AP42 Section: 11.1

Reference Number: 163

Title: Toxic Air Contaminant Emission Inventory Test At Granite Construction Company Asphalt Concrete Drum-Mix Plant, Sacramento, California,

Eureka Laboratories, Inc., Sacramento, CA,

January 29, 1991.

APPENDIX F
PLANT #53

TOXIC AIR CONTAMINANT EMISSION INVENTORY TEST AT

GRANITE CONSTRUCTION COMPANY
ASPHALT CONCRETE DRUM-MIX PLANT
Sacramento, California

Submitted to:

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1.0 INTRODUCTION

On September 5-7 and 10-11, 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 Granite Construction Company Concrete Drum Mix Plant. The facility is located in Sacramento, 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.

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) , and Benzene. 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 aggregates and conveying to a rotary kiln for heating, drying and additional mixing. The kiln uses natural gas as fuel. As the heated product leaves the kiln, it is combined with asphaltic cement 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 of a knock out box and a baghouse. Exhaust gases from the process are manifolded through the box to remove the heavier particulates and then through a baghouse to remove the fine particulates before being vented to the atmosphere from a rectangular exhaust stack. A schematic of the emission control system is shown in Figure 2. The stack is 54.0" long and 37.0" wide with 6 port holes along the length.

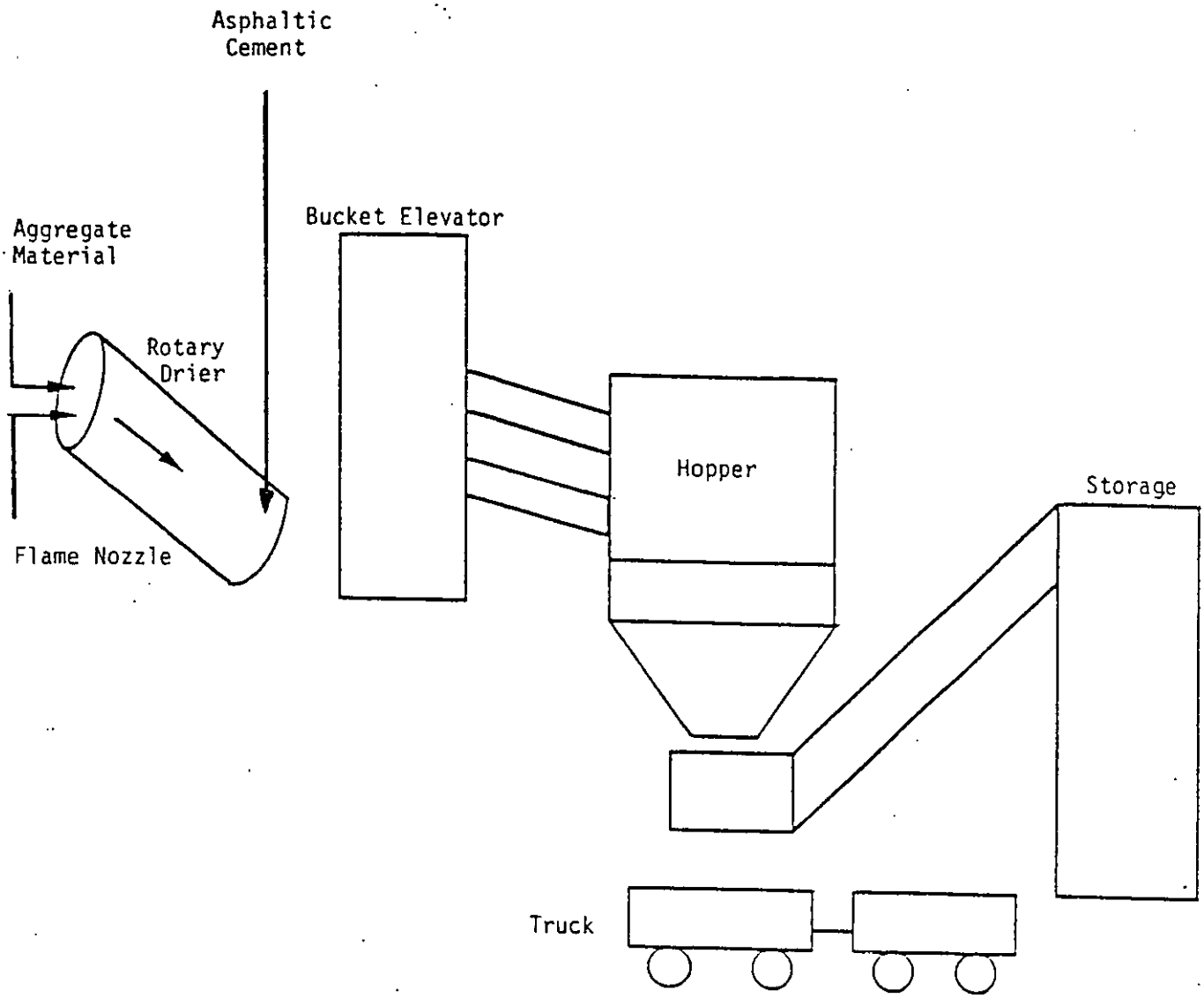


Figure 1. A Typical Asphalt Drum-Mix Plant

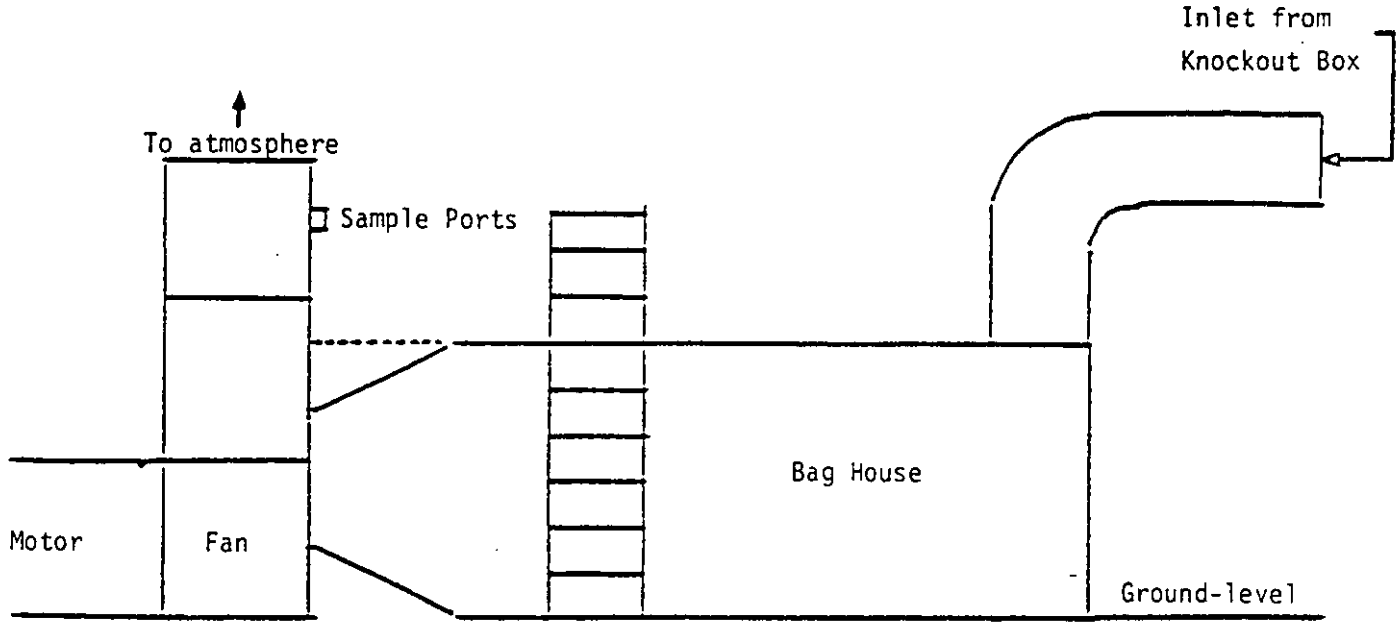


Figure 2. Sampling Location and Control Equipment

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 0.87 diameters upstream, and 4.83 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.

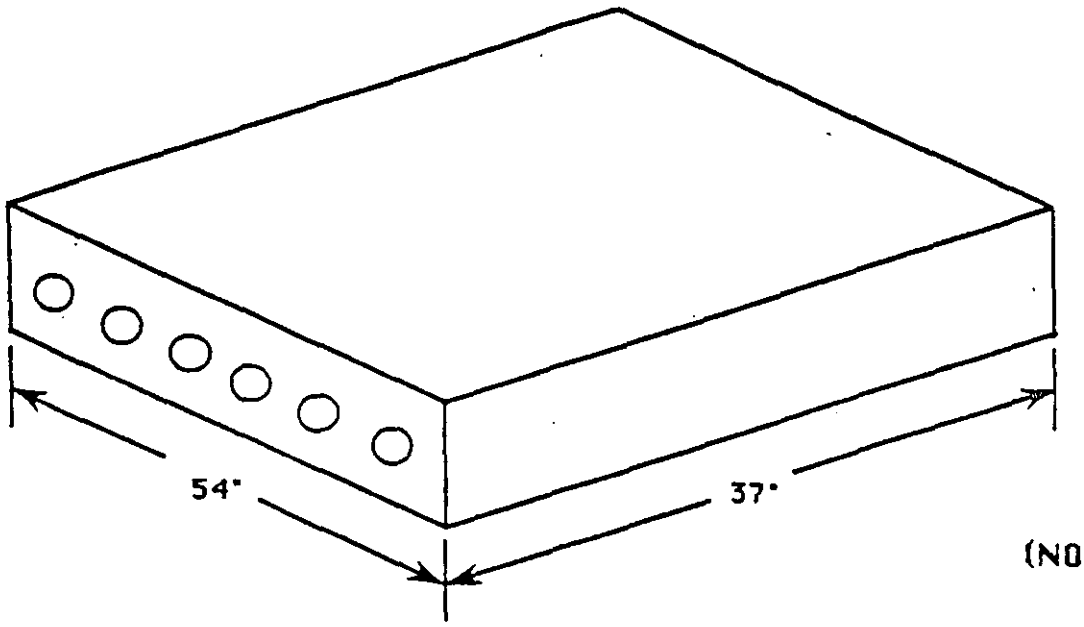
5.0 SAMPLING AND ANALYTICAL PROCEDURE

CARB Method 104 was used as sampling method for Beryllium, 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 104 for beryllium 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 all methods except for beryllium and chromium and hexachromium.

Figure 3. Sampling Points Configuration

TRAVERSE POINTS ARB METHOD 1

RECTANGULAR STACK



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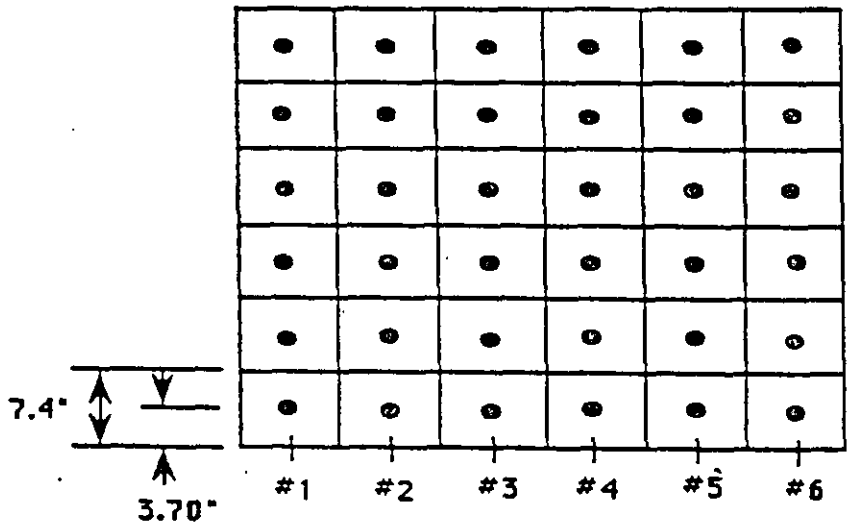


TRAVERSE POINT:	
#1	3.7"
#2	11.1"
#3	18.5"
#4	25.9"
#5	33.3"

PORTS

$$\text{EQ. DIA} = \frac{2LW}{L+W} = \frac{(2")(54")(37")}{54"+37"} = 43.9"$$

FROM SAMPLING PORTS:

UPSTREAM - 0.87" DIA
DOWNSTREAM - 4.83" DIA

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 90 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 spectrometry (CVAAS). The remainder of the trace elements were analyzed by inductively coupled argoplasma emission spectroscopy (ICAP).

5.2 Beryllium - CARB Method 104

CARB Method 104 was conducted for determination of lead. 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 (90 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 combined filter and impingers solution were acid digested and analyzed for Beryllium 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

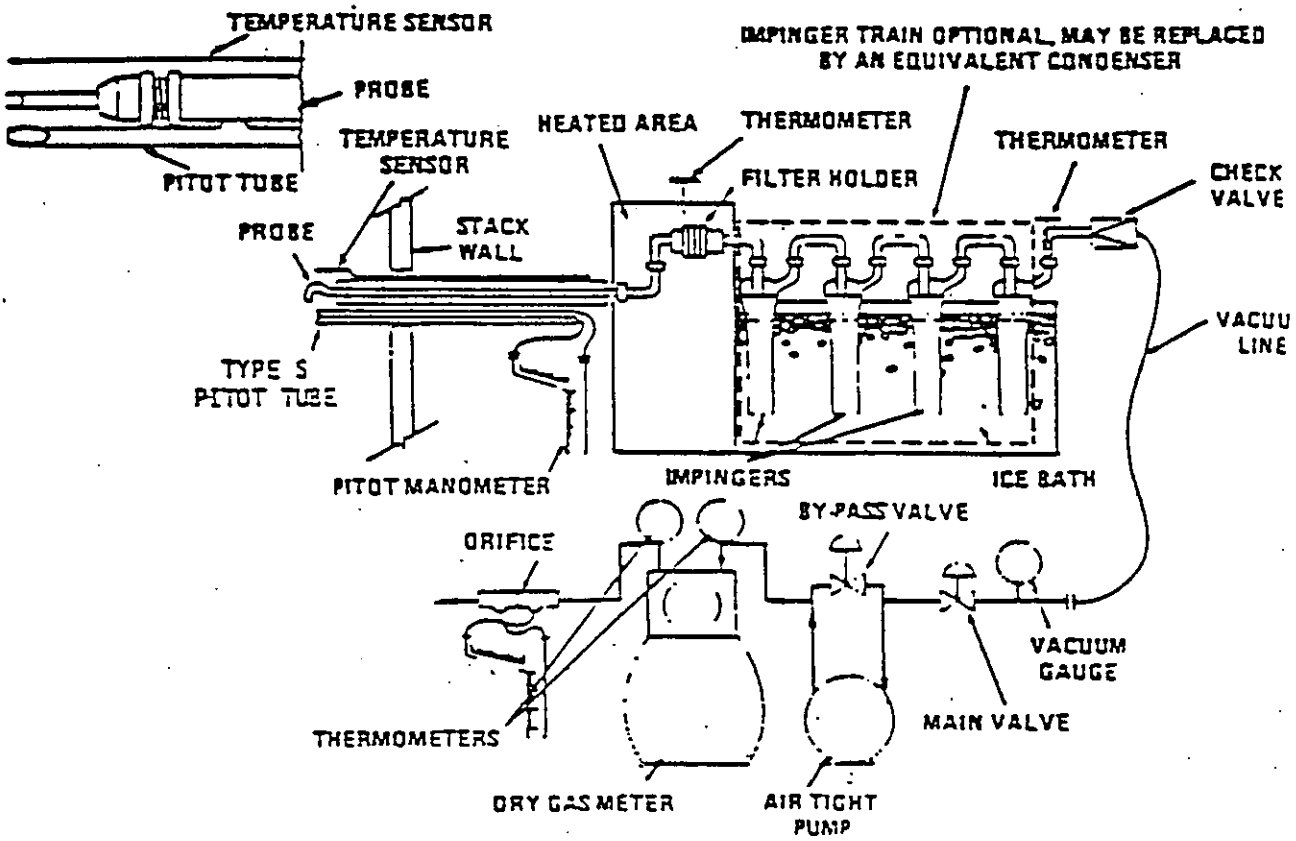


Figure 4. Schematic of Method 5 sampling train.

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.

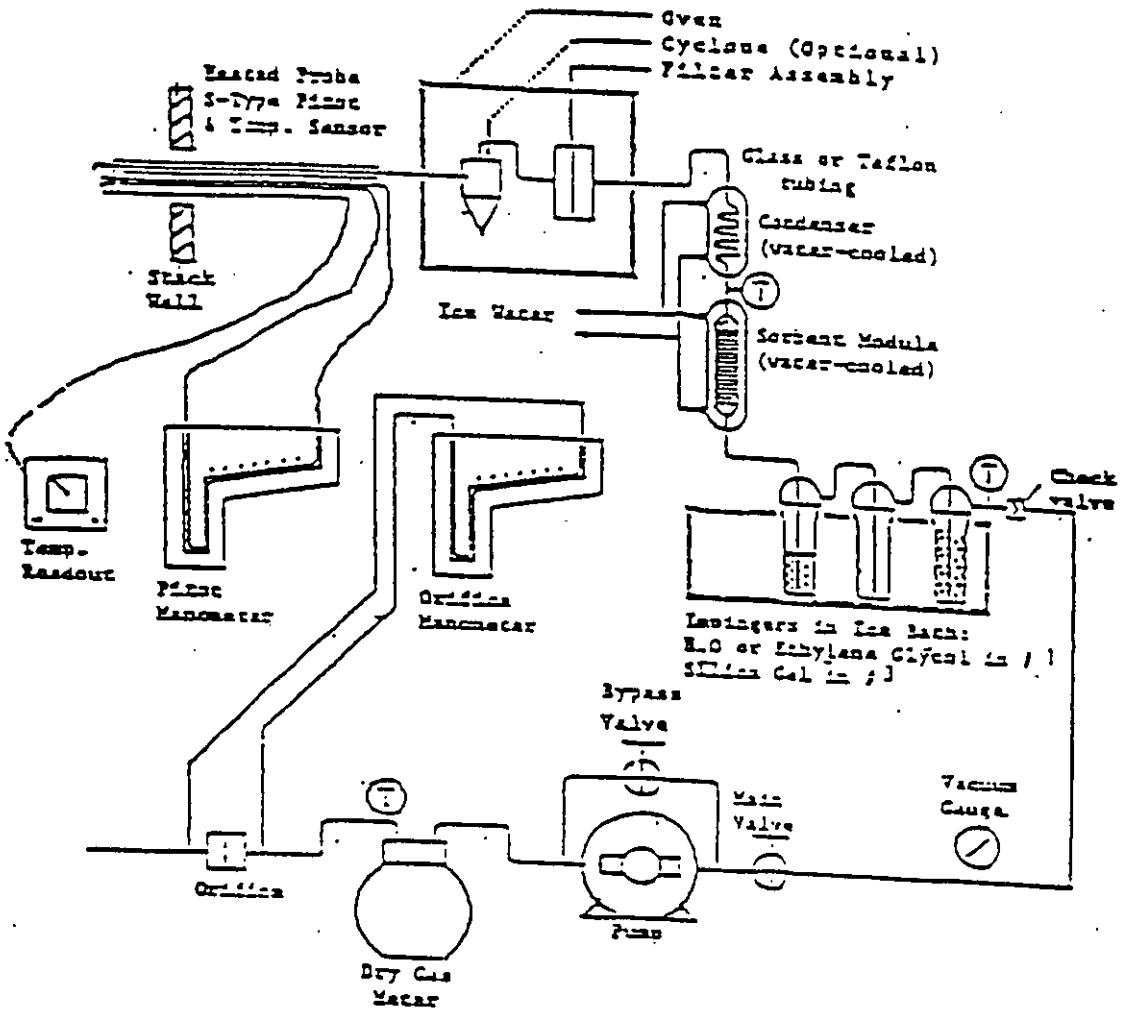
In order to estimate the precision and accuracy of the sampling train for collecting and recovering PAH in the stack gas sample, isotopic labelled PAH were spiked onto the filter (benzo[a]anthracene d12) and onto the XAD-2 resin (methyl-naphthalene-d10) prior to each test. Once in the laboratory, the 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. 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.

5.5 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).

FIGURE F: PAH SAMPLING TRAIN



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 5.

Table 1
Summary of Trace Metals Emissions Data
EPA Draft Method

CLIENT: Central Valley Rock, Sand & Gravel Association, Inc.
PROJECT: Granite Asphalt Plant

Compound	RUN #1 09/06/90 (10-3)lb/hr	RUN #2 09/07/90 (10-3)lb/hr	RUN #3 09/11/90 (10-3)lb/hr
Arsenic	< 0.80	< 0.81	< 0.92
Beryllium	< 0.08	< 0.08	< 0.09
Cadmium	< 0.16	< 0.16	< 0.18
Copper	1.45	0.97	1.65
Mercury	0.17	0.15	0.24
Nickel	1.93	4.94	3.70
Lead	< 0.40	< 0.40	< 0.46
Selenium	< 0.80	< 0.80	< 0.92
Zinc	20.31	12.59	15.33
Manganese	4.50	7.80	4.22

NOTE: "<" = less than

Table 2
Summary of Beryllium Emissions Data
CARB METHOD 104

CLIENT: Central Valley Rock, Sand & Gravel Association, Inc.
PROJECT: Granite Asphalt Plant

Compound	RUN #1 09/06/90 (10-3)lb/hr	RUN #2 09/11/90 (10-3)lb/hr	RUN #3 09/11/90 (10-3)lb/hr
Beryllium	< 0.01	N/A *	< 0.01

NOTE: "<" = less than

* Not Complete dute to plant shut down.

