1000	13.38
EXP# 2	1000	13.57
AVERAGE	1000	13.48

ACT NAME : CAM TIME:15-SEP-90 10:05 STANDARD NAME : STD7

	I.S.	AL	FE	CA	MG
EXP# 1	1000	21.83	17.57	11.18	16.64
EXP# 2	1000	21.89	17.61	11.22	16.64
AVERAGE	1000	21.86	17.59	11.20	16.64

ACT NAME : CAM TIME:15-SEP-90 10:08 STANDARD NAME : STD8

	I.S.	NA	MN
EXP# 1	1000	83.17	18.88
EXP# 2	1000	84.79	19.03
AVERAGE	1000	83.98	18.95

Conc 2.5
Na 12.5

Acceptance Range 2.25—2.75 ICV 1

ACT NAME : CAM TIME : 15-SEP-90 10:29 SAMPLE NAME: SAMPLE1
SAMPLE

Na 13.5—

	I.S.	AG	AS	BA	BE	CD	CO	CR	CU	HG
EXP# 1	1000	.0081	2.519	2.527	2.485	2.581	2.521	2.524	2.547	.0061
EXP# 2	1000	.0096	2.506	2.507	2.484	2.574	2.524	2.526	2.527	.0098
AVERAGE	1000	.0088	2.513	2.517	2.485	2.577	2.523	2.525	2.537	.0079

	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	2.499	2.493	2.534	2.614	2.607	2.514	.0083	2.545	.1159	.0092
EXP# 2	2.508	2.484	2.539	2.613	2.623	2.498	.0044	2.559	.1154	.0115
AVERAGE	2.503	2.489	2.536	2.614	2.615	2.506	.0039	2.552	.1157	.0104

	CA	MG	NA	MN
EXP# 1	.2144	.0233	.2597	.0008
EXP# 2	.2202	.0297	.2265	.0008
AVERAGE	.2173	.0265	.2431	.0008

All OK

ICV 2

ACT NAME : CAM TIME : 15-SEP-90 10:33 SAMPLE NAME: SAMPLE2
SAMPLE

	I.S.	AG	AS	BA	BE	CD	CO	CR	CU	HG
EXP# 1	1000	2.591	.0050	.0042	.0115	.0024	.0009	.0060	.0066	2.495
EXP# 2	1000	2.615	.0094	.0042	.0115	.0019	<.0000	.0052	.0057	2.526
AVERAGE	1000	2.603	.0072	.0042	.0115	.0021	.0002	.0056	.0062	2.511

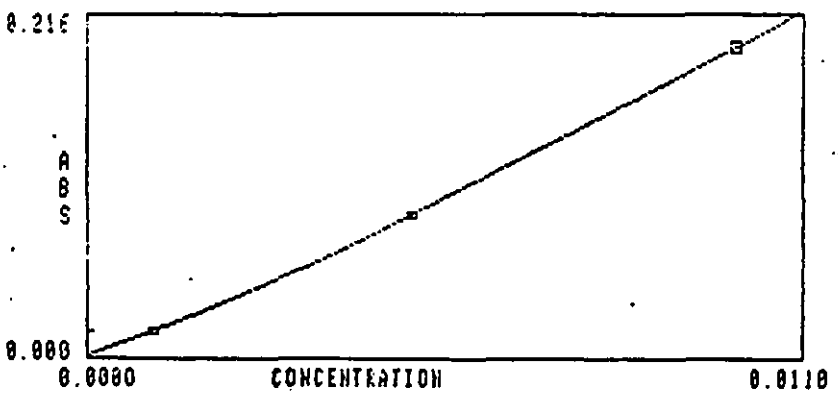
	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	.0028	.0012	.0076	.0048	.0230	.0232	2.478	<.0000	2.589	2.482
EXP# 2	.0028	.0035	<.0000	.0002	.0106	.0335	2.502	<.0000	2.631	2.[illegible]
AVERAGE	.0028	.0023	.0028	.0025	.0168	.0284	2.490	<.0000	2.610	2.[illegible]

Varian SpectrAA 30/40 System Report

OPERATOR BENJAMIN MENDOZA
DATE 9-18-90
BATCH

PROGRAM 2 Hg COLD VAPOR

SAMPLE	CONC	%RSD	MEAN ABS	READINGS		
BLANK	0.0000		-0.000	-0.001	-0.000	-0.000
STANDARD 1	0.0010	1.6	0.016	0.016	0.016	0.016
STANDARD 2	0.0050	0.2	0.091	0.091	0.091	0.091
STANDARD 3	0.0100	0.5	0.196	0.195	0.196	0.197



SAMPLE 1	BL	0.0005		7.5	0.008	0.009	0.008	0.007
SAMPLE 2	0.005	0.0050		0.3	0.092	0.092	0.092	0.092
SAMPLE 3	R	0.0060	120%	0.4	0.113	0.113	0.112	0.113
SAMPLE 4	R	0.0062		0.2	0.117	0.117	0.116	0.117
SAMPLE 4	R	0.0057	114%	0.1	0.107	0.107	0.107	0.107
SAMPLE 5	091-05	0.0047	94%	0.1	0.084	0.084	0.084	0.084
SAMPLE 6	091-05	0.0058	116%	0.1	0.109	0.109	0.109	0.109
SAMPLE 7	BL	0.0000		41.4	0.000	0.000	0.000	0.000
SAMPLE 8		OVER		0.0	0.485	0.484	0.485	0.485
SAMPLE 9	091-04	0.0001	D.000	61.5	0.001	0.002	0.001	0.001
SAMPLE 10		0.0055		0.8	0.101	0.100	0.102	0.102
SAMPLE 11	R2-dup	0.0058	116%	0.3	0.109	0.109	0.109	0.109
SAMPLE 12		0.0061		0.1	0.115	0.116	0.116	0.116
SAMPLE 12	R2-dup	0.0058	116%	0.7	0.108	0.109	0.108	0.108
SAMPLE 13	BL	-.0001		18.3	-0.002	-0.002	-0.002	-0.002
SAMPLE 14	0.005	0.0047		0.3	0.086	0.085	0.086	0.086

DF = 1.25

RUN #2

Metals - August 15, 1990

Calculation Data

Sample I.D.: California Commercial Asphalt Plant EPA Multimetal 2 (Draft Met

Section I: Particulate Sampling Data

Point #	Delta P	Delta H	T S	T i	T in	T out	VAC	Filter Temp.	VEL (FPS)
A-12	0.50	0.82	266	64	69	67	3.0	223	48.4
A-11	0.57	0.98	269	60	71	67	3.0	250	51.8
A-10	0.62	1.10	272	59	73	68	4.0	256	54.1
A-9	0.70	1.15	276	60	75	69	4.0	265	57.7
A-8	0.75	1.25	278	61	77	69	4.0	263	59.8
A-7	0.82	1.35	282	62	79	70	4.0	256	62.7
A-6	0.63	1.10	283	63	79	70	3.5	260	55.0
A-5	0.50	0.82	285	65	81	72	3.0	259	49.0
A-4	0.42	0.67	286	65	82	72	3.0	259	45.0
A-3	0.35	0.58	285	66	83	73	2.5	253	41.0
A-2	0.32	0.50	282	66	83	74	2.0	260	39.1
A-1	0.25	0.41	282	66	83	74	2.0	264	34.6
B-12	0.42	0.66	283	66	79	75	2.5	252	44.9
B-11	0.50	0.82	289	64	80	75	3.0	245	49.2
B-10	0.55	0.90	289	64	82	76	3.0	251	51.6
B-9	0.58	0.95	290	65	84	77	3.5	242	53.0
B-8	0.68	1.10	289	65	84	77	3.5	251	57.3
B-7	0.70	1.15	280	65	82	77	4.0	250	57.8
B-6	0.52	0.85	293	65	83	78	3.0	248	50.3
B-5	0.45	0.72	283	66	84	78	3.0	244	46.5
B-4	0.35	0.58	283	67	85	79	3.0	240	41.0
B-3	0.30	0.49	283	67	86	79	2.5	232	37.9
B-2	0.25	0.42	281	67	86	80	2.0	235	34.6
B-1	0.20	0.33	281	68	86	79	2.0	242	30.9
AVG	0.50	0.82	282	64	81	74	3.0	250	48.0

NOMENCLATURE

Delta P = Stack gas velocity head at each sample point (in. H2O)

Delta H = Pressure differentital across orifice meter (in. H2O)

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condensor (oF)

Tin = Dry gas meter inlet temperature

Tout = Dry gas meter outlet temperature

Vac = Sample pump vacuum (in. Hg)

Filter Temp. = Temperature of front-end filter enclosure (oF)

VEL (FPS) = Actual stack velocity at each sample point

C.C. Metal 2

FIELD DATA SHEET

VOLUME OF CONDENSED MOISTURE

Impinger #	Gross	Tare	Net
1	182 ml	0 ml	182 ml
2 & 3	208 ml	200 ml	8 ml
4 & 5	200 ml	200 ml	0 ml
6	211 gram	200 gram	11 gram
	TOTAL CONDENSED MOISTURE		201 ml

STACK GAS MOLECULAR WEIGHT

PERCENT CARBON DIOXIDE	=	6.00
PERCENT OXYGEN	=	15.00
PERCENT CARBON MONOXIDE	=	0.00
PERCENT NITROGEN & INERTS	=	79.00

COMPONENT	VOLUME%	• MOISTURE CORR	• MOLWT =	MASS FRACTION
WATER	20.86	1.00	18.00	3.76
CARBON DIOXIDE	6.00	0.79	44.00	2.09
OXYGEN	15.00	0.79	32.00	3.80
CARBON MONOXIDE	0.00	0.79	28.00	0.00
NITROGEN & INERTS	79.00	0.79	28.00	17.51
		AVERAGE MOLECULAR WEIGHT	=	27.15

C.C. Metal 2

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	917.496 CFT
Dry gas meter, final reading	=	953.710 CFT
Dry gas meter calibration factor	=	1.000
Meter volume uncorrected for Temp & Press	=	36.214 CFT
Barometric pressure at site	=	29.95 in Hg
Meter pressure (barometer + average delta H)	=	30.17 in Hg
Average meter temperature during test	=	77.3 DEG F
Dry sample volume at standard conditions	=	35.345 CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	282.1 DEG F
Volume of condensed water	=	201 ml
Percent moisture of stack gas	=	20.86 %
Pitot tube correction factor	=	0.85
Stack gas molecular weight	=	27.11
Stack gas velocity at stack conditions	=	48.05 FT/SEC
Duration of sampling	=	72 Minute
Nozzle diameter	=	0.233 in
Percent isokinetic variation	=	102.8 %
Area of stack	=	20.97 SQ FEET
Stack flow rate, standard conditions	=	33802 DSCFM

C.C. Metal 2

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	917.496	CFT
Dry gas meter, final reading	=	953.710	CFT
Dry gas meter calibration factor	=	1.000	
Meter volume uncorrected for Temp & Press	=	36.214	CFT
Barometric pressure at site	=	29.95	in Hg
Meter pressure (barometer + average delta H)	=	30.17	in Hg
Average meter temperature during test	=	77.3	DEG F
Dry sample volume at standard conditions	=	35.345	CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	282.1	DEG F
Volume of condensed water	=	201	ml
Percent moisture of stack gas	=	20.86	%
Pitot tube correction factor	=	0.85	
Stack gas molecular weight	=	27.11	
Stack gas velocity at stack conditions	=	48.05	FT/SEC
Duration of sampling	=	72	Minute
Nozzle diameter	=	0.233	in
Percent isokinetic variation	=	102.8	%
Area of stack	=	20.97	SQ FEET
Stack flow rate, standard conditions	=	33802	DSCFM

SECTION IV SUMMARY OF QUANTITATIVE ANALYSIS
EMISSION RATE OF TRACE METALS

Compound		Mass (ug)		Emission rate (10-3 lb/hr)
Arsenic	<	11.44	<	1.44
Beryllium	<	1.14	<	0.14
Cadmium	<	2.29	<	0.29
Copper		28.33		3.58
Mercury		15.18		1.92
Nickel		1192.03		150.45
Lead		18.60		2.35
Selenium	<	11.44	<	1.44
Zinc		927.32		117.04
Manganese		117.54		14.84

Field Data

ENVIRONMENTAL LABORATORIES, INC.

Corporate Office
6790 FLORIN PERKINS ROAD
SACRAMENTO, CA 95828
TEL: (916) 381-7953
FAX (916) 381-4013

Branch Office
12121 NORTHUP WAY, SUITE 212
BELLEVUE WA 98005
TEL: (206) 885-0284
FAX (206) 885-6162

Chemical Analysis
Research & Testing
Environmental Studies
Hazardous
Toxicology

6:00 A.M. O_2 15.75
CO_2 5.5

P= 29.95 in Hg

FIELD TEST DATA FORM

Site: C.C. San Diego Asphalt Hot plant Date: 8/15/90 Test No. #2 Metals

Nozzle I.D. E1 Diameter 0.233 Filter No. #3

LEAK CHECKS: Pitot tubes -- Initial Y O.K. (U: D:) Final _____

Sample train -- Initial Y O.K. Final .005 (Final) .005 at Vac 10 for 1 minutes

Initial Reading 917.496 917.316 917.495

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
5:50	SE-12	.50	.82	266	64	69	67	3	223
A.M.								919.850	
5:53	11	.57	.98	269	60	71	67	3	250
								920.495	
5:56	10	.62	1.10	272	59	73	68	4	256
								922.235	
5:59	9	.70	1.15	276	60	75	69	4	265
								924.15	
6:02	8	.75	1.25	275	61	77	69	4	263
								925.985	
6:05	7	.82	1.35	282	62	79	70	4	256
								927.785	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
6:08	6	.63	1.10	283	63	79	70	3.5	260
								929.525	
6:11	5	.50	.82	285	65	81	72	3	259
								931.45	
6:14	4	.42	.67	286	65	82	72	3	259
								933.433	
6:17	3	.35	.58	285	66	83	73	2.5	253
								933.865	
6:20	2	.32	.50	282	66	83	74	.12	260
								934.985	
6:23	1	.25	.41	282	66	83	74	2	264
	✓				B-37	G62		936.127	

EUREKA LABORATORIES, INC.

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Air Pollution
Chemical Analysis
Research & Testing
Environmental Studies
Robotics
Toxicology

FIELD TEST DATA FORM

after leak check at 6:30

Site: C.C. San Diego Asphalt Hot plant Date: 8/15/90 Test No. #2 Metal.

Nozzle I.D. E1 Diameter .233 Filter No. #3

LEAK CHECKS: Pitot tubes -- Initial Y o.k. Final Y O.K

Initial 936.197 Sample train -- Initial Y o.k. Final ____

.005 in 1 min at 10 in. Hg

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
6:35	NW 12	.42	.66	293	66	79	75	2.5	252
								937.525	
6:38	11	.50	.82	289	64	80	75	3	245
								939.075	
6:41	10	.55	.90	289	64	82	76	3	251
								940.785	
6:44	9	.58	.95	290	65	84	77	3.5	242
								942.335	
6:47	8	.68	1.10	289	65	84	77	3.5	251
								943.110	
6:50	7	.70	1.15	280	65	82	77	4	250
								945.920	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
6:55	6	.52	.85	293	65	83	78	3	248
								947.535	
6:58	5	.45	.72	283	66	84	78	3	244
								949.000	
7:01	4	.35	.58	283	67	85	79	3	240
								950.315	
7:04	13	.30	.49	283	67	86	79	2.5	232
								951.535	
7:07	12	.25	.42	281	67	86	80	.2	235
								952.750	
7:10	1	.20	.33	281	66	86	79	2	242
					B-38	G83		953.710	

Date/Time 8/15 190 | Barometric Pressure (in. Hg.) 29.95

Test Location _____ | Static Pressure (in. wg.) .1

Run Number #2 Metal | Probe Type/Length 6'

Stack Diameter 5' 2" | Pitot Coefficient .85

Operator Shar-P- | Meter Box No./Y _____

Filter No. #3 | Nozzle No./Size (in.) .233

Filter Temp (°F) _____ | Probe Heater Setting (%) _____

Impinger Volumes/Weights				Gas Composition %			
Contents	Final	Initial	Net	Time	CO_2	O_2	CO
Impinger 1	182	0	182	6:20	5.5	14.5	
Impinger 2+3	208	200	8	7:10	6	13.75	
Silica gel	210.8	200	10.8	8:00	5.5	15.75	
S.G.				Leak Rate		cfm	"Hg
		Total	200.8				
Filter	Final	Initial	Net	Initial			
Weight				Final			

Ambient O_2 20.5

Sample Point	Sampling Time (min.)	ΔP (in wg)	ΔH (in wg)	Gas Meter Volume (Ft^3)	Temperature (°F) Stack	Imp.	Gas Meter In	Gas Meter Out	Pump Vacuum (in Hg)	$\sqrt{\Delta P}$
	Total		Avg.	Total	Avg.	Avg.	Avg.		Avg.	Avg.

Analytical Data

METALS
EPA MULTIMETAL METHOD

CLIENT :
PROJECT: cc Asphalt Plant 90-08-192
SAMPLING DATE:
SAMPLE I.D.: Train 2

COMPOUND	D/L ppm	Filter+Rinse F1	µg	Impinger+Rinse F2	µg	Total
Arsenic	0.1	< 0.1	< 6	< 0.1	< 5.44	< 11.44
Beryllium	0.01	< 0.01	< 0.6	< 0.01	< 0.54	< 1.14
Cadmium	0.02	< 0.02	< 1.2	< 0.02	< 1.09	< 2.29
Chromium	0.02	1.498	119.88	0.0871	4.74	124.62
Copper	0.01	0.4159	24.95	0.0620	3.38	28.33
Nickel	0.1	19.77	1186.2	0.1070	5.83	1192.03
Lead	0.05	0.2646	15.876	< 0.05	< 2.72	18.
Selenium	0.1	< 0.1	< 6	< 0.1	< 5.44	< 11.4
Zinc	0.01	15.22	913.2	0.2594	14.12	927.32
Manganese	0.01	0.38	22.8	1.74	94.74	117.54
Mercury	0.001	~~< 0.001 × 6~~	~~< 0.006~~	~~< 0.001 × 10~~	~~< 0.1224~~	~~< 0.1284~~
		0.001 × 3.0		0.0015	12.18	15.18

$F1 = 50 * \frac{300}{250} = 60$

$F2 = 50 * \frac{612}{562} =$

$Hg \begin{cases} DF_1 = 50 * \frac{300}{5} = 3000 \\ DF_2 = \left(50 * \frac{612}{5}\right) + \left(50 * \frac{200}{5}\right) = 8120 \end{cases}$

TREE

Method: EPA 6010 WATER mg/L

E R	Ag	As	Ba	Be	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Sb	Se	Tl	V	Zn
	<.0002	.0339	11.51	.0005	.0510	.0059	.3856	.0508	.0128	.0092	.3769	.0685	.0404	.0184	.0506	.0142	7.506
D	<.0002	.0041	.0089	<.0004	.0023	<.0002	.0008	.0178	<.0010	<.0002	.0151	<.002c	<.001c	<.002c	.0096	<.000:	.1375
IS P	<.0002	<0.0024 .0156	.1250	<.0004	.0098	<.0002	.1115	.3037	.0019	.0027	.7152	<.002c	<.0010	.0106	.0202	<.000:	.5344
IS P.	<.0002	<0.0024 .0117	.1056	<.0004	.0061	<.0002	.0871	.0620	.0063	.0064	.1070	<.002c	<.0010	.0130	.0156	.0106	.2594
IS P.	<.0002	.0351	.1133	<.0004	.0045	<.0002	.0090	.1219	.0072	.0093	.0484	.0555	.0060	.0262	.0453	.0045	.3105
IS SH	<.0002	.0395	8.759	<.0005	.0122	.0486	.0820	.0731	.0402	.0014	19.86	.0977	.0196	.0064	.0411	.0041	7.988
IS SH	<.0003	.0516	13.30	<.0011	.0269	.0577	1.998	.4159	.0466	.0238	19.77	.2046	.0447	.0465	.1215	.0929	15.22
IS SH	<.0002	.0357	9.636	<.0005	.0036	.0032	.3064	.0437	.0390	.0189	.4323	.0595	.0331	.0121	.0579	.0254	7.055
	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
s)	110%	99	95	99	100	100	99	103	96	99	97	98	103	104	102	101	98
ds)	109	98	95	98	99	98	98	.102	95	98	95	97	100	103	103	99	97
		0.0224		0.0044	0.0202		0.0059	0.0043			0.0255	0.0445		0.0493			0.0206
	0.0	0.1	0.02	0.01	0.02	0.02	0.02	0.01	0.05	0.02	0.1	0.05	0.05	0.1	0.1	0.01	0.02

B-42

G67

Date: 9/15/90 Company: Shining Tree Method: EPA 6010 WATER mg/L

	AL		Ca		Mg		Fe		Na		Mn		K		B		
12																	
											0.06						
D																	
											0.06						
gw																	
1											0.06						
-2											1.74						
3											2.10						
											0.23						
12																	
											0.35						
13																	
											0.06						

B+43

G68

Client: SHILING TREE (90-08-192)

ANALYSIS: CV. Hg - Water Sample

METHOD: EPA 7470

ELI NO.	SAMPLE ID.	LOCATION	UNITS: mg/L (ppm)
	Impinger-Hg 1 4.5	~~50~~ 50 or 5/50	0.0140 ✓
	Impinger-Hg 2		0.0130
	Impinger-Hg 3		0.0150
	Impinger-Metals 1	50/512	0.0030 ✓
	Impinger-Metals 2		0.0020
	Impinger-Metals 3		0.0020
	Filter & Wash -1		0.0100 ✓
	Filter & Wash -2		0.0100
	Filter & Wash -3		0.0110
	Impinger-Hg 3 - (S)		116%
	Impinger-Hg 3 - (DS)		116%
	Method Blank		0.0006
	Detection Limit		

Did you remember to include QA data?, duplicate?, blank?, spike recovery?, detection limits? Thank You!

NOTE: Values of results already multiplied by a factor of 10 (DF: $\frac{50}{5}$)

Analyst: Benjamin Trefoy

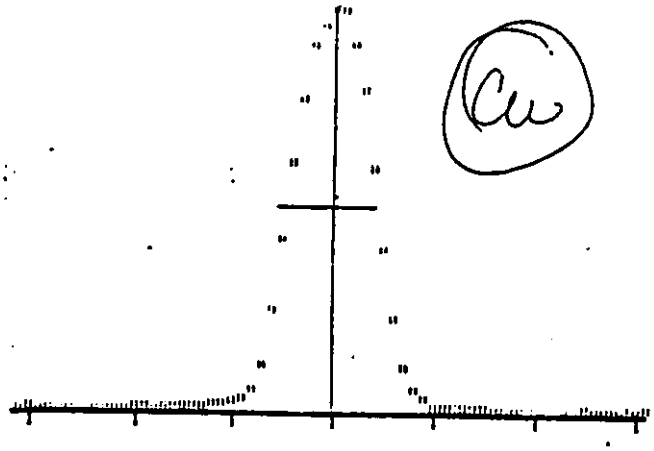
Extraction Date: 8/28/90

Date Reported: 9/19/90

Calibration Data

9/12/90

PROFILE FOR PHYSICAL CHANNEL 13
12-SEP-90 07:07



-30 -20 -10 0 +10 +20 +30

PEAK IS AT POSITION 0
PEAK HAS A WIDTH OF 10.4

MAX = 187 MIN = 15

ACT NAME : M-21 TIME:12-SEP-90 08:54 STANDARD NAME : STD1

	I.S.	AG	AS	BA	BE	CD	CO	CR	CU	HG
EXP# 1	1000	.1430	.2840	.0190	.0200	.0610	.2950	.1510	.1410	.096
EXP# 2	1000	.1440	.2820	.0180	.0200	.0600	.2940	.1490	.1410	.100
AVERAGE	1000	.1435	.2830	.0180	.0200	.0605	.2945	.1500	.1410	.098

	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	.2440	.1380	.8830	.6950	.5430	.1260	.1290	.0500	1.524	.420
EXP# 2	.2440	.1390	.8800	.6950	.5370	.1210	.1310	.0500	1.532	.420
AVERAGE	.2440	.1380	.8815	.6950	.5350	.1235	.1300	.0500	1.528	.420

	CA	MG
EXP# 1	1.729	1.298
EXP# 2	1.731	1.300
AVERAGE	1.730	1.299

ACT NAME : M-21 TIME:12-SEP-90 08:56 STANDARD NAME : STD2

	I.S.	BA	CD	CO	CU	PB	ZN
EXP# 1	1000	12.37	19.67	29.76	25.42	14.37	12.27
EXP# 2	1000	12.39	19.88	29.96	25.48	14.46	12.40
AVERAGE	1000	12.38	19.77	29.86	25.45	14.41	12.34

ACT NAME : M-21 TIME:12-SEP-90 08:59 STANDARD NAME : STD3

	I.S.	BE	MO	NI	SB	TL
EXP# 1	1000	18.23	31.81	14.35	19.34	4.217
EXP# 2	1000	18.36	32.11	14.42	18.56	4.230
AVERAGE	1000	18.30	31.96	14.39	18.40	4.224

ACT NAME : M-21 TIME:12-SEP-90 09:03 STANDARD NAME : STD4

	I.S.	AS	CR	SE
EXP# 1	1000	6.604	13.00	11.05
EXP# 2	1000	6.648	13.10	11.22
AVERAGE	1000	6.626	13.05	11.14

ACT NAME : M-21 TIME:12-SEP-90 09:04 STANDARD NAME : STD5

	I.S.	HG	V
EXP# 1	1000	9.228	15.38
EXP# 2	1000	9.302	15.42
AVERAGE	1000	9.265	15.40

ACT NAME : M-21 TIME:12-SEP-90 09:07 STANDARD NAME : STD6

	I.S.	AG
EXP# 1	1000	14.19
EXP# 2	1000	14.36
AVERAGE	1000	14.27

ACT NAME : M-21 TIME:12-SEP-90 09:09 STANDARD NAME : STD7

	I.S.	AL	FE	CA	MG
EXP# 1	1000	23.92	19.65	11.55	18.69
EXP# 2	1000	24.04	19.76	11.61	18.80
AVERAGE	1000	23.98	19.71	11.58	18.75

ACT NAME : M-21 TIME : 12-SEP-90 09:15 SAMPLE NAME: CAL.CK-1 ICV
CAL.CK

	I.S.	AG	AS	BA	BE	CD	CO	CR	CU	HG
EXP# 1	1000	1.791	1.726	1.657	1.702	1.737	1.723	1.696	1.667	1.67
EXP# 2	1000	1.802	1.721	1.653	1.699	1.755	1.734	1.706	1.664	1.67
AVERAGE	1000	1.797	1.724	1.655	1.701	1.746	1.729	1.701	1.665	1.67

	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	1.474	1.646	1.696	1.733	1.775	1.687	1.719	1.648	1.832	1.69
EXP# 2	1.485	1.602	1.719	1.732	1.773	1.741	1.725	1.661	1.836	1.69
AVERAGE	1.480	1.624	1.708	1.733	1.774	1.714	1.722	1.654	1.834	1.69

	CA	MG
EXP# 1	1.180	1.678
EXP# 2	1.195	1.676
AVERAGE	1.188	1.677

ACT NAME : M-21 TIME : 12-SEP-90 09:19 SAMPLE NAME: CAL.CK-1 ICB
CAL.CK

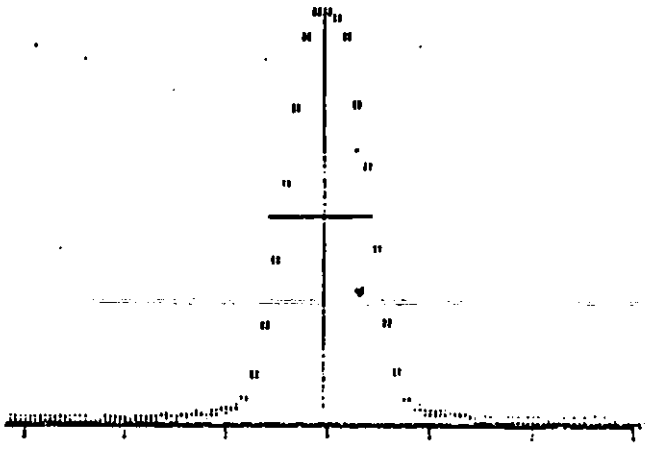
	I.S.	AG	AS	BA	BE	CD	CO	CR	CU	HG
EXP# 1	1000	.0011	<.0020	<.0004	<.0004	<.0002	<.0002	<.0004	<.0002	.005
EXP# 2	1000	.0039	<.0020	<.0004	<.0004	.0033	<.0002	<.0004	.0004	.002
AVERAGE	1000	.0025	<.0020	<.0004	<.0004	.0008	<.0002	<.0004	<.0002	.003

	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	.0013	.0049	<.0020	<.0010	<.0020	.0086	<.0002	<.0003	.0013	.001
EXP# 2	<.0002	.0021	<.0020	<.0010	<.0020	.0036	<.0002	<.0002	<.0000	.002
AVERAGE	.0003	.0035	<.0020	<.0010	<.0020	.0061	<.0002	<.0002	.0002	.001

	CA	MG
EXP# 1	<.0000	<.0000
EXP# 2	<.0000	<.0000
AVERAGE	<.0000	<.0000

9/15/90

PROFILE FOR PHYSICAL CHANNEL 13
15-SEP-90 08:56



-30 -20 -10 0 +10 +20 +30

PEAK IS AT POSITION -.1
PEAK HAS A WIDTH OF 10.6

MAX = 182 MIN = 16

ACT NAME : CAM TIME:15-SEP-90 09:48 STANDARD NAME : STD1

	I.S.	AG	AS	FE	FE	CD	CO	CR	CU	HG
EXP# 1	1000	.1510	.2760	.0170	.0200	.0570	.2970	.1570	.1460	.0920
EXP# 2	1000	.1510	.2720	.0160	.0200	.0570	.3040	.1580	.1470	.0950
AVERAGE	1000	.1510	.2740	.0165	.0200	.0570	.3005	.1575	.1465	.0935

	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	.2370	.1500	.8920	.0890	.5310	.1260	.1360	.1030	1.362	.2640
EXP# 2	.2380	.1530	.8950	.0940	.5460	.1300	.1370	.1030	1.381	.2640
AVERAGE	.2375	.1515	.8935	.0915	.5385	.1280	.1365	.1030	1.372	.2640

	CA	MG	NA	MN
EXP# 1	.9800	1.176	1.087	.0360
EXP# 2	.9840	1.192	1.130	.0370
AVERAGE	.9820	1.184	1.109	.0365

ACT NAME : CAM TIME:15-SEP-90 09:51 STANDARD NAME : STD2

	I.S.	BA	CD	CO	CU	PB	ZN
EXP# 1	1000	10.62	18.84	27.10	21.88	13.42	11.30
EXP# 2	1000	10.68	18.97	27.32	22.09	13.52	11.40
AVERAGE	1000	10.65	18.91	27.21	21.99	13.47	11.35

ACT NAME : CAM TIME:15-SEP-90 09:54 STANDARD NAME : STD3

	I.S.	BE	MO	NI	SB	TL
EXP# 1	1000	15.48	28.25	13.11	16.17	3.805
EXP# 2	1000	15.78	28.57	13.17	16.45	3.987
AVERAGE	1000	15.70	28.41	13.14	16.31	3.896

ACT NAME : CAM TIME:15-SEP-90 09:57 STANDARD NAME : STD4

	I.S.	AS	CR	SE
EXP# 1	1000	5.822	11.91	9.410
EXP# 2	1000	5.870	11.95	9.614
AVERAGE	1000	5.846	11.93	9.512

ACT NAME : CAM TIME:15-SEP-90 10:00 STANDARD NAME : STD5

	I.S.	HG	V
EXP# 1	1000	8.292	13.74
EXP# 2	1000	8.330	13.82
AVERAGE	1000	8.311	13.78

ACT NAME : CAM TIME:15-SEP-90 10:03 STANDARD NAME : STD6

	I.S.	AG
EXP# 1	1000	13.38
EXP# 2	1000	13.57
AVERAGE	1000	13.48

ACT NAME : CAM TIME:15-SEP-90 10:05 STANDARD NAME : STD7

	I.S.	AL	FE	CA	MG
EXP# 1	1000	21.83	17.57	11.18	16.64
EXP# 2	1000	21.89	17.61	11.23	16.64
AVERAGE	1000	21.86	17.59	11.20	16.64

ACT NAME : CAM TIME:15-SEP-90 10:08 STANDARD NAME : STD8

	I.S.	NA	MN
EXP# 1	1000	83.17	18.88
EXP# 2	1000	84.79	19.03
AVERAGE	1000	83.98	18.95

Conc 2.5
Na 12.5

Acceptance Range 2.25—2.75 ICV 1

ACT NAME : CAM TIME : 15-SEP-90 10:29 SAMPLE NAME: SAMPLE1
SAMPLE

Na 13.5 —

	I.S.	AG	AS	BA	BE	CD	CO	CR	CU	HG
EXP# 1	1000	.0081	2.519	2.527	2.485	2.581	2.521	2.524	2.547	.0061
EXP# 2	1000	.0096	2.506	2.507	2.484	2.574	2.524	2.526	2.527	.0098
AVERAGE	1000	.0088	2.513	2.517	2.485	2.577	2.523	2.525	2.537	.0079