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

CLIENT: Central Valley Rock, Sand & Gravel Associations, Inc.
PROJECT: Granite Asphalt Company

Compound	RUN #1 09/05/90 (10-3)lb/hr	RUN #2 09/07/90 (10-3)lb/hr
Total Chromium	2.95	0.70
Hexavalent Chromium	< 0.17	0.36

NOTE: "<" = less than

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

CLIENT: Central Valley Rock, Sand & Gravel Association, Inc.
PROJECT: Granite Asphalt Plant

Compound	RUN #1 09/10/90 (10-3)lb/hr	RUN #2 09/10/90 (10-3)lb/hr	RUN #3 09/10/90 (10-3)lb/hr
Naphthalene	118.49	115.50	123.40
Acenaphthylene	< 0.09	< 0.09	< 0.09
Acenaphene	< 0.09	< 0.09	< 0.09
Fluorene	0.96	1.04	1.12
Phenanthrene	1.50	1.77	1.99
Anthracene	< 0.09	< 0.09	< 0.09
Fluoranthene	< 0.09	< 0.09	< 0.09
Pyrene	< 0.09	0.10	< 0.09
Benzo(a)anthracene	< 0.09	< 0.09	< 0.09
Chrysene	< 0.09	< 0.09	< 0.09
Benzo(a)fluoranthene	< 0.09	< 0.09	< 0.09
Benzo(k)fluoranthene	< 0.09	< 0.09	< 0.09
Benzo(a)pyrene	< 0.09	< 0.09	< 0.09
Benzo(g,h,i)perylene	< 0.09	< 0.09	< 0.09
Dibenzo(a,h)anthracene	< 0.09	< 0.09	< 0.09
Indeno(1,2,3-cd)pyrene	< 0.09	< 0.09	< 0.09

NOTE: "<" = less than

Table 5
Summary of Benzene Emissions Data
CARB METHOD 410A

CLIENT: Central Valley Rock, Sand & Gravel Association, Inc.
PROJECT: Granite Asphalt Company

Compound	RUN #1 09/11/90	RUN #2 09/11/90
Benzene	0.010 lb/hr	0.008 lb/hr

8.0 DISCUSSION OF RESULTS

Source test sampling was performed on September 5-7 and 10-11, 1990. 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 90 minutes of sampling time for all tests except for CARB Method 429 (PAH) which required 120 minutes.

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

All tests were run in duplicate under contractual agreement except for Multimetal Draft Method and PAH's which were run in triplicates.

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 + silica gel gain) • 0.0464

* Sampled Volume at Standard Condition

Vmstd = (17.38 * Vm * Ps)/Tm (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] * θ * Ps * Vs)

- Volumetric Flow Rate

$Qs = Vs \bullet A \bullet 60 = AFCM$

$Qstd = Qs * (Tstd/Tsavg) \bullet (Ps/Pstd) = SFCM$

$Qstd(dry) = Qstd(wet) \bullet (1-Bws) = SDCFM)$

- Particulate Concentration

$C's = 0.154 * (Mn/Vmstd) \bullet (gain/SDCF)$

- 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. H20)
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

Granite Asphalt Plant Multimetal Field Blank

SUMMARY OF QUANTITATIVE ANALYSIS

Trace Metal	Mass (ug)
Arsenic	< 12.67
Beryllium	< 1.26
Cadmium	< 2.53
Chromium	< 2.53
Copper	< 1.26
Nickel	< 12.67
Lead	< 6.33
Selenium	< 12.67
Zinc	< 1.26
Manganese	< 1.26
Mercury	< 0.06

NOTE: "<" = less than

METALS
EPA MULTIMETAL METHOD

CLIENT :
PROJECT: Granite
SAMPLING DATE:
SAMPLE I.D.: Train Field Blk (MM)

COMPOUND	D/L ppm	Filter mass	DF_1	Imp + Rinse mass	DF_2	Total mass
		µg		µg		µg
Arsenic	0.1	<0.1	<6	<0.1	<6.67	<12.8
Beryllium	0.01	<0.01	<0.6	<0.01	<0.67	<1.2
Cadmium	0.02	<0.02	<1.2	<0.02	<1.33	<2.4
Chromium	0.02	<0.02	<1.2	<0.02	<1.33	<2.4
Copper	0.01	<0.01	<0.6	<0.01	<0.67	<1.2
Nickel	0.1	<0.1	<6	<0.1	<6.67	<12.8
Lead	0.05	<0.05	<3	<0.05	<3.33	<6
Selenium	0.1	<0.1	<6	<0.1	<6.67	<12
Zinc	0.01	<0.01	<0.6	<0.01	<0.67	<1.2
Manganese	0.01	<0.01	<0.6	<0.01	<0.67	<1.2
Mercury	0.001	<0.001 *60	<0.06	<0.001 *200/50	<0.004	<0.0

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

$DF_2 = 50 * \frac{200}{150} = 66.7$

RUN #1

Metals - September 6, 1990

Granite Asphalt Plant 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)
1-5	0.90	1.00	321	76	76	74	5.0	255	68.7
1-4	1.10	1.25	318	76	76	73	5.0	255	75.8
1-3	1.20	1.35	317	75	78	74	5.0	259	79.1
1-2	1.40	1.55	315	74	79	74	5.0	265	85.3
1-1	1.20	1.35	312	74	80	75	5.0	263	78.9
2-5	1.30	1.45	316	74	80	75	5.0	265	82.3
2-4	1.60	1.80	318	74	82	76	5.0	262	91.4
2-3	1.70	1.90	317	74	84	76	5.0	252	94.2
2-2	1.10	1.25	315	75	84	77	4.0	270	75.6
2-1	0.85	0.95	310	76	85	77	4.0	275	66.3
3-5	0.90	1.00	317	77	84	77	4.0	265	68.5
3-4	0.95	1.05	318	77	85	78	4.0	250	70.4
3-3	0.95	1.05	318	77	85	78	4.0	277	70.4
3-2	0.85	0.95	317	79	86	79	4.0	273	66.6
3-1	0.80	0.90	313	80	86	79	4.0	264	64.4
4-5	0.50	0.54	318	80	86	79	3.0	256	51.1
4-4	0.87	1.00	318	81	86	79	4.0	277	67.4
4-3	1.00	1.10	318	81	87	80	4.0	284	72.3
4-2	0.85	0.95	318	81	87	80	4.0	282	66.6
4-1	0.80	0.90	312	82	88	81	4.0	290	64.4
5-5	0.95	1.05	316	81	88	81	4.0	286	70.3
5-4	1.00	1.15	318	81	88	81	5.0	276	72.3
5-3	1.10	1.25	320	82	89	82	5.0	278	75.9
5-2	1.50	1.30	318	83	89	82	5.0	266	88.5
5-1	1.20	1.35	313	84	88	82	5.0	264	78.9
6-5	1.00	1.15	310	85	88	82	5.0	261	71.9
6-4	0.95	1.05	310	84	88	82	5.0	270	70.1
6-3	1.10	1.25	313	84	88	83	5.0	280	88.0
6-2	0.45	0.50	317	86	88	83	3.0	291	48.4
6-1	0.30	0.34	313	86	88	83	3.0	295	39.5
AVG	1.01	1.12	316	79	85	79	4.4	270	72.1

Granite Asphalt Plant Multimetal 1

NOMENCLATURE

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

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

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condenser (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	440 ml	0 ml	440 ml
2 & 3	275 ml	200 ml	75 ml
4 & 5	200 ml	200 ml	0 ml
6	209 gram	200 gram	9 gram
	TOTAL CONDENSED MOISTURE		524 ml

STACK GAS MOLECULAR WEIGHT

PERCENT CARBON DIOXIDE	=	6.00
PERCENT OXYGEN	=	7.20
PERCENT CARBON MONOXIDE	=	0.00
PERCENT NITROGEN & INERTS	=	86.80

COMPONENT	VOLUME% *	MOISTURE CORR *	MOLWT =	MASS FRAC
WATER	31.79	1.00	18.00	5.72
CARBON DIOXIDE	6.00	0.68	44.00	1.80
OXYGEN	7.20	0.68	32.00	1.57
CARBON MONOXIDE	0.00	0.68	28.00	0.00
NITROGEN & INERTS	86.80	0.68	28.00	16.58
		AVERAGE MOLECULAR WEIGHT =		25.67

Granite Asphalt Plant Multimetal 1

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	271.295 CFT
Dry gas meter, final reading	=	324.375 CFT
Dry gas meter calibration factor	=	1.000
Meter volume uncorrected for Temp & Press	=	53.080 CFT
Barometric pressure at site	=	30.32 in Hg
Meter pressure (barometer + average delta H)	=	30.64 in Hg
Average meter temperature during test	=	81.8 DEG F
Dry sample volume at standard conditions	=	52.177 CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	315.8 DEG F
Volume of condensed water	=	524 ml
Percent moisture of stack gas	=	31.79 %
Pitot tube correction factor	=	0.85
Stack gas molecular weight	=	25.67
Stack gas velocity at stack conditions	=	71.70 FT/SEC
Duration of sampling	=	90 Minute
Nozzle diameter	=	0.233 in
Percent isokinetic variation	=	97.2 %
Area of stack	=	13.87 SQ FEET
Stack flow rate, standard conditions	=	27941 DSCFM

SECTION IV SUMMARY OF QUANTITATIVE ANALYSIS
AND EMISSION RATE OF TRACE METALS

Compound		Mass (ug)		Emission rate (10-3 lb/hr)
Arsenic	<	11.27	<	0.80
Beryllium	<	1.13	<	0.08
Cadmium	<	2.25	<	0.16
Copper		20.52		1.45
Mercury		2.34		0.17
Nickel		27.26		1.93
Lead	<	5.63	<	0.40
Selenium	<	11.27	<	0.80
Zinc		287.38		20.31
Manganese		63.64		4.50

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

Silica gel = 8.5 g

FIELD TEST DATA FORM

Site: Granite Asphalt Plant Date: 9/6/90 Test No. Multi metal 1

Nozzle I.D. E 1 Diameter 0.233 Filter No. Metal (1)

LEAK CHECKS: Pitot tubes -- Initial OK at 3 inches Final OK at 3 inches

Sample train -- Initial OK Final .02 at 10 in Hg

.001 at 10 in Hg 1 min

Start at 271.295

Water collected
= 440 ml (1)
75 ml (2)
0 ml (3)
515 ml

TIME A.M	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
1:00	1-5	0.9	1.0	321	76	76	74	5	255
								273.535	
1:03	1-4	1.1	1.25	318	76	76	73	5	255
								275.065	
1:06	1-3	1.2	1.35	317	75	78	74	5	259
								276.935	
1:09	1-2	1.4	1.55	315	74	79	74	5	265
								278.995	
1:12	1-1	1.2	1.35	312	74	80	75	5	263
								280.875	
1:15	2-5	1.3	1.45	316	74	81	75	5	265
								282.755	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
1:18	2-4	1.6	1.80	318	74	82	76	5	262
								285.795	
1:21 24	2-3	1.7	1.90	317	74	84	76	5	252
								287.345	
1:24 27	2-2	1.1	1.25	315	75	84	77	4	270
								289.285	
1:27 30	2-1	.85	.95	310	76	85	77	4	275
								290.960	
1:30 33	3-5	.90	1.00	317	77	84	77	4	265
								292.655	
1:33 36	3-4	.95	1.05	318	77	85	78	4	250

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Air Pollution
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r2 063

FIELD TEST DATA FORM

Site: Granite Asphalt Plant Date: 9/6/96 Test No. Multi-nozl (1)

Nozzle I.D. E1 Diameter 0.233 Filter No. Multi-nz (1)

LEAK CHECKS: Pitot tubes -- Initial ____ Final ____

Sample train -- Initial ____ Final ____

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
1:36	3-3	.95	1.05	318	77	85	78	4	277
								296.105	
1:39 42	3-2	.85	.95	317	79	86	79	4	273
								297.815	
1:42 45	3-1	.90	.90	313	80	86	79	4	264
								299.413	
1:46 48	4-5	.50	.54	318	82	85	79	3	256
								300.695	
1:49 51	4-4	.57	1.0	318	18	86	79	4	277
								302.335	
1:52 54	4-3	1.0	1.1	318	8	87	80	4	284
								304.105	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
1:55	4-2	.85	.95	318	81	87	80	4	282
								305.775	
1:58 60	4-1	.80	.90	312	82	88	81	4	290
								307.491	
2:02 63	5-5	.95	1.05	316	81	88	81	4	286
								309.115	
2:05 66	5-4	1.00	1.15	318	81	88	81	5	278
								310.910	
2:08 69	5-3	1.10	1.25	320	82	89	82	5	276
								312.715	
2:11 72	5-2	1.15	1.30	318	83	89	82	5	266

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P 3 of 3

$P_{bar} = 30.32$

FIELD TEST DATA FORM

Site: Granite Asphalt plant Date: 9/6/90 Test No. Multi mt (1)

Nozzle I.D. E1 Diameter 0.233 Filter No. Multi mat (1)

LEAK CHECKS: Pitot tubes -- Initial _____ Final _____

Sample train -- Initial _____ Final _____

PT #	ΔP	ΔH	T_S	T_i	T_{IN}	T_{OUT}	VAC	TEMP	TIME
S-1	1.20	1.35	313	84	88	82	5	264	2:14
							316.524		
16-5	1.0	1.15	310	84	87	82	5	270	:17
							318.335		
6-4	.95	1.05	310	85	88	82	5	261	:20
							320.075		
6-3	1.10	1.25	313	84	88	83	5	280	:23
							319.655		
6-2	.45	.50	317	86	88	83	3	291	:26
							328.335		
6-1	.30	.34	313	86	88	83	3	295	:29
							324.375		

PT #	ΔP	ΔH	T_S	T_i	T_{IN}	T_{OUT}	VAC	TEMP	TIME

Analytical Data

METALS
EPA MULTIMETAL METHOD

CLIENT : C.V. S & G Ass
PROJECT: Granite Asphalt plant
SAMPLING DATE: 9/6/90
SAMPLE I.D.: Train 1

COMPOUND	D/L ppm	Filter+R DF1 ug		Impinger DF2 ug		
Arsenic	0.1	<0.1	<6	<0.1	<5.27	<11.27
Beryllium	0.01	<.01	<0.6	<.01	<0.53	<1.13
Cadmium	0.02	<0.02	<1.2	<.02	<1.05	<2.25
Chromium	0.02	.2889	17.334	.1681	8.85	26.18
Copper	0.01	.1855	11.13	.1783	9.39	20.52
Nickel	0.1	.3317	19.902	.1398	7.36	27.26
Lead	0.05	<.05	<3	<.05	<2.63	<5.6
Selenium	0.1	<.1	<6	<.1	<5.27	<11.27
Zinc	0.01	4.193	251.58	.6797	35.80	287.38
Manganese	0.01	.9901	59.406	.0803	4.23	63.64
Mercury	0.001	<0.001	<0.06	.0570	2.28	2.34

+60

$DF1 = ppm * 50ml * \frac{300}{250}$

$= ppm * 60$

$DF2 = ppm * 50ml * \frac{984}{934}$

Hg: ppm 0.057 ppm * 10 * $\frac{200}{50}$

Thinning Tree Method: EPA 6010 WATER mg/L

AIR SAMPLES

SPLE	Ag	As	Ba	Be	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Sb	Se	Tl	V	Zn
TER	< .0000	.0198	5.913	.0014	.0134	.0295	.2889	.1855	.0274	.0192	.3317	.0263	.0278	.0001	.1186	.1112	4.193
ONT																	
NSE																	
	< .0000	.0053	.0834	< .0000	.0015	.0013	.1681	.1783	.0053	.0105	.1398	< .0000	< .0000	.0206	.0158	< .0000	.6787
INGAR																	
ID																	
K																	
INSE																	
TER																	
AP																	
THOD	< .0000	< .0000	< .0000	.0000	.0006	< .0000	< .0000	< .0000	< .0000	< .0000	.0017	< .0000	< .0000	< .0000	.0113	.0007	< .0000
K																	
(s)	116%	117	80	115	102	103	118	102	102	106	114	100	94	118	117	103	106
(d)	114%	114	92	112	98	99	115	99	100	104	110	97	100	116	112	101	102
	0.0	0.1	0.02	0.01	0.02	0.02											

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Date: 10/12/90 Company: Shining Tree Method: EPA 6010 WATER mg/L

LI NO.

AMPLE NO.	AL		Ca		Mg		Fe		Na		Mn		K		B	
Filter																
Front Rinse											0.9901					
Impinger Acid											0.0803					
Back Rinse																
Water Trap																

Client: SHINING TREE (90-09-085)

ANALYSIS: ~~90-09-085 EP. Hg~~ Water Samples

METHOD: EPA 7470 ~~mod~~

ELI NO.	SAMPLE ID.	LOCATION	UNITS: mg/l (ppm)
	~~OES~~		
	FRONT RINSE & FILTER-1		0.0010
	IMPINGER-1 RIP. WATER RINSE TRAP. -1		0.0030
	IMPINGER - Hg -1		0.0570
	Imp. Hg - 1 - (S)		114%
	Imp Hg - 1 - (DS)		110%
	Method Blank		
	Detection Limit		

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

Analyst: Benjamin Mendoza

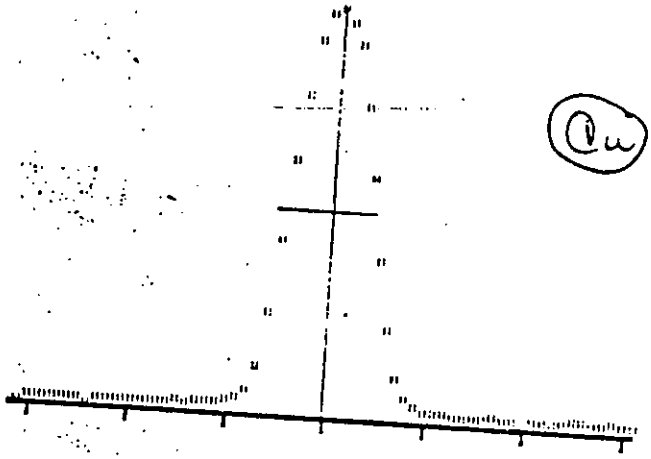
Extraction Date: 9/28/80

Date Reported: 10/6/80

Calibration Data

10/12/90

PROFILE FOR PHYSICAL CHANNEL 13
12-OCT-90 08:0[illegible]



Shining
-085

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

PEAK IS AT POSITION 0
PEAK HAS A WIDTH OF 10.3

MAX = 161 MIN = 15

ACT NAME : CAM TIME:12-OCT-90 12:39 STANDARD NAME : STD1

	I.S.	AG	AS	BA	BE	CD	CO	CR	CU	HG
EXP# 1	1000	.1530	.2780	.0[illegible]	.2[illegible]	.09[illegible]	.7[illegible]	.1480	.1450	.0930
EXP# 2	1000	.1550	.2800	.0[illegible]	.2[illegible]	.09[illegible]	.7[illegible]	.1510	.1470	.0910
AVERAGE	1000	.1540	.2790	.0[illegible]	.2[illegible]	.0[illegible]	.7[illegible]	.1495	.1460	.0920

	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	.2350	.1440	.8840	.6980	.5180	.1190	.1310	.0490	1.378	.2380
EXP# 2	.2370	.1500	.8920	.6950	.5370	.1200	.1300	.0500	1.382	.2390
AVERAGE	.2360	.1470	.8880	.6965	.5275	.1195	.1305	.0495	1.380	.2385

	CA	MG	NA	MN	%	%
EXP# 1	3.276	1.513	1.967	.0350	2.118	.0690
EXP# 2	3.312	1.520	1.940	.0360	2.127	.0700
AVERAGE	3.294	1.517	1.954	.0355	2.123	.0695

ACT NAME : CAM TIME:12-OCT-90 12:43 STANDARD NAME : STD2

	I.S.	BA	CD	CO	CU	PB	ZN
EXP# 1	1000	8.361	18.37	26.09	18.37	12.51	11.04
EXP# 2	1000	8.335	18.49	26.14	18.32	12.57	11.09
AVERAGE	1000	8.348	18.43	26.11	18.35	12.54	11.07

ACT NAME : CAM TIME:12-OCT-90 12:45 STANDARD NAME : STD3

	I.S.	BE	MO	NI	SB	TL
EXP# 1	1000	14.43	24.29	11.83	14.77	3.797
EXP# 2	1000	14.74	24.91	11.14	15.29	3.936
AVERAGE	1000	14.58	24.60	11.99	15.03	3.867

ACT NAME : CAM TIME:12-OCT-90 12:47 STANDARD NAME : STD4

	I.S.	AS	CR	SE
EXP# 1	1000	5.645	10.59	9.131
EXP# 2	1000	5.822	10.92	9.373
AVERAGE	1000	5.734	10.75	9.252

ACT NAME : CAM TIME:12-OCT-90 12:50 STANDARD NAME : STD5

	I.S.	HG	V
EXP# 1	1000	7.868	11.96
EXP# 2	1000	8.076	12.19
AVERAGE	1000	7.972	12.08

ACT NAME : CAM TIME:12-OCT-90 12:52 STANDARD NAME : STD6

	I.S.	AG
EXP# 1	1000	11.67
EXP# 2	1000	11.78
AVERAGE	1000	11.73

ACT NAME : CAM TIME:12-OCT-90 12:55 STANDARD NAME : STD7

	I.S.	AL	FE	CA	MG
EXP# 1	1000	18.82	16.35	10.96	14.88
EXP# 2	1000	19.00	16.55	11.07	15.04
AVERAGE	1000	18.91	16.45	11.01	14.96

ACT NAME : CAM TIME:12-OCT-90 12:57 STANDARD NAME : STD8

	I.S.	NA	MN
EXP# 1	1000	63.42	17.23
EXP# 2	1000	64.31	17.58
AVERAGE	1000	63.87	17.40

ACT NAME : CAM TIME:12-OCT-90 13:00 STANDARD NAME : STD9

	I.S.	K	B
EXP# 1	1000	4.714	2.775
EXP# 2	1000	4.813	2.921
AVERAGE	1000	4.764	3.798

(2.25 → 2.75)

ACT NAME : CAM TIME : 12-OCT-90 13:11 SAMPLE NAME: CAL.CK-1 ICV ✓

CAL.CK

	I.S.	AG	AS	BA	BE	CD	CO	CR	CU	HG
EXP# 1	1000	.0050	2.588	2.412	2.506	2.527	2.468	2.548	2.392	2.53
EXP# 2	1000	.0033	2.608	2.442	2.539	2.538	2.493	2.579	2.431	2.576
AVERAGE	1000	.0042	2.598	2.427	2.522	2.532	2.481	2.563	2.411	2.557

	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	2.345	2.506	2.516	2.560	2.601	2.542	2.548	2.513	.1398	.0139
EXP# 2	2.379	2.525	2.545	2.607	2.660	2.531	2.574	2.548	.1335	.0108
AVERAGE	2.362	2.516	2.531	2.584	2.631	2.537	2.561	2.531	.1366	.0123

	CA	MG	NA	MN	K	B
EXP# 1	<.0000	<.0000	<.0000	.0014	3.200	.0495
EXP# 2	<.0000	<.0000	<.0000	.0014	3.010	.0568
AVERAGE	<.0000	<.0000	<.0000	.0014	3.105	.0531

(2.25 → 2.75)

ACT NAME : CAM TIME : 12-OCT-90 13:15 SAMPLE NAME: CAL.CK-2 ICV

CAL.CK

	I.S.	AG	AS	BA	BE	CD	CO	CR	CU	HG
EXP# 1	1000	2.646	.0152	.0036	.0048	.0044	.0035	.0086	.0044	.0136
EXP# 2	1000	2.671	<.0000	.0046	.0041	.0055	.0015	.0058	.0033	.0047
AVERAGE	1000	2.659	.0076	.0042	.0045	.0049	.0025	.0072	.0038	.0092

ACT NAME : CAM TIME : 12-OCT-90 13:15 SAMPLE NAME: CAL.CK-2

CAL.CK

	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	.0050	.0101	<.0000	.0073	.0379	.0273	.0040	.0166	2.569	2.548
EXP# 2	.0029	.0059	<.0000	.0045	.0056	.0296	.0031	.0166	2.606	2.590
AVERAGE	.0039	.0080	<.0000	.0059	.0217	.0285	.0036	.0166	2.588	2.569

	CA	MG	NA	MN	K	B
EXP# 1	.4069	2.282	15.36	2.500	26.98	2.674
EXP# 2	.4290	2.315	15.60	2.530	26.71	2.721
AVERAGE	.4180	2.298	15.48	2.515	26.85	2.697

ACT NAME : CAM TIME : 12-OCT-90 13:19 SAMPLE NAME: CAL.CK-3 ICB

CAL.CK

	I.S.	AG	AS	BA	BE	CD	CO	CR	CU	HG
EXP# 1	1000	.0035	<.0000	.0024	.0007	<.0000	.0012	<.0000	.0011	<.0000
EXP# 2	1000	.0043	<.0000	.0024	<.0000	.0014	.0023	.0024	.0027	<.0000
AVERAGE	1000	.0039	<.0000	.0024	.0003	.0005	.0017	.0005	.0019	<.0000

	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	.0008	.0008	<.0000	<.0000	.0074	.0334	.0004	.0005	.0120	<.00
EXP# 2	.0008	<.0000	.0154	.0058	.0062	.0441	.0021	<.0000	.0194	<.0000
AVERAGE	.0008	<.0000	.0077	.0027	.0068	.0387	.0013	<.0000	.0157	<.0000

	CA	MG	NA	MN	B-2K	B
EXP# 1	<.0000	.0115	.2265	.0049	.9655	.0238

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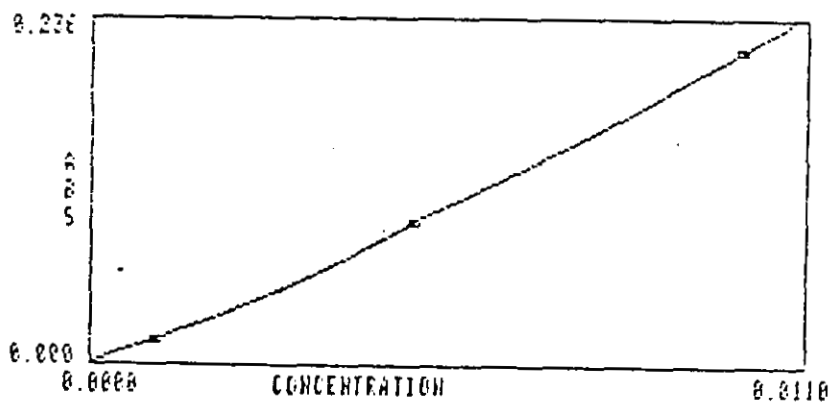
Varian SpectrAA 30/40 System Report

OPERATOR BENJAMIN MENDOZA
DATE 10-08-90
BATCH EPA PERFORMANCE

PROGRAM 2 [illegible]

[illegible]	[illegible]	[illegible]	MEAN ABS	[illegible]	READINGS	
[illegible]	[illegible]		-0.000	-0.000	-0.000	-0.000
STD#1	0.0000	1.8	0.015	0.015	0.015	0.015
STD#2	0.0050	0.4	0.098	0.097	0.098	0.099
STD#3	0.0100	0.3	0.214	0.214	0.214	0.215



SAMPLE 1	1st	0.0052 ✓		1.0	0.102	0.101	0.102	0.103
SAMPLE 2	ICB	0.0001		22.6	0.001	0.001	0.001	0.001
SAMPLE 3	MB-1	0.0049	0.0061	0.1	0.096	0.096	0.096	0.096
SAMPLE 4	MB-1dup	0.0049	0.0061	0.1	0.096	0.096	0.096	0.096
SAMPLE 5	MB-2	OVER		0.2	0.716	0.715	0.716	0.718
SAMPLE 6	MB-2 dup	OVER		0.1	0.725	0.724	0.725	0.726
SAMPLE 7	WP-2022-1	0.0070	0.0088	1.8	0.142	0.145	0.141	0.139
SAMPLE 8	dup	0.0065	0.0081	0.2	0.131	0.131	0.131	0.131
SAMPLE 9	WP-2022-2	0.0010	0.0013	2.6	0.015	0.015	0.015	0.015
SAMPLE 10	dup	0.0008	0.001	1.3	0.012	0.012	0.012	0.012
SAMPLE 11	MB-2	0.0073	0.0456	0.9	0.148	0.147	0.148	0.149
SAMPLE 12	MB-2dup	0.0075	0.0469	0.2	0.155	0.155	0.155	0.155
SAMPLE 13	CCV	0.0052 ✓		0.3	0.101	0.101	0.101	0.102
SAMPLE 14	CCB	0.0002		17.5	0.003	0.003	0.002	0.002

DF = 1.25
DL = 5
DL = 5

RUN #2

Metals - September 7, 1990

Calculation Data

Granite Asphalt Plant Multimetal 2

Sample Granit Asphalt Plant EPA Draft Method(Multi Mel-2).

Section I: Particulate Sampling Data

Point #	Delta P	Delta H	T S	T i	T in	T out	VAC	Filter Temp.	VEL (FPS)
1-5	1.00	1.10	316	74	75	74	12.0	225	72.0
1-4	1.10	1.25	316	73	76	74	14.0	237	75.5
1-3	1.50	1.70	315	76	77	75	14.0	252	88.1
1-2	1.40	1.55	314	77	78	75	14.0	267	85.1
1-1	1.20	1.35	310	75	78	75	14.0	263	78.6
2-5	1.10	1.25	317	73	78	75	14.0	267	75.6
2-4	1.20	1.35	316	74	80	76	7.0	273	78.9
2-3	1.50	1.70	318	72	81	76	5.0	277	88.3
2-2	1.60	1.80	293	67	80	77	6.0	273	89.7
2-1	1.10	1.25	294	71	81	78	5.0	265	74.4
3-5	1.10	1.25	301	73	83	78	4.0	264	74.8
3-4	1.40	1.55	302	73	84	78	5.0	259	84.4
3-3	1.40	1.55	301	73	85	78	4.0	253	84.4
3-2	0.95	1.05	301	74	85	79	4.0	269	69.5
3-1	0.80	0.90	301	75	86	79	4.0	288	63.8
4-5	0.65	0.74	302	78	86	80	3.0	274	57.5
4-4	0.90	1.00	301	77	87	80	4.0	270	67.6
4-3	0.85	0.95	302	78	88	80	4.0	266	65.8
4-2	0.65	0.74	301	79	88	81	3.0	262	57.5
4-1	0.25	0.28	301	80	89	82	2.0	264	35.6
5-5	0.20	0.23	299	84	88	82	2.0	261	31.8
5-4	0.35	0.38	301	81	90	82	3.0	264	42.2
5-3	0.40	0.45	300	77	91	83	3.0	264	45.1
5-2	0.35	0.38	301	77	91	83	3.0	263	42.2
5-1	0.35	0.38	301	75	91	83	3.0	263	42.2
6-5	0.10	0.11	300	83	88	83	2.0	261	22.5
6-4	0.15	0.17	301	82	89	84	2.0	265	27.6
6-3	0.20	0.23	300	82	89	84	2.0	263	31.9
6-2	0.22	0.25	300	80	90	84	2.0	263	33.4
6-1	0.15	0.17	300	82	91	85	2.0	266	27.6
AVG	0.80	0.90	304	77	85	79	5.5	263	60.4

Granite Asphalt Plant Multimetal 2

NOMENCLATURE

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

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

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condenser (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	364 ml	0 ml	364 ml
2 & 3	239 ml	200 ml	39 ml
4 & 5	200 ml	200 ml	0 ml
6	232 gram	200 gram	32 gram
	TOTAL CONDENSED MOISTURE		435 ml

STACK GAS MOLECULAR WEIGHT

PERCENT CARBON DIOXIDE	=	6.00
PERCENT OXYGEN	=	7.20
PERCENT CARBON MONOXIDE	=	0.00
PERCENT NITROGEN & INERTS	=	86.80

COMPONENT	VOLUME%	*	MOISTURE CORR	*	MOLWT	=	MASS FRAC
WATER	31.26		1.00		18.00		5.63
CARBON DIOXIDE	6.00		0.69		44.00		1.81
OXYGEN	7.20		0.69		32.00		1.58
CARBON MONOXIDE	0.00		0.69		28.00		0.00
NITROGEN & INERTS	86.80		0.69		28.00		16.71
				AVERAGE MOLECULAR WEIGHT =			25.73

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	435.958	CFT
Dry gas meter, final reading	=	481.016	CFT
Dry gas meter calibration factor	=	1.000	
Meter volume uncorrected for Temp & Press	=	45.058	CFT
Barometric pressure at site	=	30.32	in Hg
Meter pressure (barometer + average delta H)	=	30.73	in Hg
Average meter temperature during test	=	82.1	DEG F
Dry sample volume at standard conditions	=	44.387	CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	304.2	DEG F
Volume of condensed water	=	435	ml
Percent moisture of stack gas	=	31.26	%
Pitot tube correction factor	=	0.85	
Stack gas molecular weight	=	25.73	
Stack gas velocity at stack conditions	=	60.40	FT/SEC
Duration of sampling	=	90	Minute
Nozzle diameter	=	0.233	in
Percent isokinetic variation	=	95.7	%
Area of stack	=	13.87	SQ FEET
Stack flow rate, standard conditions	=	24146	DSCFM

Granite Asphalt Plant Multimetal 2

SECTION IV SUMMARY OF QUANTITATIVE ANALYSIS
AND EMISSION RATE OF TRACE METALS

Compound		Mass (ug)		Emission rate (10-3 lb/hr)
Arsenic	<	11.31	<	0.81
Beryllium	<	1.13	<	0.08
Cadmium	<	2.26	<	0.16
Copper		13.46		0.97
Mercury		2.08		0.15
Nickel		68.79		4.94
Lead	<	5.65	<	0.41
Selenium	<	11.31	<	0.81
Zinc		175.31		12.59
Manganese		108.59		7.80

Field Data

EUREKA LABORATORIES, INC.

Corporate Office:
6790 FLORIN PERKINS ROAD
SACRAMENTO, CA 95826
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

Pbar = 30.32 in Hg

FIELD TEST DATA FORM

Silica gel = 32g

water Temp. 364ml Site: Granite Asphalt plant Date: 9/7/93 Test No. Multimetal (2)

Impinger Nozzle I.D. E1 Diameter 0.233 Filter No. Multimetal (2)

239-200 =39 LEAK CHECKS: Pitot tubes -- Initial Y at 3 in Hg Final Y at 3 in Hg.

start at 435.958

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

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
3 10:15	1-5	1.00	1.10	316	74	75	74	12	225
								437.715	
6 10:18	1-4	1.10	1.25	316	73	76	74	14	237
								439.495	
9 10:21	1-3	1.50	1.70	315	76	77	75	14	252
								441.635	
12 10:24	1-2	1.40	1.55	314	77	78	75	14	267
								443.655	
15 10:27	1-1	1.20	1.35	310	75	78	75	14	263
								445.605	
18 10:30	2-5	1.10	1.25	317	73	81	75	14	267
								447.505	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
21 10:33	2-4	1.20	1.35	316	73	80	76	7	273
								449.395	
24 10:36	2-3	1.50	1.70	318	72	81	76	5	277
								451.515	
27 10:39	2-2	1.60	1.80	293	67	80	77	6	273
								453.715	
30 10:42	2-1	1.10	1.25	294	71	81	78	5	265
								455.554	
33 10:45	3-5	1.10	1.25	301	73	83	78	4	264
								457.560	
36 10:48	3-4	1.40	1.55	302	73	84	78	5	259

B-33 F55

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Air Pollution
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1) 2 of 2

FIELD TEST DATA FORM

Site: Granite Asphalt plant Date: 9/7/90 Test No. Multimetal

Nozzle I.D. E1 Diameter 0.233 Filter No. Multimetal (2)

LEAK CHECKS: Pitot tubes -- Initial ____ Final ____

Sample train -- Initial ____ Final ____

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
1:07 39	3-3	1.4	1.55	301	73	85	78	4	253
								461.605	
:10 42	3-2	.95	1.05	301	74	85	79	4	269
								463.315	
:13 45	3-1	.80	.90	301	75	86	79	4	281
								464.902	
:16 48	4-5	.65	.74	302	78	86	80	3	274
								466.385	
:19 51	4-4	.90	1.00	301	77	87	80	4	270
								468.025	
:22 54	4-3	.85	.95	302	78	88	80	4	266
								469.445	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
:25 57	4-2	.65	.74	301	79	88	81	3	262
								471.145	
:28 60	4-1	.25	.28	301	80	89	82	2	264
								472.124	
:31 63	5-5	.20	.23	299	84	88	82	2	261
								472.955	
4 66	5-4	.35	.39	301	81	90	82	3	264
								473.95	
:7 69	5-3	.40	.45	300	77	91	83	3	264
								475.155	
:10 72	5-2	.35	.39	301	77	91	83	3	263

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P.3 of 3

FIELD TEST DATA FORM

Site: Granite Asphalt plant Date: 9/7/90 Test No. Multimetal (2)

Nozzle I.D. E1 Diameter 0.233 Filter No. Multimetal (2)

LEAK CHECKS: Pitot tubes -- Initial _____ Final _____

Sample train -- Initial _____ Final _____

TIME	PT #	ΔP	ΔH	T_S	T_i	T_{IN}	T_{OUT}	VAC	TEMP
11:43 75	5-1	.35	.38	301	75	91	83	3	263
								477.355	
1:46 78	6-5	.10	.11	300	83	88	83	2	261
								477.885	
1:49 81	6-4	.15	.17	301	82	89	84	2	265
								478.593	
1:52 84	6-3	.20	.23	300	82	89	84	2	263
								479.405	
1:55 87	6-2	.22	.25	300	80	90	84	2	268
								480.285	
1:58 90	6-1	.15	.17	300	82	91	85	2	266
								481.016	

TIME	PT #	ΔP	ΔH	T_S	T_i	T_{IN}	T_{OUT}	VAC	TEMP

Analytical Data

METALS
EPA MULTIMETAL METHOD

CLIENT : C.V.S & G Ass.
PROJECT: Granite
SAMPLING DATE: 9/7/90
SAMPLE I.D.: Train 2

COMPOUND	D/L ppm	Filter x DF1		Impinger x DF2		Total ug
Arsenic	0.1	<0.1	<6	<0.1	<5.31	<11.31
Beryllium	0.01	<.01	<0.6	<.01	<0.53	<1.13
Cadmium	0.02	<.02	<1.2	<.02	<1.06	<2.26
Chromium	0.02	.1396	8.38	<.02	<1.06	9.44
Copper	0.01	.1504	9.02	.0836	4.44	13.46
Nickel	0.1	1.058	63.48	<0.1	<5.31	68.79
Lead	0.05	<.05	<3	<.05	<2.65	<5.65
Selenium	0.1	<0.1	<6	<0.1	<5.31	<11.31
Zinc	0.01	1.762	105.72	1.311	69.59	175.31
Manganese	0.01	.8199	49.19	1.119	59.40	108.59
Mercury	.01 0.001	<.01 x60	<0.6	.0370	1.48	2.08

$DF1 = ppm \times 50\ ml * \frac{300}{250}$

$= ppm \times 60$

$DF2 = ppm \times 50\ ml \times \frac{861}{811}$

Hg $0.0370 * 10 * \frac{200}{50}$

te: 10/12/90 Company: Shining Tree Method: EPA 6010 WATER mg/L

AIR SAMPLES

	Ag	As	Ba	Be	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Sb	Se	Tl	V	Zn
C 1	< .0000	.0299	.5157	.0010	.0151	.0249	.1396	.1504	.0224	.0118	1.058	.0356	.0345	.0233	.0843	.0916	1.762
2																	
per BK	< .0000	.0059	.0648	< .0000	.0187	< .0000	.0182	.0836	.0100	.0039	.0295	< .0000	< .0000	.0033	.0367	< .0000	1.311
2																	
rap																	
																F60	B-38
9	116%	117	80	115	102	103	118	102	102	106	114	100	94	118	117	103	106
1	114%	114	92	112	98	99	115	99	100	104	110	97	100	116	112	101	102
IDP K	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<

...e: 10/12/90 Company: Shining Tree ... 04-050

Method: EPA 6010 WATER mg/L.

...I NO.

...IPLE NO.	AL		Ca		Mg		Fe		Na		Mn		K		B		
...ILTER.																	
...ONT RINSE											0.8199 ~~0.82~~						
...MPINGER																	
...CID																	
...ck Rinse											1.119						
...ter Trap																	
...ceg (3)																	
											100%						
...ceg (ds)																	
											99%						

Client: SHINING TREE (90-09-050)

ANALYSIS: ~~Cr~~ Hg · Water Sample

METHOD: EPA 7470 mod

ELI NO.	SAMPLE ID.	LOCATION	UNITS: mg/L (ppm)
	FRONT RINSE & FILTER - 2		0.0040
	BACK RINSE, WATER TRAP AND IMPINGER-ACID-2		0.0030
	IMPINGER - 2		0.0370
	MATRIX - (S)		114%
	MATRIX - (DS)		110%
	NOTES		
	Method Blank		
	Detection Limit		

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

Analyst: Benjamin Hodges

Extraction Date: 9/28/90

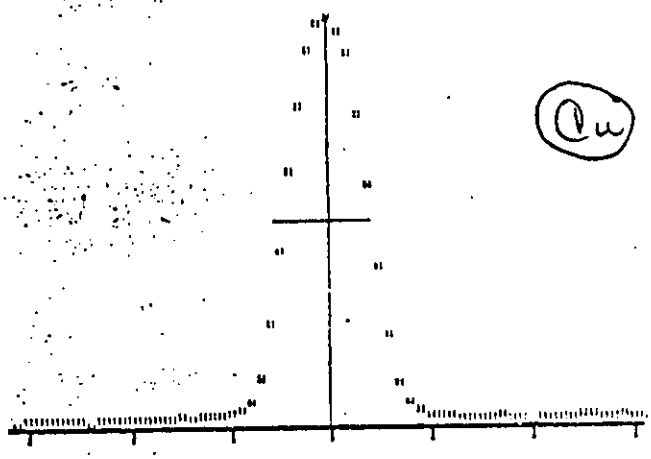
Date Reported: 10/6/90

F62

Calibration Data

10/12/90

PROFILE FOR PHYSICAL CHANNEL 13
12-OCT-90 08:06



(Qw)

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

PEAK IS AT POSITION 0
PEAK HAS A WIDTH OF 10.3

MAX = 161 MIN = 15

Shinning
050

ACT NAME : CAM TIME:12-OCT-9[illegible] [illegible] STANDARD NAME : STD1

	I.S.	AG	AS	SN	SE	[illegible]	[illegible]	CR	CU	HG
EXP# 1	1000	.1530	.2790	.0190	[illegible]	[illegible]	.2960	.1480	.1450	.09
EXP# 2	1000	.1550	.2800	[illegible]	[illegible]	[illegible]	.3000	.1510	.1470	.09
AVERAGE	1000	.1540	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.1495	.1460	.09

	MO	NI	PB	SB	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	FE
EXP# 1	.2350	.1440	.9240	[illegible]	[illegible]	[illegible]	[illegible]	.0490	1.378	.23
EXP# 2	.2370	.1500	.8520	.6950	.5270	[illegible]	.1320	.0500	1.382	.23
AVERAGE	.2360	.1470	.8880	.6965	.5275	.1255	.1315	.0495	1.380	.23

	CA	MG	NA	[illegible]	[illegible]	[illegible]
EXP# 1	3.276	1.517	[illegible]	[illegible]	[illegible]	[illegible]
EXP# 2	3.312	1.520	1.940	.0360	[illegible]	[illegible]
AVERAGE	3.294	1.517	1.954	.0355	[illegible]	[illegible]

ACT NAME : CAM TIME:12-OCT-9[illegible] STANDARD NAME : STD2

	I.S.	SN	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
EXP# 1	1000	8.361	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
EXP# 2	1000	8.335	18.49	26.14	[illegible]	[illegible]	[illegible]
AVERAGE	1000	8.348	18.43	26.11	18.85	12.54	11.07

ACT NAME : CAM TIME:12-OCT-9[illegible] STANDARD NAME : STD3

	I.S.	BE	MO	[illegible]	[illegible]	[illegible]
EXP# 1	1000	14.43	24.29	11.83	[illegible]	[illegible]
EXP# 2	1000	14.74	24.91	12.14	15.29	3.93[illegible]
AVERAGE	1000	14.58	24.60	11.99	15.03	3.8[illegible]