	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	2.499	2.493	2.534	2.611	2.607	2.514	.0032	2.545	.1159	.0092
EXP# 2	2.508	2.484	2.539	2.613	2.623	2.478	.0046	2.559	.1154	.0115
AVERAGE	2.503	2.489	2.536	2.614	2.615	2.506	.0039	2.552	.1157	.0104

All OK

	CA	MG	NA	MN
EXP# 1	.2144	.0233	.2597	.0008
EXP# 2	.2202	.0297	.2265	.0009
AVERAGE	.2173	.0265	.2431	.0008

ICV 2

ACT NAME : CAM TIME : 15-SEP-90 10:33 SAMPLE NAME: SAMPLE2
SAMPLE

	I.S.	AG	AS	BA	BE	CD	CO	CR	CU	HG
EXP# 1	1000	2.591	.0050	.0042	.0115	.0024	.0009	.0060	.0066	2.495
EXP# 2	1000	2.615	.0094	.0042	.0115	.0019	<.0000	.0052	.0057	2.526
AVERAGE	1000	2.603	.0072	.0042	.0115	.0021	.0002	.0056	.0062	2.511

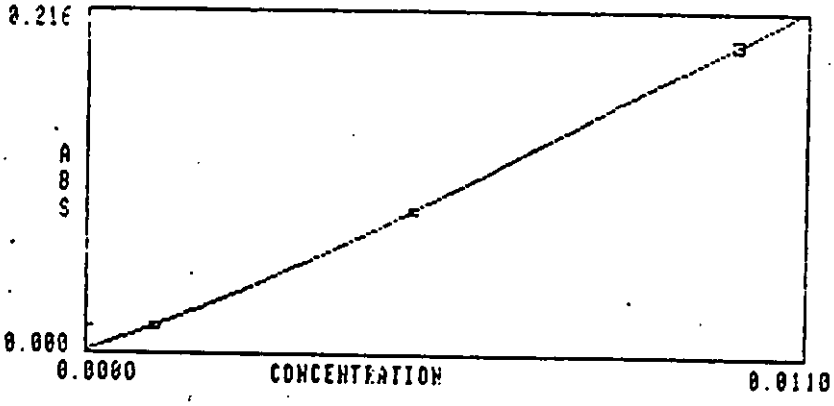
	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	.0028	.0012	.0076	.0048	.0230	.0232	2.478	<.0000	2.589	2.482
EXP# 2	.0028	.0035	<.0000	.0002	.0106	.0335	2.502	<.0000	2.631	2.519
AVERAGE	.0028	.0023	.0028	.0025	.0168	.0284	2.490	<.0000	2.610	2.501

Varian SpectrAA 30/40 System Report

OPERATOR BENJAMIN MENDOZA
DATE 9-18-90
BATCH

PROGRAM 2 Hg COLD VAPOR

SAMPLE	CONC	%RSD	MEAN ABS	READINGS		
BLANK	0.0000		-0.000	-0.001	-0.000	-0.000
STANDARD 1	0.0010	1.6	0.016	0.016	0.016	0.016
STANDARD 2	0.0050	0.2	0.091	0.091	0.091	0.091
STANDARD 3	0.0100	0.5	0.196	0.195	0.196	0.197



SAMPLE 1 BL	0.0005		7.5	0.008	0.009	0.008	0.007
SAMPLE 2 0.005 QC	0.0050		0.3	0.092	0.092	0.092	0.092
SAMPLE 3 RQ	0.0060	120%	0.4	0.113	0.113	0.112	0.113
SAMPLE 4 RQ	0.0062		0.2	0.117	0.117	0.116	0.117
SAMPLE 4 RQ	0.0057	114%	0.1	0.107	0.107	0.107	0.107
SAMPLE 5 091-00	0.0047	94%	0.1	0.084	0.084	0.084	0.084
SAMPLE 6 091-00	0.0058	116%	0.1	0.109	0.109	0.109	0.109
SAMPLE 7 BL	0.0000		41.4	0.000	0.000	0.000	0.000
SAMPLE 8	OVER		0.0	0.485	0.484	0.485	0.485
SAMPLE 9 091-00	0.0001	D.000	61.5	0.001	0.002	0.001	0.001
SAMPLE 10	0.0055		0.8	0.101	0.100	0.102	0.102
SAMPLE 11 RQ-dup	0.0058	116%	0.3	0.109	0.109	0.109	0.109
SAMPLE 12	0.0061		0.1	0.115	0.115	0.116	0.116
SAMPLE 12 RQ-dup	0.0058	116%	0.7	0.108	0.109	0.108	0.108
SAMPLE 13 BL	-.0001		18.3	-0.002	-0.002	-0.002	-0.002
SAMPLE 14 0.005 QC	0.0047		0.3	0.086	0.085	0.086	0.086

DF=1.25

RUN #3

Metals - August 16, 1990

Calculation Data

C. C. Metal 3

Sample I.D.: California Commercial Asphalt Plant EPA Multimetal 3 (Draft Met

Section I: Particulate Sampling Data

Point #	Delta P	Delta H	T S	T i	T in	T out	VAC	Filter Temp.	VEL (FPS)
A-12	0.42	0.70	250	65	68	66	3	250	43.8
A-11	0.55	0.90	258	64	70	66	4	257	50.4
A-10	0.65	1.05	258	62	72	66	4	260	54.8
A-9	0.70	1.15	263	61	74	67	4	260	57.1
A-8	0.75	1.25	268	60	76	68	5	270	59.3
A-7	0.85	1.40	269	60	78	69	5	274	63.2
A-6	0.65	1.05	271	60	80	70	4	259	55.3
A-5	0.55	0.90	273	60	80	70	4	256	51.0
A-4	0.45	0.72	274	61	81	71	3	288	46.1
A-3	0.45	0.72	275	61	81	71	3	280	46.2
A-2	0.35	0.58	271	62	82	73	3	260	40.6
A-1	0.30	0.49	271	62	82	73	3	237	37.6
B-12	0.45	0.74	282	62	81	74	3	267	46.4
B-11	0.50	0.82	288	60	82	75	4	275	49.1
B-10	0.60	0.99	289	60	83	75	4	264	53.8
B-9	0.65	1.10	290	60	83	76	4	280	56.0
B-8	0.70	1.15	291	61	84	76	4	290	58.2
B-7	0.75	1.25	291	61	85	77	5	268	60.2
B-6	0.62	1.05	290	63	86	77	4	244	54.7
B-5	0.50	0.82	290	64	86	78	4	238	49.2
B-4	0.45	0.74	290	65	87	79	4	276	46.6
B-3	0.35	0.58	289	66	88	79	3	273	41.1
B-2	0.30	0.48	285	66	88	80	3	257	37.9
B-1	0.25	0.41	280	67	88	80	4	235	34.5
AVG	0.53	0.88	277	62	81	73	3.8	263	49.7

NOMENCLATURE

Delta P = Stack gas velocity head at each sample point (in. H2O)

Delta H = Pressure differentital across orifice meter (in. H2O)

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condensor (oF)

Tin = Dry gas meter inlet temperature

Tout = Dry gas meter outlet temperature

Vac = Sample pump vacuum (in. Hg)

Filter Temp. = Temperature of front-end filter enclosure (oF)

VEL (FPS) = Actual stack velocity at each sample point

C. C. Metal 3

FIELD DATA SHEET

VOLUME OF CONDENSED MOISTURE

Impinger #	Gross	Tare	Net
1	174 ml	0 ml	174 ml
2 & 3	210 ml	200 ml	10 ml
4 & 5	200 ml	200 ml	0 ml
6	210 gram	200 gram	10 gram
	TOTAL CONDENSED MOISTURE		194 ml

STACK GAS MOLECULAR WEIGHT

PERCENT CARBON DIOXIDE	=	5.00
PERCENT OXYGEN	=	15.00
PERCENT CARBON MONOXIDE	=	0.00
PERCENT NITROGEN & INERTS	=	80.00

Component	VOLUME%	* MOISTURE CORR	* MOLWT =	MASS FRACTION
Water	20.01	1.00	18.00	3.60
Carbon Dioxide	5.00	0.80	44.00	1.76
Oxygen	15.00	0.80	32.00	3.84
Carbon Monoxide	0.00	0.80	28.00	0.00
Nitrpgen & Inerts	80.00	0.80	28.00	17.92
		AVERAGE MOLECULAR WEIGHT =		27.12

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	78.601	CFT
Dry gas meter, final reading	=	115.385	CFT
Dry gas meter calibration factor	=	1.000	
Meter volume uncorrected for Temp & Press	=	36.784	CFT
Barometric pressure at site	=	29.95	in Hg
Meter pressure (barometer + average delta H)	=	30.23	in Hg
Average meter temperature during test	=	77.1	DEG F
Dry sample volume at standard conditions	=	35.977	CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	277.3	DEG F
Volume of condensed water	=	194	ml
Percent moisture of stack gas	=	20.01	%
Pitot tube correction factor	=	0.85	
Stack gas molecular weight	=	27.11	
Stack gas velocity at stack conditions	=	49.72	FT/SEC
Duration of sampling	=	72	Minute
Nozzle diameter	=	0.233	in
Percent isokinetic variation	=	99.2	%
Area of stack	=	20.97	SQ FEET
Stack flow rate, standard conditions	=	35647	DSCFM

SECTION IV SUMMARY OF QUANTITATIVE ANALYSIS
EMISSION RATE OF TRACE METALS

Compound		Mass (ug)		Emission rate (10-3 lb/hr)
Arsenic	<	11.45	<	1.50
Beryllium	<	1.15	<	0.15
Cadmium	<	2.29	<	0.30
Copper		9.27		1.21
Mercury		16.97		2.22
Nickel		31.39		4.10
Lead		6.60		0.86
Selenium	<	11.45	<	1.50
Zinc		442.04		57.80
Manganese		118.08		15.44

Field Data

EUREKA LABORATORIES, INC.

Corporate Office:
6790 FLORIN PERKINS ROAD
SACRAMENTO, CA 95828
TEL: (916) 381-7953
FAX: (916) 381-4013

Branch Office
12121 NORTHUP WAY, SUITE 212
BELLEVUE, WA 98005
TEL: (206) 885-0284
FAX: (206) 885-6162

Air Pollution
Chemical Analysis
Research & Testing
Environmental Studies
Robotics
Toxicology

C2 15

Page 1 of 2

P: 29.95 in Hg

FIELD TEST DATA FORM

Site: C.C. San Diego Asphalt Hot plant Date: 8/16/90 Test No. #3 Metals

Nozzle I.D. E1 Diameter 0.233 Filter No. #7

LEAK CHECKS: Pitot tubes -- Initial ✓ OK Final _____

Sample train -- Initial ✓ OK Final _____

0.010 CFM 1 min at 10 in Hg

Initial 78.601

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
5:45	SE 12	.42	1.70	250	65	69	66	3	250
								5.205	
5:49	SE 11	.55	.90	259	64	70	66	4	257
								81.215	
5:51	SE 10	.65	1.05	258	62	72	66	4	260
								82.355	
5:54	SE 9	.70	1.15	263	61	74	67	4	260
								84.615	
5:57	SE 8	.75	1.25	268	60	76	68	4.5	270
								86.875	
6:00	SE 7	.95	1.40	269	60	79	69	5	274
								88.295	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
6:03	SE 6	.65	1.05	271	60	80	70	4	259
								90.215	
6:06	SE 5	.55	.96	273	60	80	70	4	256
								91.625	
6:09	SE 4	.45	.72	274	61	81	71	3	285
								93.075	
6:12	SE 3	.45	.72	275	61	81	71	2	290
								94.515	
6:15	SE 2	.35	.58	271	62	80	73	3	260
								95.915	
6:17	SE 1	.30	.49	271	62	82	73	2	237
								97.010	

EUREKA LABORATORIES, INC.

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FAX: (206) 885-6162

Air Pollution
Chemical Analysis
Research & Testing
Environmental Studies
Robotics
Toxicology

Pg 2

FIELD TEST DATA FORM

Site: CC San Diego Aerial - Straight Date: 8/16/90 Test No. #3 Metals

Nozzle I.D. E1 Diameter 0.233 Filter No. #7

LEAK CHECKS: Pitot tubes -- Initial Y O.K. Final Y. O.K.

Initial reading after leak check at 97.125

Sample train -- Initial Y O.K. Final Y O.K 0.015 CFM in 1 min

0.010 CFM in 1 min at 10 in Hg

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
:25	NW 12	.45	1.74	292	62	81	74	3	267
								98.515	
:28	11	.50	1.82	292	60	82	75	4	275
								100.025	
:31	10	.60	.99	289	60	83	75	4	264
								101.645	
:34	9	.45	1.10	290	60	83	76	4	280
								103.395	
:37	8	.70	1.15	291	61	84	76	4	290
								105.148	
:40	7	.75	1.25	291	61	85	77	5	266
								106.775	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
:43	6	.62	1.05	290	63	86	77	4	244
								108.710	
:46	5	.50	.82	290	64	86	78	4	238
								110.265	
:49	4	.45	.74	290	65	87	79	4	276
								111.725	
:52	3	.35	.53	289	64	88	79	3	273
								113.150	
:55	2	.80	.49	285	66	88	80	3	257
								114.275	
:58	1	.25	.41	290	67	86	80	3.5	235
				G86	B-61			115.365	

Date/Time 8/16/90 Barometric Pressure (in. Hg.) 29.95

Test Location [illegible] Static Pressure (in. wg.) _____

Run Number #3 [illegible] Probe Type/Length 6'

Stack Diameter 5' 2" Pitot Coefficient .85

Operator [illegible] Meter Box No./Y _____

Filter No. _____ Nozzle No./Size (in.) .233

Filter Temp (°F) _____ Probe Heater Setting (%) _____

Impinger Volumes/Weights				Gas Composition			
Contents	Final	Initial	Net	Time	CO_2	O_2	CO
[illegible] 1	174	0	174	5:52	4.5	15	
2+3	210	200	10	6:00	4.5	14.5	
4+5	200	200	0	6:52	6	14.3	
S.G.	210	200	10	Leak Rate		cfm	"Hg
		Total	194 ml				
Filter	Final	Initial	Net	Initial			
Weight				Final			

Sample Point	Sampling Time (min.)	ΔP (in wg)	ΔH (in wg)	Gas Meter Volume (Ft³)	Temperature (°F) Stack	Imp.	Gas Meter In	Gas Meter Out	Pump Vacuum (in Hg)	√Δ
	Total		Avg.	Total	Avg.	Avg.	Avg.		Avg.	Avg

Analytical Data

METALS
EPA MULTIMETAL METHOD

CLIENT :
PROJECT: c.c. Asphalt plant 90-08-192
SAMPLING DATE:
SAMPLE I.D.: Train 3

COMPOUND	D/L ppm	Filter + Rinse F1	µg	Impinger + Rinse F2	µg	Total µg
Arsenic	0.1	< 0.1	< 6	< 0.1	< 5.45	< 11.45
Beryllium	0.01	< 0.01	< 0.6	< 0.01	< 0.55	< 1.15
Cadmium	0.02	< 0.02	< 1.2	< 0.02	< 1.09	< 2.29
Chromium	0.02	0.3064	18.38	< 0.02	< 1.09	19.47
Copper	0.01	0.0437	2.62	0.1219	6.65	9.27
Nickel	0.1	0.4323	25.94	< 0.1	< 5.45	31.39
Lead	0.05	0.0595	3.57	0.0555	3.03	6.60
Selenium	0.1	< 0.1	< 6	< 0.1	< 5.45	< 11.45
Zinc	0.01	7.085	425.1	0.3108	16.94	442.04
Manganese	0.01	0.06	3.6	2.1	114.48	118.08
Mercury	0.001	~~< 0.001 * 6~~	~~< .006~~	~~< 0.001 * 10 * 40 / 50~~	< 0.12	~~< 0.126~~
		0.0011	3.3	0.0017	13.67	16.97

Hg^{DF_1} Hg^{DF_2}

$F1 = 50 * \frac{300}{250}$

$F2 = 50 * \frac{604}{554}$

$DF_1 = 50 * \frac{300}{5} = 3000$

$Hg \begin{cases} DF_2 = \left(50 * \frac{604}{5}\right) + \left(50 * \frac{200}{5}\right) = 8040 \end{cases}$

Company: SHINING TREE

Method: EPA 6010

WATER mg/L

Ag	As	Ba	Be	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Sb	Se	Tl	V	Zn
<.0002	.0334	11.51	.0005	.0510	.0059	.3856	.0508	.0128	.0092	.3769	.0685	.0404	.0184	.0506	.0142	7.506
<.0002	.0041	.0089	<.0004	.0023	<.0002	.0008	.0178	<.0010	<.0002	.0151	<.002c	<.001c	<.002c	.0096	<.002	.1375
<.0002	<0.0224 .0156	.1250	<.0004	.0098	<.0002	.1115	.3037	.0019	.0027	.7152	<.002c	<.001D	.0106	.0202	<.002	.5344
<.0002	<0.0224 .0117	.1056	<.0004	.0061	<.0002	.0871	.0620	.0063	.0064	.1070	<.002c	<.0010	.0130	.0156	.0106	.2594
<.0002	.0351	.1133	<.0004	.0045	<.0002	.0090	.1219	.0072	.0093	.0484	.0555	.0060	.0262	.0453	.0045	.3105
<.0002	.0395	8.759	<.0005	.0122	.0486	.0820	.0731	.0402	.0014	19.86	.0977	.0196	.0064	.0411	.0071	7.988
<.0003	.0516	13.30	<.0011	.0269	.0577	1.998	.4159	.0466	.0238	19.77	.2646	.0447	.0465	.1215	.0929	15.22
<.0002	.0357	9.636	<.0005	.0036	.0032	.3064	.0437	.0390	.0189	.4323	.0595	.0331	.0121	.0579	.0254	7.055
<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
110%	99	95	99	100	100	99	103	96	99	97	98	103	104	102	101	98
109	98	95	98	99	98	98	.102	95	98	95	97	100	103	103	99	97
	0.0224		0.0044	0.0202		0.0059	0.0043			0.0235	0.0445		0.0493			2.0006
0.01	0.1	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

G90

8-65

Date: 9/15/90 Company: Shining Tree Method: EPA 6010 WATER mg/L

	AL	Ca	Mg	Fe	Na	Mn	K	B	
2									
						0.06			
						0.06			
						0.06			
						1.74			
3						2.10		B-66	
						0.23			G91
2						0.38			
3						0.06			

Client: SHINING TREE (90-08-192)

ANALYSIS: CV. Hg · Water Samples

METHOD: EPA 7470

ELI NO.	SAMPLE ID.	LOCATION	UNITS: mg/l (ppm)
	Impinger-Hg 1	50 to 5/500	0.0140 ✓
	Impinger-Hg 2		0.0130
	Impinger-Hg 3		0.0150
	Impinger-Metals 1	50/512	0.0030 ✓
	Impinger-Metals 2		0.0020
	Impinger-Metals 3		0.0020
	Filter & Wash -1		0.0100 ✓
	Filter & Wash -2		0.0100
	Filter & Wash -3		0.0110
	Impinger-Hg 3 - (S)		116%
	Impinger-Hg 3 - (DS)		116%
	Method Blank		0.0006
	Detection Limit		

Did you remember to include QA data?, duplicate?, blank?, spike recovery?, detection limits? Thank You!

NOTE: Values of results already multiplied by a factor of 10 (DF: $\frac{50}{5}$)

Analyst: Benjamin Hartford

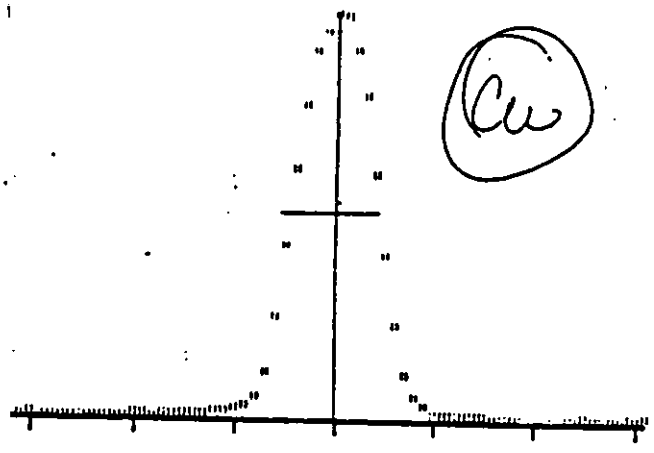
Extraction Date: 8/28/90

Date Reported: 9/19/90

Calibration Data

9/12/90

PROFILE FOR PHYSICAL CHANNEL 13
12-SEP-90 07:07



-30 -20 -10 0 +10 +20 +30

PEAK IS AT POSITION 0
PEAK HAS A WIDTH OF 10.1

MAX = 187 MIN = 16

ACT NAME : M-21 TIME:12-SEP-90 08:54 STANDARD NAME : STD1

	I.S.	AG	AS	B-	BE	CD	CO	CR	CU	HG
EXP# 1	1000	.1430	.2840	.0130	.0200	.0610	.2950	.1510	.1410	.098
EXP# 2	1000	.1440	.2820	.0180	.0200	.0600	.2940	.1490	.1410	.100
AVERAGE	1000	.1435	.2830	.0180	.0200	.0605	.2945	.1500	.1410	.098

	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	.2440	.1380	.8830	.0950	.5430	.1260	.1290	.0500	1.524	.420
EXP# 2	.2440	.1380	.8800	.0950	.5270	.1210	.1310	.0500	1.532	.420
AVERAGE	.2440	.1380	.8815	.0950	.5350	.1235	.1300	.0500	1.528	.420

	CA	MG
EXP# 1	1.729	1.298
EXP# 2	1.731	1.300
AVERAGE	1.730	1.299

ACT NAME : M-21 TIME:12-SEP-90 08:56 STANDARD NAME : STD2

	I.S.	BA	CD	CO	CU	PB	ZN
EXP# 1	1000	12.37	19.07	25.76	25.42	14.37	12.27
EXP# 2	1000	12.39	19.89	25.96	25.48	14.46	12.40
AVERAGE	1000	12.38	19.77	25.86	25.45	14.41	12.34

ACT NAME : M-21 TIME:12-SEP-90 08:59 STANDARD NAME : STD3

	I.S.	BE	MO	NI	SB	TL
EXP# 1	1000	18.23	31.81	14.35	19.24	4.212
EXP# 2	1000	18.36	32.11	14.42	18.56	4.236
AVERAGE	1000	18.30	31.96	14.39	18.40	4.224

ACT NAME : M-21 TIME:12-SEP-90 09:02 STANDARD NAME : STD4

	I.S.	AS	CR	SE
EXP# 1	1000	6.604	13.00	11.05
EXP# 2	1000	6.648	13.10	11.22
AVERAGE	1000	6.626	13.05	11.14

ACT NAME : M-21 TIME:12-SEP-90 09:04 STANDARD NAME : STD5

	I.S.	HG	V
EXP# 1	1000	9.228	15.38
EXP# 2	1000	9.302	15.42
AVERAGE	1000	9.265	15.40

ACT NAME : M-21 TIME:12-SEP-90 09:07 STANDARD NAME : STD6

	I.S.	AG
EXP# 1	1000	14.19
EXP# 2	1000	14.36
AVERAGE	1000	14.27

ACT NAME : M-21 TIME:12-SEP-90 09:09 STANDARD NAME : STD7

	I.S.	AL	FE	CA	MG
EXP# 1	1000	23.92	19.65	11.55	18.69
EXP# 2	1000	24.04	19.76	11.61	18.80
AVERAGE	1000	23.98	19.71	11.58	18.75

ACT NAME : M-21 TIME : 12-SEP-90 09:15 SAMPLE NAME: CAL.CK-1 ICV
CAL.CK

	I.S.	AG	AS	BA	BE	CD	CO	CR	CU	HG
EXP# 1	1000	1.791	1.726	1.657	1.702	1.737	1.723	1.696	1.667	1.6
EXP# 2	1000	1.802	1.721	1.653	1.699	1.755	1.734	1.706	1.664	1.6
AVERAGE	1000	1.797	1.724	1.655	1.701	1.746	1.729	1.701	1.665	1.6

	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	1.474	1.646	1.696	1.733	1.775	1.687	1.719	1.648	1.832	1
EXP# 2	1.485	1.602	1.719	1.733	1.779	1.741	1.725	1.661	1.836	1
AVERAGE	1.480	1.624	1.708	1.733	1.776	1.714	1.722	1.654	1.834	1.6

	CA	MG
EXP# 1	1.180	1.678
EXP# 2	1.195	1.676
AVERAGE	1.188	1.677

ACT NAME : M-21 TIME : 12-SEP-90 09:19 SAMPLE NAME: CAL.CK-3 ICB
CAL.CK

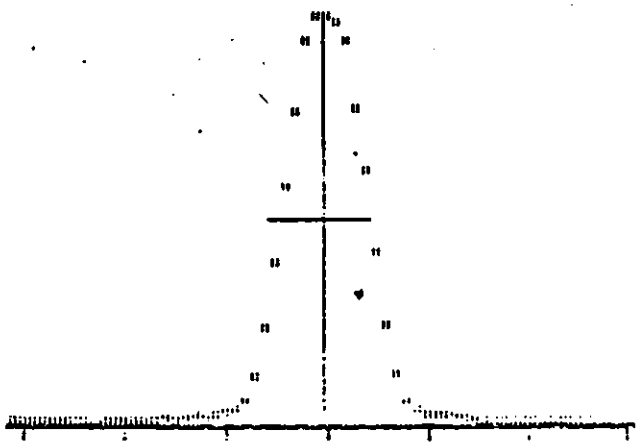
	I.S.	AG	AS	BA	BE	CD	CO	CR	CU	HG
EXP# 1	1000	.0011	<.0020	<.0004	<.0004	<.0002	<.0002	<.0004	<.0002	.005
EXP# 2	1000	.0039	<.0020	<.0004	<.0004	.0033	<.0002	<.0004	.0004	.002
AVERAGE	1000	.0025	<.0020	<.0004	<.0004	.0008	<.0002	<.0004	<.0002	.003

	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	.0013	.0049	<.0020	<.0010	<.0020	.0086	<.0002	<.0002	.0013	.001
EXP# 2	<.0002	.0021	<.0020	<.0010	<.0020	.0036	<.0002	<.0002	<.0000	.002
AVERAGE	.0003	.0035	<.0020	<.0010	<.0020	.0061	<.0002	<.0002	.0002	.001

	CA	MG
EXP# 1	<.0000	<.0000
EXP# 2	<.0000	<.0000
AVERAGE	<.0000	<.0000

9/15/90

PROFILE FOR PHYSICAL CHANNEL 13
15-SEP-90 08:56



-30 -20 -10 0 +10 +20 +30

PEAK IS AT POSITION -.1
PEAK HAS A WIDTH OF 10.6

MAX = 182 MIN = 16

ACT NAME : CAM TIME:15-SEP-90 09:48 STANDARD NAME : STD1

	I.S.	AS	AG	BE	CD	CO	CR	CU	HG
EXP# 1	1000	.1510	.2760	.0170	.0200	.0570	.2970	.1570	.1460	.0920
EXP# 2	1000	.1510	.2720	.0160	.0200	.0570	.3040	.1580	.1470	.0950
AVERAGE	1000	.1510	.2740	.0165	.0200	.0570	.3005	.1575	.1465	.0935

	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	.2370	.1500	.8920	.7890	.5210	.1260	.1360	.1030	1.362	.2640
EXP# 2	.2380	.1530	.8950	.7040	.5460	.1300	.1370	.1030	1.381	.2640
AVERAGE	.2375	.1515	.8935	.6965	.5335	.1280	.1365	.1030	1.372	.2640

	CA	MG	NA	MN
EXP# 1	.9800	1.176	1.087	.0360
EXP# 2	.9840	1.192	1.130	.0370
AVERAGE	.9820	1.184	1.109	.0365

ACT NAME : CAM TIME:15-SEP-90 09:51 STANDARD NAME : STD2

	I.S.	BA	CD	CO	CU	PB	ZN
EXP# 1	1000	10.62	18.84	27.10	21.88	13.42	11.30
EXP# 2	1000	10.68	18.97	27.33	22.09	13.52	11.40
AVERAGE	1000	10.65	18.91	27.21	21.99	13.47	11.35

ACT NAME : CAM TIME:15-SEP-90 09:54 STANDARD NAME : STD3

	I.S.	BE	MO	NI	SB	TL
EXP# 1	1000	15.63	25.25	13.11	16.17	3.805
EXP# 2	1000	15.76	26.56	13.26	16.46	3.987
AVERAGE	1000	15.70	26.41	13.19	16.31	3.896

ACT NAME : CAM TIME:15-SEP-90 09:57 STANDARD NAME : STD4

	I.S.	AG	CR	SE
EXP# 1	1000	5.832	11.8[illegible]	.423
EXP# 2	1000	5.870	11.96	9.614
AVERAGE	1000	5.846	11.92	9.517

ACT NAME : CAM TIME:15-SEP-90 10:00 STANDARD NAME : STD5

	I.S.	HG	V
EXP# 1	1000	8.292	13.74
EXP# 2	1000	8.330	13.82
AVERAGE	1000	8.311	13.78

ACT NAME : CAM TIME:15-SEP-90 10:03 STANDARD NAME : STD6

	I.S.	AG
EXP# 1	1000	13.38
EXP# 2	1000	13.57
AVERAGE	1000	13.48

ACT NAME : CAM TIME:15-SEP-90 10:05 STANDARD NAME : STD7

	I.S.	AL	FE	CA	MG
EXP# 1	1000	21.83	17.57	11.18	16.64
EXP# 2	1000	21.89	17.61	11.22	16.64
AVERAGE	1000	21.86	17.59	11.20	16.64

ACT NAME : CAM TIME:15-SEP-90 10:08 STANDARD NAME : STD8

	I.S.	NA	MN
EXP# 1	1000	83.17	18.88
EXP# 2	1000	84.79	19.03
AVERAGE	1000	83.98	18.95

Conc 2.5
Na 12.5

Acceptance Range 2.25—2.75 ICV 1

ACT NAME : CAM TIME : 15-SEP-90 10:29 SAMPLE NAME: SAMPLE1
SAMPLE

Na 13.5—16.