ACT NAME : CAM TIME:12-OCT-90 12:4[illegible] STANDARD NAME : STD4

	I.S.	AS	CR	SE
EXP# 1	1000	5.645	10.59	9.131
EXP# 2	1000	5.822	10.92	9.373
AVERAGE	1000	5.734	10.75	9.252

ACT NAME : CAM TIME:12-OCT-90 12:50 STANDARD NAME : STD5

	I.S.	HG	V
EXP# 1	1000	7.868	11.96
EXP# 2	1000	8.076	12.19
AVERAGE	1000	7.972	12.08

F65

ACT NAME : CAM TIME:12-OCT-90 12:52 STANDARD NAME : STD6

	I.S.	AG
EXP# 1	1000	11.67
EXP# 2	1000	11.78
AVERAGE	1000	11.73

ACT NAME : CAM TIME:12-OCT-90 12:55 STANDARD NAME : STD7

	I.S.	AL	FE	CA	MG
EXP# 1	1000	18.82	16.35	10.96	14.88
EXP# 2	1000	19.00	16.55	11.07	15.04
AVERAGE	1000	18.91	16.45	11.01	14.96

ACT NAME : CAM TIME:12-OCT-90 12:57 STANDARD NAME : STD8

	I.S.	NA	MN
EXP# 1	1000	63.42	17.23
EXP# 2	1000	64.31	17.58
AVERAGE	1000	63.87	17.40

ACT NAME : CAM TIME:12-OCT-90 13:00 STANDARD NAME : STD9

	I.S.	K	B
EXP# 1	1000	4.714	2.775
EXP# 2	1000	4.813	2.821
AVERAGE	1000	4.764	2.798

(2.25 → 2.75)

ACT NAME : CAM TIME : 12-OCT-90 13:11 SAMPLE NAME: CAL.CK-1 ICV ✓
CAL.CK

	I.S.	AG	AS	BA	BE	CD	CO	CR	CU	HG
EXP# 1	1000	.0050	2.588	2.412	2.506	2.527	2.468	2.548	2.392	2.53
EXP# 2	1000	.0033	2.608	2.442	2.539	2.538	2.493	2.579	2.431	2.57
AVERAGE	1000	.0042	2.598	2.427	2.522	2.532	2.481	2.563	2.411	2.55

	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	2.345	2.506	2.516	2.560	2.601	2.542	2.548	2.513	.1398	.013
EXP# 2	2.379	2.525	2.545	2.607	2.660	2.531	2.574	2.548	.1335	.011
AVERAGE	2.362	2.516	2.531	2.584	2.631	2.537	2.561	2.531	.1366	.012

	CA	MG	NA	MN	K	B
EXP# 1	<.0000	<.0000	<.0000	.0014	3.200	.0493
EXP# 2	<.0000	<.0000	<.0000	.0014	3.010	.0568
AVERAGE	<.0000	<.0000	<.0000	.0014	3.105	.0531

(2.25 → 2.75)

ACT NAME : CAM TIME : 12-OCT-90 13:15 SAMPLE NAME: CAL.CK-2 ICV
CAL.CK

	I.S.	AG	AS	BA	BE	CD	CO	CR	CU	HG
EXP# 1	1000	2.646	.0152	.0036	.0048	.0044	.0035	.0086	.0044	.013
EXP# 2	1000	2.671	<.0000	.0048	.0041	.0055	.0015	.0058	.0033	.004
AVERAGE	1000	2.659	.0076	.0042	.0045	.0049	.0025	.0072	.0038	.009

ACT NAME : CAM TIME : 12-OCT-90 13:15 SAMPLE NAME: CAL.CK-2
CAL.CK

	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	.0050	.0101	<.0000	.0073	.0379	.0273	.0040	.0166	2.569	2.54
EXP# 2	.0029	.0059	<.0000	.0045	.0056	.0296	.0031	.0166	2.606	2.59
AVERAGE	.0039	.0080	<.0000	.0059	.0217	.0285	.0036	.0166	2.588	2.56

	CA	MG	NA	MN	K	B
EXP# 1	.4069	2.282	15.36	2.500	26.98	2.674
EXP# 2	.4290	2.315	15.60	2.530	26.71	2.721
AVERAGE	.4180	2.298	15.48	2.515	26.85	2.697

ACT NAME : CAM TIME : 12-OCT-90 13:19 SAMPLE NAME: CAL.CK-3 ICB
CAL.CK

	I.S.	AG	AS	BA	BE	CD	CO	CR	CU	HG
EXP# 1	1000	.0035	<.0000	.0024	.0007	<.0000	.0012	<.0000	.0011	<.000
EXP# 2	1000	.0043	<.0000	.0024	<.0000	.0014	.0023	.0024	.0027	<.000
AVERAGE	1000	.0039	<.0000	.0024	.0003	.0005	.0017	.0005	.0019	<.000

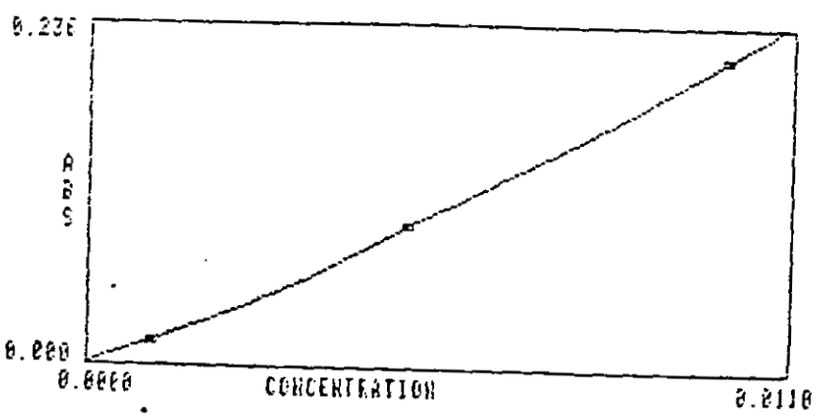
	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	.0008	.0008	<.0000	<.0000	.0074	.0334	.0004	.0005	.0120	<.0000
EXP# 2	.0008	<.0000	.0154	.0058	.0062	.0441	.0021	<.0000	.0194	<.0000
AVERAGE	.0008	<.0000	.0077	.0027	.0068	.0387	.0013	<.0000	.0157	<.0000

	CA	MG	NA	MN	K	B
EXP# 1	<.0000	.0115	.2265	.0049	.9655	.0238
EXP# 2	.0298	.0234	.2095	.0048	1.074	.0225

Varian SpectrAA 30/40 System Report

OPERATOR BENJAMIN MENDOZA
DATE 10-06-90
BATCH EPA PERFORMANCE

			MEAN ABS		MEAN/RSE	
BLANK	0.0000		-0.000	-0.000	-0.000	-0.000
STANDARD 1	0.0010	1.8	0.015	0.015	0.015	0.015
STANDARD 2	0.0050	0.4	0.098	0.097	0.098	0.098
STANDARD 3	0.0100	0.3	0.214	0.214	0.214	0.215



SAMPLE 1 1ev	0.0052 ✓	1.0	0.102	0.101	0.102	0.103	
SAMPLE 2 ICB	0.0001	22.6	0.001	0.001	0.001	0.001	
SAMPLE 3 MB1	0.0049 0.0041	0.1	0.096	0.096	0.096	0.096	DF = 1.25
SAMPLE 4 MB1dup	0.0049 0.0061	0.1	0.096	0.096	0.096	0.096	
SAMPLE 5 MB-2	OVER	0.2	0.716	0.715	0.716	0.718	
SAMPLE 6 MB-2 dup	OVER	0.1	0.725	0.724	0.725	0.726	
SAMPLE 7 WP-222 SP-1	0.0070 0.0086	1.8	0.142	0.145	0.141	0.139	
SAMPLE 8 dup	0.0065 0.0081	0.2	0.131	0.131	0.131	0.131	
SAMPLE 9 WP-222 SP-2	0.0010 0.0013	2.6	0.015	0.015	0.015	0.015	
SAMPLE 10 dup	0.0008 0.001	1.3	0.012	0.012	0.012	0.012	
SAMPLE 11 MB-2	0.0073 0.0456	0.9	0.148	0.147	0.148	0.149	DL = 5
SAMPLE 12 MB-2dup	0.0075 0.0469	0.2	0.155	0.155	0.155	0.155	DL = 5
SAMPLE 13 ccv	0.0052 ✓	0.3	0.101	0.101	0.101	0.102	
SAMPLE 14 ccb	0.0002	17.3	0.003	B-46003	0.002	0.002	

Granite Asphalt Plant Multimetal 3

Section I: Particulate Sampling Data

Point #	Delta P	Delta H	T S	T i	T in	T out	VAC	Filter Temp.	VEL (FPS)
1-5	1.60	1.10	311	61	63	61	10.0	212	91.5
1-4	1.10	0.76	311	62	64	62	8.0	221	75.9
1-3	0.80	0.55	301	65	65	62	8.0	220	64.3
1-2	1.00	0.69	300	65	65	62	8.0	225	71.8
1-1	0.91	0.63	295	67	66	62	8.0	232	68.3
2-5	1.15	0.80	310	66	67	62	10.0	226	77.5
2-4	1.05	0.71	308	64	67	63	10.0	228	74.0
2-3	1.05	0.71	306	64	67	63	10.0	229	73.9
2-2	1.20	0.83	306	61	68	63	10.0	226	79.0
2-1	1.10	0.76	304	60	67	63	10.0	231	75.5
3-5	0.90	0.62	306	61	67	63	10.0	227	68.4
3-4	1.25	0.86	306	62	67	63	10.0	220	80.6
3-3	1.15	0.80	302	62	67	63	10.0	233	0.8
3-2	0.96	0.66	301	63	67	64	10.0	230	70.4
3-1	0.75	0.52	300	64	67	64	10.0	233	62.2
4-5	1.10	0.76	300	63	68	64	10.0	237	75.3
4-4	1.10	0.76	305	64	68	64	10.0	240	75.6
4-3	1.10	0.76	304	64	68	64	10.0	235	75.5
4-2	1.10	0.76	301	65	68	64	10.0	234	75.4
4-1	0.95	0.65	300	65	68	65	10.0	236	70.0
5-5	0.90	0.62	300	64	68	65	10.0	247	68.1
5-4	0.80	0.55	303	65	68	65	10.0	250	64.4
5-3	0.70	0.48	309	66	68	65	10.0	246	60.4
5-2	0.45	0.32	305	67	67	65	10.0	241	48.3
5-1	0.30	0.21	296	64	68	65	10.0	246	39.2
6-5	0.20	0.14	300	66	68	66	10.0	263	32.1
6-4	0.30	0.21	301	69	69	66	10.0	263	39.4
6-3	0.30	0.21	302	71	69	66	10.0	259	39.4
6-2	0.20	0.14	301	72	70	67	10.0	256	32.1
6-1	0.20	0.14	254	71	68	66	10.0	251	31.1
AVG	0.86	0.59	302	65	67	64	9.7	237	62.0

Granite Asphalt Plant Multimetal 3

NOMENCLATURE

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

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

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condenser (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	432 ml	0 ml	432 ml
2 & 3	237 ml	200 ml	37 ml
4 & 5	202 ml	200 ml	2 ml
6	211 gram	200 gram	11 gram
	TOTAL CONDENSED MOISTURE		482 ml

STACK GAS MOLECULAR WEIGHT

PERCENT CARBON DIOXIDE	=	6.00
PERCENT OXYGEN	=	7.20
PERCENT CARBON MONOXIDE	=	0.00
PERCENT NITROGEN & INERTS	=	86.80

COMPONENT	VOLUME% *	MOISTURE CORR •	MOLWT =	MASS FRAC
WATER	36.40	1.00	18.00	6.55
CARBON DIOXIDE	6.00	0.64	44.00	1.68
OXYGEN	7.20	0.64	32.00	1.47
CARBON MONOXIDE	0.00	0.64	28.00	0.00
NITROGEN & INERTS	86.80	0.64	28.00	15.46
		AVERAGE MOLECULAR WEIGHT =		25.15

Granite Asphalt Plant Multimetal 3

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	685.815	CFT
Dry gas meter, final reading	=	724.011	CFT
Dry gas meter calibration factor	=	1.000	
Meter volume uncorrected for Temp & Press	=	38.196	CFT
Barometric pressure at site	=	30.22	in Hg
Meter pressure (barometer + average delta H)	=	30.94	in Hg
Average meter temperature during test	=	65.6	DEG F
Dry sample volume at standard conditions	=	39.075	CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	301.6	DEG F
Volume of condensed water	=	482	ml
Percent moisture of stack gas	=	36.40	%
Pitot tube correction factor	=	0.85	
Stack gas molecular weight	=	25.15	
Stack gas velocity at stack conditions	=	64.35	FT/SEC
Duration of sampling	=	90	Minute
Nozzle diameter	=	0.206	in
Percent isokinetic variation	=	108.2	%
Area of stack	=	13.87	SQ FEET
Stack flow rate, standard conditions	=	24046	DSCFM

SECTION IV SUMMARY OF QUANTITATIVE ANALYSIS
AND EMISSION RATE OF TRACE METALS

Compound		Mass (ug)		Emission rate (10-3 lb/hr)
Arsenic	<	11.29	<	0.92
Beryllium	<	1.13	<	0.09
Cadmium	<	2.26	<	0.18
Copper		20.35		1.65
Mercury		2.96		0.24
Nickel		45.50		3.70
Lead	<	5.65	<	0.46
Selenium	<	11.29	<	0.92
Zinc		188.81		15.33
Manganese		51.99		4.22

Field Data

EUREKA LABORATORIES, INC.

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6790 FLORIN PERKINS ROAD
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FAX: (916) 381-4013

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BELLEVUE, WA 98005
TEL: (206) 885-0284
FAX: (206) 885-6162

Air Pollution
Chemical Analysis
Research & Testing
Environmental Studies
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Toxicology

FIELD TEST DATA FORM

Site: Granite Asphalt plant Date: 9/1/92 Test No. Multiwind (3)

Nozzle I.D. EGL 1 Diameter 0.206 Filter No. Multiwind (3)

LEAK CHECKS: Pitot tubes -- Initial Y Final Y

Sample train -- Initial Y Final

<0.025 CF at 10 in Hg for 1 min <0.005 CF at 10 in Hg for 1 min

PT #	ΔP	ΔH	Ts	Ti	Tin	Tout	VAC	TEMP
1-5	1.6	1.10	311	61	63	62	10	212
1-4	1.10	0.76	311	62	64	62	687.595 / 8	221
1-3	.80	.55	301	65	65	62	688.975 / 8	220
1-2	1.00	.619	300	65	65	62	690.245 / 8	225
1-1	.911	.631	2915	67	66	62	691.645 / 8	232
2-5	1.15	.510	310	66	67	62	693.915 / 10	226
2-1	1.05	.711	308	64	67	63	694.695 / 10	228
2-3	1.05	.711	306	64	67	63	695.895 / 10	224
2-2	1.20	.83	306	61	68	62	697.356 / 10	226
2-1	1.10	.765	304	69	67	63	698.595 / 10	231
3-5	1.90	.621	306	61	67	63	700.295 / 10	227
3-4	1.25	.826	306	62	67	63	701.735 / 10	220

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p.2 of 3

FIELD TEST DATA FORM

Site: Granite Asphalt plant Date: 2/11 '90 Test No. Multimetal (3)

Nozzle I.D. ES-1 Diameter .206 Filter No. Multimetal (3)

LEAK CHECKS: Pitot tubes -- Initial _____ Final _____

Sample train -- Initial _____ Final _____

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
1539	3-3	1.15	.80	302	62	67	63	10	233
								706.825	
1742	3-2	.96	.66	301	63	67	64	10	230
								706.925	
2045	3-1	.75	.52	300	64	67	64	10	233
								707.500	
2348	4-5	1.10	.76	300	63	68	64	10	237
								709.095	
0151	4-4	1.10	.76	305	64	68	64	10	240
								710.415	
0354	4-3	1.10	.76	304	64	68	64	10	235
								711.895	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
0557	4-2	1.10	.76	301	65	68	64	10	234
								712.44	
0760	4-1	.95	.65	300	65	68	65	10	236
								714.775	
1043	5-5	.90	.62	300	64	68	65	10	247
								716.275	
1346	5-4	.80	.55	303	65	68	65	10	250
								717.815	
1649	5-3	.70	.48	309	66	68	65	10	246
								719.500	
1952	5-2	.45	.32	305	B-5-55	67	65	10	241

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P.E. 5

FIELD TEST DATA FORM

Site: Granite Asphalt Mill Date: 9/11/90 Test No. Multiple

Nozzle I.D. EGL 1 Diameter 0.206 Filter No. M(Y,ZJ (3)

LEAK CHECKS: Pitot tubes -- Initial ____ Final ____

Sample train -- Initial ____ Final ____

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
1320	5-1	.37	1.21	296	64	68	65	10	214.6
								720.425	
1335	6-5	.20	.136	300	66	68	66	10	263
								721.100	
1345	6-4	.20	.21	301	69	69	66	10	263
								721.915	
1384	6-3	.30	.121	302	71	69	66	10	259
								722.695	
1487	5-2	.20	.141	301	72	70	67	10	254
								723.360	
1590	6-1	.20	.14	254	71	68	66	10	254
								724.011	
1652									

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP

RUN #3

Metals - September 11, 1990

Calculation Data

Analytical Data

METALS
EPA MULTIMETAL METHOD

CLIENT : C.V.S.R.G Ass.
PROJECT: Granite
SAMPLING DATE: 9/12/90
SAMPLE I.D.: Train 3

COMPOUND	D/L ppm	F+R	DF1	Imp.	DF2	Total Mg
Arsenic	0.1	<0.1	<6	<0.1	<5.29	<11.29
Beryllium	0.01	<0.01	<0.6	<0.01	<0.53	<1.13
Cadmium	0.02	<0.02	<1.2	<0.02	<1.06	<2.26
Chromium	0.02	.1116	6.96	<0.02	<1.06	8.02
Copper	0.01	.2666	15.996	.0822	4.35	20.35
Nickel	0.1	.6701	40.206	<0.1	<5.29	45.5
Lead	0.05	<0.05	<3	<0.05	<2.65	<5.6
Selenium	0.1	<0.1	<6	<0.1	<5.29	<11.29
Zinc	0.01	2.379	142.74	.8705	46.07	188.81
Manganese	0.01	.5620	33.72	.3452	18.27	51.99
Mercury	0.001	<0.01	<0.6	0.0590	2.36	2.96

$DF1 = ppm * 50 * \frac{300}{250}$

$= ppm * 60$

$DF2 = ppm * 50\,ml * \frac{904}{854}$

$\mu g\,Mn = .0590 * 10 * \frac{200}{50}$

Date: 10/12/90 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
ER ONT ISE	<.0000	.0240	.4370	.0010	.0119	.0187	.1116	.2666	.0177	.0068	.6701	.0564	.0366	<.0000	.0509	.0131	2.379
INCER ID K																	
NSE TER AP	<.0000	<.0000	.0822	<.0000	.0053	<.0000	.0152	.0522	.0085	.0026	.0456	<.0000	<.0000	.0122	.0360	.0031	.8705
f)	116%	117	80	115	102	103	118	102	102	106	114	100	94	118	117	103	106
f s)	114%	114	92	112	98	99	115	99	100	104	110	97	100	116	112	101	10.2
HOD UK	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
	0.01	0.1	0.02	0.01	0.02												

F81 B-59

Date: 10/12/90 Company: Shining Net Method: EPA 6010 WATER mg/L

L NO. / MPLE NO.	AL	Ca	Mg	Fe	Na	Mn	K	B
LTER								
RONT								
RINSE						0.5620		
MPINGER								
CID								
ACK RINSE						0.3452		
VATER								
TRAP								
eg (5)								
R (5)						100%		
ng (ds)								
R (ds)						99%		
lethod								
BK						<		

F82 B-60

Client: STANLEY TROE (90-09-077)

ANALYSIS: ~~Cd~~ Hg · Water Samples

METHOD: EPA 7470 ~~Mod~~

ELI NO.	SAMPLE ID.	LOCATION	UNITS: mg/L (ppm)
	FRONT RINSE AND FILTER - 3		0.0050
	BACK RINSE, WATER TRAP AND IMPINGER - ACID - 3		0.0036
	IMPINGER - Hg - 3		0.0590
	MATRIX - (S)		114%
	MATRIX - (DS)		110%
	NOTE 6		
	Method Blank		
	Detection Limit		

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

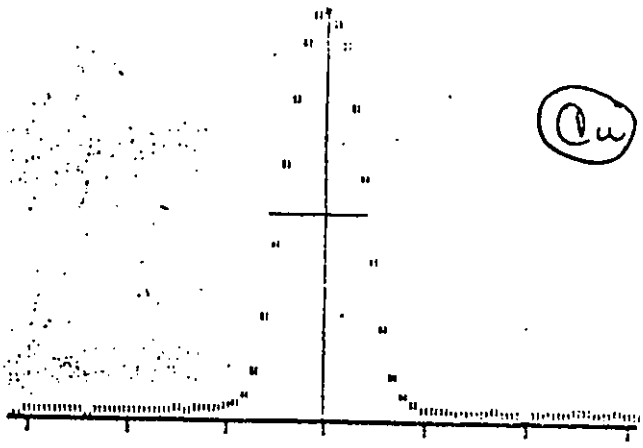
Analyst: Benjamin V. Anderson Jr.

Extraction Date: ~~9/28/96~~ 9/28/96

Date Reported: 10/6/96

F83

PROFILE FOR PHYSICAL CHANNEL 13
12-OCT-90 08:06



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

PEAK IS AT POSITION 0
PEAK HAS A WIDTH OF 11.1

MAX = 161 MIN = 15

ACT NAME : CAM TIME:12-OCT-90 12:39 STANDARD NAME : STD1

	I.S.	AG	AS	BA	BE	CD	CO	CR	CU	HG
EXP# 1	1000	.1530	.2780	.0190	.0170	.0580	.2960	.1480	.1450	.093
EXP# 2	1000	.1550	.2800	.0190	.0170	.0590	.3000	.1510	.1470	.091
AVERAGE	1000	.1540	.2790	.0190	.0170	.0585	.2980	.1495	.1460	.092

	MO	NI	PB	SB	SE	[illegible]	[illegible]	ZN	AL	FE
EXP# 1	.2350	.1440	.8840	[illegible]	[illegible]	[illegible]	[illegible]	.0490	1.378	.238
EXP# 2	.2370	.1500	.8920	[illegible]	[illegible]	[illegible]	[illegible]	.0500	1.382	.239
AVERAGE	.2360	.1470	.8880	.6965	.5275	.1255	.1315	.0495	1.380	.238

	CA	MG	NA	[illegible]	[illegible]	[illegible]
EXP# 1	3.276	1.513	[illegible]	[illegible]	[illegible]	[illegible]
EXP# 2	3.312	1.520	[illegible]	[illegible]	[illegible]	[illegible]
AVERAGE	3.294	1.517	1.954	[illegible]	[illegible]	[illegible]

ACT NAME : CAM TIME:12-OCT-90 [illegible] STANDARD NAME : STD2

	I.S.	BA	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
EXP# 1	1000	8.361	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
EXP# 2	1000	8.335	18.49	[illegible]	[illegible]	[illegible]	[illegible]
AVERAGE	1000	8.348	18.43	26.11	18.25	12.54	11.07

ACT NAME : CAM TIME:12-OCT-90 [illegible] STANDARD NAME : STD3

	I.S.	BE	MO	[illegible]	[illegible]	[illegible]
EXP# 1	1000	14.43	24.29	11.83	[illegible]	[illegible]
EXP# 2	1000	14.74	24.91	12.14	15.29	[illegible]
AVERAGE	1000	14.58	24.60	11.99	15.03	[illegible]

ACT NAME : CAM TIME:12-OCT-90 12:47 STANDARD NAME : STD4

	I.S.	AS	CR	SE
EXP# 1	1000	5.645	10.59	9.131
EXP# 2	1000	5.822	10.92	9.373
AVERAGE	1000	5.734	10.75	9.252

ACT NAME : CAM TIME:12-OCT-90 [illegible] STANDARD NAME : STD5

	I.S.	HG	V
EXP# 1	1000	7.868	11.96
EXP# 2	1000	8.076	12.19
AVERAGE	1000	7.972	12.08

F86

```
ACT NAME : CAM  TIME:12-OCT-90  12:52        STANDARD NAME : STD6
           I.S.   AG
EXP# 1     1000   11.67
EXP# 2     1000   11.78
AVERAGE    1000   11.73
```

```
ACT NAME : CAM  TIME:12-OCT-90  12:55        STANDARD NAME : STD7
           I.S.   AL      FE      CA      MG
EXP# 1     1000   18.82   16.35   10.96   14.88
EXP# 2     1000   19.00   16.55   11.07   15.04
AVERAGE    1000   18.91   16.45   11.01   14.96
```

```
ACT NAME : CAM  TIME:12-OCT-90  12:57        STANDARD NAME : STD8
           I.S.   NA      MN
EXP# 1     1000   63.42   17.23
EXP# 2     1000   64.31   17.58
AVERAGE    1000   63.87   17.40
```

```
ACT NAME : CAM  TIME:12-OCT-90  13:00        STANDARD NAME : STD9
           I.S.   K       B
EXP# 1     1000   4.714   2.775
EXP# 2     1000   4.813   2.821
AVERAGE    1000   4.764   2.798
```

(2.25 → 2.75)

ACT NAME : CAM TIME : 12-OCT-90 13:11 SAMPLE NAME: CAL.CK-1 ICV ✓
CAL.CK

	I.S.	AG	AS	BA	BE	CD	CO	CR	CU	HG
EXP# 1	1000	.0050	2.588	2.412	2.516	2.537	2.488	2.548	2.392	
EXP# 2	1000	.0033	2.608	2.442	2.529	2.538	2.473	2.579	2.431	2.4
AVERAGE	1000	.0042	2.598	2.427	2.522	2.532	2.481	2.563	2.411	2.5

	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	2.345	2.506	2.516	2.560	2.601	2.542	2.548	2.513	.1398	.01
EXP# 2	2.379	2.525	2.545	2.607	2.660	2.581	2.574	2.548	.1335	.01
AVERAGE	2.362	2.516	2.531	2.584	2.631	2.537	2.561	2.531	.1366	.01

	CA	MG	NA	MN	K	B
EXP# 1	<.0000	<.0000	<.0000	.0014	3.200	.0495
EXP# 2	<.0000	<.0000	<.0000	.0014	3.010	.0568
AVERAGE	<.0000	<.0000	<.0000	.0014	3.105	.0531

(2.25 → 2.75)

ACT NAME : CAM TIME : 12-OCT-90 13:15 SAMPLE NAME: CAL.CK-2 ICV
CAL.CK

	I.S.	AG	AS	BA	BE	CD	CO	CR	CU	HG
EXP# 1	1000	2.646	.0152	.0036	.0048	.0044	.0035	.0086	.0044	.013
EXP# 2	1000	2.671	<.0000	.0048	.0041	.0055	.0015	.0058	.0033	.004
AVERAGE	1000	2.659	.0076	.0042	.0045	.0049	.0025	.0072	.0038	.009

ACT NAME : CAM TIME : 12-OCT-90 13:15 SAMPLE NAME: CAL.CK-2
CAL.CK

	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	.0050	.0101	<.0000	.0073	.0379	.0273	.0040	.0166	2.569	2.548
EXP# 2	.0029	.0059	<.0000	.0045	.0054	.0294	.0031	.0166	2.606	2.590
AVERAGE	.0039	.0080	<.0000	.0059	.0217	.0285	.0036	.0166	2.588	2.569

	CA	MG	NA	MN	K	B
EXP# 1	.4069	2.282	15.36	2.500	26.98	2.674
EXP# 2	.4290	2.315	15.60	2.530	26.71	2.721
AVERAGE	.4180	2.298	15.48	2.515	26.85	2.697

ACT NAME : CAM TIME : 12-OCT-90 13:19 SAMPLE NAME: CAL.CK-3 ICB
CAL.CK

	I.S.	AG	AS	BA	BE	CD	CO	CR	CU	HG
EXP# 1	1000	.0035	<.0000	.0024	.0007	<.0000	.0012	<.0000	.0011	<.0000
EXP# 2	1000	.0043	<.0000	.0024	<.0000	.0014	.0023	.0024	.0027	<.0000
AVERAGE	1000	.0039	<.0000	.0024	.0003	.0005	.0017	.0005	.0019	<.0000

	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	.0008	<.0008	<.0000	<.0000	.0074	.0334	.0004	.0005	.0120	<.00
EXP# 2	.0008	<.0000	.0154	.0058	.0062	.0441	.0021	<.0000	.0194	<.0000
AVERAGE	.0008	<.0000	.0077	.0027	.0068	.0387	.0013	<.0000	.0157	<.0000

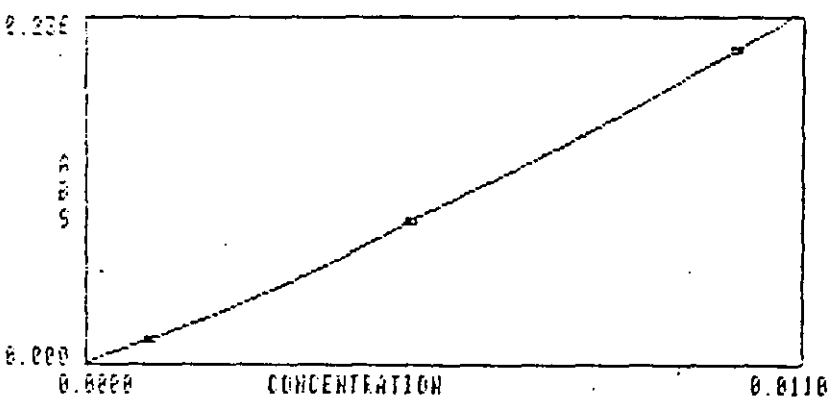
	CA	MG	NA	MN	K	B
EXP# 1	<.0000	.0115	.2265	.0049	B-66.55	.0239
EXP# 2	.0398	.0234	.2095	.0049	1.374	.0231

Thermo Spectra 30/40 System Report

OPERATOR BENJAMIN MENDOZA
DATE 10-06-90
BATCH EPA PERFORMANCE

PROGRAM 1 Pb 217.0 nm

SAMPLE	CONC	STD	MEAN ABS	READINGS			
BLANK	0.0000		-0.000	-0.000	-0.000	-0.000
STANDARD 1	0.0010	1.8	0.015	0.015	0.015	0.015
STANDARD 2	0.0050	0.4	0.096	0.097	0.096	0.096
STANDARD 3	0.0100	0.3	0.214	0.214	0.214	0.215



SAMPLE 1 lcv	0.0052	✓	1.0	0.102	0.101	0.102	0.103	
SAMPLE 2 ICB	0.0001		22.6	0.001	0.001	0.001	0.001	
SAMPLE 3 MB1	0.0049	0.0061	0.1	0.096	0.096	0.096	0.096	DF = 1.25
SAMPLE 4 MB1dup	0.0049	0.0061	0.1	0.096	0.096	0.096	0.096	
SAMPLE 5 MB-2	OVER		0.2	0.716	0.715	0.716	0.718	
SAMPLE 6 MB-2 dup	OVER		0.1	0.725	0.724	0.725	0.726	
SAMPLE 7 WP-pz1	0.0070	0.0088	1.8	0.142	0.145	0.141	0.139	
SAMPLE 8 dup	0.0065	0.0081	0.2	0.131	0.131	0.131	0.131	
SAMPLE 9 WP-pz2	0.0010	0.0013	2.6	0.015	0.015	0.015	0.015	
SAMPLE 10 dup	0.0008	0.001	1.3	0.012	0.012	0.012	0.012	
SAMPLE 11 MB-2	0.0073	0.0456	0.9	0.148	0.147	0.148	0.149	DL = 5
SAMPLE 12 MB-2dup	0.0075	0.0469	0.2	0.155	0.155	0.155	0.155	DL = 5
SAMPLE 13 ccv	0.0052	✓	0.3	0.101	0.101	0.101	0.102	
SAMPLE 14 ccb	0.0002		17.5	0.003	0.003	0.002	0.002	

APPENDIX C

Beryllium Data and Calculations

FIELD BLANK

Analytical Data

Granite Asphalt Plant Beryllium Field Blank

SUMMARY OF QUANTITATIVE ANALYSIS

Beryllium	Mass (ug)
Beryllium	< 0.10

NOTE: "<" = less than

METALS CARB Method 104
EPA ~~MULTIMETAL~~ METHOD
Beryllium

CLIENT :
PROJECT: Grant
SAMPLING DATE:
SAMPLE I.D.: Train Field Blk

COMPOUND	D/L ppm	Filter ~~mg/ml~~	DF	mass µg	Imp ~~µg/ml~~	DF	mass µg	Total µg
Arsenic	0.1							
Beryllium	~~0.01~~ 0.001	<0.001	x5	<0.005	<0.001		<0.005	<0.0
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							

RUN #1

Beryllium - September 6, 1990

Calculation Data

Granite Asphalt Plant CARB 104 Train 1

Sample I.D.: Granite Asphalt Plant Beryllium 1

Section I: Particulate Sampling Data

Point #	Delta P	Delta H	T S	T i	T in	T out	VAC	Filter Temp.	VEL (FPS)
1-5	0.60	0.68	318.00	82.00	87.00	86.00	7.00	245.00	56.1
1-4	0.75	0.85	320.00	79.00	88.00	86.00	6.00	256.00	62.7
1-3	0.80	0.90	323.00	76.00	90.00	86.00	6.00	269.00	64.5
1-2	0.70	0.78	320.00	75.00	91.00	87.00	6.00	274.00	60.5
1-1	0.60	0.68	304.00	74.00	92.00	87.00	5.00	269.00	56.1
2-5	1.10	1.25	321.00	74.00	92.00	87.00	7.00	285.00	75.7
2-4	1.10	1.25	323.00	74.00	92.00	87.00	7.00	274.00	75.5
2-3	1.15	1.30	322.00	73.00	93.00	88.00	7.00	258.00	76.4
2-2	0.97	1.10	321.00	72.00	94.00	88.00	7.00	282.00	70.7
2-1	0.68	0.78	305.00	73.00	95.00	88.00	5.00	292.00	59.3
3-5	0.90	1.00	320.00	73.00	95.00	89.00	4.00	272.00	68.4
3-4	0.90	1.00	320.00	72.00	95.00	89.00	3.00	263.00	68.4
3-3	0.92	1.05	322.00	72.00	96.00	90.00	3.00	266.00	69.3
3-2	0.75	0.83	321.00	73.00	97.00	90.00	3.00	295.00	62.6
3-1	0.75	0.83	315.00	74.00	96.00	90.00	3.00	284.00	62.8
4-5	0.92	1.05	320.00	75.00	96.00	90.00	3.00	274.00	69.4
4-4	1.00	1.15	321.00	75.00	96.00	90.00	3.00	268.00	71.6
4-3	1.00	1.15	317.00	75.00	96.00	91.00	4.00	261.00	72.4
4-2	0.90	1.00	313.00	75.00	97.00	91.00	3.00	261.00	68.8
4-1	0.50	0.56	296.00	76.00	97.00	91.00	3.00	258.00	51.2
5-5	0.45	0.50	309.00	78.00	96.00	91.00	2.00	259.00	48.6
5-4	0.60	0.68	312.00	77.00	97.00	91.00	3.00	261.00	55.5
5-3	1.00	1.15	314.00	78.00	97.00	91.00	4.00	261.00	72.3
5-2	1.00	1.15	314.00	77.00	97.00	92.00	4.00	260.00	72.3
5-1	0.45	0.50	315.00	78.00	97.00	92.00	2.00	260.00	48.6
6-5	0.25	0.28	308.00	79.00	91.00	91.00	4.00	254.00	36.2
6-4	0.30	0.34	314.00	79.00	92.00	91.00	4.00	257.00	39.5
6-3	1.00	1.15	314.00	79.00	94.00	92.00	6.00	259.00	72.3
6-2	1.30	1.45	311.00	80.00	96.00	92.00	7.00	265.00	82.5
6-1	0.80	0.85	308.00	82.00	97.00	92.00	5.00	266.00	64.6
AVG	0.80	0.91	315.37	75.97	94.30	89.53	4.53	266.93	63.83

Granite Asphalt Plant CARB 104 Train 1

NOMENCLATURE

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

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

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condenser (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	343 ml	100 ml	243 ml
2	322 ml	100 ml	222 ml
3	0 ml	0 ml	0 ml
4	238 gram	200 gram	38 gram
	TOTAL CONDENSED MOISTURE		503 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 CORR	* MOLWT	= MASS FRAC
WATER	33.17	1.00	18.00	5.97
CARBON DIOXIDE	6.00	0.67	44.00	1.76
OXYGEN	16.00	0.67	32.00	3.42
CARBON MONOXIDE	0.00	0.67	28.00	0.00
NITROGEN & INERTS	78.00	0.67	28.00	14.60
		AVERAGE MOLECULAR WEIGHT =		25.75

Granite Asphalt Plant CARB 104 Train 1

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	324.980 CFT
Dry gas meter, final reading	=	364.705 CFT
Dry gas meter calibration factor	=	1.000
Meter volume uncorrected for Temp & Press	=	48.715 CFT
Barometric pressure at site	=	30.32 in Hg
Meter pressure (barometer + average delta H)	=	30.65 in Hg
Average meter temperature during test	=	91.9 DEG F
Dry sample volume at standard conditions	=	47.024 CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	315.4 DEG F
Volume of condensed water	=	503 ml
Percent moisture of stack gas	=	33.17 %
Pitot tube correction factor	=	0.85
Stack gas molecular weight	=	25.67
Stack gas velocity at stack conditions	=	65.43 FT/SEC
Duration of sampling	=	90 Minute
Nozzle diameter	=	0.233 in
Percent isokinetic variation	=	97.9 %
Area of stack	=	13.87 SQ FEET
Stack flow rate, standard conditions	=	25005 DSCFM

SECTION IV SUMMARY OF QUANTITATIVE ANALYSIS AND EMISSION RATE OF BERYLLIUM

Compound		Mass (ug)		Emission rate (10-3 lb/hr)
Beryllium	<	0.10	<	0.01

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

water vol = 903-400 = 503 ml

O2: 9.5%

P_{bar} = 30.32

FIELD TEST DATA FORM

P: 1 of 3

CARB 104 C1

Site: Granite Arnold Date: 9/6/90 Test No. Be

Nozzle I.D. E1 Diameter 0.233 Filter No. Be(104) 104-(1)

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

Sample train -- Initial Y Final Y

1) 250 + 193 ml = 443
2) 250 + 172 ml = 422
3) 38
903 ml

Start at 324.980

0.005 1 min at 10 in Hg 0.005 at 10 in H

TIME	PT #	ΔP	ΔH	T_S	T_i	T_{IN}	T_{OUT}	VAC	TEMP
1:10	1+5	0.60	0.68	318	82	87	86	7	245
								326.465	
1:13	1+4	.75	.85	320	79	88	86	6	256
								327.875	
1:16	1-3	.80	.90	323	76	90	86	6	269
								329.515	
1:19	1-2	.70	.78	320	75	91	87	6	274
								331.025	
1:22	1-1	.62	.68	304	74	92	87	5	269
								332.454	
1:25	2-5	1.10	1.75	321	74	92	87	7	285
								334.325	

TIME	PT #	ΔP	ΔH	T_S	T_i	T_{IN}	T_{OUT}	VAC	TEMP
1:28	2-4	1.10	1.25	323	74	92	87	7	274
								336.175	
1:31	2-3	1.15	1.30	322	73	93	88	7	258
								338.085	
1:34	2-2	.97	1.10	321	72	94	88	7	282
								339.645	
1:37	2-1	.68	.78	305	73	95	89	5	292
								341.518	
1:40	3-5	.90	1.0	320	73	95	89	4	272
					C-12			343.920	
1:43	3-4	.90	1.0	320	72	95	89	3	263

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P2063

O2 : 9.5%

FIELD TEST DATA FORM

Site: Granite Asphalt plant Date: 9/6/90 Test No. 104(1)

Nozzle I.D. E1 Diameter 0.233 Filter No. 104(1)

LEAK CHECKS: Pitot tubes -- Initial ____ Final ____

Sample train -- Initial ____ Final ____

TIME	PT #	ΔP	ΔH	T_S	T_i	T_{IN}	T_{OUT}	VAC	TEMP
:46	3-3	.92	1.05	322	72	96	90	3	266
42								346.885	
:49	3-2	.75	.83	321	73	97	90	3	295
45									
:52	3-1	.75	.83	315	74	96	90	348.335	
48								3	284
55	4-5	.92	1.05	320	75	96	90	349.895	
51								3	274
58	4-14	1.0	1.15	321	75	96	90	351.655	
54								3	268
0	4-3	1.0	1.15	317	75	96	91	353.415	
								4	261
								355.215	

TIME	PT #	ΔP	ΔH	T_S	T_i	T_{IN}	T_{OUT}	VAC	TEMP
04	4-12	.90	1.0	313	75	97	91	3	261
60								356.965	
07	4-11	.50	.56	296	76	97	91	3	258
64									
10	4-5	.45	.50	309	78	96	91	358.392	
67								2	259
13	4-14	.60	.68	312	77	97	91	359.635	
70								3	261
16	4-13	1.0	1.15	314	78	97	91	361.055	
73								4	261
19	4-2	1.0	1.15	314	77	97	92	362.815	
								4	260

F102

EUREKA LABORATORIES, INC.