	I.S.	AG	AS	BA	BE	CD	CO	CR	CU	HG
EXP# 1	1000	.0081	2.519	2.527	2.488	2.581	2.521	2.524	2.547	.0061
EXP# 2	1000	.0096	2.506	2.507	2.484	2.574	2.524	2.526	2.527	.0098
AVERAGE	1000	.0088	2.513	2.517	2.485	2.577	2.523	2.525	2.537	.0079

	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	2.499	2.493	2.584	2.616	2.497	2.514	.0032	2.545	.1159	.0092
EXP# 2	2.508	2.484	2.589	2.613	2.622	2.498	.0046	2.559	.1154	.0115
AVERAGE	2.503	2.489	2.586	2.614	2.615	2.506	.0039	2.552	.1157	.0104

All OK

	CA	MG	NA	MN
EXP# 1	.2144	.0233	.2597	.0008
EXP# 2	.2202	.0297	.2265	.0009
AVERAGE	.2173	.0265	.2431	.0008

ICV 2

ACT NAME : CAM TIME : 15-SEP-90 10:33 SAMPLE NAME: SAMPLE2
SAMPLE

	I.S.	AG	AS	BA	BE	CD	CO	CR	CU	HG
EXP# 1	1000	2.591	.0050	.0042	.0115	.0024	.0009	.0060	.0066	2.495
EXP# 2	1000	2.615	.0094	.0042	.0115	.0019	<.0000	.0052	.0057	2.526
AVERAGE	1000	2.603	.0072	.0042	.0115	.0021	.0002	.0056	.0062	2.511

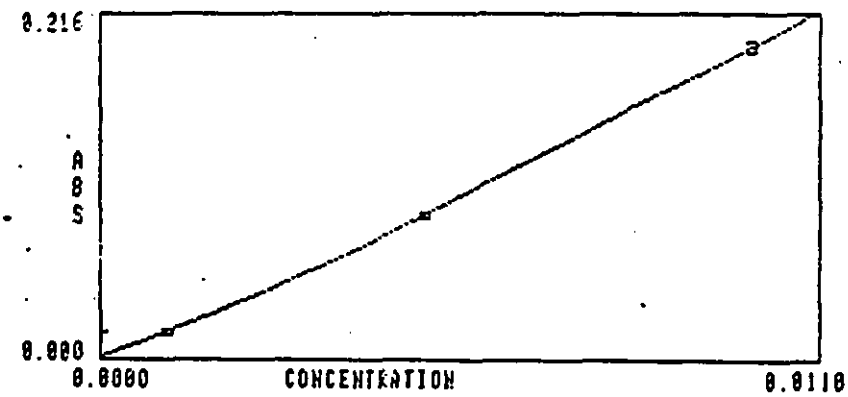
	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	.0028	.0012	.0076	.0048	.0230	.0232	2.478	<.0000	2.589	2.482
EXP# 2	.0028	.0035	<.0000	.0002	.0106	.0335	2.502	<.0000	2.631	2.519
AVERAGE	.0028	.0023	.0028	.0025	.0168	.0284	2.490	<.0000	2.610	2.501

Varian SpectrAA 30/40 System Report

OPERATOR BENJAMIN MENDOZA
DATE 9-18-90
BATCH

PROGRAM 2 Hg COLD VAPOR

SAMPLE	CONC	%RSD	MEAN ABS	READINGS		
BLANK	0.0000		-0.000	-0.001	-0.000	-0.000
STANDARD 1	0.0010	1.6	0.016	0.016	0.016	0.016
STANDARD 2	0.0050	0.2	0.091	0.091	0.091	0.091
STANDARD 3	0.0100	0.5	0.196	0.195	0.196	0.197



SAMPLE 1 BL	0.0005		7.5	0.008	0.009	0.008	0.007	
SAMPLE 2 0.005Q	0.0050		0.3	0.092	0.092	0.092	0.092	
SAMPLE 3 RQ	0.0060	120%	0.4	0.113	0.113	0.112	0.113	
SAMPLE 4 RQ	0.0062		0.2	0.117	0.117	0.116	0.117	
SAMPLE 4R RQ	0.0057	114%	0.1	0.107	0.107	0.107	0.107	
SAMPLE 5 091-050	0.0047	94%	0.1	0.084	0.084	0.084	0.084	
SAMPLE 6 091-050	0.0058	116%	0.1	0.109	0.109	0.109	0.109	
SAMPLE 7 BL	0.0000		41.4	0.000	0.000	0.000	0.000	
SAMPLE 8	OVER		0.0	0.485	0.484	0.485	0.485	
SAMPLE 9 091-040	0.0001	D.000	61.5	0.001	0.002	0.001	0.001	DF=1.25
SAMPLE 10	0.0055		0.8	0.101	0.100	0.102	0.102	
SAMPLE 11 RQ-091-050	0.0058	116%	0.2	0.109	0.109	0.109	0.109	
SAMPLE 12	0.0061		0.1	0.116	0.116	0.116	0.116	
SAMPLE 12R RQ-091-050	0.0058	116%	0.7	0.108	0.109	0.108	0.108	
SAMPLE 13 BL	-.0001		18.3	-0.002	-0.002	-0.002	-0.002	
SAMPLE 14 0.005 QC	0.0047		0.3	0.086	0.085	0.086	0.086	

APPENDIX C

Arsenic Data and Calculations

FIELD BLANK

Analytical Data

C.C. San Diego Arsenic Field Blank

SUMMARY OF QUANTITATIVE ANALYSIS

Arsenic	Mass (ug)
Arsenic	< 2.80

METALS CAR Method 423
EPA ~~MULTIMETAL~~ METHOD
Arsenic.

CLIENT :
PROJECT: C.C. San Diego.
SAMPLING DATE:
SAMPLE I.D.: Train Field BK

COMPOUND	D/L ppm	Filter Rinse µg/ml	DF, µg	Imp µg/ml	DF, µg	Total µg
Arsenic	0.004	<0.004	<0.8	<0.004	<2	<2.8
Beryllium	0.01					
Cadmium	0.02					
Chromium	0.02					
Copper	0.01					
Nickel	0.1					
Lead	0.05					
Selenium	0.1					
Zinc	0.01					
Manganese	0.01					
Mercury	0.001					

$DF_1 = 50 \times \frac{200}{50}$

$DF_2 = 50 \times \frac{500}{50}$

RUN #1

Arsenic - August 14, 1990

Calculation Data

C.C. Arsenic 1

Sample I.D.:California Comercial Asphalt Plant Arsenic 1

Section I: Particulate Sampling Data

Point #	Delta P	Delta H	T S	T i	T in	T out	VAC	Filter Temp.	VEL (FPS)
A-12	0.50	0.82	262	66	77	77	1.0	166	48.8
A-11	0.62	1.00	253	63	79	79	2.0	192	54.5
A-10	0.65	1.10	265	62	81	78	2.0	182	55.8
A-9	0.75	1.25	270	64	84	79	2.0	181	60.0
A-8	0.85	1.40	272	65	86	79	2.0	183	63.9
A-7	0.95	1.60	274	66	88	80	3.0	179	67.5
A-6	0.70	1.15	274	67	89	80	2.0	181	58.0
A-5	0.63	1.10	275	67	89	81	2.0	177	55.0
A-4	0.50	0.81	275	69	91	82	2.0	219	48.9
A-3	0.45	0.74	273	69	91	83	2.0	235	46.4
A-2	0.35	0.60	271	69	91	82	1.0	275	40.7
A-1	0.30	0.48	271	69	91	83	1.0	259	37.7
B-12	0.37	0.60	271	69	88	84	1.0	259	41.8
B-11	0.45	0.74	274	67	89	84	2.0	260	45.8
B-10	0.53	0.88	274	67	90	84	2.0	233	50.1
B-9	0.60	1.00	276	68	92	85	2.0	238	53.5
B-8	0.65	1.10	275	68	92	85	2.0	275	55.7
B-7	0.70	1.15	275	70	95	86	2.0	275	57.9
B-6	0.85	1.40	276	69	94	86	2.0	275	63.8
B-5	0.75	1.25	275	71	95	87	2.0	275	60.0
B-4	0.70	1.15	273	72	95	87	2.0	265	57.9
B-3	0.50	0.81	272	72	95	88	2.0	236	48.9
B-2	0.45	0.74	265	71	95	87	2.0	232	46.3
B-1	0.30	0.50	265	73	95	88	2.0	247	37.8
AVG	0.59	0.93	271	68	90	83	1.9	229	52.4

NOMENCLATURE

Delta P = Stack gas velocity head at each sample point (in. H2O)

Delta H = Pressure differentital across orifice meter (in. H2O)

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condensor (oF)

Tin = Dry gas meter inlet temperature

Tout = Dry gas meter outlet temperature

Vac = Sample pump vacuum (in. Hg)

Filter Temp. = Temperature of front-end filter enclosure (oF)

VEL (FPS) = Actual stack velocity at each sample point

FIELD DATA SHEET

VOLUME OF CONDENSED MOISTURE

Impinger #	Gross	Tare	Net
1	222 ml	100 ml	122 ml
2	200 ml	100 ml	100 ml
3	0 ml	0 ml	0 ml
4	213 gram	200 gram	13 gram
	TOTAL CONDENSED MOISTURE		235 ml

STACK GAS MOLECULAR WEIGHT

PERCENT CARBON DIOXIDE	=	6.00
PERCENT OXYGEN	=	16.00
PERCENT CARBON MONOXIDE	=	0.00
PERCENT NITROGEN & INERTS	=	78.00

COMPONENT	VOLUME%	• MOISTURE COR	• MOLWT =	MASS FRACTION
WATER	22.12	1.00	18.00	3.98
CARBON DIOXIDE	6.00	0.78	44.00	2.06
OXYGEN	16.00	0.78	32.00	3.99
CARBON MONOXIDE	0.00	0.78	28.00	0.00
NITROGEN & INERTS	78.00	0.78	28.00	17.01
		AVERAGE MOLECULAR WEIGHT=		27.03

C.C. Arsenic 1

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	876.160	CFT
Dry gas meter, final reading	=	916.224	CFT
Dry gas meter calibration factor	=	1.000	
Meter volume uncorrected for Temp & Press	=	40.064	CFT
Barometric pressure at site	=	29.92	in Hg
Meter pressure (barometer + average delta H)	=	30.06	in Hg
Average meter temperature during test	=	86.4	DEG F
Dry sample volume at standard conditions	=	38.306	CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	271.0	DEG F
Volume of condensed water	=	235	ml
Percent moisture of stack gas	=	22.12	%
Pitot tube correction factor	=	0.85	
Stack gas molecular weight	=	26.91	
Stack gas velocity at stack conditions	=	52.34	FT/SEC
Duration of sampling	=	72	Minute
Nozzle diameter	=	0.233	in
Percent isokinetic variation	=	102.8	%
Area of stack	=	20.97	SQ FEET
Stack flow rate, standard conditions	=	36645	DSCFM

SECTION IV SUMMARY OF QUANTITATIVE ANALYSIS
EMISSION RATE OF ARSENIC

Compound	Mass (ug)	Emission rate (10-3 lb/hr)
Arsenic	< 2.80	< 0.26

Field Data

Corporate Office
6790 FLORIN PERKINS ROAD
SACRAMENTO, CA 95828
TEL (916) 381-7953
FAX (916) 381-4013

Branch Office
12121 NORTHUP WAY, SUITE 212
BELLEVUE, WA 98005
TEL (206) 885-0264
FAX (206) 885-5162

Chemical Analysis
Research & Testing
Environmental Studies
Process
Toxicology

p1 of 2

O_2: 16%
CO_2: 5%

p = 29.92 in Hg

FIELD TEST DATA FORM

Site: C.C. San Diego Ammonia plant Date: 8/12/80 Test No. #1 Arsenic

Nozzle I.D. E1 Diameter .233' Filter No. #2

LEAK CHECKS: Pitot tubes -- Initial Y Final

Sample train -- Initial Y Final 0.005 CFT in 1 min @ 10 in Hg

Initial Reading 876.160

876.196

876.255

TIME	PT #	ΔP	ΔH	T_s	T_i	T_{IN}	T_{OUT}	VAC	TEMP
1:27	SE 12	.50	.82	262	66	77	77	1	166
								877.645	
1:30	SE 11	.62	1.01	253	63	79	79	2	192
								879.335	
1:33	SE 10	.65	1.10	265	62	81	78	2	182
								881.155	
1:36	SE 9	.75	1.25	270	64	84	79	2	181
								882.945	
1:39	SE 8	.95	1.40	272	65	86	79	2	183
								884.925	
1:42	SE 7	.95	1.60	274	66	82	80	3	179
								887.055	

TIME	PT #	ΔP	ΔH	T_s	T_i	T_{IN}	T_{OUT}	VAC	TEMP
1:45	SE 6	.70	1.15	274	67	89	80	2	181
								888.975	
1:48	SE 5	.63	1.10	275	67	91	81	2	177
								890.675	
1:51	SE 4	.50	.81	275	69	91	82	2	219
								892.365	
1:54	SE 3	.45	.74	273	69	91	83	2	235
								893.845	
1:57	SE 2	.35	.60	271	69	91	82	1	275
								895.175	
2:00	SE 1	.30	.48	271	69	91	83	1	259
				G112	C-12			896.424	

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BELLEVUE, WA 98005
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FAX (206) 885-6162

Chemical Analysis
Research & Testing
Environmental Studies
Resource
Toxicology

P = 0/2

916.355
916.415

.015
.0
.0055
.060 cfm

12:15 O_2: 15.25%
CO_2: 4.5%

FIELD TEST DATA FORM

Site: C C San Diego Aerojet Plant Date: 2/12/90 Test No. #1 Arrow

Nozzle I.D. E1 Diameter .233" Filter No. #2

Field Reading

916.424

LEAK CHECKS: Pitot tubes -- Initial ____ Final Y.O.K.

0.025 @ 5 in Hg
0.022 @ 5 in Hg Sample train -- Initial ____ Final .020 CFM at 1 min at 10 in

916.225 .575

TIME	PT #	ΔP	ΔH	Ts	Ti	T_{IN}	T_{OUT}	VAC	TEMP
12:09	NW-12	.37	.60	271	69	88	84	1	259
								897.775	
12:11	NW-11	.45	.74	274	67	89	84	2	260
								879.255	
12:14	NW-10	.53	.88	274	67	90	84	2	233
								900.695	
17	NW-9	.60	1.00	276	68	92	85	2	238
								902.645	
12:20	NW-8	.65	1.10	275	68	92	85	2	275
								904.810	
12:23	NW-7	.70	1.15	275	670	95	86	2	275
								906.316	

TIME	PT #	ΔP	ΔH	Ts	Ti	T_{IN}	T_{OUT}	VAC	TEMP
12:26	NW-6	.85	1.40	276	69	94	86	2	275
								908.155	
12:29	NW-5	.75	1.25	275	71	95	87	2	275
								910.025	
12:31	NW-4	.70	1.15	273	72	95	87	2	265
								911.845	
12:34	NW-3	.50	.81	272	72	95	88	2	236
								913.675	
37	NW-2	.45	.74	265	71	95	87	.12	232
								914.215	
12:40	NW-1	.30	.50	265	70	95	93	2	247
	✓			G113	C-13			916.224	

Plant _____

Date/Time _____ Barometric Pressure (in. Hg.) 30.00

Test Location Aspire Static Pressure (in. wg.) .1

Run Number #1 Arsenic 423 Probe Type/Length 6'

Stack Diameter 5' 2" Pitot Coefficient .95

Operator Shan-Pin Meter Box No./Y

Filter No. _____ Nozzle No./Size (in.) .233

Filter Temp (°F) _____ Probe Heater Setting (%) _____

50
64
108
422

52.5
190
12.5

Impinger Volumes/Weights				Gas Composition			
Contents	Final	Initial	Net	Time	CO_2	O_2	CO
Water	422	200	222	11:45	5%	16%	
				11:58	5.8%	15.5%	
				12:07	15.5%	5%	
S.G.			12.5	Leak Rate		cfm	"Hg
		Total	234.5	Initial			
Filter Weight	Final	Initial	Net	Final			

Sample Point	Sampling Time (min.)	Δ P (in wg)	Δ H (in wg)	Gas Meter Volume (Ft 3)	Temperature (°F)				Pump Vacuum (in Hg)	$\sqrt{\Delta P}$
					Stack	Imp.	Gas Meter In	Gas Meter Out		
	Total		Avg.	Total	Avg.	Avg.	Avg.		Avg.	Avg.

Analytical Data

CARB METHOD 423

~~METALS~~

EPA MULTIMETAL METHOD

ARSENIC

CLIENT :
PROJECT: CC ASPHALT PLANT
SAMPLING DATE:
SAMPLE I.D.: Train 1

COMPOUND	D/L ppm	conc F+R(ppm)	ppm × DF mass(ug) DF1	conc I(ppm)	ppm × DF mass(ug) DF2	total / ... mass
Arsenic	0.004 0.1	<0.004	<0.8	<0.004	<2	<2
Beryllium	0.01					
Cadmium	0.02					
Chromium	0.02					
Copper	0.01					
Nickel	0.1					
Lead	0.05					
Selenium	0.1					
Zinc	0.01					
Manganese	0.01					
Mercury	0.001					

$DF_1 = 50 \times \frac{200}{50}$

$DF_2 = 50 \times \frac{500}{50}$

Client: SHINING TREE - 90-08-192

ANALYSIS: As by AA - Water Samples

METHOD: CAR 423

ELI NO.	SAMPLE ID.	LOCATION	UNITS: mg/l (ppm)
	TEST 1 - Imp		-0.0006
	TEST 2 - Imp		~~-0.0011~~ -0.0011
	TEST 3 - Imp		-0.0014
	TEST 1 - Filter & Rinse		-0.0001
	TEST 2 - Filter & Rinse		~~-~~0.0013
	TEST 3 - Filter & Rinse		0.0004
	TEST 1 - Imp - (S)		93%
	TEST 1 - Imp - (DS)		78%
	FIELD Method Blank		~~-0.0009~~ -0.0012
	~~Detection Limit~~		

Did you remember to include QA data?, duplicate?, blank?, spike recovery?, detection limits? Thank You!

1/2 = 50 ml / 500 ml

$(X + \frac{50}{1000} \times 10) - \frac{50}{1000} = \frac{1}{2} \times X$

Analyst: Benjamin Tindog J.

Extraction Date: 8/28

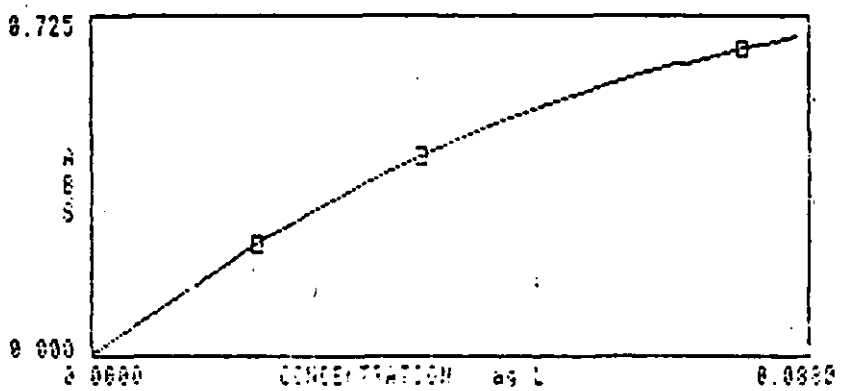
Date Reported: 9/13/90

Calibration Data

OPERATOR BENJAMIN MENDOZA
DATE 9-13-90
BATCH SHINING TREE, M.I.

PROGRAM 30 As Ni Mod

SAMPLE	CONC mg/L	%RSD	MEAN ABS	READINGS		
BLANK	0.0000		0.023	0.026	0.017	0.026
STANDARD 1	0.0200	4.0	0.236	0.232	0.230	0.247
STANDARD 2	0.0400	3.1	0.420	0.422	0.432	0.407
STANDARD 3	0.0800	1.7	0.659	0.651	0.654	0.671



SAMPLE 1 BL	-.0007		57.3	-0.009	-0.007	-0.005	-0.014
SAMPLE 2 0.04 CC	.0421		2.4	0.437	0.435	0.438	0.447
SAMPLE 3 CC	0.0443	111%	2.7	0.454	0.461	0.461	0.439
SAMPLE 4 CC	0.0431	108%	2.5	0.444	0.440	0.457	0.436
SAMPLE 5 Test-Imp	0.0332	83%	1.9	0.362	0.363	0.355	0.369
SAMPLE 6 Test-Imp	0.0310	78%	2.4	0.343	0.338	0.339	0.353
SAMPLE 7 Raw	-.0012		50.8	-0.014	-0.021	-0.006	-0.016
SAMPLE 8 Test-Imp	-.0006		42.6	-0.007	-0.008	-0.010	-0.004
SAMPLE 9 Test-Imp	.0011		47.8	-0.012	-0.008	-0.020	-0.011
SAMPLE 10 Test-Imp	.0014		15.2	-0.012	-0.012	-0.020	-0.015
SAMPLE 11 BL	-.0017		37.0	-0.020	-0.012	-0.026	-0.022
SAMPLE 12 0.04 CC	0.0424		1.7	0.439	0.448	0.435	0.435
SAMPLE 13 Test-Raw	-.0001		99.9	-0.001	0.003	-0.003	-0.002
SAMPLE 14 Test-Imp	0.0013		20.8	0.016	0.014	0.019	0.014
SAMPLE 15 Test-Imp	0.0004		37.7	0.004	0.005	0.005	0.003
SAMPLE 16 Raw EVA-011-F	OVER						0.848

G119

SAMPLE	CONC mg/L	%RSD	MEAN ABS	READINGS

RUN #2

Arsenic - August 15, 1990

Calculation Data

C. C. Arsenic 2

Sample I.D.: California Comercial Asphalt Plant Arsenic 2

Section I: Particulate Sampling Data

Point #	Delta P	Delta H	T S	T i	T in	T out	VAC	Filter Temp.	VEL (FPS)
A-12	0.48	0.80	292	61	78	79	2.0	220	48.9
A-11	0.50	0.81	294	57	79	79	2.0	223	49.8
A-10	0.55	0.90	297	59	80	79	2.0	235	52.3
A-9	0.65	1.10	298	59	82	79	2.5	255	56.8
A-8	0.75	1.25	298	60	83	79	2.5	261	60.6
A-7	0.81	1.35	298	60	84	79	3.0	268	62.9
A-6	0.72	1.20	298	61	85	80	2.5	253	59.4
A-5	0.65	1.10	298	62	86	80	2.5	256	56.5
A-4	0.46	0.78	297	63	86	80	2.0	257	47.5
A-3	0.42	0.64	297	63	86	81	2.0	260	45.4
A-2	0.40	0.63	290	62	85	81	2.0	263	44.1
A-1	0.25	0.38	290	63	86	81	2.0	262	34.9
B-12	0.35	0.58	295	62	84	82	2.0	262	41.6
B-11	0.45	0.72	294	59	84	82	2.0	251	47.3
B-10	0.50	0.81	296	59	85	81	2.0	244	49.9
B-9	0.55	0.90	295	60	86	81	2.0	241	52.4
B-8	0.60	0.99	283	62	87	82	2.5	233	54.7
B-7	0.65	1.10	282	61	87	82	3.0	235	57.0
B-6	0.70	1.15	285	63	87	82	3.0	236	59.1
B-5	0.72	1.20	286	63	88	82	3.0	238	60.0
B-4	0.72	1.20	286	63	88	82	3.0	240	59.9
B-3	0.72	1.20	284	63	88	82	3.0	245	59.9
B-2	0.68	1.10	279	63	88	82	3.0	237	58.0
B-1	0.60	1.00	279	63	88	83	2.5	240	54.4
AVG	0.58	0.92	293	61	85	81	2.4	246	53.1

NOMENCLATURE

Delta P = Stack gas velocity head at each sample point (in. H2O)

Delta H = Pressure differentital across orifice meter (in. H2O)

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condensor (oF)

Tin = Dry gas meter inlet temperature

Tout = Dry gas meter outlet temperature

Vac = Sample pump vacuum (in. Hg)

Filter Temp. = Temperature of front-end filter enclosure (oF)

VEL (FPS) = Actual stack velocity at each sample point

C. C. Arsenic 2

FIELD DATA SHEET

VOLUME OF CONDENSED MOISTURE

Impinger #	Gross	Tare	Net
1	272 ml	100 ml	172 ml
2	200 ml	100 ml	100 ml
3	0 ml	0 ml	0 ml
4	209 gram	200 gram	9 gram
	TOTAL CONDENSED MOISTURE		281 ml

STACK GAS MOLECULAR WEIGHT

PERCENT CARBON DIOXIDE	=	6.00
PERCENT OXYGEN	=	13.00
PERCENT CARBON MONOXIDE	=	0.00
PERCENT NITROGEN & INERTS	=	81.00

COMPONENT	VOLUME%	• MOISTURE CORR	• MOLWT =	MASS FRACTION
WATER	25.40	1.00	18.00	4.57
CARBON DIOXIDE	6.00	0.75	44.00	1.97
OXYGEN	13.00	0.75	32.00	3.10
CARBON MONOXIDE	0.00	0.75	28.00	0.00
NITROGEN & INERTS	81.00	0.75	28.00	16.92
		AVERAGE MOLECULAR WEIGHT =		26.56

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	954.649	CFT
Dry gas meter, final reading	=	994.316	CFT
Dry gas meter calibration factor	=	1.000	
Meter volume uncorrected for Temp & Press	=	39.667	CFT
Barometric pressure at site	=	30.00	in Hg
Meter pressure (barometer + average delta H)	=	30.18	in Hg
Average meter temperature during test	=	82.9	DEG F
Dry sample volume at standard conditions	=	38.321	CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	292.5	DEG F
Volume of condensed water	=	281	ml
Percent moisture of stack gas	=	25.40	%
Pitot tube correction factor	=	0.85	
Stack gas molecular weight	=	26.56	
Stack gas velocity at stack conditions	=	53.09	FT/SEC
Duration of sampling	=	72	Minute
Nozzle diameter	=	0.233	in
Percent isokinetic variation	=	108.5	%
Area of stack	=	20.97	SQ FEET
Stack flow rate, standard conditions	=	34727	DSCFM

SECTION IV SUMMARY OF QUANTITATIVE ANALYSIS
EMISSION RATE OF ARSENIC

Compound	Mass (ug)	Emission rate (10-3 lb/hr)
Arsenic	< 2.80	< 0.26

Field Data

EUREKA LABORATORIES, INC.

Corporate Office
6790 FLORIN PERKINS ROAD
SACRAMENTO, CA 95828
TEL (916) 381-7953
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Air Pollution
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PAGE 1 OF 2

P = 30.00 in. Hg

FIELD TEST DATA FORM

Site: C.C. San Diego Mini Mill plant Date: 8/15/93 Test No. #2 Arac

Nozzle I.D. E1 Diameter .233 Filter No. #4

LEAK CHECKS: Pitot tubes -- Initial Y O.K Final ____

Sample train -- Initial Y OK Final ____

.010 in 1 min at 10 in. Hg

Initial reading 954.649

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
8:40	SE 12	.48	.80	292	61	78	79	2	220
								956.35	
8:43	SE 11	.50	.8	294	57	79	79	2	223
								957.685	
8:46	SE 10	.55	.90	297	59	80	79	2	235
								959.285	
8:49	SE 9	.65	1.10	298	59	82	79	2.5	255
								961.055	
8:52	SE 8	.75	1.25	298	60	83	79	2.5	261
								962.900	
8:55	SE 7	.81	1.35	298	60	84	79	3	268
								964.825	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
8:50	SE 6	.72	1.20	298	61	85	80	2.5	253
								966.665	
9:01	SE 5	.65	1.10	298	62	86	80	2.5	256
								968.455	
9:04	SE 4	.46	.78	297	63	86	80	2	257
								970.010	
9:07	SE 3	.42	.64	297	63	86	81	2	260
								971.410	
9:10	SE 2	.40	.63	290	62	85	81	.2	263
								972.895	
9:13	SE 1	.25	.39	290	63	84	81	2	262
								973.900	

G127

C-27

EUREKA LABORATORIES, INC.

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FIELD TEST DATA FORM

Site: CC San Diego Asphalt Hot Plant Date: 8/15/90 Test No. #2 Arsenic

Nozzle I.D. E1 Diameter .233 Filter No. #4

LEAK CHECKS: Pitot tubes -- Initial Y Final Y Leak check O.K.

Sample train -- Initial Y Final Y O.K.

Initial reading after leak check 972.976

.010 1 min at 10 in Hg 0.01 CFM at 10 in Hg

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
9:23	NW 12	.35	.58	295	62	84	82	2	262
								975.250	
9:26	NW 11	.45	.72	294	59	84	82	2	251
								976.685	
9:29	NW 10	.50	.91	296	59	85	81	2	247
								978.245	
9:32	NW 9	.55	.90	295	60	86	81	2	241
								979.855	
9:35	NW 8	.60	.99	293	62	87	82	2.5	233
								981.565	
9:38	NW 7	.65	1.10	282	61	87	82	3	235
								983.420	
9:41	NW 6	.70	1.15	285	63	87	82	3	236
								985.235	
9:44	NW 5	.72	1.20	286	63	88	82	3	238
								987.055	
9:47	NW 4	.72	1.20	286	63	88	82	3	240
								988.910	
9:50	NW 2	.72	1.20	284	63	86	82	3	245
								990.775	
9:53	NW 2	.68	1.10	279	63	88	82	3	237
								992.545	
9:56	NW 1	.60	1.00	279	63	88	83	2.5	240
				G128	C-28			994.316	

PLANT C C San Diego hot plant

Date/Time 8/15/00 — Barometric Pressure (in. Hg.) 30.00

Test Location Ambalt hot plant — Static Pressure (in. wg.) ____

Run Number #2 Arsenic — Probe Type/Length 6'

Stack Diameter 5' 2" — Pitot Coefficient .85

Operator Shaft up — Meter Box No./Y ____

Filter No. #5 — Nozzle No./Size (in.) .233

Filter Temp (°F) ____ — Probe Heater Setting (%) ____

Impinger Volumes/Weights				Gas Composition			
Contents	Final	Initial	Net	Time	CO_2	O_2	CO
Impinger 1+2	472	200	272	8:51	6	13	
Silica gel	209.2g	200g	9.2g	9:05	6.5	13	
				9:35	5.5	13.25	
S.G.				Leak Rate		cfm	"Hg
		Total	281.2g		6.5	10.5	
Filter	Final	Initial	Net	Initial			
Weight				Final			

Ambient O_2 20.5, CO_2 0

Sample Point	Sampling Time (min.)	ΔP (in wg)	ΔH (in wg)	Gas Meter Volume (Ft³)	Temperature (°F) Stack	Imp.	Gas Meter In	Gas Meter Out	Pump Vacuum (in Hg)	√Δ
	Total		Avg.	Total	Avg.	Avg.	Avg.		Avg.	Avg

Analytical Data

~~METALS~~ CAA Method 423

~~EPA MULTIMETAL~~ METHOD

Arsenic.

CLIENT :
PROJECT: C.C. San Diego
SAMPLING DATE:
SAMPLE I.D.: Train 2

COMPOUND	D/L ppm	Filter Acetone µg/ml	DF1	µg	Imp µg/ml	DF2	µg	Total µg
Arsenic	~~0.1~~ 0.004	<0.004		<0.8	<0.004		<2	<2.8
Beryllium	0.01							
Cadmium	0.02							
Chromium	0.02							
Copper	0.01							
Nickel	0.1							
Lead	0.05							
Selenium	0.1							
Zinc	0.01							
Manganese	0.01							
Mercury	0.001							

$DF_1 = 50 \times \frac{200}{50}$

$DF_2 = 50 \times \frac{500}{50}$

Client: SHINING TREE - 90-08-172

ANALYSIS: As by AA - Water Samples

METHOD: CAR 423

ELI NO.	SAMPLE ID.	LOCATION	UNITS: mg/l (ppm)
	TEST 1-Inp		-0.0006
	TEST 2-Inp		~~-0.0011~~ -0.0011
	TEST 3-Inp		-0.0014
	TEST 1-Filter & Rinse		-0.0001
	TEST 2-Filter & Rinse		~~0~~ 0.0013
	TEST 3-Filter & Rinse		0.0004
	TEST 1-Inp -(S)		93%
	TEST 1-Inp -(DS)		78%
	FIELD Method Blank		~~-0.0009~~ -0.0012 for
	~~Detection Limit~~		

Did you remember to include QA data?, duplicate?, blank?, spike recovery?, detection limits? Thank You!

per
1/L = 50 ml / 500 ml

$(X * \frac{50}{1000} * 10) = \frac{500}{1000} = \frac{1}{2} * X$

Analyst: Benjamin/Lindsay J.
Extraction Date: 8/28
Date Reported: 9/13/90

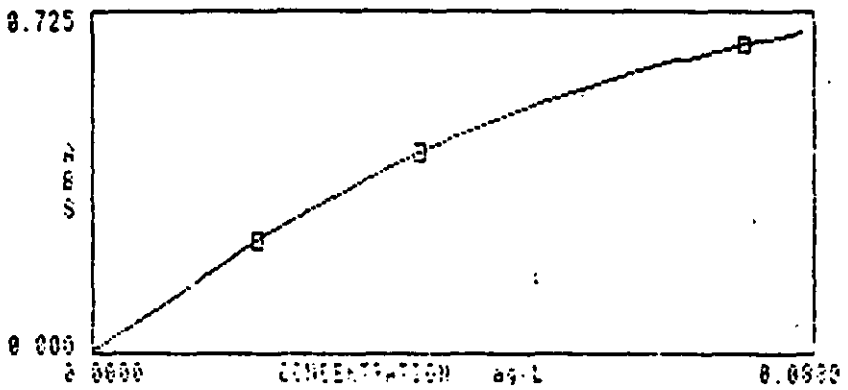
C-32

Calibration Data

OPERATOR BENJAMIN MENDOZA
DATE 9-13-90
BATCH SHINING TREE, M.I.