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Air Pollution
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Toxicology

p.3 of 3

FIELD TEST DATA FORM

Site: Granite As Date: 9/6/90 Test No. 104(1)

Nozzle I.D. E1 Diameter 0.233 Filter No. 104(1)

LEAK CHECKS: Pitot tubes -- Initial ____ Final ____

Sample train -- Initial ____ Final ____

TIME	PT #	ΔP	ΔH	T_S	T_i	T_{IN}	T_{OUT}	VAC	TEMP
2:22	5-1	.45	.50	315	78	97	92	2	260
								366.02	
2:45	6-5	.25	.28	308	79	91	91	4	254
								367.145	
2:48	6-4	.30	.34	314	79	92	91	4	257
								368.255	
	6-3	1.0	1.15	1314	79	94	92	6	259
								370.055	
5:12	6-2	1.13	1.45	311	80	96	92	7	265
								372.115	
5:15	6-1	.80	.95	308	82	97	92	5	266
								373.695	

TIME	PT #	ΔP	ΔH	T_S	T_i	T_{IN}	T_{OUT}	VAC	TEMP

METALS
EPA MULTIMETAL METHOD

CLIENT : C.V.S & G Ass
PROJECT: Granite
SAMPLING DATE: 9/6/90
SAMPLE I.D.: Train 1

COMPOUND	D/L ppm	Filter		Impiger		Total ug
Arsenic	0.1					
Beryllium	0.001 0.01	<0.001	x50 <.05	<0.001	x50 <.05	<0.1
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					

Client: Shining Nite 90-09-085 Air Samples

ANALYSIS: Be

METHOD: 7091

ELI NO.	SAMPLE ID.	LOCATION	UNITS: ~~ug/Kg~~ (ppm)
	Be 1 Filter		0.0016
	Be 1 Rinse		0.0000
	Be 1 Imp		0.0002
	R(S) Filter		90%
	R(DS) Filter		90%
	R(S)		80%
	R(DS)		70%
	Method Blank		
	D/L		0.001 ppm

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

Analyst : Ramona T

Date : 10/24/90

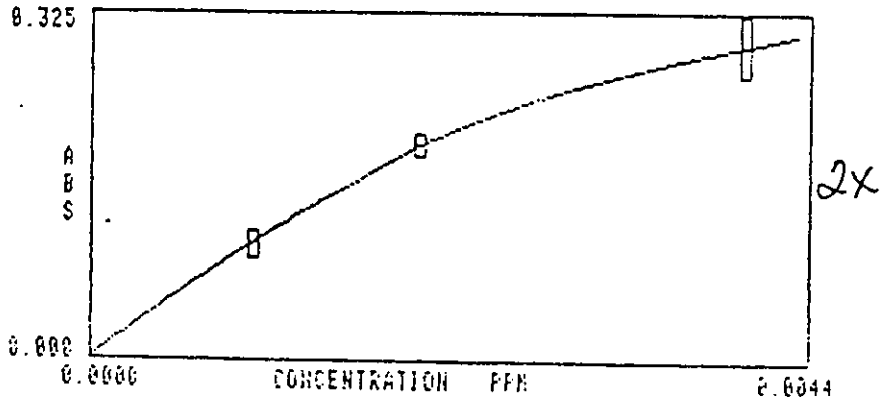
Calibration Data

Varian SpectrAA System Report

OPERATOR TAMARA JEROME
DATE 10-24-90
BATCH BE

PROGRAM 16 Be

SAMPLE	CONC PPM	%RSD	MEAN ABS	READINGS	
BLANK	0.0000		0.017	0.030	0.003
BLANK	0.0000		0.003	0.003	0.003
STANDARD 1	0.0010	8.9	0.108	0.115	0.102
STANDARD 2	0.0020	3.9	0.201	0.206	0.195
STANDARD 3	0.0040	8.5	0.296	0.278	0.313



SAMPLE 1	ICV 0.0009 Vbk	17.9	0.102	0.089	0.115	X2
BLANK	0.0000		-0.001	-0.002	-0.000	
SAMPLE 2	ICB 0.0000	99.9	-0.001	-0.001	0.000	
SAMPLE 3	R(S) 0.0009 90%	10.6	0.094	0.087	0.101	Filter 1
SAMPLE 4	R(S) 0.0009 90%	11.1	0.094	0.086	0.101	Filter 1
SAMPLE 5	R(S) 0.0008 80%	11.8	0.086	0.093	0.079	
SAMPLE 6	R(S) 0.0007 70%	3.0	0.074	0.072	0.076	
SAMPLE 7	BK ZERO 0.0000	99.9	0.001	0.001	0.000	
SAMPLE 8	BK 0.0000	99.9	0.001	0.000	0.001	
SAMPLE 9	0.0008 ⊠ 0.0016	4.9	0.088	0.085	0.091	—085 Be 1 Filter
SAMPLE 10	0.0003	6.3	0.033	0.034	0.031	—050 Be 2 Filter
SAMPLE 11	0.0004	12.9	0.046	0.042	0.051	—077 Be 3 Filter
SAMPLE 12	0.0000	34.6	0.001	0.002	0.001	—BK
SAMPLE 13	CCV 0.0011 Vbk				0.119	

RUN #2

Beryllium - Not complete due to plant shutdown

RUN #3

Beryllium - September 11, 1990

Calculation Data

Granite Asphalt Plant CARB 104 Train 3

Sample I.D.: Granite Asphalt Plant Beryllium 3

Section I: Particulate Sampling Data

Point #	Delta P	Delta H	T S	T i	T in	T out	VAC	Filter Temp.	VEL (FPS)
1-5	1.50	1.00	306.00	76.00	70.00	70.00	2.00	257.00	88.4
1-4	1.90	1.30	307.00	78.00	71.00	69.00	10.00	257.00	99.5
1-3	1.70	1.15	305.00	76.00	72.00	70.00	10.00	257.00	93.5
1-2	1.80	1.25	304.00	78.00	74.00	70.00	10.00	275.00	96.8
1-1	1.50	1.05	302.00	79.00	75.00	70.00	4.00	275.00	88.4
2-5	1.30	0.90	304.00	63.00	77.00	71.00	3.00	269.00	82.2
2-4	2.10	1.50	307.00	62.00	78.00	71.00	4.00	261.00	104.5
2-3	2.10	1.50	309.00	62.00	78.00	71.00	4.00	265.00	104.1
2-2	1.70	1.15	308.00	63.00	79.00	72.00	3.00	261.00	94.1
2-1	1.20	0.83	307.00	64.00	79.00	72.00	3.00	263.00	79.1
3-5	1.20	0.83	308.00	65.00	90.00	72.00	3.00	261.00	78.3
3-4	1.50	1.05	309.00	64.00	80.00	72.00	3.00	260.00	87.5
3-3	1.50	1.05	309.00	65.00	65.00	73.00	3.00	266.00	88.2
3-2	1.15	0.80	310.00	65.00	65.00	74.00	3.00	271.00	77.3
3-1	0.75	0.52	300.00	67.00	67.00	74.00	2.00	270.00	62.3
4-5	0.80	0.55	309.00	67.00	67.00	74.00	2.00	274.00	64.3
4-4	0.90	0.62	309.00	67.00	67.00	75.00	2.00	269.00	68.1
4-3	1.00	0.69	308.00	67.00	67.00	75.00	2.00	274.00	71.9
4-2	0.85	0.60	308.00	68.00	68.00	76.00	2.00	272.00	66.4
4-1	0.50	0.34	303.00	68.00	68.00	76.00	2.00	280.00	51.0
5-5	0.45	0.31	309.00	70.00	70.00	76.00	2.00	279.00	48.4
5-4	1.10	0.76	310.00	69.00	69.00	77.00	3.00	275.00	75.6
5-3	1.10	0.76	294.00	70.00	70.00	77.00	3.00	271.00	75.6
5-2	0.90	0.62	294.00	71.00	71.00	77.00	3.00	270.00	68.4
5-1	0.75	0.52	300.00	72.00	83.00	77.00	2.00	272.00	62.5
6-5	0.80	0.55	305.00	74.00	84.00	77.00	3.00	272.00	64.6
6-4	0.50	0.34	309.00	75.00	84.00	78.00	2.00	274.00	50.7
6-3	0.50	0.34	311.00	76.00	84.00	78.00	2.00	275.00	51.0
6-2	0.35	0.24	308.00	77.00	84.00	79.00	2.00	282.00	42.7
6-1	1.30	0.90	302.00	75.00	88.00	79.00	4.00	283.00	82.2
AVG	1.16	0.80	305.80	69.77	74.80	74.07	3.43	269.67	75.58

Granite Asphalt Plant CARB 104 Train 3

NOMENCLATURE

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

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

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condenser (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	300 ml	100 ml	200 ml
2	276 ml	100 ml	176 ml
3	104 ml	0 ml	104 ml
4	211 gram	200 gram	11 gram
	TOTAL CONDENSED MOISTURE		491 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 CORR	*	MOLWT	=	MASS FRAC
WATER	33.81		1.00		18.00		6.09
CARBON DIOXIDE	6.00		0.66		44.00		1.75
OXYGEN	16.00		0.66		32.00		3.39
CARBON MONOXIDE	0.00		0.66		28.00		0.00
NITROGEN & INERTS	78.00		0.66		28.00		14.46
				AVERAGE MOLECULAR WEIGHT		=	25.68

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	724.500	CFT
Dry gas meter, final reading	=	762.495	CFT
Dry gas meter calibration factor	=	1.000	
Meter volume uncorrected for Temp & Press	=	44.996	CFT
Barometric pressure at site	=	30.22	in Hg
Meter pressure (barometer + average delta H)	=	30.47	in Hg
Average meter temperature during test	=	74.4	DEG F
Dry sample volume at standard conditions	=	44.590	CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	305.8	DEG F
Volume of condensed water	=	491	ml
Percent moisture of stack gas	=	33.81	%
Pitot tube correction factor	=	0.85	
Stack gas molecular weight	=	25.60	
Stack gas velocity at stack conditions	=	79.74	FT/SEC
Duration of sampling	=	90	Minute
Nozzle diameter	=	0.206	in
Percent isokinetic variation	=	97.7	%
Area of stack	=	13.87	SQ FEET
Stack flow rate, standard conditions	=	30378	DSCFM

Granite Asphalt Plant CARB 104 Train 3

SECTION IV SUMMARY OF QUANTITATIVE ANALYSIS
AND EMISSION RATE OF BERYLLIUM

Compound	Mass (ug)	Emission rate (10-3 lb/hr)
Beryllium	< 0.10	< 0.01

EUREKA LABORATORIES, INC.

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FAX: (206) 885-6162

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Research & Testing
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Toxicology

water collected = 480 ml

p.1063

pbar = 30.22

FIELD TEST DATA FORM

Site: Granite Asphalt plant Date: 9/11/90 Test No. Be (3)

Nozzle I.D. EGL 1 Diameter 0.206 Filter No. Be (3)

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

Sample train -- Initial Y Final Y

<0.005 CF for 1 min at 15 in Hg <0.005 CF for 1 min at 15 in Hg

start at 724.500

PT #	ΔP	ΔH	Ts	Ti	Tin	Tout	VAC	TEMP
1-5	1.5	1.0	306	76	70	70	2	257
1-4	1.9	1.30	307	78	71	69	726.825	
							10	257
1-3	1.7	1.15	305	76	72	70	728.645	
							10	257
1-2	1.8	1.25	304	78	74	70	730.430	
							10	275
1-1	1.5	1.05	302	79	75	70	732.365	
							4	275
2-5	1.30	.90	304	63	71	71	734.085	
							3	269
							735.670	

PT #	ΔP	ΔH	Ts	Ti	Tin	Tout	VAC	TEMP
2-4	2.1	1.5	307	62	78	71	4	261
2-3	2.1	1.5	309	62	78	71	737.675	
							4	265
2-2	1.7	1.15	308	63	79	72	739.630	
							3	261
2-1	1.2	.83	307	64	79	72	741.440	
							3	263
1-5	1.2	.83	308	65	80	72	743.030	
							3	261
2-4	1.5	1.05	309	64	80	72	745.040	
							3	>60

C-28

F117

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FIELD TEST DATA FORM

Site: Granite Asphalt plant Date: 9/11/90 Test No. Be(3)

Nozzle I.D. EGL 1 Diameter .206 Filter No. Be(3)

LEAK CHECKS: Pitot tubes -- Initial ____ Final ____

Sample train -- Initial ____ Final ____

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
1:09 39	3-3	1.15	1.05	309	65	81	73	3	266
								147.965	
1:12 42	3-2	1.15	.80	310	65	81	74	.3	271
								149.500	
1:15 45	3-1	.75	.52	300	67	82	74	2	270
								150.770	
1848	4-1	.80	.55	309	67	82	74	2	274
								152.015	
1:51	4-4	.90	.62	309	67	82	75	2	264
								153.375	
1:54	4-3	1.0	.69	308	67	83	75	2	274
								154.789	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
7 57	4-2	.85	.60	308	68	83	76	2	272
								156.105	
0 60	4-1	.50	.34	303	68	83	76	2	280
								157.85	
63	5-5	.45	.31	309	70	83	76	2	279
								158.125	
66	5-4	1.10	.76	310	69	84	77	3	275
								159.565	
69	5-3	1.10	.76	294	70	85	77	3	277
								161.000	
72	5-2	.90	.62	294	69	84	77	3	270

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p.3063

FIELD TEST DATA FORM

Site: Granite Asphalt plant Date: 9/11/90 Test No. Be(3)

Nozzle I.D. EGL 1 Diameter .206 Filter No. Be(3)

LEAK CHECKS: Pitot tubes -- Initial ____ Final ____

Sample train -- Initial ____ Final ____

TIME	PT #	ΔP	ΔH	T_S	T_i	T_{IN}	T_{OUT}	VAC	TEMP
.4575	5-1	.75	.52	300	72	83	77	2	272
								763.652	
:4878	6-5	.80	.55	305	74	84	77	3	272
								764.900	
:5181	6-4	.50	.34	309	75	84	78	2	274
								765.930	
84	6-3	.50	.34	311	76	84	78	2	275
								766.930	
:5787	6-2	.35	.24	308	77	84	79	2	282
								767.815	
:0090	6-1	1.20	.90	302	75	88	79	4	283
								769.496	
ND									
2:04									

TIME	PT #	ΔP	ΔH	T_S	T_i	T_{IN}	T_{OUT}	VAC	TEMP

Analytical Data

METALS
EPA MULTIMETAL METHOD

CLIENT : C.U. S R R. Ass.
PROJECT: Granite
SAMPLING DATE: 9/12/90
SAMPLE I.D.: Train 3

COMPOUND	D/L ppm	F+R		Imp.		Total ug
Arsenic	0.1					
Beryllium	0.001 / 0.01	<0.001	*50 <.05	<0.001	*50 <.05	<0.1
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					

Client: Shining Wire 40-04-011 Air Samples

ANALYSIS: Be

METHOD: 7091

ELI NO.	SAMPLE ID.	LOCATION	UNITS: ~~mg/kg~~ (~~ppm~~)
	Be 3 Filter		0.0008
	Be 3 Rinse		0.0000
	Be 3 Imp		0.0000
	R(S) Filter		90%
	R(DS) Filter		90%
	R(S)		80%
	R(DS)		70%
	Method Blank		<
	D/L		0.001 ppm

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

Analyst : Tamara Ten

Date : 10/24/90

Calibration Data

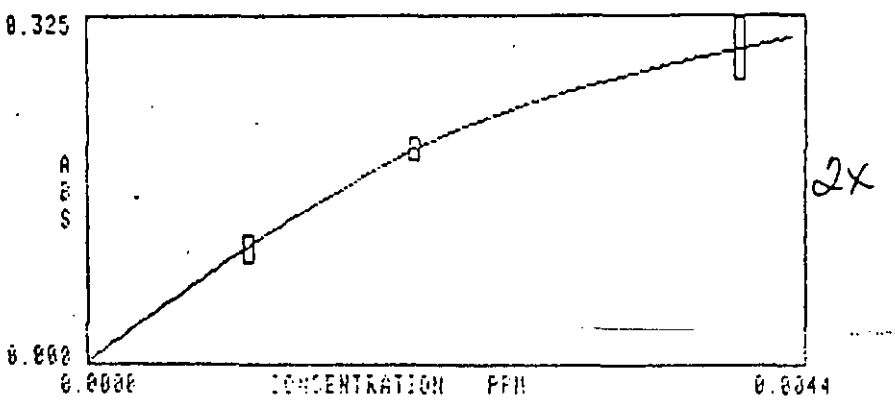
1/

arian SpectrAA System Report

OPERATOR TAMARA JEROME
DATE 10-24-90
BATCH BE

PROGRAM 16 Be

MPLE	CONC PPM	%RSD	MEAN ABS	READINGS	
ANK	0.0000		0.017	0.030	0.003
ANK	0.0000		0.003	0.003	0.003
ANDARD 1	0.0010	8.9	0.108	0.115	0.102
ANDARD 2	0.0020	3.9	0.201	0.206	0.195
ANDARD 3	0.0040	8.5	0.296	0.278	0.313



2X

AMPLE 1ICV	0.0009 ✓BK	17.9	0.102	0.089	0.115	X2
LANK	0.0000		-0.001	-0.002	-0.000	
AMPLE 2ICB	0.0000	99.9	-0.001	-0.001	0.000	
AMPLE 3RS	0.000990%	10.6	0.094	0.087	0.101	Filter
AMPLE 4RS	0.000990%	11.1	0.094	0.086	0.101	Filter
AMPLE 5RS	0.000880%	11.8	0.086	0.093	0.079	
AMPLE 6RS	0.000770%	13.0	0.074	0.072	0.076	
AMPLE 7BK/ICB	0.0000	99.9	0.001	0.001	0.000	
AMPLE 8BK	0.0000	99.9	0.001	0.000	0.001	
AMPLE 9	0.0008	4.9	0.088	0.085	0.091	—085 Be 1 Filter
AMPLE 10	0.0003	9.3	0.033	0.034	0.031	—030 Be 2 Filter
AMPLE 11	0.0004x2=0.0008	12.9	0.046	0.042	0.051	—047 Be 3 Filter
AMPLE 12	0.0000	34.6	0.001	0.002	0.001	—BK
AMPLE 13CCV	0.0011 ✓BK	2.2	0.117 F124	0.115	0.119	

APPENDIX D

Chromium Data and Calculations

FIELD BLANK

Analytical Data

Granite Asphalt Plant Chromium & Hexavalent Chromium Field Blank

SUMMARY OF QUANTITATIVE ANALYSIS

Chromium	Mass (ug)
Chromium	< 1.20
Hexavalent Chromium	< 2.00

NOTE: "<" = less than

METALS CAR Method 42J

~~EPA MULTIMETAL METHOD~~

$Cr + Cr^{++}$

CLIENT :
PROJECT: Granite
SAMPLING DATE:
SAMPLE I.D.: Train Field BK.

	COMPOUND	D/L ppm	F+R µg/ml	mass µg	imp µg/ml	nitric µg	Total µg
	Arsenic	0.1					
	Beryllium	0.01					
	Cadmium	0.02					
DF,	Chromium	~~0.02~~ 0.006	<0.006	<0.6	<0.006	<1	<1.2
	Copper	0.01					
	Nickel	0.1					
	Lead	0.05					
	Selenium	0.1					
	Zinc	0.01					
	Manganese	0.01					
	Mercury	0.001					
DF$_2$	Cr^{++}	0.005	<0.005	<1	<0.005	<1	* <2

DF$_1$ = 50 × 2 = 100

DF$_2$ = 100 × 2 = 200

RUN #1

Chromium - September 5, 1990

Calculation Data

Granite Asphalt Plant CARB 425 train 1

Sample I.D.: Granite 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)
1-5	1.50	1.60	299.00	77.00	77.00	76.00	3.00	216.00	90.2
1-4	1.40	1.50	303.00	60.00	78.00	77.00	3.00	247.00	87.1
1-3	1.00	1.10	306.00	56.00	80.00	77.00	3.00	261.00	68.9
1-2	0.85	0.99	307.00	55.00	81.00	77.00	3.00	261.00	67.3
1-1	0.70	0.76	290.00	57.00	82.00	78.00	3.00	251.00	61.3
2-5	1.50	1.60	309.00	56.00	84.00	78.00	3.00	255.00	89.8
2-4	1.50	1.65	310.00	56.00	85.00	79.00	3.00	261.00	89.8
2-3	1.40	1.65	310.00	56.00	85.00	79.00	3.00	260.00	86.3
2-2	1.00	1.10	309.00	59.00	85.00	79.00	3.00	260.00	73.4
2-1	0.75	0.82	304.00	60.00	85.00	80.00	2.00	248.00	63.6
3-5	1.20	1.30	310.00	61.00	85.00	80.00	3.00	271.00	80.2
3-4	1.10	1.20	312.00	60.00	87.00	81.00	3.00	264.00	76.7
3-3	1.10	1.20	311.00	60.00	88.00	81.00	3.00	254.00	76.7
3-2	0.80	0.88	310.00	61.00	89.00	82.00	3.00	271.00	65.5
3-1	0.45	0.48	215.00	65.00	85.00	83.00	2.00	256.00	49.3
4-5	0.55	0.60	296.00	65.00	85.00	83.00	2.00	261.00	54.5
4-4	0.70	0.76	303.00	64.00	87.00	84.00	2.00	260.00	60.8
4-3	0.55	0.60	303.00	65.00	89.00	84.00	2.00	255.00	54.6
4-2	0.45	0.48	304.00	60.00	89.00	84.00	2.00	252.00	49.4
4-1	0.20	0.22	295.00	61.00	90.00	85.00	2.00	260.00	32.9
5-5	0.20	0.22	305.00	64.00	89.00	85.00	2.00	258.00	32.9
5-4	0.18	0.20	306.00	66.00	91.00	86.00	1.00	263.00	31.1
5-3	0.25	0.27	301.00	67.00	92.00	86.00	1.00	251.00	36.8
5-2	0.10	0.11	300.00	68.00	91.00	86.00	1.00	251.00	23.3
5-1	0.10	0.11	279.00	71.00	90.00	86.00	1.00	254.00	23.3
6-5	0.09	0.10	296.00	71.00	89.00	87.00	1.00	262.00	22.1
6-4	0.05	0.10	299.00	73.00	90.00	87.00	1.00	261.00	15.4
6-3	0.05	0.10	297.00	74.00	90.00	87.00	1.00	256.00	16.3
6-2	0.05	0.10	297.00	74.00	90.00	87.00	1.00	256.00	16.4
6-1	0.05	0.10	297.00	75.00	90.00	88.00	1.00	260.00	16.4
AVG	0.66	0.73	299.43	63.90	86.60	82.40	2.13	256.53	53.74

Granite Asphalt Plant CARB 425 train 1

NOMENCLATURE

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

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

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condenser (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	384 ml	100 ml	284 ml
2	300 ml	100 ml	200 ml
3	0 ml	0 ml	0 ml
4	207 gram	200 gram	7 gram
	TOTAL CONDENSED MOISTURE		491 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	40.98		1.00		18.00		7.38
CARBON DIOXIDE	5.50		0.59		44.00		1.43
OXYGEN	12.50		0.59		32.00		2.36
CARBON MONOXIDE	0.00		0.59		28.00		0.00
NITROGEN & INERTS	82.00		0.59		28.00		13.55
			AVERAGE MOLECULAR WEIGHT			=	24.72

Granite Asphalt Plant CARB 425 train 1

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	235.036	CFT
Dry gas meter, final reading	=	268.795	CFT
Dry gas meter calibration factor	=	1.000	
Meter volume uncorrected for Temp & Press	=	33.759	CFT
Barometric pressure at site	=	30.29	in Hg
Meter pressure (barometer + average delta H)	=	30.45	in Hg
Average meter temperature during test	=	84.5	DEG F
Dry sample volume at standard conditions	=	32.808	CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	299.4	DEG F
Volume of condensed water	=	491	ml
Percent moisture of stack gas	=	40.98	%
Pitot tube correction factor	=	0.85	
Stack gas molecular weight	=	24.63	
Stack gas velocity at stack conditions	=	62.60	FT/SEC
Duration of sampling	=	72	Minute
Nozzle diameter	=	0.206	in
Percent isokinetic variation	=	102.0	%
Area of stack	=	13.87	SQ FEET
Stack flow rate, standard conditions	=	21423	DSCFM

Granite Asphalt Plant CARB 425 train 1

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

Compound		Mass (ug)		Emission rate (10-3 lb/hr)
Chromium		34.20		2.95
Hexavalent Chromium	<	2.00	<	0.17

Field Data

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P1 of 3

P_{bar} = 30.29
water = 491 ml

FIELD TEST DATA FORM

Site: Granite Asphalt Plant Date: 9/5/90 Test No. Chromium + Cr (1)

Nozzle I.D. E1 Diameter 0.206 in Filter No. Chrom 1

LEAK CHECKS: Pitot tubes -- Initial ok at 3 inches Final ____

Sample train -- Initial ok at .002 at 3 Final ok at .002 at 3

235.036

TIME A.M.	PT #	ΔP	ΔH	T_s	T_i	T_{IN}	T_{OUT}	VAC	TEMP
10:55	1-5	1.5	1.60	299	77	77	76	3	216
STOP								236.965	
11:25	1-4	1.4	1.50	303	60	78	77	3	247
								237.945	
11:28	1-3	1.0	1.10	306	56	80	77	3	261
								239.245	
11:31	1-2	.85	.99	307	55	81	77	3	267
								241.075	
11:34	1-1	.70	.76	290	57	82	78	3	251
								242.502	
11:40	2-5	1.50	1.60	309	56	841	78	3	255
								244.565	

TIME	PT #	ΔP	ΔH	T_s	T_i	T_{IN}	T_{OUT}	VAC	TEMP
11:43	2-4	1.50	1.65	310	56	85	79	3	26
								246.615	
11:46	2-3	1.40	1.50	309	57	85	79	3	260
								248.725	
11:49	2-2	1.0	1.10	309	59	85	79	3	260
AM								250.595	
11:52	2-1	.75	.82	304	60	85	80	2	248
								252.025	
11:55	3-5	1.2	1.30	310	61	85	80	3	271
								253.895	
11:58	3-4	1.1	1.20	312	60	87	81	3	264
								255.715	

EUREKA LABORATORIES, INC.

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FIELD TEST DATA FORM

Site: Granite Asphalt Date: 9/5/90 Test No. G+3+G+6(1)

Nozzle I.D. E1 Diameter .206 in Filter No. Chron (1)

LEAK CHECKS: Pitot tubes -- Initial _____ Final _____

Sample train -- Initial _____ Final _____

TIME	PT #	ΔP	ΔH	T_S	T_i	T_{IN}	T_{OUT}	VAC	TEMP
12:01	3-3	1.1	1.2	311	60	88	81	3	257
								257.455	
12:04	2	.80	.88	310	61	89	82	3	271
								259.045	
12:21	1	.45	.48	215	65	85	83	2	256
								260.205	
12:25	4-5	.55	.60	296	65	86	83	2	261
								261.495	
12:28	4	.70	.76	303	64	87	84	2	260
								262.835	
12:31	3	.55	.60	303	65	891	84	2	255
								264.295	

TIME	PT #	ΔP	ΔH	T_S	T_i	T_{IN}	T_{OUT}	VAC	TEMP
12:34	1-2	.45	.48	304	60	89	84	2	252
								265.335	
12:37	1	.20	.22	294	6	90	85	2	260
								266.195	
12:40	5-5	.20	.22	305	64	89	85	2	258
								266.825	
12:43	4	.18	.20	306	66	91	86	1	263
								267.525	
12:46	3	.25	.27	301	67	92	86	1	251
								268.315	
12:49	2	.10	.11	300	68	91	86	1	251
								268.795	

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water collected 284 ml.
silica gel 78

FIELD TEST DATA FORM

Site: Granite Asphalt Date: 9/5/90 Test No. $C_T+3 + C_T+6$

Nozzle I.D. E1 Diameter .206 Filter No. Chrom 1

LEAK CHECKS: Pitot tubes -- Initial _____ Final _____

Sample train -- Initial _____ Final _____

TIME	PT #	ΔP	ΔH	T_S	T_i	T_{IN}	T_{OUT}	VAC	TEMP
12:52	5-1	.10	.11	279	71	91	86	1	254
								269.234	
12:53	6-5	.09	.10	296	71	89	87	1	262
								269.695	
12:56	4	.05	.10	299	73	90	87	1	261
								270.135	
12:59	3	.05	.10	297	74	90	87	1	256
								270.555	
1:02	2	.05	.10	297	75	90	88	1	260
								271.085	
1:05	1	.05	.10	252	76	91	88	1	259
								271.385	

TIME	PT #	ΔP	ΔH	T_S	T_i	T_{IN}	T_{OUT}	VAC	TEMP

Analytical Data

METALS
EPA MULTIMETAL METHOD

CLIENT : C.V.S & G Asso.
PROJECT: Granite
SAMPLING DATE: 9/5/90
SAMPLE I.D.: Train 1

COMPOUND	D/L ppm	F+R		Imp		Total mg
Arsenic	0.1					
Beryllium	0.01					
Cadmium	0.02					
Chromium	0.006 0.02	< 0.12 x100	< 12	0.222 x100	22.2	34.2
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 x100 x2	< 1.0	< 0.005 x100 x2	< 1.0	< 2.0

CLIENT SHIELDS TEST (90-09-037)

TEST CR +6

METHOD CrR 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	~~94%~~ 98%
REAGENT DUP SPIKE	0.060	~~98~~ 122%
037-01A (FILTER-1)	0.003	0.001 ppm
037-02A+07A (RINSE-1)	0.003	0.001 " ppm
037-04A (IMPINGER-1)	0.006	0.004 " ppm

Elaine Mendoza
ANALYST

~~10/9~~ 9/25/90
DATE

F141

Calibration Data

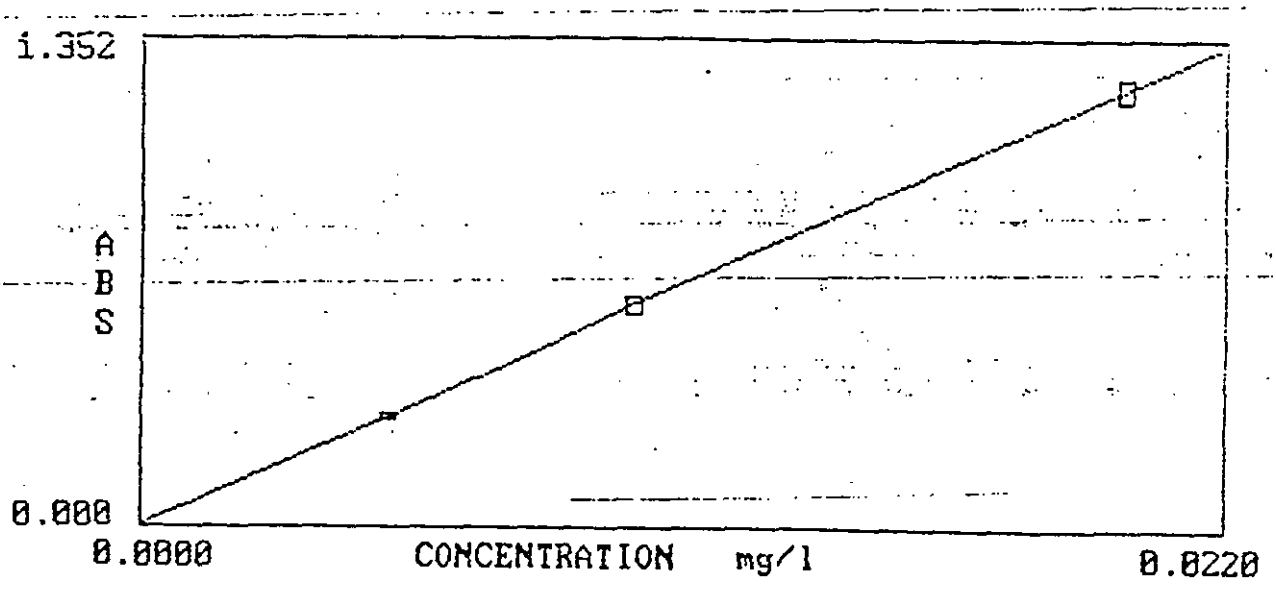
Varian SpectrAA 300/400 Zeeman Report

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	0.629	0.637	0.620
STANDARD 3	0.0200	2.1	1.229	1.211	1.247



SAMPLE 1 ICV	0.0111	0.8	0.695	0.694	0.702
SAMPLE 2 ICB	-.0000	63.8	-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-BKG	.0022	35.9	0.136	0.170	0.101
SAMPLE 8 101-1	OVER	0.5	1.789	1.782	1.795

CLIENT SHINING TREE (90-09-057)

TEST CR +6

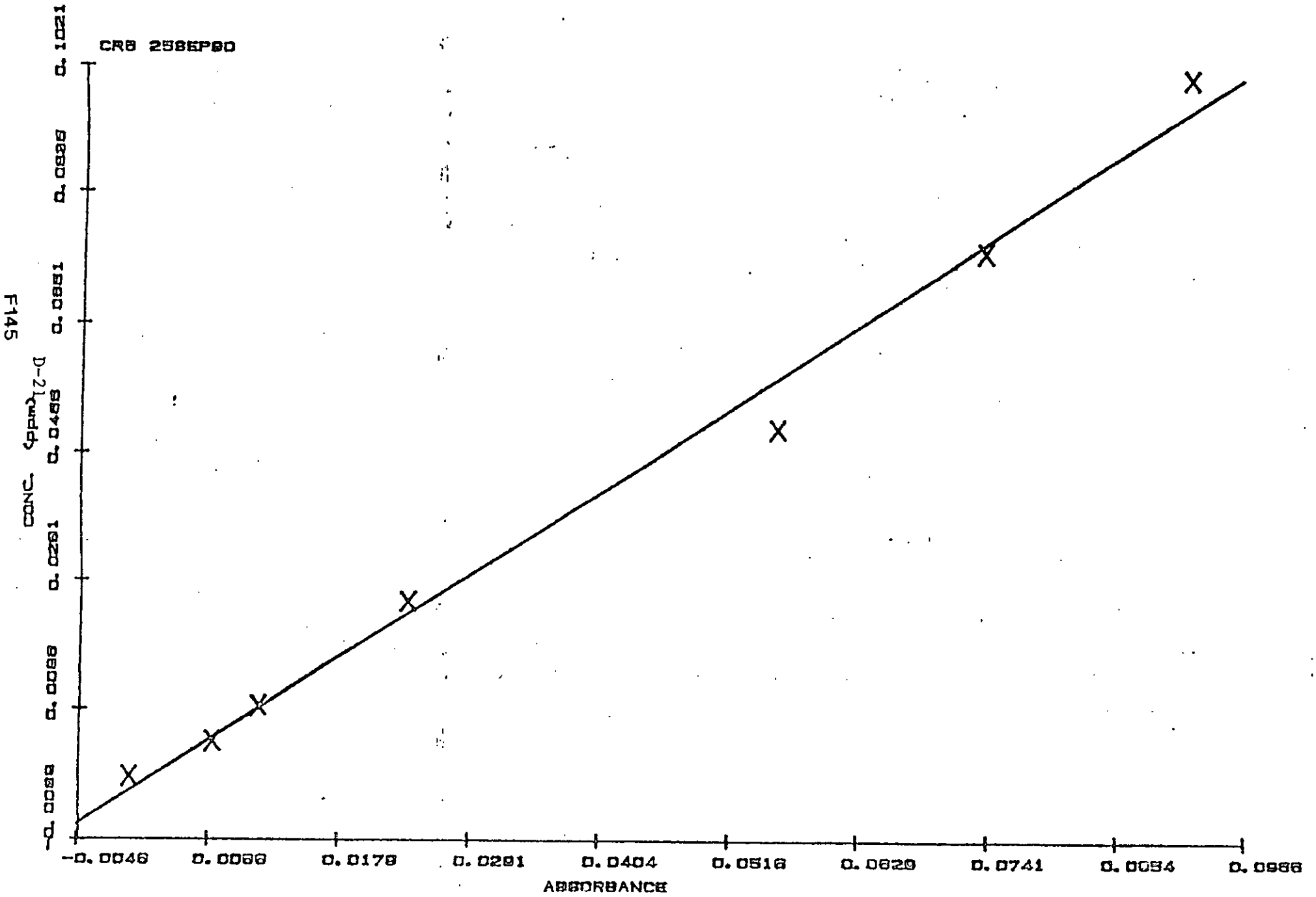
METHOD CrR 4/25

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	~~47~~ 98%
REAGENT DUP SPIKE	0.060	~~60~~ 122%
057-01A (FILTER-1)	0.003	0.001 ppm
057-02A+03A (RINSE-1)	0.003	0.001 " ppm
057-04A (Impinger-1)	0.006	0.004 " ppm

Elizabeth V. Henderson
ANALYST

~~10/9~~ 9/25/90
DATE

F144


CR8 2586P80
0.1021
0.0696
0.0351
0.0486
0.0261
0.0086
-0.0039
CONC (ppm)
D-2,4
-0.0046
0.0086
0.0179
0.0291
0.0404
0.0516
0.0629
0.0741
0.0854
0.0966
ABSORBANCE

RUN #2

Chromium - September 7, 1990

Calculation Data

Granite Asphalt CARB 425 Train 2

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

Section I: Particulate Sampling Data

Point #	Delta P	Delta H	T S	T i	T in	T out	VAC	Filter Temp.	VEL (FPS)
1-5	0.57	0.63	307.00	81.00	66.00	65.00	5.00	260.00	53.9
1-4	0.70	0.78	310.00	77.00	68.00	65.00	11.00	249.00	59.6
1-3	0.73	0.82	310.00	76.00	69.00	66.00	11.00	261.00	60.5
1-2	0.65	0.74	311.00	76.00	70.00	66.00	9.00	269.00	57.4
1-1	0.60	0.68	307.00	75.00	71.00	66.00	8.00	273.00	55.1
2-5	0.68	0.76	312.00	74.00	72.00	67.00	11.00	246.00	58.7
2-4	0.80	0.90	311.00	71.00	72.00	67.00	12.00	259.00	63.7
2-3	0.82	0.92	313.00	70.00	73.00	67.00	11.00	264.00	64.2
2-2	0.65	0.74	315.00	71.00	73.00	68.00	8.00	277.00	57.4
2-1	0.60	0.68	310.00	73.00	73.00	68.00	7.00	276.00	55.2
3-5	0.80	0.90	314.00	73.00	73.00	68.00	11.00	271.00	63.8
3-4	0.88	1.00	314.00	71.00	73.00	68.00	12.00	267.00	66.9
3-3	0.90	1.00	313.00	70.00	74.00	68.00	11.00	276.00	67.4
3-2	0.85	0.95	310.00	71.00	74.00	69.00	11.00	275.00	65.7
3-1	0.75	0.84	302.00	72.00	74.00	69.00	9.00	273.00	61.7
4-5	1.00	1.10	310.00	72.00	75.00	69.00	12.00	276.00	71.3
4-4	1.00	1.10	309.00	71.00	75.00	69.00	11.00	276.00	71.1
4-3	1.10	1.20	309.00	70.00	75.00	69.00	12.00	274.00	74.8
4-2	1.10	1.20	309.00	70.00	76.00	70.00	12.00	274.00	74.8
4-1	0.95	1.05	304.00	71.00	76.00	70.00	11.00	273.00	69.6
5-5	1.00	1.10	309.00	72.00	76.00	70.00	12.00	281.00	71.5
5-4	1.10	1.20	311.00	71.00	76.00	71.00	12.00	278.00	74.7
5-3	1.20	1.35	312.00	70.00	77.00	71.00	12.00	273.00	78.2
5-2	1.20	1.35	311.00	69.00	77.00	71.00	12.00	286.00	78.2
5-1	1.10	1.20	308.00	70.00	77.00	72.00	11.00	282.00	74.8
6-5	0.90	1.00	307.00	72.00	76.00	72.00	12.00	268.00	67.6
6-4	1.10	1.20	309.00	72.00	76.00	72.00	12.00	267.00	74.3
6-3	1.15	1.30	310.00	71.00	77.00	72.00	13.00	278.00	76.4
6-2	1.10	1.20	309.00	71.00	77.00	72.00	12.00	274.00	74.7
6-1	1.00	1.10	296.00	71.00	77.00	72.00	12.00	271.00	71.2
AVG	0.90	1.00	309.40	72.13	73.93	68.97	10.83	270.90	67.14

Granite Asphalt CARB 425 Train 2

NOMENCLATURE

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

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

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condenser (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	310 ml	100 ml	210 ml
2	300 ml	100 ml	200 ml
3	0 ml	0 ml	0 ml
4	204 gram	200 gram	4 gram
	TOTAL CONDENSED MOISTURE		414 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 FRAC
WATER	32.37	1.00	18.00	5.83
CARBON DIOXIDE	5.50	0.68	44.00	1.64
OXYGEN	12.50	0.68	32.00	2.71
CARBON MONOXIDE	0.00	0.68	28.00	0.00
NITROGEN & INERTS	82.00	0.68	28.00	15.53
		AVERAGE MOLECULAR WEIGHT	=	25.70

Granite Asphalt CARB 425 Train 2

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	385.189 CFT
Dry gas meter, final reading	=	424.635 CFT
Dry gas meter calibration factor	=	1.000
Meter volume uncorrected for Temp & Press	=	39.446 CFT
Barometric pressure at site	=	30.32 in Hg
Meter pressure (barometer + average delta H)	=	31.12 in Hg
Average meter temperature during test	=	71.5 DEG F
Dry sample volume at standard conditions	=	40.140 CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	309.4 DEG F
Volume of condensed water	=	414 ml
Percent moisture of stack gas	=	32.37 %
Pitot tube correction factor	=	0.85
Stack gas molecular weight	=	25.75
Stack gas velocity at stack conditions	=	65.60 FT/SEC
Duration of sampling	=	72 Minute
Nozzle diameter	=	0.206 in
Percent isokinetic variation	=	103.0 %
Area of stack	=	13.87 SQ FEET
Stack flow rate, standard conditions	=	25953 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	8.22	0.70
Hexavalent Chromium	4.20	0.36

Field Data

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p1063
Silica gel 4 grams
Chrom water 510 ml

$P_{bar} = 30.32$

FIELD TEST DATA FORM

CARB 425

Site: Granite Asphalt plant Date: 9/7/90 Test No. Chrom (2)

Nozzle I.D. E1 Diameter 0.233 Filter No. Chrom (2)

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

Sample train -- Initial Y Final Y

start meter at 385.189

0.005 for 1 min at 10 in Hg 0.005 for 1 min at 15 in Hg

TIME	PT #	ΔP	ΔH	T_S	T_i	T_{IN}	T_{OUT}	VAC	TEMP
8:10	1-5	.57	1.63	307	61	66	65	5	250
								386.845	
8:136	1-4	.70	.78	310	77	68	65	.11	249
								387.905	
8:169	1-3	.73	.82	310	76	69	66	11	261
								388.555	
8:1712	1-2	.65	.714	311	76	70	66	9	269
								390.825	
8:2215	1-1	.60	.68	307	75	71	66	8	273
								392.262	
8:2518	2-5	.63	.76	312	74	72	67	11	246
								393.805	

TIME	PT #	ΔP	ΔH	T_S	T_i	T_{IN}	T_{OUT}	VAC	TEMP
8:2821	2-4	.80	.90	311	71	72	67	12	259
								395.345	
8:3124	2-3	.82	.92	313	70	73	67	11	264
								397.015	
8:3427	2-2	.65	.74	315	71	73	68	8	277
								398.555	
8:3730	2-1	.60	.68	310	73	73	68	7	276
								399.925	
8:403	3-5	.80	.90	314	73	73	68	11	271
								401.505	
8:4336	3-4	.82	1.00	314	71	73	68	12	267
								403.27	

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p. 2 of 3

$O_2 = 6.5\%$

FIELD TEST DATA FORM

Site: Granite Asphalt plant Date: 9/7/90 Test No. Chrom(2)

Nozzle I.D. E1 Diameter 0.233 Filter No. Chrom (2)

LEAK CHECKS: Pitot tubes -- Initial ____ Final ____

Sample train -- Initial ____ Final ____

TIME	PT #	ΔP	ΔH	T_S	T_i	T_{IN}	T_{OUT}	VAC	TEMP
39	3-3	.80	1.00	313	70	74	68	11	276
								405.185	
42	B-2	.85	.95	310	71	74	69	11	275
								406.435	
45	3-1	.75	.84	302	72	74	69	9	27
48								408.224	
54	4-5	1.0	1.10	310	72	75	69	12	276
								409.785	
51	4-4	1.0	1.10	309	74	75	69	11	276
								411.795	
54	4-3	1.1	1.20	309	70	75	69	12	274
								413.695	

TIME	PT #	ΔP	ΔH	T_S	T_i	T_{IN}	T_{OUT}	VAC	TEMP
57	4-2	1.1	1.20	309	70	76	70	12	274
00								415.445	
03	4-1	.95	1.05	304	71	76	70	11	273
06								417.195	
09	5-5	1.0	1.10	309	72	76	70	12	281
12								418.965	
69	5-4	1.10	1.20	311	71	76	71	12	278
5								420.815	
72	5-3	1.20	1.35	312	70	77	71	12	273
								422.765	
	5-2	1.20	1.35	311	69	77	71	12	286

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Pg 063

FIELD TEST DATA FORM

Site: Granite Asphalt Plant Date: 9/7/90 Test No. Chrom (2)

Nozzle I.D. E1 Diameter 0.233 Filter No. Chrom (2)

LEAK CHECKS: Pitot tubes -- Initial ____ Final ____

Sample train -- Initial ____ Final ____

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
9:21	5-1	1.10	1.20	308	70	77	72	11	282
								426.500	
9:24	6-5	.90	1.00	307	72	76	72	12	268
								428.245	
9:27	6-4	1.10	1.20	309	72	76	72	12	267
								430.075	
9:30	6-3	1.15	1.30	310	71	77	72	13	278
								431.945	
9:33	6-2	1.10	1.20	309	71	77	72	12	274
								433.125	
9:36	6-1	1.0	1.10	296	71	77	72	12	271
								435.690	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP

Analytical Data

METALS
EPA MULTIMETAL METHOD

CLIENT : C.V.S & Assoc.
PROJECT: Granite
SAMPLING DATE: 9/7/90
SAMPLE I.D.: Train 2

COMPOUND	D/L ppm	Filter + Rinse	µg	Impinger	µg	µg Total
Arsenic	0.1					
Beryllium	0.01					
Cadmium	0.02					
Chromium	0.006 0.02	0.07 * 50 * 2	7	0.0122 * 50 * 2	1.22	8.22
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	0.016 * 100 * 2	3.2	<0.005 * 100 * 2	1	4.2

Client: Shuling TSEC (90-08-054)

ANALYSIS: C.R. ~~by AA~~

METHOD: CAR 425

ELI NO.	SAMPLE ID.	LOCATION	UNITS: mg/Kg OR mg/L (ppm)
	FILTER-2		0.0700
	RINSE-2		0.0720
	IMPINGER-2		0.0122
	ROAGENT ③		104 %
	ROAGENT 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

Date : 10/11/90

CLIENT SHINNIG TREE (90-C9-050)

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	98%
REAGENT DUP SPIKE	0.060	122%
050-09A (425-C FILTER)	0.017	0.016 ppm
050-06A+09A (425-C RINSE)	0.003	0.001 ppm
050-10A (425-C/IMPINGER)	0.007	0.005 ppm

Benjamin V. Mendoza J.
ANALYST

9/25/90
DATE

F159

Calibration Data

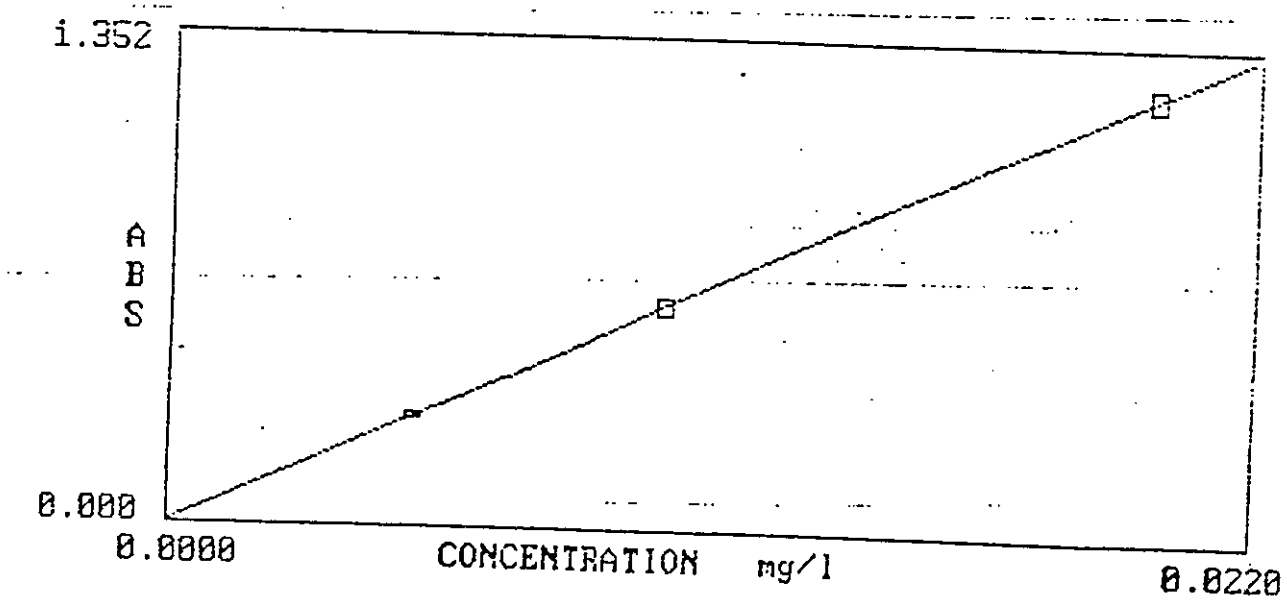
Varian SpectrAA 300/400 Zeeman Report

EUREKA LABORATORIES, INC.