PROGRAM 30 As N1 Mod

SAMPLE	CONC mg/L	%RSD	MEAN ABS	READINGS		
BLANK	0.0000		0.023	0.026	0.017	0.026
STANDARD 1	0.0200	4.0	0.236	0.232	0.230	0.247
STANDARD 2	0.0400	3.1	0.420	0.422	0.432	0.407
STANDARD 3	0.0800	1.7	0.659	0.651	0.654	0.671



SAMPLE 1 BL	-.0007		57.3	-0.009	-0.007	-0.005	-0.014
SAMPLE 2 0.04 CC	0.0421		2.4	0.437	0.426	0.438	0.447
SAMPLE 3 R@	0.0443	111%	2.7	0.454	0.461	0.461	0.439
SAMPLE 4 R@	0.0431	108%	2.5	0.444	0.446	0.457	0.436
SAMPLE 5 Test(1 hr)	0.0332	83%	1.9	0.362	0.363	0.355	0.369
SAMPLE 6 Test(1 hr)	0.0310	78%	2.4	0.343	0.338	0.339	0.353
SAMPLE 7 Test	-.0012		50.8	-0.014	-0.021	-0.006	-0.016
SAMPLE 8 Test Filtered	-.0006		42.6	-0.007	-0.008	-0.010	-0.004
SAMPLE 9 Test 2 hr	.0011		47.3	-0.013	-0.008	-0.020	-0.011
SAMPLE 10 Test 5 hr	.0014		15.2	-0.017	-0.017	-0.020	-0.015
SAMPLE 11 BL	-.0017		37.0	-0.020	-0.012	-0.026	-0.023
SAMPLE 12 0.04 CC	0.0424		1.7	0.439	0.448	0.435	0.435
SAMPLE 13 Test Raw	-.0001		99.9	-0.001	0.003	-0.003	-0.002
SAMPLE 14 Test 20 Raw	0.0013		20.8	0.016	0.014	0.019	0.014
SAMPLE 15 Test 10 Raw	0.0004		27.7	0.004	0.005	0.005	0.003
SAMPLE 16 EQA-04-F	OVER						

SAMPLE	CONC mg/L			READINGS

RUN #3

Arsenic - August 16, 1990

Calculation Data

C. C. Arsenic 3

Sample I.D.: California Comercial Asphalt Plant Arsenic 3

Section I: Particulate Sampling Data

Point #	Delta P	Delta H	T S	T i	T in	T out	VAC	Filter Temp.	VEL (FPS)
A-12	0.50	0.82	267	56	79	80	10.0	255	49.1
A-11	0.60	0.99	273	56	79	80	10.0	255	53.8
A-10	0.65	1.10	279	57	79	80	5.0	256	56.1
A-9	0.70	1.15	283	60	83	81	4.0	265	58.2
A-8	0.75	1.25	285	60	84	81	3.0	260	60.3
A-7	0.80	1.30	290	61	86	81	3.0	240	62.3
A-6	0.60	0.99	288	61	87	81	3.0	263	53.9
A-5	0.50	0.82	288	61	88	82	2.5	263	49.1
A-4	0.45	0.74	290	60	88	82	2.0	267	46.6
A-3	0.40	0.65	290	61	88	82	2.0	260	43.9
A-2	0.35	0.57	287	62	89	83	2.0	269	40.9
A-1	0.30	0.49	285	63	89	83	2.0	259	37.8
B-12	0.55	0.90	290	65	86	83	2.5	195	50.7
B-11	0.45	0.74	291	64	88	84	2.0	252	46.1
B-10	0.55	0.90	293	63	89	84	3.0	265	51.1
B-9	0.60	1.00	293	62	89	85	3.0	269	53.5
B-8	0.67	1.10	293	61	90	85	3.0	247	56.7
B-7	0.75	1.25	294	60	90	84	3.0	235	60.1
B-6	0.60	0.99	292	61	91	85	3.0	268	53.7
B-5	0.50	0.82	291	62	91	85	2.5	275	49.0
B-4	0.40	0.65	291	62	91	86	2.0	275	43.9
B-3	0.32	0.51	290	64	91	86	2.0	251	39.3
B-2	0.27	0.44	285	65	91	86	2.0	234	36.0
B-1	0.20	0.33	280	64	90	86	2.0	264	31.0
AVG	0.52	0.82	288	61	87	83	3.3	256	49.3

NOMENCLATURE

Delta P = Stack gas velocity head at each sample point (in. H2O)

Delta H = Pressure differentital across orifice meter (in. H2O)

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condensor (oF)

Tin = Dry gas meter inlet temperature

Tout = Dry gas meter outlet temperature

Vac = Sample pump vacuum (in. Hg)

Filter Temp. = Temperature of front-end filter enclosure (oF)

VEL (FPS) = Actual stack velocity at each sample point

FIELD DATA SHEET

VOLUME OF CONDENSED MOISTURE

Impinger #	Gross	Tare	Net
1	286 ml	100 ml	186 ml
2	100 ml	100 ml	0 ml
3	0 ml	0 ml	0 ml
4	208 gram	200 gram	8 gram
	TOTAL CONDENSED MOISTURE		194 ml

STACK GAS MOLECULAR WEIGHT

PERCENT CARBON DIOXIDE	=	5.00
PERCENT OXYGEN	=	15.00
PERCENT CARBON MONOXIDE	=	0.00
PERCENT NITROGEN & INERTS	=	80.00

COMPONENT	VOLUME% *	MOISTURE CORR *	MOLWT =	MASS FRACTION
WATER	20.05	1.00	18.00	3.61
CARBON DIOXIDE	5.00	0.80	44.00	1.76
OXYGEN	15.00	0.80	32.00	3.84
CARBON MONOXIDE	0.00	0.80	28.00	0.00
NITROGEN & INERTS	80.00	0.80	28.00	17.91
		AVERAGE MOLECULAR WEIGHT =		27.11

C. C. Arsenic 3

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	115.636	CFT
Dry gas meter, final reading	=	152.800	CFT
Dry gas meter calibration factor	=	1.000	
Meter volume uncorrected for Temp & Press	=	37.164	CFT
Barometric pressure at site	=	30.01	in Hg
Meter pressure (barometer + average delta H)	=	30.25	in Hg
Average meter temperature during test	=	85.2	DEG F
Dry sample volume at standard conditions	=	35.837	CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	287.5	DEG F
Volume of condensed water	=	194	ml
Percent moisture of stack gas	=	20.05	%
Pitot tube correction factor	=	0.85	
Stack gas molecular weight	=	27.14	
Stack gas velocity at stack conditions	=	49.31	FT/SEC
Duration of sampling	=	72	Minute
Nozzle diameter	=	0.233	in
Percent isokinetic variation	=	101.0	%
Area of stack	=	20.97	SQ FEET
Stack flow rate, standard conditions	=	34879	DSCFM

SECTION IV SUMMARY OF QUANTITATIVE ANALYSIS
EMISSION RATE OF ARSENIC

Compound	Mass (ug)	Emission rate (10-3 lb/hr)
Arsenic	< 2.80	< 0.26

Field Data

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Air Pollution
Chemical Analysis
Research & Testing
Environmental Studies
Robotics
Toxicology

P 1 of 2

Bar Press = 30.01

FIELD TEST DATA FORM

Site: C.C. San Diego Arsenic Date: 8/16/00 Test No. #3 Arsenic CARB #23

Nozzle I.D. C-2 Diameter .233 Filter No. #8

LEAK CHECKS: Pitot tubes -- Initial ✓ OK Final _____

Sample train -- Initial ✓ OK Final _____

.005 CFM in 1 min at 10 in Hg

Initial reading 115.636

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
:00	SE-12	.50	.82	267	56	79	80	10	255
							~~117.115~~	117.115	
:03	11	.60	.99	273	56	79	80	10	255
								118.325	
:06	10	.65	1.10	279	57	79	80	5	256
								120.465	
:09	9	.70	1.15	283	60	83	81	4	265
								122.315	
:12	5	.75	1.25	295	60	84	81	3	2610
:15								124.165	
	7	.80	1.30	290	61	86	81	3	240
								126.055	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
:18	SE-6	.60	.99	288	61	87	81	3	263
								127.765	
:21	5	.50	.82	288	61	88	82	2.5	263
:24								129.315	
	4	.45	.74	290	60	88	82	2	267
:27								130.775	
	3	.40	.65	290	61	88	83	2	260
:30								132.145	
	2	.85	.57	227	62	87	83	2	269
:33								133.475	
	1	.30	.49	235	63	89	83	2	259
				G142	C-42			134.669	

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Air Pollution
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FIELD TEST DATA FORM

CARB 4

Site: C.C. San Diego Asphalt Plant Date: 8/16/90 Test No. #3 Arsenic

Nozzle I.D. E1 Diameter .233 Filter No. # 8

LEAK CHECKS: Pitot tubes -- Initial ____ Final Y

Initial Leakage 134.769 Sample train -- Initial Y Final Y

.005 CMF at 10 in Hg for 1 min ≤ 0.005 at 10 in for 1 min

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
8:40	NW-12	.55	.90	290	65	86	83	2.5	195
								136.345	
8:43	11	.45	.74	291	64	88	84	2	252
								137.965	
8:46	10	.55	.90	293	63	89	84	3	265
								139.395	
8:49	9	.60	1.00	293	62	89	85	3	269
								141.180	
8:52	9	.67	1.10	293	61	90	85	3	247
								142.840	
8:55	7	.75	1.25	294	60	90	84	3	235
								144.715	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
8:58	NW-6	.60	.99	292	61	91	85	3	268
								146.405	
9:01	5	.50	.82	291	62	91	85	2.5	275
								147.955	
9:04	4	.40	.65	291	62	91	86	2	275
								149.365	
9:07	3	.32	.51	290	64	91	86	2	251
								1510.625	
9:10	12	.27	.44	295	65	91	86	12	234
								151.775	
9:13	1	.20	.33	290	64	90	86	2	264
				G143	C-43			1152.800	

PLANT [illegible]

Date/Time 8/16/90 — Barometric Pressure (in. Hg.) _____

Test Location Asphalt Hot plant — Static Pressure (in. wg.) _____

Run Number #3 Arsenic CARB 423 — Probe Type/Length 6'

Stack Diameter 5' 2" — Pitot Coefficient .85

Operator Shaw-Pac — Meter Box No./Y _____

Filter No. #8 — Nozzle No./Size (in.) _____

Filter Temp (°F) _____ — Probe Heater Setting (%) _____

Impinger Volumes/Weights				Gas Composition			
Contents	Final	Initial	Net	Time	CO_2	O_2	CO
Imp 1+2	386	200	186	8:17	5.5	14.9	
				8:52	5	14.8	
S.G.	207.7	200	7.7	Leak Rate		cfm	"Hg
		Total	193.7				
Filter Weight	Final	Initial	Net	Initial			
				Final			

Sample Point	Sampling Time (min.)	Δ P (in wg)	Δ H (in wg)	Gas Meter Volume (Ft 3)	Temperature (°F) Stack	Imp.	Gas Meter In	Gas Meter Out	Pump Vacuum (in Hg)	$\sqrt{\Delta P}$
	Total		Avg.	Total	Avg.	Avg.	Avg.		Avg.	Avg.

Analytical Data

~~METALS~~ CAR Method 423
~~EPA MULTIMETAL METHOD~~
Arsenic

CLIENT :
PROJECT: C.C. San Diego.
SAMPLING DATE:
SAMPLE I.D.: Train 3

COMPOUND	D/L ppm	Filter + Rinse µg/ml	DF	µg	Imp µg/ml	DF	µg	Total µg
Arsenic	~~0.1~~ 0.004	<0.004	<0.8		<0.004	<2		<2.8
Beryllium	0.01							
Cadmium	0.02							
Chromium	0.02							
Copper	0.01							
Nickel	0.1							
Lead	0.05							
Selenium	0.1							
Zinc	0.01							
Manganese	0.01							
Mercury	0,001							

$DF_1 = 50 \times \frac{200}{50}$

$DF_2 = 50 \times \frac{500}{50}$

Client: SHINING TREE - 90-08-192

ANALYSIS: As by AA - Water Samples

METHOD: CAR 423

ELI NO.	SAMPLE ID.	LOCATION	UNITS: mg/l (ppm)
	TEST 1 - Imp		-0.0006
	TEST 2 - Imp		~~-0.0011~~ -0.0011
	TEST 3 - Imp		-0.0014
	TEST 1 - Filter & Rinse		-0.0001
	TEST 2 - Filter & Rinse		~~0~~ 0.0013
	TEST 3 - Filter & Rinse		0.0004
	TEST 1 - Imp - (S)		93%
	TEST 1 - Imp - (ds)		78%
	FIELD Method Blank		~~-0.0009~~ -0.0012
	~~Detection Limit~~		

Did you remember to include QA data?, duplicate?, blank?, spike recovery?, detection limits? Thank You!

Imp ppm
1/L = 50 ml / 500 ml

$(X + \frac{50}{1000} \times 10) - \frac{500}{1000} = \frac{1}{L} \times X$

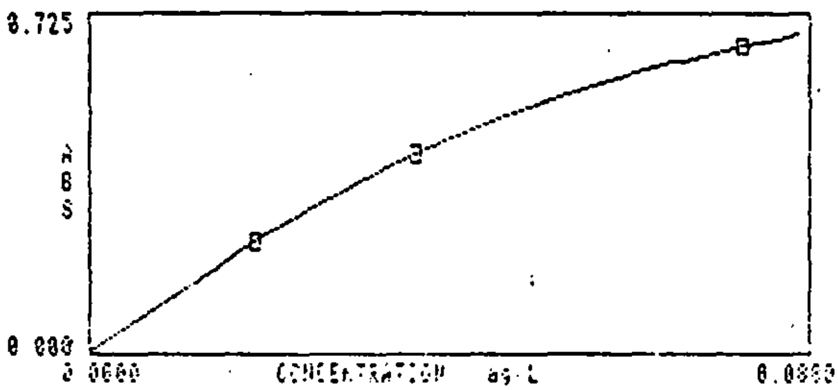
Analyst: Benjamin Hodges J.
Extraction Date: 8/28
Date Reported: 9/13/90

Calibration Data

OPERATOR BENJAMIN MENDOZA
DATE 9-13-90
BATCH SHINING TREE, M.I.

PROGRAM 30 As Ni Mod

SAMPLE	CONC mg/L	%RSD	MEAN ABS	READINGS		
BLANK	0.0000		0.023	0.026	0.017	0.0[illegible]5
STANDARD 1	0.0200	4.0	0.236	0.232	0.230	0.2[illegible]7
STANDARD 2	0.0400	3.1	0.420	0.422	0.432	0.407
STANDARD 3	0.0800	1.7	0.659	0.651	0.654	0.671



SAMPLE 1 [illegible]	-.0007	57.3	-0.009	-0.007	-0.005	-0.014
SAMPLE 2 0.04	.0431	2.4	[illegible]	0.426	0.438	0.447
SAMPLE 3 [illegible]	0.0443 111%	2.7	0.454	0.461	0.461	0.439
SAMPLE 4 [illegible]	0.0431 108%	2.5	0.444	0.440	0.457	0.436
SAMPLE 5 [illegible]	0.0332 83%	1.9	0.362	0.363	0.355	0.369
SAMPLE 6 [illegible]	0.0310 78%	2.4	0.343	0.338	0.339	0.353
SAMPLE 7 [illegible]	-.0012	50.8	-0.014	-0.021	-0.006	-0.016
SAMPLE 8 [illegible]	-.0006	42.8	-0.007	-0.008	-0.010	-0.004
SAMPLE 9 [illegible]	.0011	47.5	-0.01[illegible]	-0.008	-0.020	-0.011
SAMPLE 10 [illegible]	.0014	15.2	-0.017	-0.017	-0.020	-0.015
SAMPLE 11 BL	-.0017	37.0	-0.020	-0.012	-0.026	-0.022
SAMPLE 12 0.04	0.0424	1.7	0.439	0.448	0.435	0.435
SAMPLE 13 [illegible] FAW	-.0001	99.9	-0.001	0.003	-0.003	-0.002
SAMPLE 14 [illegible]	.0013	20.8	0.016	0.014	0.019	0.014
SAMPLE 15 [illegible] FAW	.0004	[illegible]	[illegible]	0.005	0.005	0.003
SAMPLE 16 FSW 269-0A-F	OVER	[illegible]	[illegible]	[illegible]	[illegible]	0.8485

SAMPLE CONC mg/L %RSD MEAN ABS READINGS

APPENDIX D

Chromium Data and Calculations

FIELD BLANK

Analytical Data

C.C. San Diego Chromium & Hexavalent Chromium Field Blank

SUMMARY OF QUANTITATIVE ANALYSIS

Chromium	Mass (ug)
Chromium	0.54
Hexavalent Chromium	< 2.00

NOTE: "<" = less than

~~METALS~~ CARB Method 425
EPA ~~MULTIMETAL METHOD~~ Cr & Cr+6

CLIENT :
PROJECT: Cr. San Diego
SAMPLING DATE:
SAMPLE I.D.: Train Field BK

	COMPOUND	D/L ppm	Filter Rinse µg/ml	µg	Impingers µg/ml	µg	Total µg
	Arsenic	0.1					
	Beryllium	0.01					
	Cadmium	0.02					
DF1	Chromium	~~0.02~~ 0.004	0.054	0.54	<0.004	<0.4	0.54
	Copper	0.01					
	Nickel	0.1					
	Lead	0.05					
	Selenium	0.1					
	Zinc	0.01					
	Manganese	0.01					
DF2	Mercury	0.001					
Lab	Cr^{+6}	0.005	<0.005	<1	<0.005	<1	<2

RUN #1

Chromium - August 15, 1990

Calculation Data

C. C. Chromium and Hexavalent Chromium 1

Sample I.D.: C. C. Asphalt Plant CARB 425 Chromium & Hexvalent Chromium 1

Section I: Particulate Sampling Data

Point #	Delta P	Delta H	T S	T i	T in	T out	VAC	Filter Temp.	VEL (FPS)
A-12	0.35	0.58	276	67	82	84	2.0	215	41.7
A-11	0.50	0.82	276	66	83	84	2.0	211	49.8
A-10	0.54	0.88	278	66	84	83	2.0	233	51.9
A-9	0.65	1.05	284	67	86	84	2.5	216	57.4
A-8	0.65	1.05	281	68	87	83	2.5	235	57.4
A-7	0.63	1.05	282	68	88	84	2.5	241	56.5
A-6	0.72	1.15	286	70	89	84	2.5	238	60.3
A-5	0.70	1.15	283	69	89	84	3.0	240	59.3
A-4	0.82	1.35	282	70	88	84	3.0	243	64.0
A-3	0.95	1.55	280	71	90	85	3.0	238	68.7
A-2	1.00	1.60	274	72	90	84	3.0	247	69.9
A-1	0.75	1.25	274	73	91	85	2.5	257	60.5
B-12	0.65	1.05	277	64	88	85	2.5	257	56.7
B-11	0.72	1.17	278	63	89	85	2.5	243	59.7
B-10	0.50	0.82	282	64	90	86	2.0	256	49.8
B-9	0.55	0.90	292	64	92	86	2.0	240	52.5
B-8	0.60	0.99	294	63	92	86	2.0	244	54.7
B-7	0.75	1.20	293	63	92	86	2.5	243	61.2
B-6	0.90	1.45	290	63	92	87	3.0	269	67.2
B-5	0.90	1.45	286	61	92	86	3.0	274	67.1
B-4	0.75	1.20	281	63	92	86	3.0	252	61.2
B-3	0.65	1.05	279	63	92	87	2.5	254	56.9
B-2	0.45	0.74	266	64	89	86	2.0	273	47.2
B-1	0.30	0.48	264	63	90	87	2.0	252	38.5
AVG	0.67	1.04	276	66	89	85	2.5	245	57.1

NOMENCLATURE

Delta P = Stack gas velocity head at each sample point (in. H2O)

Delta H = Pressure differentital across orifice meter (in. H2O)

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condensor (oF)

Tin = Dry gas meter inlet temperature

Tout = Dry gas meter outlet temperature

Vac = Sample pump vacuum (in. Hg)

Filter Temp. = Temperature of front-end filter enclosure (oF)

VEL (FPS) = Actual stack velocity at each sample point

FIELD DATA SHEET

VOLUME OF CONDENSED MOISTURE

Impinger #	Gross	Tare	Net
1	274 ml	100 ml	174 ml
2	200 ml	100 ml	100 ml
3	0 ml	0 ml	0 ml
4	211 gram	200 gram	11 gram
	TOTAL CONDENSED MOISTURE		285 ml

STACK GAS MOLECULAR WEIGHT

PERCENT CARBON DIOXIDE	=	5.50
PERCENT OXYGEN	=	12.50
PERCENT CARBON MONOXIDE	=	0.00
PERCENT NITROGEN & INERTS	=	82.00

COMPONENT	VOLUME%	• MOISTURE CORR	• MOLWT =	MASS FRACTION
WATER	24.65	1.00	18.00	4.44
CARBON DIOXIDE	5.50	0.75	44.00	1.82
OXYGEN	12.50	0.75	32.00	3.01
CARBON MONOXIDE	0.00	0.75	28.00	0.00
NITROGEN & INERTS	82.00	0.75	28.00	17.30
		AVERAGE MOLECULAR WEIGHT =		26.57

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	994.526 CFT
Dry gas meter, final reading	=	1036.650 CFT
Dry gas meter calibration factor	=	1.000
Meter volume uncorrected for Temp & Press	=	42.124 CFT
Barometric pressure at site	=	30.05 in Hg
Meter pressure (barometer + average delta H)	=	30.23 in Hg
Average meter temperature during test	=	87.0 DEG F
Dry sample volume at standard conditions	=	40.460 CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	275.5 DEG F
Volume of condensed water	=	285 ml
Percent moisture of stack gas	=	24.65 %
Pitot tube correction factor	=	0.85
Stack gas molecular weight	=	25.94
Stack gas velocity at stack conditions	=	56.89 FT/SEC
Duration of sampling	=	72 Minute
Nozzle diameter	=	0.233 in
Percent isokinetic variation	=	103.3 %
Area of stack	=	20.97 SQ FEET
Stack flow rate, standard conditions	=	38520 DSCFM

SECTION IV SUMMARY OF QUANTITATIVE ANALYSIS
EMISSION RATE OF CHROMIUM AND HEXAVALENT CHROMIUM

Compound		Mass (ug)		Emission rate (10-3 lb/hr)
Chromium		56.76		7.14
Hexavalent Chromium	<	2.00	<	0.25

Field Data

EUREKA LABORATORIES, INC.

Corporate Office
6790 FLORIN PERKINS ROAD
SACRAMENTO, CA 95828
TEL: (916) 381-7953
FAX: (916) 381-4013

Branch Office
12121 NORTHUP WAY, SUITE 212
BELLEVUE, WA 98005
TEL: (206) 885-0284
FAX: (206) 885-6162

Chemical Analysis
Research & Testing
Environmental Studies
Hazardous
Toxicology

$D_p = 30.05$ in

FIELD TEST DATA FORM

Site: C.C. San Diego Asphalt plant Date: 8/15/90 Test No. #1 CARB 40 CFR Part 60

Nozzle I.D. E1 Diameter .233 Filter No. #6

LEAK CHECKS: Pitot tubes -- Initial YOK Final _____

Initial Ready

Sample train -- Initial YOK Final _____

994.526 994.713 .010 CFM Hg@ 1 min at 10 in Hg

TIME	PT #	ΔP	ΔH	T_s	T_i	T_{IN}	T_{OUT}	VAC	TEMP
10:45	SE 12	.35	.59	276	67	92	84	2	215
								995.815	
10:48	SE 11	.50	.82	276	66	83	84	2	211
								997.335	
10:51	SE 10	.54	.88	278	66	84	83	2	233
								998.915	
10:54	SE 9	.65	1.05	284	67	86	84	2.5	216
								1000.715	
10:57	SE 8	.65	1.05	291	69	87	83	2.5	235
								1002.515	
11:00	SE 7	.63	1.05	282	68	88	84	2.5	241
								1004.335	

TIME	PT #	ΔP	ΔH	T_s	T_i	T_{IN}	T_{OUT}	VAC	TEMP
11:03	SE 6	.72	1.15	281	70	89	84	2.5	238
								1006.135	
11:06	SE 5	.70	1.15	283	69	89	84	3	240
								1008.100	
11:09	SE 4	.82	1.35	252	70	88	84	3	243
								1010.120	
11:12	SE 3	.95	1.55	280	71	90	85	3	238
								1012.110	
11:15	SE 2	1.00	1.60	274	72	90	84	.5	247
								1014.125	
11:18	SE 1	.75	1.25	274	73	91	85	2.5	257
	✓							1016.080	

EUREKA LABORATORIES, INC.

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Branch Office
12121 NORTHUP WAY SUITE 212
BELLEVUE WA 98005
TEL (206) 885-0264
FAX (206) 885-6162

30.05 in H_2O

FIELD TEST DATA FORM

Site: C.C. San Diego Asphalt plant Date: 8/15/90 Test No. #1 Chromic + Cr^{+6}

Nozzle I.D. E1 Diameter .233 Filter No. #6

LEAK CHECKS: Pitot tubes -- Initial ____ Final ____

Sample train -- Initial Y OK Final Y

0.005 in 1 min at 10 in Hg

0.010 1 mi at 10

Initial Reading after leak check 1016.159

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
11:25	NW 12	.65	1.05	277	64	88	85	2.5	257
								1017.915	
11:28	NW 11	.72	1.17	278	63	89	85	2.5	243
								1019.655	
11:31	NW 10	.58	.82	282	64	90	86	2	256
								1021.265	
11:34	NW 9	.55	.90	292	64	92	86	2	240
								1022.855	
11:37	NW 8	.60	.94	294	63	92	86	2	244
								1024.685	
11:40	NW 7	.75	1.20	293	63	92	86	2.5	243
								1026.415	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
11:43	NW 6	.90	1.45	290	63	92	87	3	269
								1028.425	
11:46	NW 5	.90	1.45	286	61	92	86	3	274
								1030.440	
11:49	NW 4	.75	1.20	281	63	92	86	3	252
								1032.265	
11:52	NW 3	.65	1.05	279	63	92	87	2.5	254
								1033.910	
11:55	NW 2	.45	.74	266	64	89	86	2	272
								1035.525	
11:58	NW 1	.30	.48	264	63	90	87	2	252
				G162	D-13			1036.650	

Date/Time 8/15/90 | Barometric Pressure (in. Hg.) 30.05

Test Location Assist Hot shot | Static Pressure (in. wg.) ____

Run Number #1 CTP3 425 | Probe Type/Length 6'

Stack Diameter 5' 2" | Pitot Coefficient .85

Operator Shao-Zi YD | Meter Box No./Y ____

Filter No. ____ | Nozzle No./Size (in.) .235

Filter Temp (°F) ____ | Probe Heater Setting (%) ____

Impinger Volumes/Weights				Gas Composition			
Contents	Final	Initial	Net	Time	CO_2	O_2	CO
water 1+2	474	200	274	11:15	5.5	11.5	
Silicagel	211.3	200	11.3	11:55	5.5	12.5	
S.G.				Leak Rate		cfm	"Hg
		Total	285.3				
Filter Weight	Final	Initial	Net	Initial			
				Final			

Cr^{+3} 0.028
Cr^{+6} 0.000

Sample Point	Sampling Time (min.)	ΔP (in wg)	ΔH (in wg)	Gas Meter Volume (Ft^3)	Temperature (°F) Stack	Imp.	Gas Meter In	Gas Meter Out	Pump Vacuum (in Hg)	$\sqrt{\Delta P}$
	Total		Avg.	Total	Avg.	Avg.	Avg.		Avg.	Avg

Analytical Data

CARB METHOD 425
~~METALS~~
EPA MULTIMETAL METHOD
CHROMIUM & HEXAVALENT CHROMIUM

CLIENT :
PROJECT: CC Asphalt Plant
SAMPLING DATE:
SAMPLE I.D.: Train

COMPOUND	D/L ppm	Front (µg/mL)	µg/mL x DF mass (µg)	Conc I (µg/mL)	µg/mL x DF mass (µg)	Total µg
Arsenic	0.1					
Beryllium	0.01					
Cadmium	0.02					
* Chromium	~~0.02~~ 0.004	0.56	56	0.0076	0.76	56.76
Copper	0.01					
Nickel	0.1					
Lead	0.05					
Selenium	0.1					
Zinc	0.01					
Manganese	0.01					
Mercury	0.001					
** CR+6	0.005	<0.005	<1.0	<0.005	<1	<2

* DF = 50 x 2 = 100

** DF = 100 x 2 = 200

CLIENT: [illegible]

ANALYSIS: CR by AA

METHOD: CAR 425

ELI NO.	SAMPLE ID.	LOCATION	UNITS: mg/Kg OR mg/l (ppm)
	FIELD BK		0.0054
	#92 FILTER-1		0.1460 \ sum + 50/100
	RINSE-1		4.1400 0.41+ .02938 mg
	IMPINGER-1		0.0076 /
	FILTER-2		0.0211 \
	RINSE-2		0.2900 | .016005 mg
	IMPINGER-2		0.0090 /
	FILTER-3		0.2060 \
	RINSE-3		0.3860 | .02985 mg
	IMPINGER-3		0.0050 /
	REAGENT ③		104%
	REAGENT ⑤		103%
	METHOD BLANK		0.0000
	D/L		

Did you remember to include QA data?, duplicate?, blank?, spike recovery?, detection limits? Thank You!

Analyst : Benjamin Madrigal

Date : 10/11/90

CLIENT DINING TEC (90-08-172)

TEST CR +6

METHOD CAR 425

SAMPLE I.D.	ABSORBANCE	CONCENTRATION
BLANK	0.000	0.000 ppm
STANDARD 1	0.007	0.005 ppm
STANDARD 2	0.011	0.010 ppm
STANDARD 3	0.024	0.025 ppm
STANDARD 4	0.056	0.050 ppm
STANDARD 5	0.074	0.075 ppm
STANDARD 6	0.092	0.100 ppm
REAGENT SPIKE	0.047	0.046 ppm 96%
REAGENT DUP SPIKE	0.060	0.061 ppm 122%
FIELD BLANK	0.005	0.003 ppm
192-12A (IMP-1)	<0.007	<.005 ppm
192-13A (IMP-2)	<0.007	<.005 ppm
192-14A (IMP-3)	0.004	0.002 ppm
192-15A (FILTER-1)	0.002	0.001 ppm
192-16A (FILTER-2)	0.003	0.001 ppm
192-17A (FILTER-3)	<0.007	<0.005 "
192-18A (RINSE-1)	<0.007	<0.005
192-19A (RINSE-2)	<0.007	<0.005
192-20A (RINSE-3)	<0.007	<0.005

Benjamin V. Mendoza

ANALYST

9/25/90

DATE

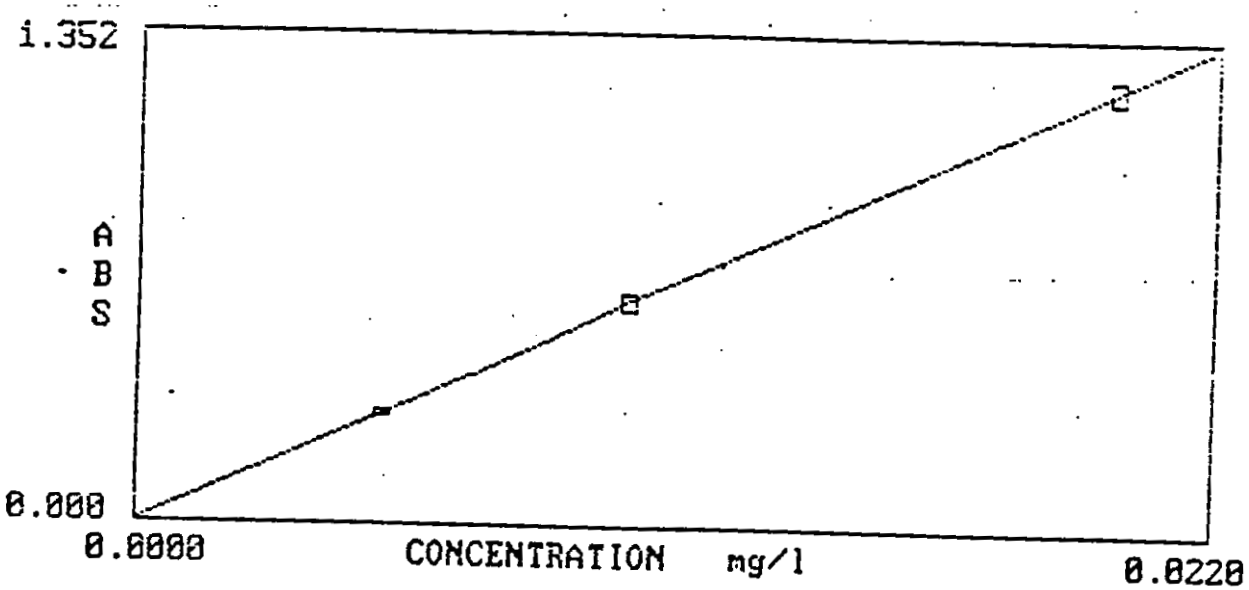
Calibration Data

EUREKA LABORATORIES, INC.

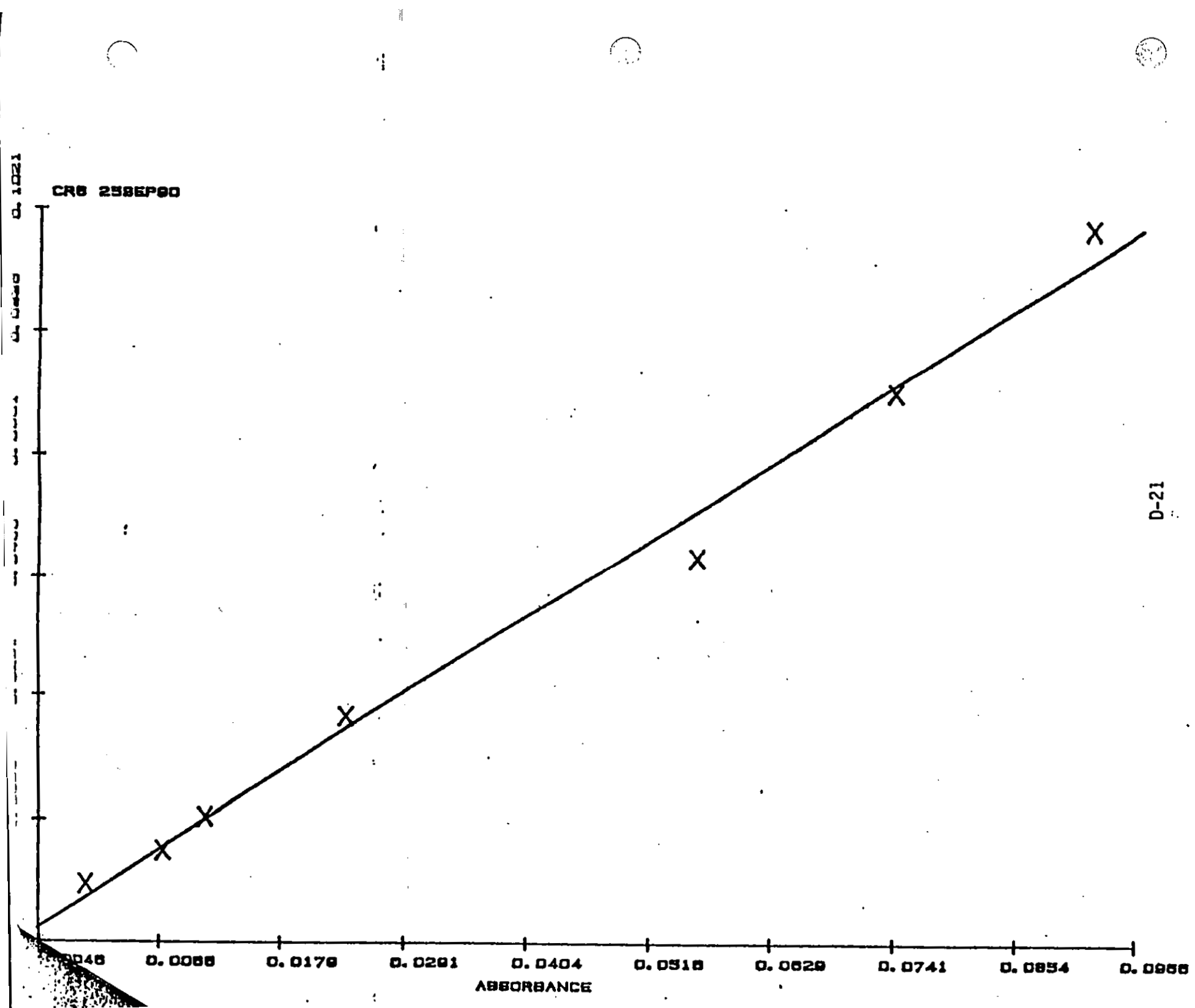
OPERATOR tamara jerome
DATE 10-08-90
BATCH CR

PROGRAM 9 Cr

SAMPLE	CONC mg/l	%RSD	MEAN ABS	READINGS	
BLANK	0.0000		0.028	0.031	0.026
STANDARD 1	0.0050	1.0	0.302	0.304	0.300
STANDARD 2	0.0100	2.0	0.628	0.637	0.620
STANDARD 3	0.0200	2.1	1.229	1.211	1.247



SAMPLE 1 ICV	0.0111	0.8	0.698	0.694	0.702
SAMPLE 2 ICB	-.0000	63.6	-0.003	-0.002	-0.005
SAMPLE 3 Reag (S)	OVER	1.9	2.464*	2.497*	2.431*
SAMPLE 4 Reag (SS)	OVER	1.9	2.620*	2.585*	2.656*
SAMPLE 5 101-1 (S)	OVER	3.6	2.306*	2.364*	2.248*
SAMPLE 6 101-1 (SS)	OVER	0.0	2.320*	2.321*	2.319*
SAMPLE 7 101-BK	.0022	38.9	0.136	0.170	0.101
SAMPLE 8 101-1	OVER	0.5	1.789	1.782	1.795


CR8 2586P80
0.1021
0.0066
0.0179
0.0291
0.0404
0.0516
0.0629
0.0741
0.0854
0.0966
ABSORBANCE
D-21
G170

RUN #2

Chromium - August 15, 1990

Calculation Data

C. C. Chromium & Hexvalent Chromium 2

Sample I.D.: C. C. Asphalt Plant CARB 425 Chromium & Hexavalent

Section I: Particulate Sampling Data

Point #	Delta P	Delta H	T S	T i	T in	T out	VAC	Filter Temp.	VEL (FPS)
A-12	0.50	0.74	240	67	83	84	2.0	209	49.8
A-11	0.60	0.99	251	62	85	84	2.0	225	54.6
A-10	0.65	1.05	260	63	87	85	2.0	239	56.8
A-9	0.73	1.20	269	64	88	85	2.5	243	60.3
A-8	0.80	1.30	272	66	90	85	2.5	242	63.1
A-7	0.85	1.40	274	67	90	85	2.5	245	64.8
A-6	0.80	1.30	275	67	91	85	2.5	250	62.5
A-5	0.68	1.10	276	68	91	85	3.0	216	57.7
A-4	0.62	1.00	275	68	90	85	3.0	225	55.1
A-3	0.60	0.99	275	68	90	85	3.0	237	54.2
A-2	0.35	0.57	278	70	91	87	3.0	237	41.2
A-1	0.30	0.48	278	70	92	87	2.5	249	38.1
B-12	0.45	0.74	286	70	89	86	2.5	206	45.8
B-11	0.50	0.82	286	69	90	86	2.5	216	48.7
B-10	0.55	0.90	286	69	90	86	2.0	202	51.4
B-9	0.55	0.90	288	70	91	87	2.0	211	51.7
B-8	0.65	1.05	288	70	92	87	2.0	212	56.3
B-7	0.75	1.25	282	70	93	87	2.5	216	60.5
B-6	0.80	1.30	274	70	93	87	3.0	214	62.6
B-5	0.74	1.20	275	70	93	87	3.0	208	60.2
B-4	0.70	1.15	276	69	92	88	3.0	203	58.5
B-3	0.70	1.15	274	70	92	88	2.5	226	58.5
B-2	0.55	0.90	268	71	91	88	2.0	223	52.0
B-1	0.35	0.57	268	71	91	88	2.0	204	41.5
AVG	0.62	0.96	282	68	90	86	2.5	223	54.4

NOMENCLATURE

Delta P = Stack gas velocity head at each sample point (in. H2O

Delta H = Pressure differentital across orifice meter (in. H2O)

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condensor (oF)

Tin = Dry gas meter inlet temperature

Tout = Dry gas meter outlet temperature

Vac = Sample pump vacuum (in. Hg)

Filter Temp. = Temperature of front-end filter enclosure (oF)

VEL (FPS) = Actual stack velocity at each sample point

FIELD DATA SHEET

VOLUME OF CONDENSED MOISTURE

Impinger #	Gross	Tare	Net
1	273 ml	100 ml	173 ml
2	200 ml	100 ml	100 ml
3	0 ml	0 ml	0 ml
4	210 gram	200 gram	10 gram
	TOTAL CONDENSED MOISTURE		283 ml

STACK GAS MOLECULAR WEIGHT

PERCENT CARBON DIOXIDE	=	5.50
PERCENT OXYGEN	=	15.00
PERCENT CARBON MONOXIDE	=	0.00
PERCENT NITROGEN & INERTS	=	79.50

COMPONENT	VOLUME%	• MOISTURE CORR	• MOLWT =	MASS FRACTION
WATER	25.11	1.00	18.00	4.52
CARBON DIOXIDE	5.50	0.75	44.00	1.81
OXYGEN	15.00	0.75	32.00	3.59
CARBON MONOXIDE	0.00	0.75	28.00	0.00
NITROGEN & INERTS	79.50	0.75	28.00	16.67
		AVERAGE MOLECULAR WEIGHT =		26.60

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	36.956 CFT
Dry gas meter, final reading	=	77.754 CFT
Dry gas meter calibration factor	=	1.000
Meter volume uncorrected for Temp & Press	=	40.798 CFT
Barometric pressure at site	=	30.05 in Hg
Meter pressure (barometer + average delta H)	=	30.23 in Hg
Average meter temperature during test	=	88.2 DEG F
Dry sample volume at standard conditions	=	39.106 CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	282.0 DEG F
Volume of condensed water	=	283 ml
Percent moisture of stack gas	=	25.11 %
Pitot tube correction factor	=	0.85
Stack gas molecular weight	=	26.22
Stack gas velocity at stack conditions	=	54.70 FT/SEC
Duration of sampling	=	72 Minute
Nozzle diameter	=	0.233 in
Percent isokinetic variation	=	105.4 %
Area of stack	=	20.97 SQ FEET
Stack flow rate, standard conditions	=	36489 DSCFM

SECTION IV SUMMARY OF QUANTITATIVE ANALYSIS
EMISSION RATE OF CHROMIUM AND HEXAVALENT CHROMIUM

Compound		Mass (ug)		Emission rate (10-3 lb/hr)
Chromium		32.00		3.94
Hexavalent Chromium	<	2.00	<	0.25

Field Data

EUREKA LABORATORIES, INC.

Corporate Office:
6790 FLORIN PERKINS ROAD
SACRAMENTO, CA 95828
TEL: (916) 381-7953
FAX: (916) 381-4013

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TEL: (206) 885-0284
FAX: (206) 885-6162

Air Pollution
Chemical Analysis
Research & Testing
Environmental Studies
Robotics
Toxicology

O_2 : 15%

FIELD TEST DATA FORM

Site: C.C. San Diego Asphalt Hot plant Date: 8/15/90 Test No. #2 CARB 425 Cr + Cr^{+6}

Nozzle I.D. E1 Diameter 0.233 Filter No. # 7

LEAK CHECKS: Pitot tubes -- Initial Y OK Final _____

Initial Reading 36.956

Sample train -- Initial Y OK Final _____

.005 10 in Hg in 1 min

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
12:50	SE-12	.5	.74	240	67	83	84	2	209
								38.365	
12:53	SE-11	.60	.99	251	62	85	84	2	225
								40.035	
12:56	SE-10	.65	1.05	260	63	87	85	2.5	239
								41.785	
12:59	SE-9	.73	1.20	269	64	88	85	3	243
								43.635	
1:02	SE 8	.80	1.30	272	66	90	85	3	248
								45.575	
1:05	SE 7	.85	1.40	274	67	90	85	3	245
								46.90	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
1:08	SE 6	.80	1.30	275	67	91	85	2.5	250
								49.595	
1:11	SE 5	.68	1.10	276	68	91	85	2.5	216
								51.275	
1:14	SE 4	.62	1.00	275	68	90	85	2	225
								52.985	
1:17	SE 3	.60	.99	275	68	90	85	2	237
								54.695	
1:20	SE 12	.35	.57	278	70	91	87	2	237
								56.045	
1:23	SE 1	.30	.48	279	70	92	87	1	249
				G178	D-29			57.274	

EUREKA LABORATORIES, INC.

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FAX (206) 885-6162

Chemical Analysis
Research & Testing
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Reports
Toxicology

FIELD TEST DATA FORM

Site: C.C. San Diego Asphalt Hot plant Date: 8/15/90 Test No. #2 CARB 425 C+C-6

Nozzle I.D. E1 Diameter 0.233 Filter No. #7

LEAK CHECKS: Pitot tubes -- Initial ____ Final Y

Sample train -- Initial Y OK Final .010 CFM 1 min at 10 in Hg

Initial Reading after leak check 57.374

.005 CFM 1 min at 10 Hg

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
1:30	NW-12	.45	.74	286	70	89	86	2	206
								58.845	
1:33	NW-11	.50	.82	286	69	90	86	2	216
								60.395	
1:36	NW-10	.55	.90	286	69	90	86	2	202
								62.035	
1:39	NW-9	.55	.90	1288	70	91	87	2	211
								63.780	
1:42	NW-8	.65	1.05	1288	70	92	87	2.5	212
								65.415	
1:45	NW-7	.75	1.25	282	70	93	87	3	216
								67.301	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
1:48	NW-6	.80	1.30	1274	70	93	87	3	214
								69.255	
1:51	NW-5	.74	1.20	275	70	93	87	2.5	208
								71.085	
1:54	NW-4	.70	1.15	276	69	92	88	2.5	203
								72.925	
1:57	NW-3	.70	1.15	274	70	92	88	2.5	226
								74.715	
2:00	NW-2	.55	.90	268	71	91	88	2.5	223
								76.395	
2:03	NW-1	.35	.57	274	71	91	88	2	204
				G179	D-30			77.754	

PLANT C.C. Sanders Asphalt Hot Plant

Date/Time 8/15/90

Barometric Pressure (in. Hg.) 30.05

Test Location Asphalt Hot plant

Static Pressure (in. wg.) _____

Run Number #2 CARB 425

Probe Type/Length 6 Foot

Stack Diameter 5' 2"

Pitot Coefficient .85

Operator Shaw-Pi

Meter Box No./Y _____

Filter No. _____

Nozzle No./Size (in.) .233

Filter Temp (°F) _____

Probe Heater Setting (%) _____

Impinger Volumes/Weights			
Contents	Final	Initial	Net
imp 1+2	473	200	273
S.G.	209.6	200	9.6
		Total	282.6

Filter	Final	Initial	Net
Weight			

Gas Composition			
Time	CO_2	O_2	CO
1:00	4.8	15	
1:40	5	14.8	
2:05	4	15.5	
Leak Rate		cfm	"Hg
Initial			
Final			

C_f e.o 1.6005
C_M 0.0005

Sample Point	Sampling Time (min.)	ΔP (in wg)	ΔH (in wg)	Gas Meter Volume (Ft³)	Temperature (°F) Stack	Imp.	Gas Meter In	Gas Meter Out	Pump Vacuum (in Hg)	√ΔP
	Total		Avg.	Total	Avg.	Avg.	Avg.		Avg.	Avg

Analytical Data

~~METALS~~ CARB Method 425
~~EPA MULTIMETAL METHOD~~
Cr + Cr^{+6}

CLIENT :
PROJECT: C.C. San Diego
SAMPLING DATE:
SAMPLE I.D.: Train 2

	COMPOUND	D/L ppm	Filter + Rinse µg/ml	µg	Impinger µg/ml	µg	Total µg
	Arsenic	0.1					
	Beryllium	0.01					
	Cadmium	0.02					
DF1	Chromium	~~0.02~~ 0.004	0.311	31.1	0.009	0.9	32.0
	Copper	0.01					
	Nickel	0.1					
	Lead	0.05					
	Selenium	0.1					
	Zinc	0.01					
	Manganese	0.01					
	Mercury	0.001					
DF2	Cr^{+6}	0.005	<0.005	<1	<0.005	<1	<2

$DF_1 = 50 \times 2 = 100$

$DF_2 = 100 \times 2 = 200$

Client: SHINING TREE (70-66-176)

ANALYSIS: CR by AA

METHOD: CAR 425

ELI NO.	SAMPLE ID.	LOCATION	UNITS: mg/Kg OR mg/l (ppm)
	FIELD BK		0.0054
	+92 FILTER-1		0.1460 \ Sum = 50/100
	RINSE-1		4.1400 0.414 .02838 mg
	IMPINGER-1		0.0096 /
	FILTER-2		0.0211 \
	RINSE-2		0.2900 / .016005 mg
	IMPINGER-2		0.0090 /
	FILTER-3		0.2060 \
	RINSE-3		0.3860 / .02985 mg
	IMPINGER-3		0.0050 /
	REAGENT ③		104%
	REAGENT ⑤		103%
	METHOD BLANK		0.0000
	D/L		

Did you remember to include QA data?, duplicate?, blank?, spike recovery?, detection limits? Thank You!

Analyst : Benjamin Madrigal

Date : 10/11/90

CLIENT SHINING TREE (90-08-172)

TEST CR +6

METHOD CAR 425

SAMPLE I.D.	ABSORBANCE	CONCENTRATION
BLANK	0.000	0.000 ppm
STANDARD 1	0.007	0.005 ppm
STANDARD 2	0.011	0.010 ppm
STANDARD 3	0.024	0.025 ppm
STANDARD 4	0.056	0.050 ppm
STANDARD 5	0.074	0.075 ppm
STANDARD 6	0.092	0.100 ppm
REAGENT SPIKE	0.047	0.048 ppm 96%
REAGENT DUP SPIKE	0.060	0.061 ppm 122%
FIELD BLANK	0.005	0.003 ppm
192-12A (MW-1)	<0.007	<.005 ppm
192-13A (MW-2)	<0.007	<.005 ppm
192-14A (MW-3)	0.004	0.002 ppm
192-15A (FILTER-1)	0.002	0.001 ppm
192-16A (FILTER-2)	0.005	0.001 ppm
192-17A (FILTER-3)	<0.007	<0.005
192-18A (RINSE-1)	<0.007	<0.005
192-19A (RINSE-2)	<0.007	<0.005
192-20A (RINSE-3)	<0.007	<0.005

Benjamin Valentine
ANALYST

9/25/90
DATE

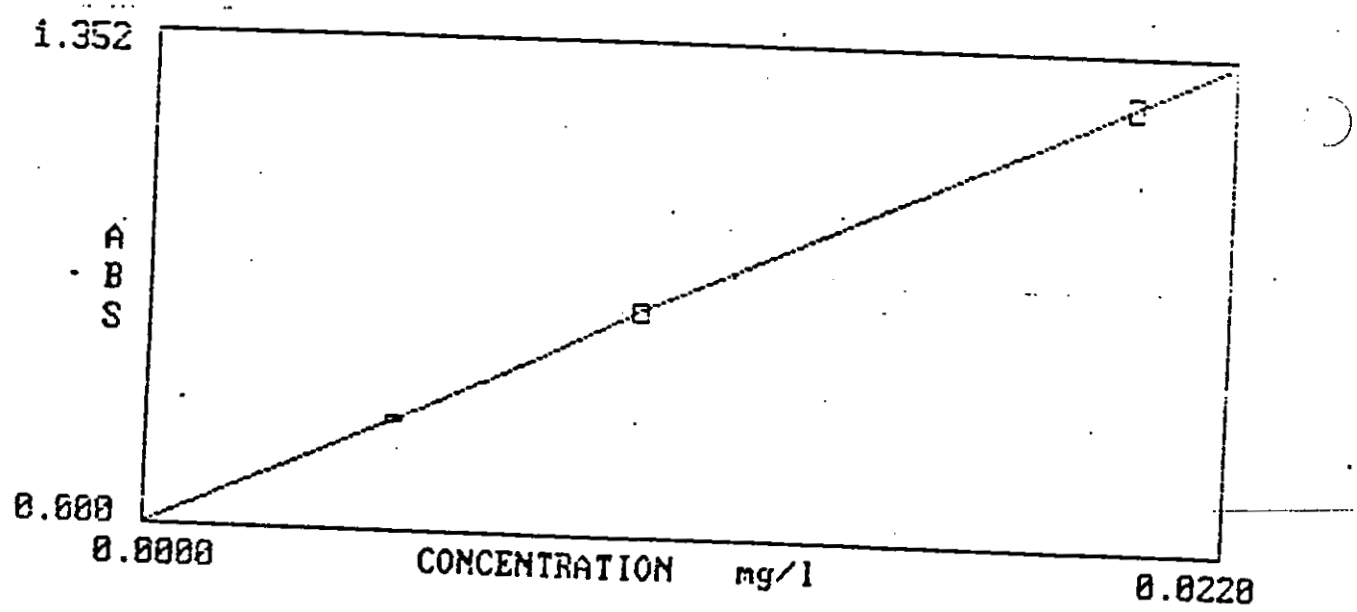
Calibration Data

EUREKA LABORATORIES, INC.

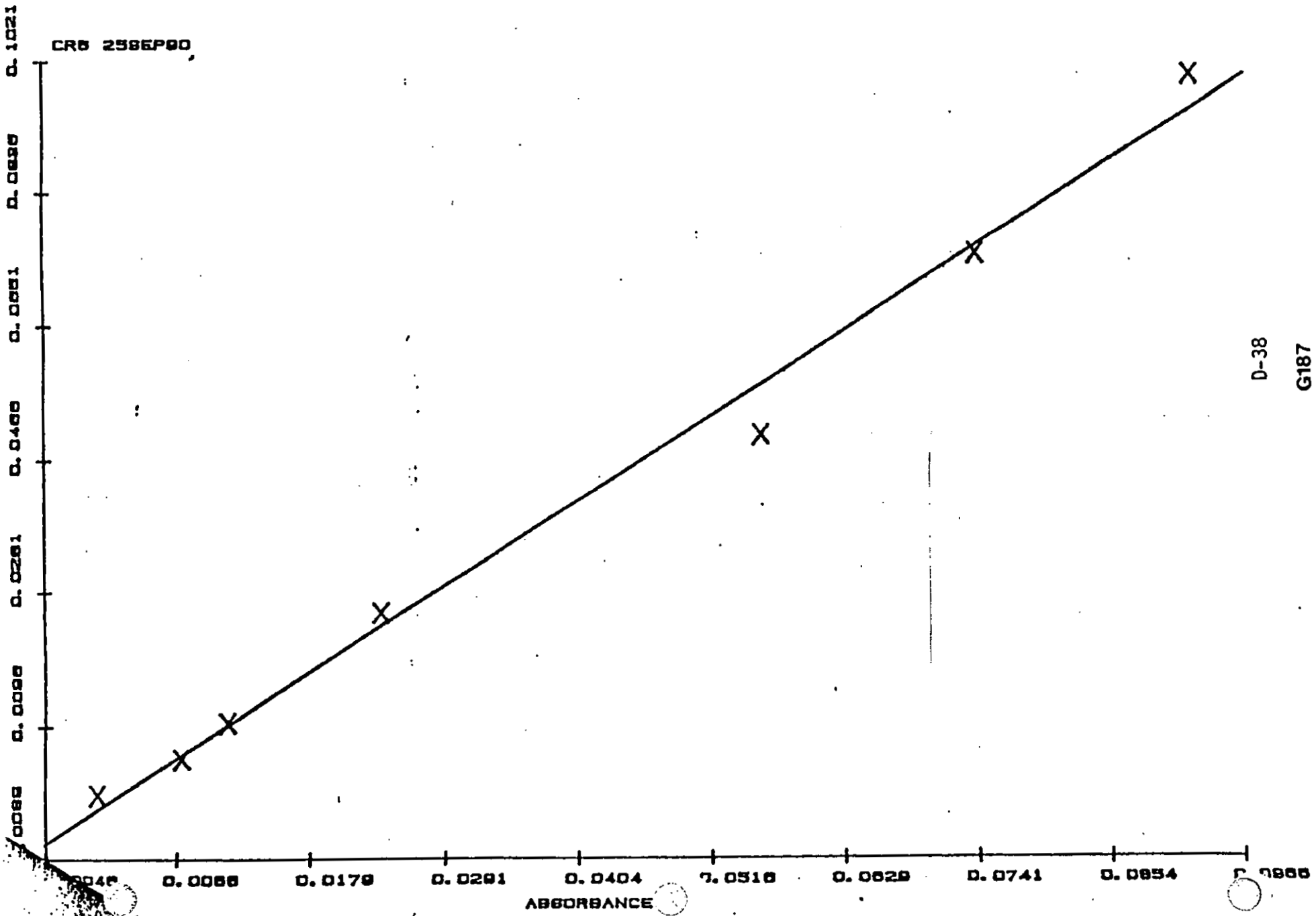
OPERATOR tamara jerome
DATE 10-08-90
BATCH CR

PROGRAM 9 Cr

SAMPLE	CONC mg/l	%RSD	MEAN ABS	READINGS	
BLANK	0.0000		0.029	0.031	0.026
STANDARD 1	0.0050	1.0	0.302	0.304	0.300
STANDARD 2	0.0100	2.0	0.628	0.637	0.620
STANDARD 3	0.0200	2.1	1.229	1.211	1.247



SAMPLE 1 ICV	0.0111	0.8	0.698	0.694	0.702
SAMPLE 2 ICB	-.0000	63.6	-0.003	-0.002	-0.005
SAMPLE 3 Reag (S)	OVER	1.9	2.464*	2.497*	2.431*
SAMPLE 4 Reag (SS)	OVER	1.9	2.620*	2.585*	2.656*
SAMPLE 5 101-1 (S)	OVER	3.6	2.306*	2.364*	2.248*
SAMPLE 6 101-1 (SS)	OVER	0.0	2.320*	2.321*	2.319*
SAMPLE 7 101-BK	.0022	38.9	0.136	0.170	0.101
SAMPLE 8 101-1	OVER	0.5	1.789	1.782	1.795


CR6 2586P00
0.1021
0.0836
0.0651
0.0466
0.0281
0.0096
0.0066
0.0179
0.0291
0.0404
0.0516
0.0629
0.0741
0.0854
ABSORBANCE

D-38

G187

RUN #3

Chromium - August 16, 1990

Calculation Data

C. C. Chromium & Hexavalent Chromium 3

Sample I.D.:C. C. Asphalt Plant CARB 425 Chromium & Hexavalent Chromium 3

Section I: Particulate Sampling Data

Point #	Delta P	Delta H	T S	T i	T in	T out	VAC	Filter Temp.	VEL (FPS)
A-12	0.45	0.74	282	67	89	89	2.0	230	46.4
A-11	0.55	0.90	285	62	91	90	2.0	249	51.4
A-10	0.62	1.00	286	61	92	90	2.0	249	54.6
A-9	0.70	1.15	287	61	94	91	2.0	254	58.0
A-8	0.80	1.30	287	61	95	90	2.0	273	62.1
A-7	0.85	1.40	286	61	95	90	2.0	255	64.0
A-6	0.65	1.05	287	61	95	90	2.0	235	55.9
A-5	0.55	0.90	286	61	95	91	2.0	272	51.3
A-4	0.45	0.72	284	62	95	91	2.0	260	46.4
A-3	0.35	0.57	277	62	93	91	2.0	213	40.9
A-2	0.35	0.57	277	62	94	91	2.0	226	40.8
A-1	0.25	0.37	276	63	94	91	2.0	274	34.4
B-12	0.35	0.57	280	65	94	91	1.0	221	40.9
B-11	0.45	0.74	283	65	94	92	1.0	235	46.5
B-10	0.50	0.82	284	63	95	92	2.0	235	49.1
B-9	0.55	0.90	285	62	96	92	2.0	231	51.5
B-8	0.65	1.05	286	63	99	93	2.0	226	56.0
B-7	0.70	1.15	286	62	100	93	2.0	230	58.1
B-6	0.74	1.20	285	62	100	93	2.0	220	59.7
B-5	0.60	0.99	282	62	98	93	2.0	218	53.8
B-4	0.50	0.82	282	64	99	94	2.0	212	49.0
B-3	0.40	0.63	282	64	99	94	2.0	215	43.6
B-2	0.35	0.57	277	64	99	94	1.0	217	40.8
B-1	0.25	0.41	275	65	100	95	1.0	205	34.5
AVG	0.53	0.82	278	63	96	92	2	236	49.6

NOMENCLATURE

Delta P = Stack gas velocity head at each sample point (in. H2O)

Delta H = Pressure differentital across orifice meter (in. H2O)

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condensor (oF)

Tin = Dry gas meter inlet temperature

Tout = Dry gas meter outlet temperature

Vac = Sample pump vacuum (in. Hg)

Filter Temp. = Temperature of front-end filter enclosure (oF)

VEL (FPS) = Actual stack velocity at each sample point

FIELD DATA SHEET

VOLUME OF CONDENSED MOISTURE

Impinger #	Gross	Tare	Net
1	168 ml	100 ml	68 ml
2	200 ml	100 ml	100 ml
3	0 ml	0 ml	0 ml
4	207 gram	200 gram	7 gram
	TOTAL CONDENSED MOISTURE		175 ml

STACK GAS MOLECULAR WEIGHT

PERCENT CARBON DIOXIDE	=	5.00
PERCENT OXYGEN	=	15.00
PERCENT CARBON MONOXIDE	=	0.00
PERCENT NITROGEN & INERTS	=	80.00

COMPONENT	VOLUME%	* MOISTURE CORR	* MOLWT =	MASS FRACTION
WATER	18.60	1.00	18.00	3.35
CARBON DIOXIDE	5.00	0.81	44.00	1.79
OXYGEN	15.00	0.81	32.00	3.91
CARBON MONOXIDE	0.00	0.81	28.00	0.00
NITROGEN & INERTS	80.00	0.81	28.00	18.23
		AVERAGE MOLECULAR WEIGHT =		27.28

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	152.993 CFT
Dry gas meter, final reading	=	190.579 CFT
Dry gas meter calibration factor	=	1.000
Meter volume uncorrected for Temp & Press	=	37.586 CFT
Barometric pressure at site	=	30.01 in Hg
Meter pressure (barometer + average delta H)	=	30.14 in Hg
Average meter temperature during test	=	93.7 DEG F
Dry sample volume at standard conditions	=	35.566 CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	278.0 DEG F
Volume of condensed water	=	175 ml
Percent moisture of stack gas	=	18.60 %
Pitot tube correction factor	=	0.85
Stack gas molecular weight	=	27.12
Stack gas velocity at stack conditions	=	49.40 FT/SEC
Duration of sampling	=	72 Minute
Nozzle diameter	=	0.233 in
Percent isokinetic variation	=	97.4 %
Area of stack	=	20.97 SQ FEET
Stack flow rate, standard conditions	=	35907 DSCFM

SECTION IV SUMMARY OF QUANTITATIVE ANALYSIS AND EMISSION RATE OF CHROMIUM AND HEXAVALENT CHROMIUM

Compound		Mass (ug)		Emission rate (10-3 lb/hr)
Chromium		59.70		7.96
Hexavalent Chromium	<	2.00	<	0.27

Field Data

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Air Pollution
Chemical Analysis
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Robotics
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B.P. 30-04

FIELD TEST DATA FORM

Site: C.C. San Diego Asphalt Hot Plant Date: 8/16/90 Test No. #3 CARB 425 G+G+6

Nozzle I.D. E1 Diameter .233 Filter No. #9

LEAK CHECKS: Pitot tubes -- Initial Y OK Final _____

Sample train -- Initial Y OK Final _____

<.005 CFM @ 1 min @ 10 in Hg

Initial Reading 152.993

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
10:10	SE 12	.45	.74	282	67	89	89	2	230
								154.425	
10:13	SE 11	.55	.90	285	62	91	90	2	249
								156.065	
10:16	SE 10	.62	1.00	286	61	92	90	2	249
								157.135	
10:19	SE 9	.70	1.15	287	61	94	91	2	254
								159.545	
10:22	SE 8	.80	1.30	287	61	95	90	2	273
								166.455	
10:25	SE 7	.85	1.40	286	61	95	90	2	255
								163.575	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
10:28	SE 6	.65	1.05	287	61	95	90	2	235
								165.215	
10:31	SE 5	.55	.90	286	61	95	91	2	272
								166.845	
10:34	SE 4	.45	.72	284	62	95	91	2	260
								168.318	
10:37	SE 3	.35	.57	277	62	93	91	2	213
								169.645	
10:40	SE 2	.35	.57	277	62	94	91	2	226
								170.965	
10:43	SE 1	.25	.37	276	63	94	91	2	274
				G195	D-46			172.081	

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FIELD TEST DATA FORM

Site: C.C. San Diego Asphalt Hot plant Date: 8/16/90 Test No. 3 Cr+ CARB 425 Cr+6

Nozzle I.D. E 1 Diameter .233 Filter No. #9

LEAK CHECKS: Pitot tubes -- Initial ____ Final Y OK

Sample train -- Initial ____ Final Y OK

Initial reading after leak check 172.211

<0.005 CFM for 1 min at 10 in Hg.

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
0:50	NW-12	.35	.57	290	65	94	91	1	221
								173.465	
0:53	NW-11	.45	.74	283	65	94	92	1	235
								174.095	
0:56	NW-10	.50	.82	284	63	95	92	2	235
								176.425	
0:59	NW-9	.55	.90	285	62	96	92	2	231
								178.075	
1:02	NW-8	.65	1.05	286	63	99	93	2	226
								179.775	
1:05	NW-7	.70	1.15	286	62	100	93	2	230
								181.555	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
1:08	NW-6	.74	1.20	285	62	100	93	2	220
								183.385	
1:11	NW-5	.60	.99	282	62	98	93	2	218
								185.095	
1:14	NW-4	.50	.82	282	64	99	94	2	212
								186.675	
1:17	NW-3	.40	.63	292	64	99	94	2	215
								188.065	
1:20	NW-2	.35	.57	277	64	99	94	1	217
								189.415	
1:23	NW-1	.25	.41	275	65	100	95	1	205
				G196	D-47			1190.579	

Date/Time 8/16/90 Barometric Pressure (in. Hg.) 30.04

Test Location C.C. San Diego Asphalt plant Static Pressure (in. wg.) _____
(ARB 425)

n Number # 3 Chromium + Cr+6 Probe Type/Length 6

Stack Diameter 5' 2" Pitot Coefficient .85

Operator Shiu-Pi Meter Box No./Y _____

Filter No. _____ Nozzle No./Size (in.) .233

Filter Temp (°F) _____ Probe Heater Setting (%) _____

Impinger Volumes/Weights				Gas Composition			
Contents	Final	Initial	Net	Time	CO_2	O_2	CO
Imp. 1+2	368	200	168	10:10	4	15.5	
				11:00	3.5	15	
S.G.	207.2	200	7.2	Leak Rate		cfm	"Hg
		Total	175.2				
Filter	Final	Initial	Net	Initial			
Weight				Final			

Cr^{+3} 0.02455
Cr^{+6} 0.00

Sample Point	Sampling Time (min.)	ΔP (in wg)	ΔH (in wg)	Gas Meter Volume (Ft^3)	Temperature (°F)				Pump Vacuum (in Hg)	$\sqrt{\Delta P}$
					Stack	Imp.	Gas Meter In	Gas Meter Out		
	Total		Avg.	Total	Avg.	Avg.	Avg.		Avg.	Avg.

Analytical Data

~~METALS~~ CAL Method 425
~~EPA MULTIMETAL METHOD~~ Cr and Cr^{+6}

CLIENT :
PROJECT: c.c. San Diego
SAMPLING DATE:
SAMPLE I.D.: Train 3

	COMPOUND	D/L ppm	Filter Rinse µg/sw	µg	Imp µg/ml	µg	Total µg
	Arsenic	0.1					
	Beryllium	0.01					
	Cadmium	0.02					
DF,	Chromium	~~0.02~~ 0.004	0.592	59.2	0.005	0.5	59.7
	Copper	0.01					
	Nickel	0.1					
	Lead	0.05					
	Selenium	0.1					
	Zinc	0.01					
	Manganese	0.01					
	Mercury	0,001					
DF$_2$	Cr^{+6}	0.005	<0.005	<1	<0.005	<1	<2

$DF_1 = 50 * 2 = 100$

$DF_2 = 100 * 2 = 200$

CLIENT: DYNATEC (10-90-1721)

ANALYSIS: CR by AA

METHOD: CAR 425

ELI NO.	SAMPLE ID.	LOCATION	UNITS: mg/Kg OR mg/l (ppm)
	FIELD BK		0.0054
	492 FILTER-1		0.1460 | sum = 50/100
	RINSE-1		4.1400 : 0.414 .02838 mg
	IMPINGER-1		0.0076 /
	FILTER-2		0.0211 \
	RINSE-2		0.2900 | .016005 mg
	IMPINGER-2		0.0090 /
	FILTER-3		0.2060 \
	RINSE-3		0.3860 | .02985 mg
	IMPINGER-3		0.0050 /
	REAGENT ③		104%
	REAGENT ⑤		103%
	METHOD BLANK		0.0000
	D/L		

Did you remember to include QA data?, duplicate?, blank?, spike recovery?, detection limits? Thank You!

Analyst : Benjamin Mendoza Jr.

Date : 10/11/90

CLIENT DINING TREE (70-08-1721

TEST CR +6

METHOD CAR 425

SAMPLE I.D.	ABSORBANCE	CONCENTRATION
BLANK	0.000	0.000 ppm
STANDARD 1	0.007	0.005 ppm
STANDARD 2	0.011	0.010 ppm
STANDARD 3	0.024	0.025 ppm
STANDARD 4	0.056	0.050 ppm
STANDARD 5	0.074	0.075 ppm
STANDARD 6	0.092	0.100 ppm
REAGENT SPIKE	0.047	0.046 ppm 96%
REAGENT DUP SPIKE	0.060	0.061 ppm 122%
FIELD BLANK	0.005	0.003 ppm
192-12A (MW-1)	<0.007	<.005 ppm
192-13A (MW-2)	<0.007	<.005 ppm
192-14A (MW-3)	0.004	0.002 ppm
192-15A (FILTER-1)	0.003	0.001 ppm
192-16A (FILTER-2)	0.005	0.001 ppm
192-17A (FILTER-3)	<0.007	<0.005
192-18A (RINSE-1)	<0.007	<0.005
192-19A (RINSE-2)	<0.007	<0.005
192-20A (RINSE-3)	<0.007	<0.005

Benjamin Verdoza
ANALYST

9/25/90
DATE

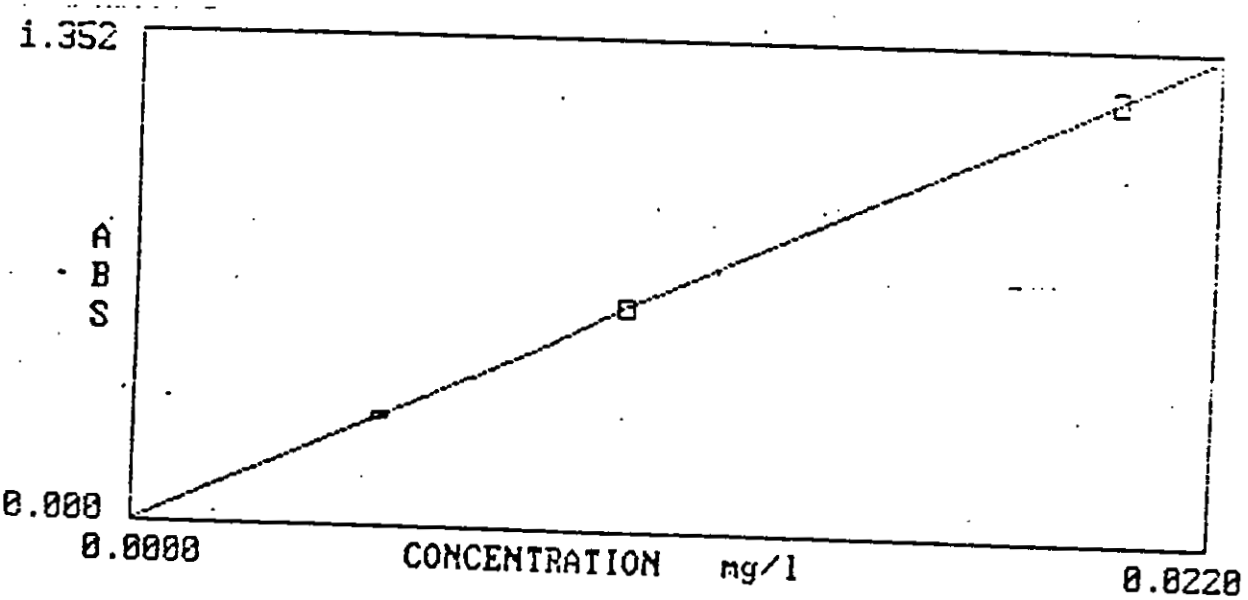
Calibration Data

EUREKA LABORATORIES, INC.

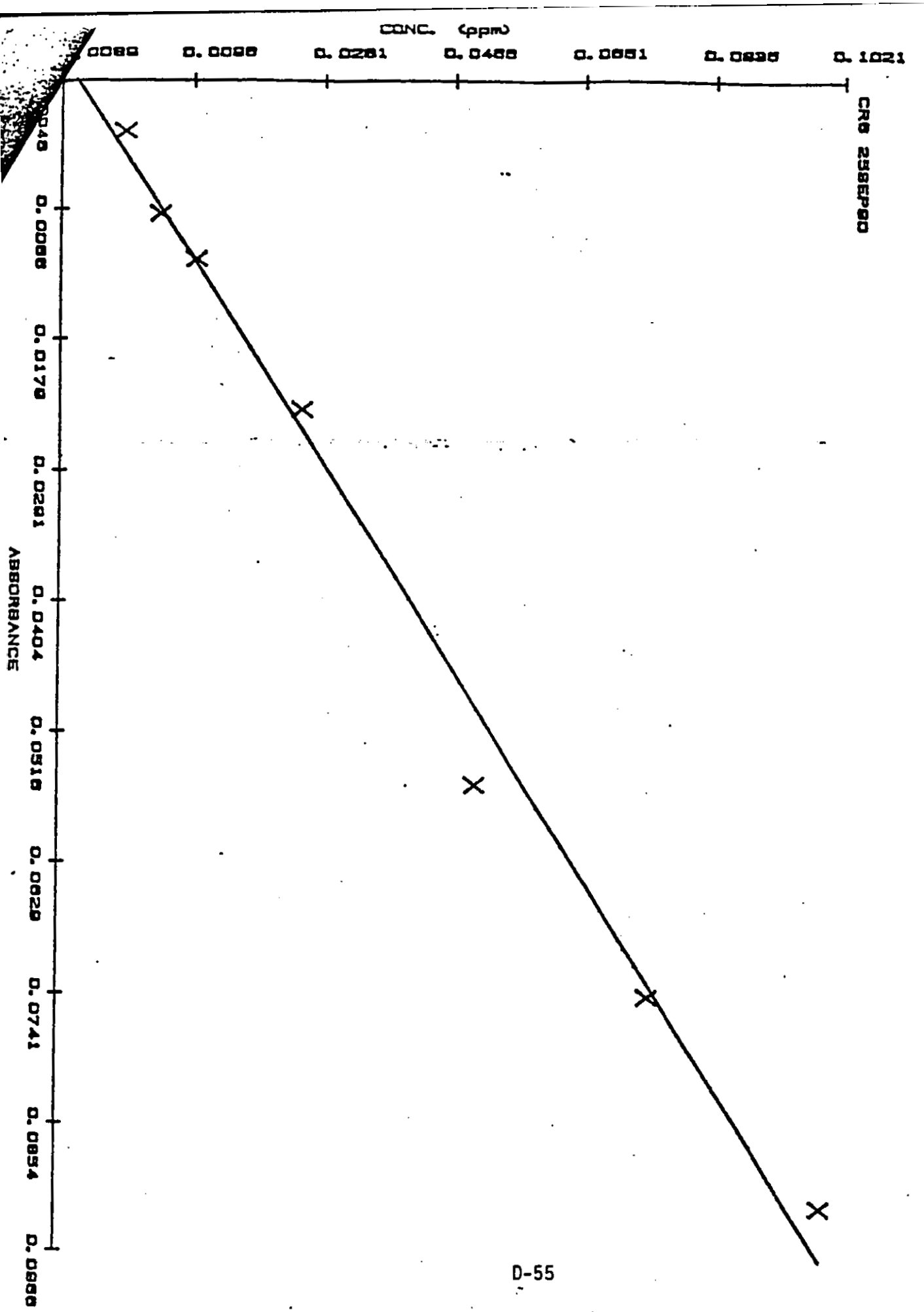
OPERATOR tamara jerome
DATE 10-08-90
BATCH CR

PROGRAM 9 Cr

SAMPLE	CONC mg/l	%RSD	MEAN ABS	READINGS	
BLANK	0.0000		0.028	0.031	0.026
STANDARD 1	0.0050	1.0	0.302	0.304	0.300
STANDARD 2	0.0100	2.0	0.628	0.637	0.620
STANDARD 3	0.0200	2.1	1.229	1.211	1.247



SAMPLE 1 ICV	0.0111	0.8	0.698	0.694	0.702
SAMPLE 2 ICB	-.0000	63.6	-0.003	-0.002	-0.005
SAMPLE 3 Reag (5)	OVER	1.9	2.464*	2.497*	2.431*
SAMPLE 4 Reag (5)	OVER	1.9	2.620*	2.585*	2.656*
SAMPLE 5 101-1 (5)	OVER	3.6	2.306*	2.364*	2.248*
SAMPLE 6 101-1 (5)	OVER	0.0	2.320*	2.321*	2.319*
SAMPLE 7 101-BK	0.0022	38.9	0.136	0.170	0.101
SAMPLE 8 101-1	OVER	0.5	1.789	1.782	1.795


CONC. (ppm)
0.0000
0.0096
0.0281
0.0466
0.0651
0.0836
0.1021
CR8 2586P90
ABSORBANCE
0.0000
0.0088
0.0176
0.0261
0.0404
0.0518
0.0629
0.0741
0.0854
0.0968

G204

APPENDIX E

Polycylic Aromatic Hydrocarbons Data and Calculations

FIELD BLANK

Analytical Data

C.C San Diego Polycyclic Aromatic Hydrocarbons Field Blank

SUMMARY OF QUANTITATIVE ANALYSIS

Compound	Mass (ug)
Napthalene	539
Acenaphthylene	< 1.5
Acenapthene	< 1.5
Fluorene	< 1.5
Phenanthrene	< 1.5
Anthracene	< 1.5
Fluroanthene	< 1.5
Pyrene	< 1.5
Benz(a)anthracene	< 1.5
Chrysene	< 1.5
Benzo(b)fluoranthene	< 1.5
Benzo(k)fluoranthene	< 1.5
Benzo(a)pyrene	< 1.5
Benzo(ghi)perylene	< 1.5
Dibenz(ah)anthracene	< 1.5
Indeno(1,23-cd)pyrene	< 1.5

NOTE: "<" = less than

ARB METHOD 429 POLYCYLIC AROMATIC HYDROCARBONS

Shining Tree

UNIT: ng/L

MATRIX: Air

90-9178

QC

SAMPLE ID. / TAL (Target Analyte)	M. BK.	CC Blank	CC PAH-1	CC PAH-2	CC PAH-3		% Recovery R. Spk	% Recovery R. SpkD	PQL ng/sample
Naphthalene	↑	539 ~~662~~	1530	319	1490		95	95	1.5
Acenaphthylene		↑	↑	↑	↑		64	78	
Acenaphthene			ND ↓	ND ↓	ND ↓		77	82	
Fluorene			19.5	5.8	269		72	74	
Phenanthrene			16.6	6.1	18.2		87	91	
Anthracene			↑	↑	↑		93	97	
Fluoranthene							92	96	
Pyrene							89	93	
Benz(a)anthracene							78	80	
Chrysene	ND	ND	ND	ND	ND		73	76	
Benzo(b)fluoranthene							73	83	
Benzo(k)fluoranthene							69	75	
Benzo(a)pyrene							93	95	
Benzo(ghi)perylene							102	94	
Dibenz(ah)anthracene							100	94	
Indeno(1,23-cd)pyrene	↓	↓	↓	↓	↓		92	~~88~~	↓

SURROGATE/SPIKE RECOVERY

Benzo(a)anthracene-d_{12}	138	~~706~~ 87	133	58	155		103	107	
Methyl-Naphthalene-d_{10}	—	~~29~~ 10	26	10	35		—	—	

RUN #1

Polycylic Aromatic Hydrocarbons - September 17, 1990

Calculation Data

Sample I.D.: California Commercial Asphalt Plant CARB 429 PAHS 1

Section I: Particulate Sampling Data

Point #	Delta P	Delta H	T S	T i	T in	T out	VAC	Filter Temp.	VEL (FPS)
A-12	0.50	1.05	261	52	68	67	4.0	262	48.3
A-11	0.55	1.15	262	53	69	67	5.0	242	50.7
A-10	0.70	1.45	263	55	72	68	5.0	250	57.2
A-9	0.70	1.45	264	56	73	68	5.0	262	57.3
A-8	0.80	1.68	266	56	75	68	6.0	273	61.3
A-7	0.75	1.60	267	56	77	69	6.0	274	59.4
A-6	0.65	1.35	267	56	78	70	5.0	274	55.3
A-5	0.50	1.05	267	56	78	70	5.0	266	48.5
A-4	0.45	0.95	267	55	78	70	4.0	269	46.0
A-3	0.40	0.84	265	55	79	71	4.0	272	43.3
A-2	0.30	0.63	265	56	79	72	4.0	274	37.5
A-1	0.30	0.63	260	55	79	71	4.0	277	37.4
B-12	0.50	1.05	268	54	77	72	5.0	267	48.5
B-11	0.50	1.05	267	55	77	72	5.0	268	48.5
B-10	0.55	1.15	268	56	78	73	5.0	276	50.9
B-9	0.60	1.26	267	56	79	73	6.0	267	53.1
B-8	0.65	1.37	268	56	79	73	6.0	247	55.3
B-7	0.70	1.47	268	57	80	74	6.0	237	57.4
B-6	0.60	1.26	267	57	80	74	6.0	278	53.1
B-5	0.50	1.05	266	57	81	74	5.0	281	48.5
B-4	0.40	0.84	266	57	81	75	4.0	272	43.4
B-3	0.33	0.70	264	57	82	75	4.0	258	39.3
B-2	0.30	0.63	263	57	82	75	4.0	240	37.5
B-1	0.22	0.46	260	57	82	76	4.0	252	32.0
AVG	0.52	1.09	265	56	78	72	4.9	264	48.8

NOMENCLATURE

Delta P = Stack gas velocity head at each sample point (in. H2O)

Delta H = Pressure differentital across orifice meter (in. H2O)

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condensor (oF)

Tin = Dry gas meter inlet temperature

Tout = Dry gas meter outlet temperature

Vac = Sample pump vacuum (in. Hg)

Filter Temp. = Temperature of front-end filter enclosure (oF)

VEL (FPS) = Actual stack velocity at each sample point

C.C. PAH 1

FIELD DATA SHEET

VOLUME OF CONDENSED MOISTURE

Impinger #	Gross	Tare	Net
1	224 ml	100 ml	124 ml
2	200 ml	100 ml	100 ml
3	0 ml	0 ml	0 ml
4	208 gram	200 gram	8 gram
	TOTAL CONDENSED MOISTURE		232 ml

STACK GAS MOLECULAR WEIGHT

PERCENT CARBON DIOXIDE	=	6.00
PERCENT OXYGEN	=	9.00
PERCENT CARBON MONOXIDE	=	0.00
PERCENT NITROGEN & INERTS	=	85.00

COMPONENT	VOLUME%	• MOISTURE CORR	• MOLWT =	MASS FRACTION
WATER	21.08	1.00	18.00	3.79
CARBON DIOXIDE	6.00	0.79	44.00	2.08
OXYGEN	9.00	0.79	32.00	2.27
CARBON MONOXIDE	0.00	0.79	28.00	0.00
NITROGEN & INERTS	85.00	0.79	28.00	18.78
		AVERAGE MOLECULAR WEIGHT =		26.93

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	799.716	CFT
Dry gas meter, final reading	=	840.572	CFT
Dry gas meter calibration factor	=	1.000	
Meter volume uncorrected for Temp & Press	=	40.856	CFT
Barometric pressure at site	=	29.92	in Hg
Meter pressure (barometer + average delta H)	=	30.28	in Hg
Average meter temperature during test	=	74.6	DEG F
Dry sample volume at standard conditions	=	40.218	CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	265.3	DEG F
Volume of condensed water	=	232	ml
Percent moisture of stack gas	=	21.08	%
Pitot tube correction factor	=	0.85	
Stack gas molecular weight	=	26.93	
Stack gas velocity at stack conditions	=	48.74	FT/SEC
Duration of sampling	=	72	Minute
Nozzle diameter	=	0.256	in
Percent isokinetic variation	=	93.3	%
Area of stack	=	20.97	SQ FEET
Stack flow rate, standard conditions	=	35113	DSCFM

SECTION 1V SUMMARY OF QUANTITATIVE ANALYSIS
EMISSION RATE OF PAHS

Compound		Mass (ug)		Emission rate (10-3 lb/hr)
Naphthalene		1530.00		176.30
Acenaphthylene	<	1.50	<	0.17
Acenaphthene	<	1.50	<	0.17
Fluorene		19.00		2.19
Phenanthrene		16.00		1.84
Anthracene	<	1.50	<	0.17
Fluoranthene	<	1.50	<	0.17
Pyrene	<	1.50	<	0.17
Benzo(a)anthracene	<	1.50	<	0.17
Chrysene	<	1.50	<	0.17
Benzo(b)fluoranthene	<	1.50	<	0.17
Benzo(k)fluoranthene	<	1.50	<	0.17
Benzo(a)pyrene	<	1.50	<	0.17
Benzo(g,h,i)perylene	<	1.50	<	0.17
Dibenzo(a,h)anthracene	<	1.50	<	0.17
Indeno(1,2,3-cd)pyrene	<	1.50	<	0.17

Field Data

EUREKA LABORATORIES, INC.

Corporate Office:
6790 FLORIN PERKINS ROAD
SACRAMENTO, CA 95828
TEL: (916) 381-7953
FAX: (916) 381-4013

Branch Office
12121 NORTHUP WAY, SUITE 212
BELLEVUE, WA 98005
TEL: (206) 885-0284
FAX: (206) 885-6162

Air Pollution
Chemical Analysis
Research & Testing
Environmental Studies
Robotics
Toxicology

O_2: 16%

P.1 of 2

Pbar = 29.92 in Hg

FIELD TEST DATA FORM

Site: CC Asphalt plant Date: 9/17/90 Test No. PAH 1

Nozzle I.D. EGL 2 Diameter .256 Filter No. PAH 1

LEAK CHECKS: Pitot tubes -- Initial Y at 3 in Hg Final Y at 3 in Hg

Start at 799.716

Sample train -- Initial Y <0.005 at 15 in Hg Final Y <0.005 at 10 in Hg

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
6:10 3	A-12	.50	1.05	261	52	69	67	4	262
6:13 6	11	.55	1.15	262	53	69	67	801.338	
6:16 9	10	.70	1.45	263	55	72	68	5	242
6:19 12	9	.70	1.45	264	56	73	68	803.195	
6:22 15	8	.80	1.68	266	56	75	68	5	257
6:25 18	7	.75	1.60	267	56	77	69	805025	
								5	262
								806985	
								6	273
								809.065	
								6	274
								811.085	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
21	6	.65	1.35	267	56	78	70	5	274
24	5	.50	1.05	267	56	78	70	812.205	
27	4	.45	.95	267	55	78	70	5	266
30	3	.40	.84	265	55	79	71	814.715	
33	2	.30	.63	265	56	79	72	4	269
36	1	.30	.63	260	55	79	71	816.350	
								4	272
								817.925	
								4	274
								819.265	
								4	277
								820.605	

E-12 G216

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BELLEVUE, WA 98005
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FAX: (206) 885-6162

Chemical Analysis
Research & Testing
Environmental Studies
Robotics
Toxicology

p.2 of 2 0.15%

1.2.2

FIELD TEST DATA FORM

water
224-200 = 24

Site: Cc. Asphalt plant

Date: 9/17/90 Test No. PAH 1

silicagel skin = 7.5g

Nozzle I.D. EGL. 2 Diameter 0.256 Filter No. PAH 1

wet water = 231.5 ml

LEAK CHECKS: Pitot tubes -- Initial ____ Final ____

Sample train -- Initial ____ Final ____

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
6:50 (37)	B-12	.50	1.05	268	54	77	72	5	267
								822.245	
6:53 (43)	14	.50	1.05	267	55	77	72	5	268
								823.985	
6:56 (49)	10	.55	1.15	268	56	78	73	5	276
								825.735	
(55)	9	.60	1.26	267	56	79	73	6	267
								827.585	
7:02 (61)	8	.65	1.37	268	56	79	73	6	247
								829.500	
7:05 (67)	7	.70	1.47	268	57	80	74	6	237
								831.245	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
7:08 (73)	6	.60	1.26	267	57	80	74	6	278
								832.385	
7:11 (79)	5	.50	1.05	266	57	81	74	5	281
								835.025	
7:14 (85)	4	.40	.84	266	57	81	75	4	272
								836.600	
7:17 (91)	3	.33	.70	264	57	82	75	4	258
								838.095	
(97)	2	.30	.62	263	57	82	75	4	240
								839.420	
(103)	1	.22	.46	260	57	82	76	4	252
								840.52	

E-13 G217

Analytical Data

AAS METHOD 429 POLYCYLIC AROMATIC HYDROCARBONS

Shining Trace

UNIT: ug/L

MATRIX: Air

9009175

QC

SAMPLE ID. TAL(Target Analyte)	M. BK.	CC Blank	CC PAH-1	CC PAH-2	CC PAH-3		% Recovery R. Spk	R. SpkD	PQL ug/sample
Naphthalene	↑	539 ~~662~~	1530	319	1490		95	95	1.5
Acenaphthylene		↑	↑	↑	↑		64	78	
Acenaphthene			ND ↓	ND ↓	ND ↓		77	82	
Fluorene			19.5	5.8	269		72	74	
Phenanthrene			16.6	6.1	18.2		87	91	
Anthracene			↑	↑	↑		93	97	
Fluoranthene							92	96	
Pyrene							89	93	
Benz(a)anthracene							78	80	
Chrysene	ND	ND	ND	ND	ND		73	76	
Benzo(b)fluoranthene							73	83	
Benzo(k)fluoranthene							69	75	
Benzo(a)pyrene							93	95	
Benzo(ghi)perylene							102	94	
Dibenz(an)anthracene							100	94	
Indeno(1,23-cd)pyrene	↓	↓	↓	↓	↓		92	~~88~~	↓

SURROGATE/SPIKE REVOVERY

Benzo(a)anthracene-d_{12}	138	~~706~~ 87	133	58	155		103	107
Methyl-Naphthalene-d_{10}	–	~~29~~ 10	26	10	35		–	–

Calibration Data

Calibration Report

Title: ARB METHOD 429 ID FILE
Calibrated: 900415 08:35

Compound	Files: >C0380 RF 20.00	>C0382 RF 50.00	>C0378 RF 50.00	>C0383 RF 80.00	>C0384 RF 80.00	>C0386 RF 120.00	>C0387 RF 160.00	$\overline{RRT}$	$\overline{RF}$	% RSD
aphthalene-d8	-	-	-	-	-	-	-	-	-	-
Naphthalene	1.21409	1.13187	1.34576	1.14081	1.11955	.95550	1.05496	.846	1.13751	10.739
2-Methylnaphthalene-d10	.80384	.75610	.71124	.66338	.63861	.60754	.72478	.963	.70079	9.804
cenaphthene-d10	-	-	-	-	-	-	-	-	-	-
cenaphthylene	1.48175	1.41388	1.33795	1.17956	1.16471	1.01317	1.12157	1.090	1.24466	13.639
Acenaphthene	.93983	.87042	.83240	.75977	.73939	.69996	.84730	1.119	.81272	10.290
luorene	1.07961	1.04781	.99382	.91966	.89291	.83578	.99184	1.197	.96592	9.014
enanthrene-d10	-	-	-	-	-	-	-	-	-	-
Phenanthrene	1.50299	1.46274	1.37641	1.22249	1.19852	1.08949	1.23980	1.343	1.29892	11.666
nthracene	1.52986	1.47263	1.37199	1.24535	1.24035	1.09023	1.21345	1.350	1.30912	11.886
luoranthene	1.73778	1.65695	1.55768	1.40527	1.38071	1.23059	1.39794	1.526	1.48099	11.958
Pyrene	1.78300	1.68662	1.56893	1.44858	1.39387	1.26195	1.42485	1.560	1.50968	11.949
Benzo(a)anthracene-d12	1.12941	1.10933	1.05849	1.05351	1.00311	.98209	1.22883	1.748	1.08068	7.752
nzo(a)anthracene	1.67047	1.60835	1.52736	1.45235	1.43517	1.28879	1.49337	1.753	1.49655	8.301
hrysene-d12	-	-	-	-	-	-	-	-	-	-
Chrysene	1.63916	1.57476	1.49822	1.46292	1.42096	1.29505	1.49337	1.760	1.48349	7.421
nzo(b)fluoranthene	1.75036	1.70565	1.67854	1.79378	1.78517	1.55818	2.14204	1.993	1.77339	10.215
nzo(k)fluoranthene	1.76417	1.72580	1.59199	1.67018	1.57093	1.49952	1.98083	2.002	1.68620	9.431
Benzo(a)pyrene	1.61997	1.68703	1.59130	1.73887	1.62249	1.56872	1.98786	2.086	1.68803	8.551
deno(1,2,3-cd)pyrene	1.31775	1.55565	1.49082	1.64889	1.59260	1.65706	1.77852	2.534	1.57733	9.243
benz(a,h)anthracene	1.28718	1.48992	1.39705	1.56665	1.56157	1.55004	1.39259	2.553	1.46357	7.326
Benzo(g,h,i)perylene	1.29621	1.55890	-	1.62836	1.19519	1.62046	1.62178	2.665	1.48681	12.856

RF - Response Factor (Subscript is amount in ug/ml)

T - Average Relative Retention Time (RT Std/RT Istd)

$\overline{RF}$ - Average Response Factor

SD - Percent Relative Standard Deviation

Calibration Check Report

5

Title: AR8 METHOD 429 ID FILE
Calibrated: 900415 08:35

Check Standard Data File: >BB569
Injection Time: 900930 01:52

Compound	$\overline{RF}$	RF	%Diff	Calib Meth
Naphthalene-d8	-	-	-	Average
Naphthalene	1.13751	1.27497	12.08	Average
1-Methylnaphthalene-d10	.70079	-	-	Average
Acenaphthene-d10	-	-	-	Average
Acenaphthylene	1.24466	1.17319	5.74	Average
Acenaphthene	.81272	.71734	11.74	Average
Fluorene	.96592	.82715	14.37	Average
Phenanthrene-d10	-	-	-	Average
Phenanthrene	1.29892	1.17213	9.76	Average
Anthracene	1.30912	1.26956	3.02	Average
Fluoranthene	1.48099	1.34782	8.99	Average
Pyrene	1.50968	1.39179	7.81	Average
Benzo(a)anthracene-d12	1.08068	-	-	Average
Benzo(a)anthracene	1.49655	1.34007	10.46	Average
Chrysene-d12	-	-	-	Average
Chrysene	1.48349	1.41799	4.42	Average
Benzo(b)fluoranthene	1.77339	1.64418	7.29	Average
Benzo(k)fluoranthene	1.68620	1.69573	.57	Average
Benzo(a)pyrene	1.68803	1.44221	14.56	Average
Indeno(1,2,3-cd)pyrene	1.57733	1.60445	1.72	Average
Dibenz(a,h)anthracene	1.46357	1.51838	3.75	Average
Benzo(g,h,i)perylene	1.48681	1.59098	7.01	Average

- Response Factor from daily standard file at 50.00 ug/ml

F - Average Response Factor from Initial Calibration

iff - % Difference from original average or curve

RUN #2

Polycylic Aromatic Hydrocarbons - September 17, 1990

Calculation Data

Sample I.D.:California Commercial Asphalt Plant CARB 429 PAHS 2
Section I: Particulate Sampling Data

Point #	Delta P	Delta H	T S	T i	T in	T out	VAC	Filter Temp.	VEL (FPS)
A-12	0.55	1.21	268	59	79	79	5.0	264	51.1
A-11	0.60	1.32	260	59	79	79	5.0	274	53.1
A-10	0.66	1.45	263	57	80	79	5.0	274	55.8
A-9	0.75	1.65	264	58	81	79	6.0	270	59.5
A-8	0.83	1.83	268	58	83	79	6.0	251	62.8
A-7	0.83	1.83	269	60	84	80	6.0	255	62.8
A-6	0.70	1.54	269	61	86	80	6.0	280	57.7
A-5	0.60	1.32	270	62	87	81	5.0	270	53.4
A-4	0.51	1.12	271	62	87	81	5.0	250	49.3
A-3	0.41	0.90	270	61	87	81	4.0	263	44.2
A-2	0.38	0.84	237	60	86	81	4.0	263	41.6
A-1	0.23	0.51	235	62	86	81	3.0	273	32.3
B-12	0.50	1.10	271	64	85	82	4.0	244	48.8
B-11	0.55	1.19	271	61	85	82	5.0	244	51.2
B-10	0.57	1.25	272	61	86	82	5.0	277	52.2
B-9	0.60	1.32	271	61	87	82	5.0	262	53.5
B-8	0.68	1.50	273	61	88	82	6.0	237	57.0
B-7	0.90	1.98	272	61	89	83	7.0	256	65.5
B-6	0.70	1.54	271	63	89	83	6.0	281	57.8
B-5	0.70	1.54	269	63	89	83	6.0	280	57.7
B-4	0.80	1.76	269	64	91	84	7.0	257	61.7
B-3	0.70	1.54	266	63	90	84	6.0	235	57.6
B-2	0.52	1.14	265	62	89	85	5.0	254	49.6
B-1	0.45	0.99	264	63	90	85	5.0	278	46.1
AVG	0.61	1.35	266	61	86	82	5.3	262	53.4

NOMENCLATURE

Delta P = Stack gas velocity head at each sample point (in. H2O)

Delta H = Pressure differentital across orifice meter (in. H2O)

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condensor (oF)

Tin = Dry gas meter inlet temperature

Tout = Dry gas meter outlet temperature

Vac = Sample pump vacuum (in. Hg)

Filter Temp. = Temperature of front-end filter enclosure (oF)

VEL (FPS) = Actual stack velocity at each sample point

FIELD DATA SHEET

VOLUME OF CONDENSED MOISTURE

Impinger #	Gross	Tare	Net
1	302 ml	100 ml	202 ml
2	200 ml	100 ml	100 ml
3	0 ml	0 ml	0 ml
4	210 gram	200 gram	10 gram

TOTAL CONDENSED MOISTURE 312 ml

STACK GAS MOLECULAR WEIGHT

PERCENT CARBON DIOXIDE	=	6.00
PERCENT OXYGEN	=	14.00
PERCENT CARBON MONOXIDE	=	0.00
PERCENT NITROGEN & INERTS	=	80.00

COMPONENT	VOLUME%	•	MOISTURE COR	*	MOLWT	=	MASS FRACTION
WATER	24.45		1.00		18.00		4.40
CARBON DIOXIDE	6.00		0.76		44.00		1.99
OXYGEN	14.00		0.76		32.00		3.38
CARBON MONOXIDE	0.00		0.76		28.00		0.00
NITROGEN & INERTS	80.00		0.76		28.00		16.92
					AVERAGE MOLECULAR WEIGHT=		26.70

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	840.650	CFT
Dry gas meter, final reading	=	886.786	CFT
Dry gas meter calibration factor	=	1.000	
Meter volume uncorrected for Temp & Press	=	46.136	CFT
Barometric pressure at site	=	29.94	in Hg
Meter pressure (barometer + average delta H)	=	30.33	in Hg
Average meter temperature during test	=	83.8	DEG F
Dry sample volume at standard conditions	=	44.725	CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	265.8	DEG F
Volume of condensed water	=	312	ml
Percent moisture of stack gas	=	24.45	%
Pitot tube correction factor	=	0.85	
Stack gas molecular weight	=	26.70	
Stack gas velocity at stack conditions	=	53.38	FT/SEC
Duration of sampling	=	72	Minute
Nozzle diameter	=	0.256	in
Percent isokinetic variation	=	98.9	%
Area of stack	=	20.97	SQ FEET
Stack flow rate, standard conditions	=	36846	DSCFM

SECTION IV SUMMARY OF QUANTITATIVE ANALYSIS
EMISSION RATE OF PAHS

Compound		Mass (ug)		Emission rate (10-3 lb/hr)
Naphthalene		319.00		34.68
Acenaphthylene	<	1.50	<	0.16
Acenaphthene	<	1.50	<	0.16
Fluorene		5.80		0.63
Phenanthrene		6.10		0.66
Anthracene	<	1.50	<	0.16
Fluoranthene	<	1.50	<	0.16
Pyrene	<	1.50	<	0.16
Benzo(a)anthracene	<	1.50	<	0.16
Chrysene	<	1.50	<	0.16
Benzo(b)fluoranthene	<	1.50	<	0.16
Benzo(k)fluoranthene	<	1.50	<	0.16
Benzo(a)pyrene	<	1.50	<	0.16
Benzo(g,h,i)perylene	<	1.50	<	0.16
Dibenzo(a,h)anthracene	<	1.50	<	0.16
Indeno(1,2,3-cd)pyrene	<	1.50	<	0.16

Field Data

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O_2: 14%

P_{bar} = 29.94 in

FIELD TEST DATA FORM

Site: CC Asphalt plant Date: 9/17/90 Test No. PAH 2

Nozzle I.D. EGL 2 Diameter .256 Filter No. PAH 2

LEAK CHECKS: Pitot tubes -- Initial Y at 3 in Hg Final Y

Sample train -- Initial Y at <0.005 CF at 10 in Hg Final Y <0.005 CF at 10 in Hg

Start at 840.650

TIME	PT #	ΔP	ΔH	T_s	T_i	T_{IN}	T_{OUT}	VAC	TEMP
8:10 A.M. (3)	A-1.2	.55	1.21	268	59	79	79	5	264
:13 (6)	1.1	.60	1.32	260	59	79	79	840.470	
:16 (9)								5	274
	10	.66	1.45	263	57	80	79	844.385	
19 (12)								5	27
	9	.75	1.65	264	58	81	79	846.335	
22 (15)								6	270
	8	.83	1.83	268	58	83	79	845.436	
25 (18)								6	251
	7	.83	1.83	269	60	84	80	850.645	
								6	255
								850.835	

TIME	PT #	ΔP	ΔH	T_s	T_i	T_{IN}	T_{OUT}	VAC	TEMP
8 (21)	6	.70	1.54	269	61	86	80	6	280
(24)								854.985	
	5	.60	1.32	270	62	87	81	5	270
(27)								856.845	
	4	.51	1.12	271	62	87	81	5	250
9 (30)								858.650	
	3	.41	.90	270	61	87	81	4	268
(33)								861.795	
	2	.38	.84	237	60	86	211	4	
(36)								241.850	
	1	.23	.51	235	62	86	21	3	273
					E-26	G230		863.138	

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FIELD TEST DATA FORM

Site: C.C. Asphalt Plant Date: 9/17/90 Test No. PAH2

Nozzle I.D. EGL 2 Diameter .256 Filter No. PAH 2

LEAK CHECKS: Pitot tubes -- Initial ____ Final ____

Sample train -- Initial ____ Final ____

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
8:50 (3)	B-1.2	.50	1.10	271	64	85	82	4	244
								840.935	
:53 (6)	1.1	.55	1.19	271	61	85	82	5	244
								866.755	
:56 (9)	10	.57	1.25	272	61	86	82	5	277
								868.540	
(12)	9	.60	1.32	271	61	87	82	5	262
								870.455	
:02 (15)	8	1.68	1.50	273	61	88	92	6	237
								872.465	
:05 (18)	7	.90	1.98	272	61	89	93	7	256
								874.740	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
08 (21)	6	.70	1.54	271	63	89	83	6	281
								876.850	
11 (24)	5	.70	1.54	269	63	89	88	6	280
								878.930	
14 (27)	4	.80	1.76	269	64	91	84	7	257
								881.120	
(30)	3	.70	1.54	266	63	90	84	6	235
								883.190	
(33)	2	.62	1.14	265	62	89	85	5	254
								885.060	
(36)	1	.45	.99	264	63	90	85	5	278
				E-27	G231			886.786	

Analytical Data

METHOD 429 POLYCYCLIC AROMATIC HYDROCARBONS

Spiking Mix 900978 ac

UNIT: ug/L

MATRIX: Air

SAMPLE ID. TAL (Target Analyte)	M. BK.	CC Blank	CC PAH-1	CC PAH-2	CC PAH-3		% Recovery R. Spk	R. Spk D	PQL ug/sample
Naphthalene	↑	539 ~~662~~	1530	319	1480		95	95	1.5
Acenaphthylene		↑	↑	↑	↑		64	78	
Acenaphthene			ND ↓	ND ↓	ND ↓		77	82	
Fluorene			19.5	5.8	269		72	74	
Phenanthrene			16.6	6.1	18.2		87	91	
Anthracene			↑	↑	↑		93	97	
Fluoranthene							92	96	
Pyrene							89	93	
Benz(a)anthracene							78	80	
Chrysene	ND	ND	ND	ND	ND		73	76	
Benzo(b)fluoranthene							73	83	
Benzo(k)fluoranthene							69	75	
Benzo(a)pyrene							93	95	
Benzo(ghi)perylene							102	94	
Dibenz(ah)anthracene							100	94	
Indeno(1,23-cd)pyrene	↓	↓	↓	↓	↓		92	88	↓

SURROGATE/SPIKE RECOVERY

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Benzo(a)anthracene-d_{12}	138	~~706~~	133	58	155		103	107
Methyl-naphthalene-d_{10}	–	~~29~~ 10	26	10	35		–	–

Calibration Data

Calibration Report

Title: ARB METHOD 429 IO FILE
Calibrated: 900415 08:35

Compound	Files: >C0380 RF 20.00	>C0382 RF 50.00	>C0378 RF 50.00	>C0383 RF 80.00	>C0384 RF 80.00	>C0386 RF 120.00	>C0387 RF 160.00	$\overline{RRT}$	$\overline{RF}$	% RSD
aphthalene-d8	-	-	-	-	-	-	-	-	-	-
Naphthalene	1.21409	1.13187	1.34576	1.14081	1.11955	.95550	1.05496	.846	1.13751	10.739
2-Methylnaphthalene-d10	.80384	.75610	.71124	.66338	.63861	.60754	.72478	.963	.70079	9.804
cenaphthene-d10	-	-	-	-	-	-	-	-	-	-
cenaphthylene	1.48175	1.41388	1.33795	1.17956	1.16471	1.01317	1.12157	1.090	1.24466	13.639
Acenaphthene	.93983	.87042	.83240	.75977	.73939	.69996	.84730	1.119	.81272	10.290
luorene	1.07961	1.04781	.99382	.91966	.89291	.83578	.99184	1.197	.96592	9.014
enanthrene-d10	-	-	-	-	-	-	-	-	-	-
Phenanthrene	1.50299	1.46274	1.37641	1.22249	1.19852	1.08949	1.23980	1.343	1.29892	11.666
thracene	1.52986	1.47263	1.37199	1.24535	1.24035	1.09023	1.21345	1.350	1.30912	11.886
luoranthene	1.73778	1.65695	1.55768	1.40527	1.38071	1.23059	1.39794	1.526	1.48099	11.958
Pyrene	1.78300	1.68662	1.56893	1.44858	1.39387	1.26195	1.42485	1.560	1.50968	11.949
Benzo(a)anthracene-d12	1.12941	1.10933	1.05849	1.05351	1.00311	.98209	1.22883	1.748	1.08068	7.752
enzo(a)anthracene	1.67047	1.60835	1.52736	1.45235	1.43517	1.28879	1.49337	1.753	1.49655	8.301
hrysene-d12	-	-	-	-	-	-	-	-	-	-
Chrysene	1.63916	1.57476	1.49822	1.46292	1.42096	1.29505	1.49337	1.760	1.48349	7.421
enzo(b)fluoranthene	1.75036	1.70565	1.67854	1.79378	1.78517	1.55818	2.14204	1.993	1.77339	10.215
enzo(k)fluoranthene	1.76417	1.72580	1.59199	1.67018	1.57093	1.49952	1.98083	2.002	1.68620	9.431
Benzo(a)pyrene	1.61997	1.68703	1.59130	1.73887	1.62249	1.56872	1.98786	2.086	1.68803	8.551
deno(1,2,3-cd)pyrene	1.31775	1.55565	1.49082	1.64889	1.59260	1.65706	1.77852	2.534	1.57733	9.243
benz(a,h)anthracene	1.28718	1.48992	1.39705	1.56665	1.56157	1.55004	1.39259	2.553	1.46357	7.326
Benzo(g,h,i)perylene	1.29621	1.55890	-	1.62836	1.19519	1.62046	1.62178	2.665	1.48681	12.856

RF - Response Factor (Subscript is amount in ug/ml)

$\overline{RT}$ - Average Relative Retention Time (RT Std/RT Istd)

$\overline{RF}$ - Average Response Factor

SD - Percent Relative Standard Deviation

Calibration Check Report

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Title: ARB METHOD 429 ID FILE
Calibrated: 900415 08:35

Check Standard Data File: >BB569
Injection Time: 900930 01:52

Compound	$\overline{RF}$	RF	%Diff	Calib Meth
Naphthalene-d8	-	-	-	Average
Naphthalene	1.13751	1.27497	12.08	Average
2-Methylnaphthalene-d10	.70079	-	-	Average
Acenaphthene-d10	-	-	-	Average
Acenaphthylene	1.24466	1.17319	5.74	Average
Acenaphthene	.81272	.71734	11.74	Average
Fluorene	.96592	.82715	14.37	Average
Phenanthrene-d10	-	-	-	Average
Phenanthrene	1.29892	1.17213	9.76	Average
Anthracene	1.30912	1.26956	3.02	Average
Fluoranthene	1.48099	1.34782	8.99	Average
Pyrene	1.50968	1.39179	7.81	Average
Benzo(a)anthracene-d12	1.08068	-	-	Average
Benzo(a)anthracene	1.49655	1.34007	10.46	Average
Chrysene-d12	-	-	-	Average
Chrysene	1.48349	1.41799	4.42	Average
Benzo(b)fluoranthene	1.77339	1.64418	7.29	Average
Benzo(k)fluoranthene	1.68620	1.69573	.57	Average
Benzo(a)pyrene	1.68803	1.44221	14.56	Average
Indeno(1,2,3-cd)pyrene	1.57733	1.60445	1.72	Average
Dibenz(a,h)anthracene	1.46357	1.51838	3.75	Average
Benzo(g,h,i)perylene	1.48681	1.59098	7.01	Average

- Response Factor from daily standard file at 50.00 ug/ml

- Average Response Factor from Initial Calibration

iff - % Difference from original average or curve

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G236

RUN #3

Polycyclic Aromatic Hydrocarbons - September 17, 1990

Calculation Data

Calculation Data

Sample I.D.: California Commercial Asphalt Plant CARB 429 PAHS 3

Section I: Particulate Sampling Data

Point #	Delta P	Delta H	T S	T i	T in	T out	VAC	Filter Temp.	VEL (FPS)
A-12	0.55	1.21	271	62	90	90	4.0	259	51.1
A-11	0.60	1.32	274	60	89	89	4.0	258	53.5
A-10	0.65	1.43	271	61	92	90	5.0	274	55.6
A-9	0.72	1.58	273	59	93	89	5.5	275	58.6
A-8	0.80	1.76	273	61	94	89	5.8	259	61.8
A-7	0.82	1.80	274	61	95	90	6.0	265	62.6
A-6	0.65	1.43	275	61	96	90	5.0	262	55.8
A-5	0.55	1.21	274	62	95	90	4.8	250	51.3
A-4	0.48	1.05	274	64	97	91	4.5	272	47.9
A-3	0.42	0.92	275	65	98	91	4.2	258	44.8
A-2	0.32	0.70	230	64	96	91	4.0	250	37.9
A-1	0.27	0.60	223	65	95	91	3.8	268	34.6
B-12	0.45	1.00	275	65	93	90	4.8	240	46.4
B-11	0.50	1.10	275	64	93	91	5.0	266	48.9
B-10	0.60	1.32	275	65	96	92	5.0	260	53.6
B-9	0.55	1.20	273	64	96	91	5.0	258	51.2
B-8	0.62	1.30	272	64	96	91	5.4	250	54.3
B-7	0.70	1.54	269	63	94	92	6.0	273	57.6
B-6	0.60	1.32	267	64	94	91	5.5	265	53.3
B-5	0.48	1.05	267	64	93	91	5.0	258	47.6
B-4	0.45	0.99	271	65	94	92	4.8	275	46.3
B-3	0.35	0.77	267	64	95	91	4.0	243	40.7
B-2	0.26	0.57	260	63	94	91	3.8	240	34.9
B-1	0.21	0.46	230	57	92	90	3.8	235	30.7
AVG	0.53	1.15	266	63	94	91	4.8	259	49.2

NOMENCLATURE

Delta P = Stack gas velocity head at each sample point (in. H2O)

Delta H = Pressure differentital across orifice meter (in. H2O)

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condensor (oF)

Tin = Dry gas meter inlet temperature

Tout = Dry gas meter outlet temperature

Vac = Sample pump vacuum (in. Hg)

Filter Temp. = Temperature of front-end filter enclosure (oF)

VEL (FPS) = Actual stack velocity at each sample point

FIELD DATA SHEET

VOLUME OF CONDENSED MOISTURE

Impinger #	Gross	Tare	Net
1	322 ml	100 ml	222 ml
2	286 ml	100 ml	186 ml
3	0 ml	0 ml	0 ml
4	102 gram	91 gram	12 gram
	TOTAL CONDENSED MOISTURE		420 ml

STACK GAS MOLECULAR WEIGHT

PERCENT CARBON DIOXIDE	=	6.00
PERCENT OXYGEN	=	14.00
PERCENT CARBON MONOXIDE	=	0.00
PERCENT NITROGEN & INERTS	=	80.00

COMPONENT	VOLUME%	• MOISTURE CORR	• MOLWT =	MASS FRACTION
WATER	22.39	1.00	18.00	4.03
CARBON DIOXIDE	6.00	0.78	44.00	2.05
OXYGEN	14.00	0.78	32.00	3.48
CARBON MONOXIDE	0.00	0.78	28.00	0.00
NITROGEN & INERTS	80.00	0.78	28.00	17.39
		AVERAGE MOLECULAR WEIGHT =		26.94

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	887.650	CFT
Dry gas meter, final reading	=	958.512	CFT
Dry gas meter calibration factor	=	1.000	
Meter volume uncorrected for Temp & Press	=	70.862	CFT
Barometric pressure at site	=	29.94	in Hg
Meter pressure (barometer + average delta H)	=	30.29	in Hg
Average meter temperature during test	=	92.4	DEG F
Dry sample volume at standard conditions	=	67.538	CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	266.2	DEG F
Volume of condensed water	=	420	ml
Percent moisture of stack gas	=	22.39	%
Pitot tube correction factor	=	0.85	
Stack gas molecular weight	=	26.79	
Stack gas velocity at stack conditions	=	49.15	FT/SEC
Duration of sampling	=	120	Minute
Nozzle diameter	=	0.256	in
Percent isokinetic variation	=	94.9	%
Area of stack	=	20.97	SQ FEET
Stack flow rate, standard conditions	=	34791	DSCFM

SECTION IV SUMMARY OF QUANTITATIVE ANALYSIS
EMISSION RATE OF PAHS

Compound		Mass (ug)		Emission rate (10-3 lb/hr)
Naphthalene		1490.00		101.30
Acenaphthylene	<	1.50	<	0.10
Acenaphthene	<	1.50	<	0.10
Fluorene		26.00		1.77
Phenanthrene		18.00		1.22
Anthracene	<	1.50	<	0.10
Fluoranthene	<	1.50	<	0.10
Pyrene	<	1.50	<	0.10
Benzo(a)anthracene	<	1.50	<	0.10
Chrysene	<	1.50	<	0.10
Benzo(b)fluoranthene	<	1.50	<	0.10
Benzo(k)fluoranthene	<	1.50	<	0.10
Benzo(a)pyrene	<	1.50	<	0.10
Benzo(g,h,i)perylene	<	1.50	<	0.10
Dibenzo(a,h)anthracene	<	1.50	<	0.10
Indeno(1,2,3-cd)pyrene	<	1.50	<	0.10

Field Data

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p. 1 of 2

O_2 14%

Water
250+175+186) - 300 ml
313-90.5 g
419.8 ml

FIELD TEST DATA FORM

Site: C.C. Asphalt plant   Date: 9/17/90   Test No. PAH3

Nozzle I.D. EGL 2   Diameter .256   Filter No. PAH3

LEAK CHECKS: Pitot tubes -- Initial Y at 3 in Hg   Final Y at 3 in Hg

Sample train -- Initial Y 0.010 at 10 in Hg for 1 minute   Final Y 0.015 at 10 in Hg for 1 minute

Start at 887.650

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
0:25	A-12	.55	1.21	271	62	90	90	4	259
								890.255	
0:30	11	.60	1.32	274	60	89	89	4	258
								893.285	
0:35	10	.65	1.43	271	61	92	90	5	274
								896.455	
	9	.72	1.58	273	59	93	89	5.5	275
								899.955	
:45	8	.80	1.76	273	61	94	89	5.8	259
								903.535	
:50	7	.82	1.80	274	61	95	90	6.0	265
								907.265	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
0:55	6	.65	1.42	275	61	91	90	5	262
								910.524	
:00	5	0.55	1.21	274	69	95	90	4.8	250
								912.665	
:05	4	0.48	1.15	274	64	97	91	4.5	272
								916.1	
:10	3	0.42	0.92	275	65	98	91	4.2	258
								919.44	
	2	0.32	0.70	230	64	96	91	4.0	250
								921.885	
:20	1	0.27	0.60	223	65	95	91	3.8	242
								924.118	

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CURTIN LABORATORIES, INC.

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p. 1 of 2

FIELD TEST DATA FORM

Site: CC Asphalt plant Date: 9/17/90 Test No. PAH 3

Nozzle I.D. EGL 2 Diameter .256 Filter No. PAH 3

LEAK CHECKS: Pitot tubes -- Initial ____ Final ____

Sample train -- Initial ____ Final ____

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
15	B-12	0.45	1.10	275	65	93	90	4.8	240
								926.580	
7	11	0.50	1.11	275	64	93	91	5.0	246
								929.725	
7	10	0.60	1.32	275	65	96	92	5.0	261
								932.710	
9	9	0.55	1.20	272	64	96	91	5.0	258
								935.760	
8	8	0.62	1.30	272	64	96	91	5.4	250
								939.160	
9	7	0.70	1.54	269	63	94	92	6.0	273
								942.320	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
9	6	0.46	1.29	267	64	94	91	5.5	265
								945.840	
10	5	0.45	1.05	267	64	93	91	5.0	255
								948.840	
2	4	0.45	1.09	271	65	94	92	6.5	275
								951.860	
11	3	0.35	0.77	267	64	95	91	4.0	243
								954.220	
2	2	0.26	0.57	270	63	94	91	3.8	240
								957.595	
14	1	0.21	0.46	230	57	92	90	2.9	225
					E-42	G246		958.512	

Analytical Data

ARB METHOD 429 POLYCYLIC AROMATIC HYDROCARBONS

Shining Tree
9009178
cc

UNIT: ug/l
MATRIX: Air

SAMPLE ID. TAL(Target Analyte)	M. BK.	CC Blank	CC PAH-1	CC PAH-2	CC PAH-3		% Recovery R. Spk	% Recovery R. SpkD	PQL ug/sample
Naphthalene	↑	539 ~~662~~	1530	319	1490		95	95	1.5
Acenaphthylene		↑	↑	↑	↑		64	78	
Acenaphthene			ND ↓	ND ↓	ND ↓		77	82	
Fluorene			19.5	5.8	269		72	74	
Phenanthrene			16.6	6.1	18.2		87	91	
Anthracene			↑	↑	↑		93	97	
Fluoranthene							92	96	
Pyrene							89	93	
Benz(a)anthracene							78	80	
Chrysene	ND	ND	ND	ND	ND		73	76	
Benzo(b)fluoranthene							73	83	
Benzo(k)fluoranthene							69	75	
Benzo(a)pyrene							93	95	
Benzo(gni)perylene							102	94	
Dibenz(an)anthracene							100	94	
Inceno(1,23-cd)pyrene	↓	↓	↓	↓	↓		92	88	↓

SURROGATE/SPIKE REVOVERY

Benzo(a)anthracene-d_{12}	138	~~706~~ 87	133	58	155		103	107
Methyl-Napnthalene-d_{10}	–	~~29~~ 10	26	10	35		–	–

Calibration Data

Calibration Report

Title: ARB METHOD 429 ID FILE
Calibrated: 900415 08:35

Compound	Files: >C0380 RF 20.00	>C0382 RF 50.00	>C0378 RF 50.00	>C0383 RF 80.00	>C0384 RF 80.00	>C0386 RF 120.00	>C0387 RF 160.00	$\overline{RRT}$	$\overline{RF}$	% RSD
aphthalene-d8	-	-	-	-	-	-	-	-	-	-
Naphthalene	1.21409	1.13187	1.34576	1.14081	1.11955	.95550	1.05496	.846	1.13751	10.739
2-Methylnaphthalene-d10	.80384	.75610	.71124	.66338	.63861	.60754	.72478	.963	.70079	9.804
cenaphthene-d10	-	-	-	-	-	-	-	-	-	-
cenaphthylene	1.48175	1.41388	1.33795	1.17956	1.16471	1.01317	1.12157	1.090	1.24466	13.639
Acenaphthene	.93983	.87042	.83240	.75977	.73939	.69996	.84730	1.119	.81272	10.290
luorene	1.07961	1.04781	.99382	.91966	.89291	.83578	.99184	1.197	.96592	9.014
henanthrene-d10	-	-	-	-	-	-	-	-	-	-
Phenanthrene	1.50299	1.46274	1.37641	1.22249	1.19852	1.08949	1.23980	1.343	1.29892	11.666
nthracene	1.52986	1.47263	1.37199	1.24535	1.24035	1.09023	1.21345	1.350	1.30912	11.886
luoranthene	1.73778	1.65695	1.55768	1.40527	1.38071	1.23059	1.39794	1.526	1.48099	11.958
Pyrene	1.78300	1.68662	1.56893	1.44858	1.39387	1.26195	1.42485	1.568	1.50968	11.949
Benzo(a)anthracene-d12	1.12941	1.10933	1.05849	1.05351	1.00311	.98209	1.22883	1.748	1.08068	7.752
nzo(a)anthracene	1.67047	1.60835	1.52736	1.45235	1.43517	1.28879	1.49337	1.753	1.49655	8.301
hrysene-d12	-	-	-	-	-	-	-	-	-	-
Chrysene	1.63916	1.57476	1.49822	1.46292	1.42096	1.29505	1.49337	1.760	1.48349	7.421
nzo(b)fluoranthene	1.75036	1.70565	1.67854	1.79378	1.78517	1.55818	2.14204	1.993	1.77339	10.219
nzo(k)fluoranthene	1.76417	1.72580	1.59199	1.67018	1.57093	1.49952	1.98083	2.002	1.68620	9.431
Benzo(a)pyrene	1.61997	1.68703	1.59130	1.73887	1.62249	1.56872	1.98786	2.086	1.68803	8.551
deno(1,2,3-cd)pyrene	1.31775	1.55565	1.49082	1.64889	1.59260	1.65706	1.77852	2.534	1.57733	9.243
benz(a,h)anthracene	1.28718	1.48992	1.39705	1.56665	1.56157	1.55004	1.39259	2.553	1.46357	7.326
Benzo(g,h,i)perylene	1.29621	1.55890	-	1.62836	1.19519	1.62046	1.62178	2.665	1.48681	12.856

RF - Response Factor (Subscript is amount in ug/ml)

T - Average Relative Retention Time (RT Std/RT Istd)

$\overline{RF}$ - Average Response Factor

SD - Percent Relative Standard Deviation

Calibration Check Report

5

Title: ARB METHOD 429 ID FILE
Calibrated: 900415 08:35

Check Standard Data File: >88569
Injection Time: 900930 01:52

Compound	$\overline{RF}$	RF	%Diff	Calib Meth
Naphthalene-d8	-	-	-	Average
Naphthalene	1.13751	1.27497	12.08	Average
-Methylnaphthalene-d10	.70079	-	-	Average
cenaphthene-d10	-	-	-	Average
Acenaphthylene	1.24466	1.17319	5.74	Average
cenaphthene	.81272	.71734	11.74	Average
luorene	.96592	.82715	14.37	Average
Phenanthrene-d10	-	-	-	Average
henanthrene	1.29892	1.17213	9.76	Average
nthracene	1.30912	1.26956	3.02	Average
Fluoranthene	1.48099	1.34782	8.99	Average
yrene	1.50968	1.39179	7.81	Average
enzo(a)anthracene-d12	1.08068	-	-	Average
enzo(a)anthracene	1.49655	1.34007	10.46	Average
Chrysene-d12	-	-	-	Average
hrysene	1.48349	1.41799	4.42	Average
enzo(b)fluoranthene	1.77339	1.64418	7.29	Average
Benzo(k)fluoranthene	1.68620	1.69573	.57	Average
enzo(a)pyrene	1.68803	1.44221	14.56	Average
ndeno(1,2,3-cd)pyrene	1.57733	1.60445	1.72	Average
ibenz(a,h)anthracene	1.46357	1.51838	3.75	Average
Benzo(g,h,i)perylene	1.48681	1.59098	7.01	Average

- Response Factor from daily standard file at 50.00 ug/ml

$\overline{RF}$ - Average Response Factor from Initial Calibration

iff - % Difference from original average or curve

APPENDIX F

Benzene Data and Calculations

Calculation Data

Calfornia Commercial Benzene Trains

SUMMARY OF QUANTITATIVE ANALYSIS AND EMISSION RATE OF BENZENE

	Concentration ug/L	Emission Rate lb/hr
Train 1	1.58	0.212
Train 2	0.95	0.128
Train 3	0.61	0.082
Train 1 Duplicate	1.42	0.191

Emission Rate = [(ug/L)/1000000]*Qs*28.3*60*(1/454)
Qs = 35902 SDCFM

Analytical Data

TRACE ORGANICS
AMBIENT AIR IN TELDR BAG
METHOD - CARB 410, CARB 422

EUREKA LABORATORIES, INC.
6790 Florin-Perkins Road
Sacramento, CA 95828
(916) 381-7953

Order No: 90-08-167
Hazardous Waste Testing
Certification: E765

CLIENT: SHINING TREE
PROJECT: C.C. SAN DIEGO ASPHALT PLANT
PROJECT NO:
SAMPLE ID: FIELD BLANK

DATE RECEIVED: 08/20/1990
DATE ANALYZED: 08/20/1990
DATE COMPLETED: 08/20/1990
DATE SAMPLED: 08/18/1990

TARGET COMPOUNDS	ug/L (ppb)	DETECTION LIMIT ug/L (ppb)
Benzene	<0.03	0.03
	% Surrogate Spike Recovery	
Bromochloromethane	94%	
1,3-Dibromochloropropane	147%	

Harlan Loui
Chemist

August 21, 1990
Date

TRACE ORGANICS
AMBIENT AIR IN TELDR BAG
METHOD - CARB 410, CARB 422

EUREKA LABORATORIES, INC.
6790 Florin-Perkins Road
Sacramento, CA 95828
(916) 381-7953

Order No: 90-08-167
Hazardous Waste Testing
Certification: E765

CLIENT: SHINING TREE
PROJECT: C.C. SAN DIEGO ASPHALT PLANT
PROJECT NO:
SAMPLE ID: SAMPLE 1

DATE RECEIVED: 08/20/1990
DATE ANALYZED: 08/20/1990
DATE COMPLETED: 08/20/1990
DATE SAMPLED: 08/18/1990

TARGET COMPOUNDS	ug/L (ppb)	DETECTION LIMIT ug/L (ppb)
Benzene	1.58	0.03
	% Surrogate Spike Recovery	
Bromochloromethane	21%	
1,3-Dibromochloropropane	133%	

Harlan Loui
Chemist

August 21, 1990
Date

TRACE ORGANICS
AMBIENT AIR IN TELDR BAG
METHOD - CARB 410, CARB 422

EUREKA LABORATORIES, INC.
6790 Florin-Perkins Road
Sacramento, CA 95828
(916) 381-7953

Order No: 90-08-167
Hazardous Waste Testing
Certification: E765

CLIENT: SHINING TREE
PROJECT: C.C. SAN DIEGO ASPHALT PLANT
PROJECT NO:
SAMPLE ID: SAMPLE 1 DUP

DATE RECEIVED: 08/20/1990
DATE ANALYZED: 08/20/1990
DATE COMPLETED: 08/20/1990
DATE SAMPLED: 08/18/1990

TARGET COMPOUNDS	ug/L (ppb)	DETECTION LIMIT ug/L (ppb)
Benzene	1.42	0.03
	% Surrogate Spike Recovery	
Bromochloromethane	135%	
1,3-Dibromochloropropane	141%	

Harlan Loui
Chemist

August 21, 1990
Date

TRACE ORGANICS
AMBIENT AIR IN TELDR BAG
METHOD - CARB 410, CARB 422

EUREKA LABORATORIES, INC.
6790 Florin-Perkins Road
Sacramento, CA 95828
(916) 381-7953

Order No: 90-08-167
Hazardous Waste Testing
Certification: E765

CLIENT: SHINING TREE
PROJECT: C.C. SAN DIEGO ASPHALT PLANT
PROJECT NO:
SAMPLE ID: SAMPLE 2

DATE RECEIVED: 08/20/1990
DATE ANALYZED: 08/20/1990
DATE COMPLETED: 08/20/1990
DATE SAMPLED: 08/18/1990

TARGET COMPOUNDS	ug/L (ppb)	DETECTION LIMIT ug/L (ppb)
Benzene	0.95	0.03
	% Surrogate Spike Recovery	
Bromochloromethane	103%	
1,3-Dibromochloropropane	100%	

Harlan Loui
Chemist

August 21, 1990
Date

TRACE ORGANICS
AMBIENT AIR IN TELDR BAG
METHOD - CARB 410, CARB 422

EUREKA LABORATORIES, INC.
6790 Florin-Perkins Road
Sacramento, CA 95828
(916) 381-7953

Order No: 90-08-167
Hazardous Waste Testing
Certification: E765

CLIENT: SHINING TREE
PROJECT: C.C. SAN DIEGO ASPHALT PLANT
PROJECT NO:
SAMPLE ID: SAMPLE 3

DATE RECEIVED: 08/20/1990
DATE ANALYZED: 08/20/1990
DATE COMPLETED: 08/20/1990
DATE SAMPLED: 08/18/1990

TARGET COMPOUNDS	ug/L (ppb)	DETECTION LIMIT ug/L (ppb)
Benzene	0.61	0.03
	% Surrogate Spike Recovery	
Bromochloromethane	92%	
1,3-Dibromochloropropane	95%	

Harlan Loui
Chemist

August 21, 1990
Date

TRACE ORGANICS
AMBIENT AIR IN TELDR BAG
METHOD - CARB 410, CARB 422

EUREKA LABORATORIES, INC.
6790 Florin-Perkins Road
Sacramento, CA 95828
(916) 381-7953

Order No: 90-08-167
Hazardous Waste Testing
Certification: E765

CLIENT: SHINING TREE
PROJECT: C.C. SAN DIEGO ASPHALT PLANT
PROJECT NO:
SAMPLE ID: SPIKE RECOVERY

DATE RECEIVED: 08/20/1990
DATE ANALYZED: 08/20/1990
DATE COMPLETED: 08/20/1990
DATE SAMPLED: 08/18/1990

TARGET COMPOUNDS	% Recovery
Benzene	104%
	% Surrogate Spike Recovery
Bromochloromethane	95%
1,3-Dibromochloropropane	122%

Harlan Loui
Chemist

August 21, 1990
Date

TRACE ORGANICS
AMBIENT AIR IN TELDR BAG
METHOD - CARB 410, CARB 422

EUREKA LABORATORIES, INC.
6790 Florin-Perkins Road
Sacramento, CA 95828
(916) 381-7953

Order No: 90-08-167
Hazardous Waste Testing
Certification: E765

CLIENT: SHINING TREE
PROJECT: C.C. SAN DIEGO ASPHALT PLANT
PROJECT NO:
SAMPLE ID: SPIKE RECOVERY DUPLICATE

DATE RECEIVED: 08/20/1990
DATE ANALYZED: 08/20/1990
DATE COMPLETED: 08/20/1990
DATE SAMPLED: 08/18/1990

TARGET COMPOUNDS	% Recovery
Benzene	102%

	% Surrogate Spike Recovery
Bromochloromethane	96%
1,3-Dibromochloropropane	129%

Harlan Loui
Chemist

August 21, 1990
Date

Calibration Data

Title: GAS POLLUTANT ID FILE
Calibrated: 900820 13:21

Compound	Files: >FA415 RF 25.00	>FA416 RF 50.00	>FA417 RF 100.00	$\overline{RF}$	% RSD	
Vinyl chloride	.64503	.70539	.68025	.67689	4.480	(Conc=63.5,127.0,254.0)
Methylene chloride	.54599	.56998	.98189	.69929	35.040	(Conc=89.0,178.0,356.0)
Chloroform	1.99164	2.04393	1.89065	1.97541	3.945	(Conc=129.0,258.0,516.0)
1,1,2-Trichlorofluoroethane	-	-	-	-	-	
1,2-Dichloroethane	1.50385	1.55964	1.46098	1.50816	3.280	(Conc=108.0,216.0,432.0)
1,1,1-Trichloroethane	1.60299	1.63791	1.56076	1.60055	2.414	(Conc=143.0,286.0,572.0)
Carbon tetrachloride	1.69540	1.81898	1.72798	1.74745	3.665	(Conc=160.0,320.0,640.0)
Trichloroethene	9.08074	7.66680	6.86151	7.86969	14.276	(Conc=141.0,282.0,564.0)
Benzene	22.1701	19.2398	17.6151	19.6750	11.733	(Conc=85.0,170.0,340.0)
1,2-Dibromoethane	9.14199	7.93878	7.47651	8.18576	10.503	(Conc=210.5,421.0,842.0)
Tetrachloroethene	8.30298	7.01126	6.53432	7.28285	12.565	(Conc=185.0,370.0,740.0)
Toluene	-	-	-	-	-	
Ethylbenzene	-	-	-	-	-	
m-Xylene	-	-	-	-	-	
o,p-Xylene,total	-	-	-	-	-	

RF - Response Factor (Subscript is amount in ng)

$\overline{RF}$ - Average Response Factor

%RSD - Percent Relative Standard Deviation

QUANT REPORT

Operator ID: HARLAN Quant Rev: 6 Quant Time: 900820 10:28
Output File: ^FA415::QT Injected at: 900820 09:41
Data File: >FA415::D3 Dilution Factor: 1.00000
Name: VSTD025 624
Misc: 25ML STD + 2ML IS ICAL

ID File: IGAS1D::L1
Title: GAS POLLUTANT ID FILE
Last Calibration: 900801 18:38

	Compound	R.T.	Q ion	Area	Conc	Units	q
1)	*Bromochloromethane	10.06	49.0	11024	118.70	ng	100
2)	Vinyl chloride	3.96	62.0	3804	31.25	ng	100
3)	Methylene chloride	6.97	84.0	4513	43.08	ng	92
4)	Chloroform	12.17	83.0	23861	79.63	ng	97
6)	1,2-Dichloroethane	12.88	62.0	15084	52.08	ng	96
7)	1,1,1-Trichloroethane	14.19	97.0	21289	72.24	ng	100
8)	Carbon tetrachloride	14.58	117.0	25193	89.99	ng	96
9)	*1,2-Dibromochloropropane	20.41	77.0	8893	729.20	ng	82
10)	Trichloroethene	17.24	130.0	15615	151.96	ng	97
11)	Benzene	17.79	78.0	22982	111.32	ng	100
12)	1,2-Dibromoethane	18.86	107.0	23469	206.14	ng	97
13)	Tetrachloroethene	22.87	164.0	18733	215.27	ng	89

* Compound is ISTD

QUANT REPORT

Operator ID: HARLAN Quant Rev: 6 Quant Time: 900820 11:18
Output File: ^FA416::QT Injected at: 900820 10:51
Data File: >FA416::L2 Dilution Factor: 1.00000
Name: USTD050 624
Misc: 50ML STD + 2ML IS ICAL

ID File: IGASID::L1
Title: GAS POLLUTANT ID FILE
Last Calibration: 900801 18:38

	Compound	R.T.	Q ion	Area	Conc	Units	q
1)	*Bromochloromethane	10.06	49.0	9858	118.70	ng	100
2)	Vinyl chloride	3.96	62.0	7440	68.34	ng	100
3)	Methylene chloride	6.97	84.0	8426	89.95	ng	94
4)	Chloroform	12.17	83.0	43795	163.44	ng	94
6)	1,2-Dichloroethane	12.88	62.0	27978	108.03	ng	99
7)	1,1,1-Trichloroethane	14.19	97.0	38904	147.63	ng	100
8)	Carbon tetrachloride	14.58	117.0	48341	193.10	ng	95
9)	*1,2-Dibromochloropropane	20.37	77.0	9357	729.20	ng	84
10)	Trichloroethene	17.28	130.0	27743	256.60	ng	98
11)	Benzene	17.75	78.0	41970	193.22	ng	100
12)	1,2-Dibromoethane	18.86	107.0	42887	358.02	ng	96
13)	Tetrachloroethene	22.87	164.0	33288	363.56	ng	93

* Compound is ISTD

QUANT REPORT

Operator ID: HARLAN Quant Rev: 6 Quant Time: 900820 12:08
Output File: ^FA417::QT Injected at: 900820 11:41
Data File: >FA417::L2 Dilution Factor: 1.00000
Name: USTD100 624
Misc: 100ML STD + 2ML IS ICAL

ID File: IGAS1D::L1
Title: GAS POLLUTANT ID FILE
Last Calibration: 900801 18:38

	Compound	R.T.	Q ion	Area	Conc	Units	q
1)	*Bromochloromethane	10.09	49.0	10570	118.70	ng	100
2)	Vinyl chloride	3.98	62.0	15386	131.81	ng	100
3)	Methylene chloride	7.00	84.0	31127	309.89	ng	95
4)	Chloroform	12.19	83.0	86873	302.36	ng	96
6)	1,2-Dichloroethane	12.90	62.0	56202	202.39	ng	98
7)	1,1,1-Trichloroethane	14.21	97.0	79498	281.35	ng	100
8)	Carbon tetrachloride	14.61	117.0	98479	366.88	ng	98
9)	*1,2-Dibromochloropropane	20.39	77.0	10282	729.20	ng	83
10)	Trichloroethene	17.26	130.0	54567	459.30	ng	99
11)	Benzene	17.78	78.0	84449	353.81	ng	100
12)	1,2-Dibromoethane	18.89	107.0	88765	674.34	ng	96
13)	Tetrachloroethene	22.89	164.0	68181	677.66	ng	90

* Compound is ISTD

APPENDIX G

Formaldehyde Data and Calculations

Calculation Data

SUMMARY OF QUANTITATIVE ANALYSIS AND EMISSION RATE OF FORMALDEHYDE

	Concentration ug/L	Emission Rate lb/hr
Train 1	2.76	0.37
Train 2	2.27	0.31
Train 3	0.88	0.12

Emission Rate = [(ug/L)/1000000]*Qs*28.3*60*(1/454)
Qs = 35902 SDCFM

Analytical Data

Shinnig Tree
90-of-193

~~Formaldehyde Analysis~~

By

~~DNPH Derivatization and HPLC~~

Method 430 ARB (MS)

1A: 8/22/90 MS

EL I

Sample ID	FAD Blank	FAD -1	FAD -2	FAD -3	#7 RSD	BK.	DL ~~ppm~~ PPb
							(MG/L)
Formaldehyde	nd	~~6.17~~ 2.76	~~5.25~~ 2.27	~~2.22~~ 0.875 (MS)	11/112	nd	~~0.015~~ 0.01

Date: 8/28/90 Chemist: J.C. Test: FAD.

Client: Shinning Tree. ELI Order #: 90-08-193.

Sample Type/Size: Air. Sample Std Book #: Page:

Date Received: 8/21/90 Unit:

Date Extracted: 8/22/90 Work Book #: 1 Page: 30

Date Analyzed: 8/24/90 GC: HPLC Column: RP-18

Confirmation GC: Column:

ID	Cpd	RT	AC	RF/ Slope	I	Conc	DF	Final Conc ppm	Note mg/L (DNPH)
#1 x20	Formaldehyde	5.570	2267.531	0.002959		6.71	2ml 4ml x20	6.71	-0.024 = 6.69
#2 x20	"	5.536	1772.558			5.25		5.25	-0.024 = 5.23
#3 x20	"	5.556	757.684			2.24		2.24	-0.024 = 2.22
Meth BK.	~~5.542~~	5.598	166.144			0.49.	2ml 4ml	~~0.49~~ 0.024	
R.S. x20	"	5.575	188.271			0.56/0.5 = 112%			
R.S.D.	"	5.572	158.465			0.56/0.5 = 112%			
BK	nd								
#1 x20	FAD	5.57	2267.53	0.002957		6.71	-0.49)	2000ml/12.857 x 30/210	x 20 = 2764.4 µg/L
#2 x 20	"	"	1772.58	"		5.25	-0.49)	2000/11.99 x 30/210	x 20 = 2268.5 µg/L
#3 x 20	"	"	757.684	"		2.24	-0.49)	2000/11.42 x 30/210	x 20 = 875.6 µg/L

Volume of air sampled through DNPH #1 : 12.857 l

#2 : 11.99 l

#3 : 11.42 l

D/L : ~~[illegible]~~ 0.3 x 2000/12 x 30/210 = 7.14 µg/l = 0.007 ppb

= 0.01

Calibration Data

cpd.	R.T.	1.	2.	5.	10	20.	
Formaldehyde	5.403.	310.833	626.611	1872.013	3517.332	6753720	0.00275 7.1%
BK	5.578	166.100					
Individual cpd.							
Formaldehyde		10					
FAD	5.403	2611.65					
Acrolein	10.628	1435535					
Acetaldehyde	7.215	1951.974					

APPENDIX H

Sampling QA/QC Documents

13329 STOCKTON BLVD.
GALT, CA. 95632

ACCURATE
DEPENDABLE
GAS METER SERVICE

209 745-4644
STA. LIC. #0984

VAPOR METER TEST DATA

OWNER Eureka Lab. MAKE Rockwell

ADDRESS _____ MODEL T110

TESTED AT Elk Grove Co. SERIAL # 27324

TEMPERATURE 72° LAST TESTED _____

CONDITION Reconditioned SIZE ½

ALTITUDE 50 CAPACITY Bur. 95 Prop. 110 Nat. 150

IMMERSION TEST ✓ LOW LIGHT TEST ✓

INDEXED IN Cu. ft. TESTING MEDIUM USED Air

AT PRESSURE OF 1½ W.C.

REMARKS American Bell Prover #1558

	TESTED METER	RATE	%ERROR	TEMPERATURE
1.	#27324	13 Cu ft hr.	.50 Slow	72°
2.		22	.20 Slow	"
3.		30	✓	"
4.		48	✓	"
5.	----	71	✓	"
6.		97	.1 Fast.	"
		130	.1 Fast.	"
REMARKS		150	.1 Fast.	"

3 hrs - Total

TESTED BY Peter Okamoto STATE LICENSE # 2-0984

TABLE IV

Orifice Meter Calibration

Operator(s) Shao-Pei Yo Date 8/13/90

Meter Console No. Eureka 1 DGM No. Eureka 1

Barometric Pressure (P_m) 29.98 in.Hg. *DGM Correction Factor (DGMCF) 1.00

ΔH in H_2O	V_1 Initial DGM Dial Reading	θ Minutes	V_2 Final DGM Dial Reading	Q_m (CFM)	t_m(°F)	K_m
0.25	809.695	5	811.133	0.288	76	.734
0.5	811.310	5.3	813.448	0.403	76	.726
1.0	813.874	5	816.709	0.567	80	.719
2.0	817.082	5	820.966	0.777	82	.696
4.0	821.325	5	826.880	1.111	82	.704
6.0	827.369	5	833.855	1.317	82	.681
					Average ($\bar{K}_m$)	0.714

$$Q_m \underset{(cfm)}{=} \frac{(V_2 - V_1) \times DGMCF}{\theta(minutes)}$$

$$K_m = Q_m \left[\frac{P_m M_m}{T_m (\Delta H)}\right]^{\frac{1}{2}}$$

$$\Delta H_@ = \frac{0.9244}{(\bar{K}_m)^2}$$

δ_{n-1} 0.0207

% RSD 2.9%

$\Delta H_@ = .9244 / (.714)^2$

$= 1.813$

* checked with calibrated DGM

TABLE IV

Orifice Meter Calibration

Operator(s) Abdon Date 9/17/90

Meter Console No. #1 DGM No. _____

Barometric Pressure (P_m) 30.30 in.Hg. *DGM Correction Factor (DGMCF) 1.01

ΔH in H_2O	V_1 Initial DGM Dial Reading	θ Minutes	V_2 Final DGM Dial Reading	Q_m (CFM)	Time / t_m (°F)	K_m
0.25	979.8	5	981.25	0.293	68/66	0.752
0.5	981.25	5	983.24	0.402	73/67	0.730
1.0	983.240	5	985.99	0.553	77/67	0.710
2.0	985.99	5	989.79	0.768	81/67	0.697
4.0	989.79	5	995.1	1.073	84/69	0.689
6.0	995.1	5	001.545	1.302	86/70	0.683
					Average ($\bar{K}_m$)	0.710

$$Q_m \text{ (cfm)} = \frac{(V_2 - V_1) \times DGMCF}{\theta \text{(minutes)}}$$

$$K_m = Q_m \left[\frac{P_m M_m}{T_m \Delta H}\right]^{\frac{1}{2}}$$

$$\Delta H_@ = \frac{0.9244}{(\bar{K}_m)^2} = 1.83$$

$P_m = 30.30$ in Hg

$T_m = t_m + 460$

$M_m = 29$ mol

$T_m = 532.9$

$t_m = 72.9$

$$1.59 \leq \Delta H \leq 2.09$$

* checked with calibrated meter

NOZZLE CALIBRATION

Date 3/10/90 Calibrated by JOE W. McNeal

Nozzle identification	D_1, in.	D_2, in.	D_3, in.	ΔD, in.	D_{avg}
#6 3/16	.184	.182	.183	.183	.002
#2 1/4	.255	.256	.254	.256	.002
#4 5/16	.313	.312	315	.313	.002
#4 3/8	.377	.375	.373	.375	.002
E1	.234	.232	.231	.233	.002

where:

$D_{1, 2, 3}$ = nozzle diameter measured on a different diameter, in. Tolerance = measure within 0.001 in.

ΔD = maximum difference in any two measurements, in. Tolerance = 0.004 in.

D_{avg} = average of D_1, D_2, and D_3.

Nozzle calibration data.

NOZZLE CALIBRATION

Date Sept 17, 1990 Calibrated by Joe McNeal

Nozzle identification #	D_1, in.	D_2, in.	D_3, in.	ΔD, in.	D_{avg}
E6L-2	0.205	0.207	0.206	.002	0.206
E6L-3	0.213	0.210	0.210	.002	0.211

where:

$D_{1, 2, 3}$ = nozzle diameter measured on a different diameter, in. Tolerance = measure within 0.001 in.

ΔD = maximum difference in any two measurements, in. Tolerance = 0.004 in.

D_{avg} = average of D_1, D_2, and D_3.

Nozzle calibration data.

TEMPERATURE CALIBRATION

Name Joe W McNeal Date Aug 12, 1990

Barometric Pressure 30.25 Land Elevation

ICE BATH

Hg in Glass Thermometer Temperature				Corrected Hg in Glass Temperature				Temperature Device Probe Therm Co. Identification No. EL1-TC Temperature			
°C	°K	°F	°R	°C	°K	°F	°R	°C	°K	°F	°R
2		35.5						1.4			
2		35.5						1.8		35.1	
2		35.5						1.8		35.1	

BOILING WATER BATH

Hg in Glass Temperature				Corrected Temperature				Device No.			
°C	°K	°F	°R	°C	°K	°F	°R	°C	°K	°F	°R
		210						100.5			
		210						100.6			
		210						100.8			

MINERAL OIL BATH

Point	Hg in Glass Temperature				Corrected Temperature				Device No.			
	°C	°K	°F	°R	°C	°K	°F	°R	°C	°K	°F	°R
1		375	375						192.8		375	
2		375	375						192.6		376	
3			375						192.8		376	
4			375						192.8		376	

Form for temperature calibration.

TEMPERATURE CALIBRATION

Name Joe W McNeal Date Aug 12 1990

Barometric Pressure 30.25 Land Elevation

ICE BATH

Hg in Glass Thermometer Temperature				Corrected Hg in Glass Temperature				Temperature Device Identification No. Last Impinger EL3-TC J Temperature			
°C	°K	°F	°R	°C	°K	°F	°R	°C	°K	°F	°R
5.2								5.8			
5.4								5.8			
5.7								6.0			

BOILING WATER BATH

Hg in Glass Temperature				Corrected Temperature				Device No. Last Impinger EL3-TC J			
°C	°K	°F	°R	°C	°K	°F	°R	°C	°K	°F	°R
		211						100.6			
		211						100.5			
		211						101.1			

MINERAL OIL BATH

Point	Hg in Glass Temperature				Corrected Temperature				Device No. Last Impinger EL3-TC J			
	°C	°K	°F	°R	°C	°K	°F	°R	°C	°K	°F	°R
1			360									
2			365								366	
3			365								367	
4			365								367	
											367	

Form for temperature calibration.

TEMPERATURE CALIBRATION

Name Joe W McNeel Date Aug 12, 1990

Barometric Pressure 30.25 Land Elevation

ICE BATH

Hg in Glass Thermometer Temperature				Corrected Hg in Glass Temperature				Temperature Device Identification No. Heater Box ELSR-TC Temperature			
°C	°K	°F	°R	°C	°K	°F	°R	°C	°K	°F	°R
2.1								1.8			
2.2								2.1			
2.1								2.2			

BOILING WATER BATH

Hg in Glass Temperature				Corrected Temperature				Device No.			
°C	°K	°F	°R	°C	°K	°F	°R	°C	°K	°F	°R
		210						100.5			
		210						100.6			
		210						100.8			

MINERAL OIL BATH

Point	Hg in Glass Temperature				Corrected Temperature				Device No.			
	°C	°K	°F	°R	°C	°K	°F	°R	°C	°K	°F	°R
1			372								376	
2			374								375	
3			375								376	
4			375								376	

Form for temperature calibration.

PITOT TUBE TYPE Type S

CALIBRATED BY RAL

DATE Feb. 7, 1990 $\bar{C}_p = \frac{\bar{C}_{pA} + \bar{C}_{pB}}{2} = 0.8549$

A SIDE CALIBRATION

RUN	ΔP_{STD}	$\Delta P_{(S)}$	$C_{p\ (S)}$	DEV.
1	.25	.33	.8704	0.0138
2	.75	1.05	.8451	0.0115
3	1.00	1.37	.8548	0.0022
			$\bar{C}_{PA} = .8566$	0.00917 AVG. =

STANDARD DEVIATION OF AVG. DEV. = (Must be <.02)

B SIDE CALIBRATION

RUN	ΔP_{STD}	$\Delta P_{(S)}$	$C_{p\ (S)}$	DEV.
1	.25	.35	.8452	0.0081
2	.75	1.00	.8666	0.0133
3	1.00	1.39	.8482	0.0051
			$\bar{C}_{PB} = .8533$	.00883 AVG. =

STANDARD DEVIATION OF AVG. DEV. = (Must be <.02)

CALCULATIONS: $|\bar{C}_{p\,a} - \bar{C}_{p\,B}| = 0.0033$ (Must be <.01)

AVERAGE DEVIATION = $\frac{\sum_{i}^{3} |C_{p\ (S)} - \bar{C}_{p\ (A\ or\ B)}|}{3}$ (Must be <.01)

DEVIATION (DEV.) = $C_{p\ (S)} - \bar{C}_{p\ (A\ or\ B)}$

$C_{p\ (S)} = C_{p\ (STD)} \sqrt{\frac{\Delta P_{STD}}{\Delta P_S}}$ Where $C_{p\ (STD)} = 0.99$

Conversion of Production Data into Corrected Test Tonnage and Emission Rates into Pounds per Ton of Asphalt Concrete Produced.

The preceding portions of Appendix G, provide Source Test Emissions in pounds per hour. The Emission Inventory Criteria and Guidelines Regulation Section 93340.(b) discourages reporting toxic emissions based on hours of operation unless the operation "undergoes very limited variation over time during the reporting year". Based on the seasonal and interruptable nature of Asphalt Concrete Production, Hot Mix Asphalt, it would be inappropriate for most of these facilities to report based on hours of production. This following section corrects the emissions from hourly to a per ton basis.

Page G288 corrects the tonnage recorded during testing into tonnage more representative of the actual sample collected. This is necessary for a number of reasons. First, the operation is subject to interruptions during testing caused by plant requirements. Secondly, the operation is subject to interruptions during testing caused by testing requirements. If these tonnage corrections were not made, a false-high tonnage would be attributed to the lab reported hourly emission factor. This gives an unrealistically low emission factor per ton of AC produced.

The conversion to Actual Tons/Test & % of Interrupt Time is as follows:

$$\text{Actual Tons/Test} = (TE-TS) \times (TT/APRT)$$

$$\%\ \text{Interrupt Time} = ((TET-APRT) + (APRT-TT))/TET$$

Where:

TET = Total Elapsed Time beginning to end of test.
TT = Test Time in minutes
APRT = Actual Plant Running Time during elapsed time.
TS = Plant daily accumulated tonnage at beginning of test.
TE = Plant daily accumulated tonnage at end of test.

Page G289 converts the hourly metals emissions into metals emissions per ton of AC produced by the tested type facility.

Page G290 converts the hourly PAHs emissions into PAHs emissions per ton of AC produced by the tested type facility.

Page G291 converts the hourly Benzene, (& Formaldehyde for oil burning plants) emissions into Benzene & Formaldehyde emissions per ton of AC produced by the tested type facility.

CENTRAL VALLEY ROCK SAND & GRAVEL ASSOCIATION
AB2588 ASPHALT CONCRETE POOLED SOURCE TESTING PROGRAM
Prepared by: D.E. DEEM, R.E.A.,R.G.
PLANT: California Commercial Asphalt Company San Diego

Date of Test	Start Time	End Time	Total Elapsed Time in Min.	Testing Time in Min.	Actual Plant Running Time	Daily Tonnage Start	Daily Tonnage End	Actual Tons/Test	% Interupt	Test Name
8/15/90	1050	1205	75	72	73	2398	3012	605.59	2.01	CHROMIUM (1)
8/16/90	0545	0658	73	72	73	44	478	428.05	0.01	METALS (3)
8/16/90	1010	1123	73	72	72	1435	1852	417.00	1.00	CHROMIUM (3)
9/17/90	0550	0725	95	72	95	118	672	419.87	0.24	PAH (1)
9/17/90	0800	0923	83	72	79	876	1425	500.35	4.08	PAH (2)
9/17/90	1025	1225	120	120	120	1848	2645	797.00	0.00	PAH (3)
8/15/90	1248	1404	76	72	76	3100	3557	432.95	0.05	CHROMIUM (2)
8/14/90	1127	1240	73	72	73	1309	1740	425.10	0.01	ARSENIC (1)
8/15/90	0840	0956	76	72	74	1274	1894	603.24	2.03	ARSENIC (2)
8/16/90	0800	0913	73	72	73	700	1117	411.29	0.01	ARSENIC (3)
8/14/90	0744	0853	79	72	79	652	1154	457.52	0.09	METALS (1)
8/15/90	0550	0710	80	72	78	110	568	422.77	2.08	METALS (2)

NOTE: PRODUCTION DATA FOR THIS TEST PROVIDED BY
PAUL WEIR, R&W CONSULTANTS - SAN DIEGO
& JUSTIFIED WITH EUREKA LABS DATA

Don E. Deem 12/26/90

REGISTERED ENVIRONMENTAL ASSESSOR
DON E. DEEM
No. 53
Expires 6/30/91
STATE OF CALIFORNIA

Actual Tons / Test = (TE-TS) x (TT/APRT)

% Interrupt Time = (TET-APRT) ÷ (APRT-TT)/TET

Where:

TET = Total Elapsed Time, Beginning to End of Test
TT = Test Time in Minutes, traverse points x minutes/point
APRT = Actual Plant running time during total elapsed time
TS = Plant Tonnage Start of Test
TE = Plant Tonnage End of Test

EPA MULTIMETALS /Chromium (CARB 425)
REVISED ON: 3/2/91

CENTRAL VALLEY ROCK SAND & GRAVEL ASSOCIATION
AB2588 ASPHALT CONCRETE POOLED SOURCE TESTING PROGRAM
Prepared By: D. E. DEEM, R.E.A., R.G.
PLANT #: 501
PLANT TYPE: DRUM
FUEL TYPE: OIL
COLLECTOR TYPE: BAGHOUSE

TONS PRODUCED EPA TRAIN # 1	458	TONS PROD. Chromium TRAIN # 1	606
TONS PRODUCED EPA TRAIN # 2	423	TONS PROD. Chromium TRAIN # 2	433
TONS PRODUCED EPA TRAIN # 3	428	TONS PROD. Chromium TRAIN # 3	417
TEST TIME(min.)EPA TRAIN #1	72	TEST TIME(min.)CR+ TRAIN # 1	72
TEST TIME(min.)EPA TRAIN #2	72	TEST TIME(min.)CR+ TRAIN # 2	72
TEST TIME(min.)EPA TRAIN #3	72	TEST TIME(min.)CR+ TRAIN # 3	72

		EMISSION RATES lb/hr.			EMISSION RATES lb/ton		
COMPOUND		TEST 1	TEST 2	TEST 3	TEST 1	TEST 2	TEST 3
Arsenic	*	ND	ND	ND	0.0E+00	0.0E+00	0.0E+00
Beryllium	*	ND	ND	ND	0.0E+00	0.0E+00	0.0E+00
Cadmium	*	ND	ND	ND	0.0E+00	0.0E+00	0.0E+00
Copper		2.9E-03	3.6E-03	1.2E-03	7.5E-06	1.0E-05	3.4E-06
Mercury		2.0E-03	1.9E-03	2.2E-03	5.4E-06	5.4E-06	6.2E-06
Nickel		1.7E-01	1.5E-01	4.1E-03	4.4E-04	4.3E-04	1.1E-05
Lead		1.2E-03	2.3E-03	8.6E-04	3.1E-06	6.7E-06	2.4E-06
Selenium	*	ND	ND	ND	0.0E+00	0.0E+00	0.0E+00
Zinc		6.9E-02	1.2E-01	5.8E-02	1.8E-04	3.3E-04	1.6E-04
Manganese		2.3E-03	1.5E-02	1.5E-02	6.1E-06	4.2E-05	4.3E-05
Total Chromium		7.1E-03	3.9E-03	8.0E-03	1.4E-05	1.1E-05	2.3E-05
Hexavalent Chromium	*	ND	ND	ND	0.0E+00	0.0E+00	0.0E+00

* = EMISSION is LESS THAN DETECTABLE LIMIT FOR ALL TRAINS
ND = NOT DETECTABLE

CONVERSION OF EMISSION RATES IN lb/hr
to EMISSION RATES lb/ton =

ER #/hr /((60/TT) * TP))

Where:

ER #/hr = Emission Rate in lb/hr
60 = Minutes per hour
TT = Test Time in minutes
TP = Tons Produced during test

POLYCYCLIC AROMATIC HYDROCARBONS (PAH's)
REVISED ON: 3/2/91

CENTRAL VALLEY ROCK SAND & GRAVEL ASSOCIATION
AB2588 ASPHALT CONCRETE POOLED SOURCE TESTING PROGRAM
Prepared By: D. E. DEEM, R.E.A., R.G.
PLANT #: 501
PLANT TYPE: DRUM
FUEL TYPE: OIL
COLLECTOR TYPE: BAGHOUSE

TONS PRODUCED TRAIN # 1	420
TONS PRODUCED TRAIN # 2	500
TONS PRODUCED TRAIN # 3	797
TEST TIME (min.) TRAIN # 1	72
TEST TIME (min.) TRAIN # 2	72
TEST TIME (min.) TRAIN # 3	120

CONVERSION OF EMISSION RATES IN lb/hr to EMISSION RATES lb/ton =

ER #/hr /((60/TT) * TP))

Where:

ER #/hr = Emission Rate in lb/hr
60 = Minutes per hour
TT = Test Time in minutes
TP = Tons Produced during test

COMPOUND		EMISSION RATES lb/hr. TEST 1	TEST 2	TEST 3	EMISSION RATES lb/ton TEST 1	TEST 2	TEST 3
Naphthalene		1.8E-01	3.5E-02	1.0E-01	5.0E-04	8.3E-05	2.5E-04
Acenaphtlylene	*	ND	ND	ND	0.0E+00	0.0E+00	0.0E+00
Acenaphene	*	ND	ND	ND	0.0E+00	0.0E+00	0.0E+00
Fluorene		2.2E-03	6.3E-04	1.8E-03	6.3E-06	1.5E-06	4.4E-06
Phenanthrene		1.8E-03	6.6E-04	1.2E-03	5.3E-06	1.6E-06	3.1E-06
Anthracene	*	ND	ND	ND	0.0E+00	0.0E+00	0.0E+00
Fluoranthene	*	ND	ND	ND	0.0E+00	0.0E+00	0.0E+00
Pyrene	*	ND	ND	ND	0.0E+00	0.0E+00	0.0E+00
Benzo(a)anthracene	*	ND	ND	ND	0.0E+00	0.0E+00	0.0E+00
Chrysene	*	ND	ND	ND	0.0E+00	0.0E+00	0.0E+00
Benzo(b)fluoranthene	*	ND	ND	ND	0.0E+00	0.0E+00	0.0E+00
Benzo(k)fluoranthene	*	ND	ND	ND	0.0E+00	0.0E+00	0.0E+00
Benzo(a)pyrene	*	ND	ND	ND	0.0E+00	0.0E+00	0.0E+00
Benzo(g,h,i)perylene	*	ND	ND	ND	0.0E+00	0.0E+00	0.0E+00
Dibenzo(a,h)anthracene	*	ND	ND	ND	0.0E+00	0.0E+00	0.0E+00
Indeno(1,2,3-cd)pyrene	*	ND	ND	ND	0.0E+00	0.0E+00	0.0E+00
DETECTION LIMIT		1.7E-04	1.6E-04	1.0E-04			
TOTAL PAHS/TON ASPHALT CONCRETE					5.1E-04	8.6E-05	2.6E-04
TOTAL PAHS/ 100.000 tons Asphalt Concrete					5.1E+01	8.6E+00	2.6E+01

* EMISSION is LESS THAN DETECTABLE LIMIT FOR ALL TRAINS
ND = NOT DETECTED

BENZENE (CARB 410A) / FORMALDEHYDE (430)
REVISED ON: 2/9/91

CENTRAL VALLEY ROCK SAND & GRAVEL ASSOCIATION
AB2588 ASPHALT CONCRETE POOLED SOURCE TESTING PROGRAM
Prepared By: D. E. DEEM, R.E.A., R.G.
PLANT #: 501
PLANT TYPE: DRUM
FUEL TYPE: OIL
COLLECTOR TYPE: BAGHOUSE

TONS/HR BENZENE TRAIN #1	350
TONS/HR BENZENE TRAIN #2	350
TONS/HR BENZENE TRAIN #3	350
TONS/HR FORMALDEHYDE TRAIN #1	350
TONS/HR FORMALDEHYDE TRAIN #2	350
TONS/HR FORMALDEHYDE TRAIN #3	350

COMPOUND	EMISSION RATES lb/hr. TRAIN 1	TRAIN 2	TRAIN 3	EMISSION RATES lb/ton TRAIN 1	TRAIN 2	TRAIN 3
Benzene	2.120E-01	1.280E-01	8.200E-02	6.1E-04	3.7E-04	2.3E-04
Formaldehyde	3.700E-01	3.100E-01	1.200E-01	1.1E-03	8.9E-04	3.4E-04

CONVERSION OF EMISSION RATES IN lb/hr
to EMISSION RATES lb/ton =

ER #/hr /((60/TT) * TP))

Where:

ER #/hr = Emission Rate in lb/hr
60 = Minutes per hour
TT = Test Time in minutes
TP = Tons Produced during test