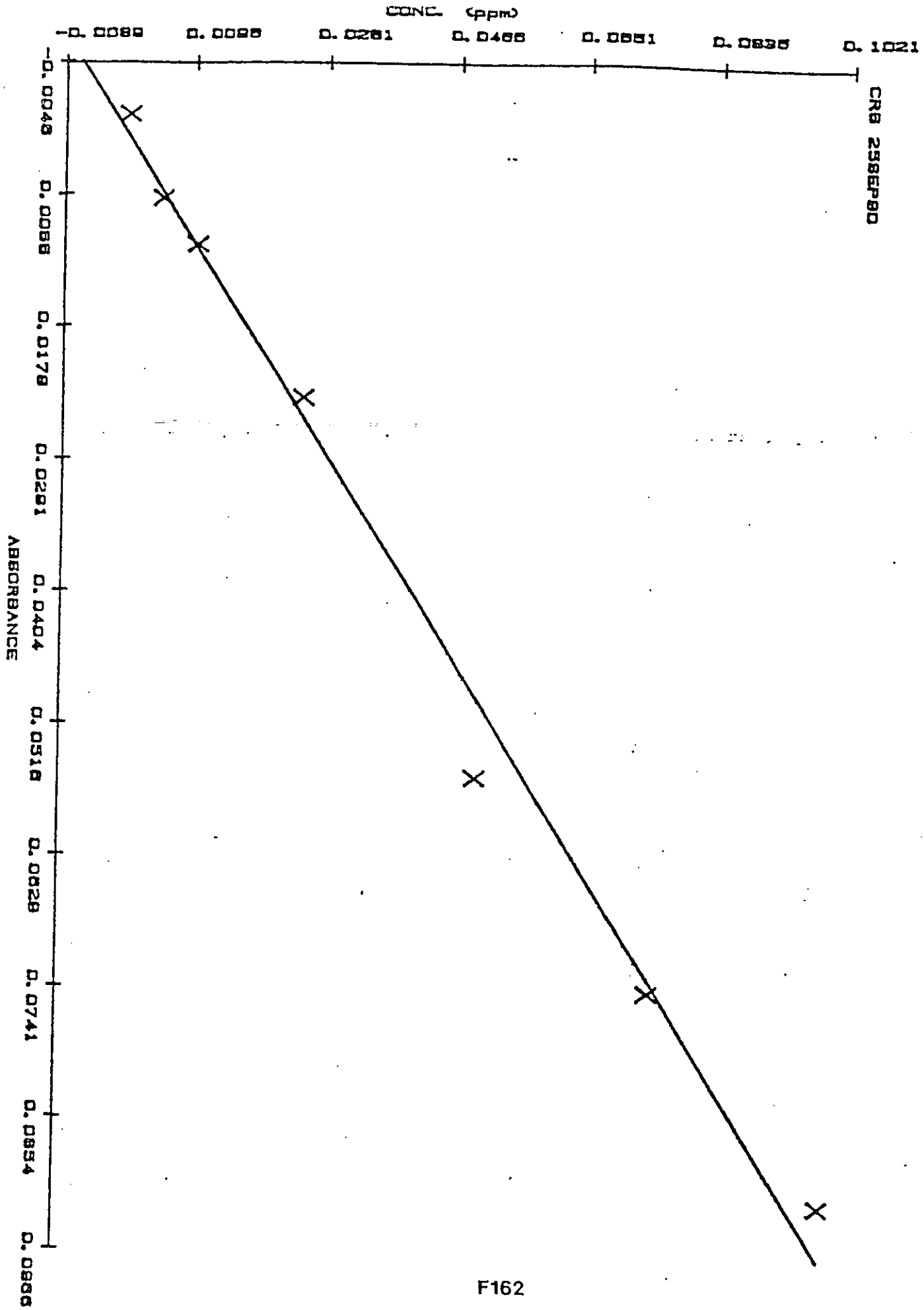
OPERATOR tamara jerome
DATE 10-08-90
BATCH CR

PROGRAM 9 Cr

SAMPLE	CONC mg/l	%RSD	MEAN ABS	READINGS	
BLANK	0.0000		0.028	0.031	0.024
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	2.484*	2.497*	2.431*
SAMPLE 4 Reag (SS)	OVER	1.9	2.630*	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	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)
-0.0080
0.0098
0.0261
0.0466
0.0651
0.0836
0.1021
-0.0048
0.0068
0.0179
0.0291
0.0404
0.0518
0.0628
0.0741
0.0854
0.0966
ABSORBANCE
CRS 2586P80

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APPENDIX E

Polycyclic Aromatic Hydrocarbons Data and Calculations

FIELD BLANK

Analytical Data

Granite Asphalt Plant Polycyclic Aromatic Hydrocarbons Field Blank

SUMMARY OF QUANTITATIVE ANALYSIS

Compound	Mass (ug)
Napthalene	< 1.5
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

UNIT: ug
MATRIX: Air

SAMPLE ID. TAL(Target Analyte)	M.BK	PAH 1	PAH 2	PAH 3	% Recovery R. Spk	% Recovery R. Spk Dup		PQL µg/cmit
Naphthalene	↑	1970	1890	1980	78	74		1.5 µg
Acenaphthylene		↑ ND	↑ ND	↑ ND	81	75		
Acenaphthene		↓	↓	↓	77	72		
Fluorene		16	17	18	75	70		
Phenanthrene	ND	25	29	32	78	74		
Anthracene		↑	↑ ND	↑ ND	80	74		
Fluoranthene			↓		80	76		
Pyrene			1.6		79	75		
Benz(a)anthracene			↑		74	72		
Chrysene		ND	ND		74	72		
Benzo(b)fluoranthene					74	66		
Benzo(k)fluoranthene					78	64		
Benzo(a)pyrene					84	78		
Benzo(ghi)perylene					94	86		
Dibenz(ah)anthracene					92	84		
Indeno(1,23-cd)pyrene	↓	↓	↓	↓	85	78		↓

SURROGATE/SPIKE RECOVERY

Benzo(a)anthracene-d_{12}	100	106	132	115	94	95		
Methyl-Naphthalene-d_{10}	–	12	42	41	–	–		

RUN #1

Polycylic Aromatic Hydrocarbons - September 10, 1990

Calculation Data

Granite Asphalt Plant PAHs 1

Sample I.D.: GRANITE 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)
1-5	1.40	1.30	260.00	50.00	67.00	68.00	10.00	269.00	81.5
1-4	0.95	0.86	284.00	57.00	68.00	68.00	10.00	263.00	68.3
1-3	0.82	0.78	281.00	58.00	70.00	68.00	9.00	256.00	63.3
1-2	0.90	0.83	290.00	58.00	71.00	68.00	9.00	291.00	66.7
1-1	0.62	0.58	297.00	59.00	73.00	68.00	8.00	290.00	55.6
2-5	0.75	0.68	306.00	60.00	72.00	69.00	9.00	274.00	61.5
2-4	0.90	0.83	313.00	60.00	74.00	69.00	10.00	263.00	67.7
2-3	0.90	0.83	313.00	60.00	74.00	69.00	10.00	260.00	67.7
2-2	0.70	0.65	313.00	61.00	75.00	70.00	9.00	259.00	59.7
2-1	0.60	0.55	301.00	61.00	76.00	70.00	8.00	257.00	54.9
3-5	0.90	0.83	304.00	61.00	76.00	70.00	10.00	256.00	67.3
3-4	1.00	0.92	302.00	61.00	76.00	71.00	10.00	256.00	70.9
3-3	1.00	0.92	305.00	62.00	78.00	71.00	10.00	257.00	71.0
3-2	0.86	0.80	307.00	62.00	78.00	72.00	10.00	258.00	66.0
3-1	0.75	0.70	280.00	63.00	78.00	72.00	10.00	259.00	60.5
4-5	1.10	1.00	315.00	64.00	78.00	72.00	10.00	258.00	75.0
4-4	0.95	0.86	320.00	63.00	78.00	73.00	10.00	256.00	69.9
4-3	1.20	1.10	314.00	62.00	80.00	74.00	10.00	256.00	78.3
4-2	0.90	0.62	316.00	62.00	80.00	74.00	10.00	258.00	67.9
4-1	0.75	0.50	283.00	63.00	81.00	74.00	8.00	260.00	60.6
5-5	1.10	0.70	312.00	63.00	82.00	75.00	10.00	258.00	74.8
5-4	1.30	0.85	310.00	63.00	82.00	75.00	11.00	262.00	81.2
5-3	1.30	0.80	310.00	63.00	82.00	76.00	11.00	261.00	81.2
5-2	1.30	0.80	311.00	64.00	83.00	77.00	11.00	263.00	81.3
5-1	1.20	0.80	307.00	64.00	84.00	77.00	11.00	263.00	77.9
6-5	0.90	0.60	311.00	67.00	83.00	78.00	9.00	263.00	67.6
6-4	0.94	0.63	311.00	67.00	84.00	78.00	9.00	262.00	69.1
6-3	1.10	0.74	309.00	66.00	85.00	79.00	10.00	264.00	74.7
6-2	1.20	0.80	303.00	66.00	85.00	79.00	10.00	263.00	77.7
6-1	0.90	0.60	300.00	67.00	84.00	79.00	9.00	262.00	67.2
AVG	0.97	0.78	303	62	78	73	9.7	263	69.6

Granite Asphalt Plant PAHs 1

NOMENCLATURE

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

Delta H = Pressure differenti0al across orifice meter (in. H2O)

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condenser (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	448 ml	100 ml	348 ml
2	382 ml	100 ml	282 ml
3	0 ml	0 ml	0 ml
4	211 gram	200 gram	11 gram
	TOTAL CONDENSED MOISTURE		641 ml

STACK GAS MOLECULAR WEIGHT

PERCENT CARBON DIOXIDE	=	9.00
PERCENT OXYGEN	=	8.00
PERCENT CARBON MONOXIDE	=	0.00
PERCENT NITROGEN & INERTS	=	83.00

COMPONENT	VOLUME%	*	MOISTURE CORR	*	MOLWT	=	MASS FRACTIO
WATER	33.12		1.00		18.00		5.96
CARBON DIOXIDE	9.00		0.67		44.00		2.65
OXYGEN	8.00		0.67		32.00		1.71
CARBON MONOXIDE	0.00		0.67		28.00		0.00
NITROGEN & INERTS	83.00		0.67		28.00		15.54
			AVERAGE MOLECULAR WEIGHT			=	25.87

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	511.214 CFT
Dry gas meter, final reading	=	570.835 CFT
Dry gas meter calibration factor	=	1.000
Meter volume uncorrected for Temp & Press	=	59.621 CFT
Barometric pressure at site	=	30.32 in Hg
Meter pressure (barometer + average delta H)	=	31.03 in Hg
Average meter temperature during test	=	75.3 DEG F
Dry sample volume at standard conditions	=	60.069 CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	302.9 DEG F
Volume of condensed water	=	641 ml
Percent moisture of stack gas	=	33.12 %
Pitot tube correction factor	=	0.85
Stack gas molecular weight	=	25.80
Stack gas velocity at stack conditions	=	69.57 FT/SEC
Duration of sampling	=	120 Minute
Nozzle diameter	=	0.206 in
Percent isokinetic variation	=	109.6 %
Area of stack	=	13.87 SQ FEET
Stack flow rate, standard conditions	=	27375 DSCFM

SECTION IV SUMMARY OF QUANTITATIVE ANALYSIS AND EMISSION RATE OF PAHS

Compound		Mass (ug)		Emission rate (10-3 lb/hr)
Naphthalene		1970.00		118.49
Acenaphthylene	<	1.50	<	0.09
Acenaphthene	<	1.50	<	0.09
Fluorene		16.00		0.96
Phenanthrene		25.00		1.50
Anthracene	<	1.50	<	0.09
Fluoranthene	<	1.50	<	0.09
Pyrene	<	1.50	<	0.09
Benzo(a)anthracene	<	1.50	<	0.09
Chrysene	<	1.50	<	0.09
Benzo(b)fluoranthene	<	1.50	<	0.09
Benzo(k)fluoranthene	<	1.50	<	0.09
Benzo(a)pyrene	<	1.50	<	0.09
Benzo(g,h,i)perylene	<	1.50	<	0.09
Dibenzo(a,h)anthracene	<	1.50	<	0.09
Indeno(1,2,3-cd)pyrene	<	1.50	<	0.09

Field Data

ΔH .92
ΔP 1.0

EUREKA LABORATORIES, INC.

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Pbar = 30.32 in

Solids gel = 160.9 − 150 = 10.9 g

Impinger 1 = 468 ml

Impinger 2 = 282 ml

FIELD TEST DATA FORM

Site: Granite Asphalt plant Date: 9/10/90 Test No. PAHs(1)

Nozzle I.D. EGL 1 Diameter 0.206 Filter No. PAHs(1)

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

Start 511.214 Sample train -- Initial Y Final Y

<0.005 CF at 10 in Hg for 1 min <0.005 CF at 10 in Hg for 1 min

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
1450	1-5	1.40	1.30	260	50	67	68	10	269
								513.715	
1548	1-4	0.95	0.86	284	57	68	68	10	263
								515.825	
1658	1-3	.82	.78	281	58	70	68	9	256
								517.815	
1802	1-2	.90	.83	290	58	71	68	9	294
								519.845	
1906	1-1	.62	.58	297	59	73	68	8	290
								521.600	
2011	2-5	.75	.68	306	60	72	69	9	274
								523.455	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
1528	2-4	.90	.83	313	60	74	69	10	263
								525.465	
1932	2-3	.90	.83	313	60	74	69	10	260
								527.485	
2336	2-2	.70	.65	313	61	75	70	9	259
								529.325	
740	2-1	.60	.55	301	61	76	70	8	257
								531.025	
1144	3-5	.90	.83	304	61	76	70	10	256
								533.085	
1548	3-4	1.0	.92	302	61	76	71	10	256

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EUREKA LABORATORIES, INC.

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FIELD TEST DATA FORM

Site: Granite Asphalt plant Date: 9/10/90 Test No. PAHs (4)

Nozzle I.D. EGL 1 Diameter 0.206 Filter No. PAH

LEAK CHECKS: Pitot tubes -- Initial ____ Final ____

Sample train -- Initial ____ Final ____

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
8:39 52	3+3	1.10	1.92	305	62	78	71	10	257
								543.385	
8:43 56	3+2	.86	.80	307	62	78	72	10	258
								539.415	
8:47 60	3-1	.75	.70	280	63	78	72	10	259
								541.332	
8:53 64	4+5	1.10	1.10	315	64	78	72	10	258
								543.595	
8:57 68	4+4	.95	.86	320	63	78	73	10	256
								545.715	
9:01 72	4-3	1.20	1.10	314	62	80	74	10	256
								548.005	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
9:05 76	4+2	.90	.62	316	62	80	74	10	258
								549.445	
9:09 80	4+1	.75	.50	283	63	81	74	8	260
								551.648	
9:13 84	5-5	1.10	.70	312	63	82	75	10	258
								553.495	
9:17 88	5-4	1.30	.85	310	63	82	75	11	262
								555.561	
9:21 92	5+3	1.30	.80	310	63	82	76	11	261
								557.545	
9:25 96	5+2	1.30	.80	311	64	83	77	11	263

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FIELD TEST DATA FORM

Site: Granite Asphalt plant Date: 9/10/90 Test No. PAHs (1)

Nozzle I.D. EGL 1 Diameter 0.206 Filter No. PAHs (1)

LEAK CHECKS: Pitot tubes -- Initial _____ Final _____

Sample train -- Initial _____ Final _____

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
29 100	5-1	1.20	.80	307	64	84	77	11	263
35 104								561.623	
	6-5	.90	.60	311	67	83	78	9	263
								563.345	
39 108	6-4	.94	.63	311	67	84	78	9	26-
								565.115	
43 112	6-3	1.10	.74	309	66	85	79	10	264
47 116								567.045	
	6-2	1.20	.80	303	66	85	79	10	262
								569.055	
51 120	6-1	.90	.60	300	67	84	79	9	262
								570.835	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP

Analytical Data

ARB METHOD 429 POLYCYLIC AROMATIC HYDROCARBONS

UNIT: ug

MATRIX: Air

SAMPLE ID. TAL(Target Analyte)	M.BK	PAH 1	PAH 2	PAH 3	% Recovery R. Spk	% Recovery R. Spk Dup		PQL µg/Emit
Naphthalene	↑	1970	1890	1980	78	74		1.5 µg
Acenaphthylene		↑ ND	↑ ND	↑ ND	81	75		
Acenaphthene		↓	↓	↓	77	72		
Fluorene		16	17	18	75	70		
Phenanthrene	ND	25	29	32	78	74		
Anthracene		↑	↑ ND	↑ ND	80	74		
Fluoranthene			↓		80	76		
Pyrene			1.6		79	75		
Benz(a)anthracene			↑		74	72		
Chrysene		ND	ND		74	72		
Benzo(b)fluoranthene					74	66		
Benzo(k)fluoranthene					78	64		
Benzo(a)pyrene					84	78		
Benzo(ghi)perylene					94	86		
Dibenz(ah)anthracene					92	84		
Indeno(1,23-cd)pyrene	↓	↓	↓	↓	85	78		↓

SURROGATE/SPIKE REVOVERY

Benzo(a)anthracene-d_{12}	100	106	132	115	94	95		
Methyl-Naphthalene-d_{10}	–	12	42	41	–	–		

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
Naphthalene-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
Acenaphthene-d10	-	-	-	-	-	-	-	-	-	-
Acenaphthylene	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
Fluorene	1.07961	1.04781	.99382	.91966	.89291	.83578	.99184	1.197	.96592	9.014
Phenanthrene-d10	-	-	-	-	-	-	-	-	-	-
Phenanthrene	1.50299	1.46274	1.37641	1.22249	1.19852	1.08949	1.23980	1.343	1.29892	11.666
Anthracene	1.52986	1.47263	1.37199	1.24535	1.24035	1.09023	1.21345	1.350	1.30912	11.886
Fluoranthene	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
Benzo(a)anthracene	1.67047	1.60835	1.52736	1.45235	1.43517	1.28879	1.49337	1.753	1.49655	8.301
Chrysene-d12	-	-	-	-	-	-	-	-	-	-
Chrysene	1.63916	1.57476	1.49822	1.46292	1.42096	1.29505	1.49337	1.760	1.48349	7.421
Benzo(b)fluoranthene	1.75036	1.70565	1.67854	1.79378	1.78517	1.55818	2.14204	1.993	1.77339	10.215
Benzo(k)fluoranthene	1.76417	1.72580	1.59199	1.67018	1.57093	1.49952	1.98083	2.002	1.68620	9.431
Benzo(e)pyrene	1.61997	1.68703	1.59130	1.73887	1.62249	1.56872	1.98786	2.086	1.68803	8.551
Indeno(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
Dibenz(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)

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

$\overline{RF}$ - Average Response Factor

%RSD - Percent Relative Standard Deviation

Calibration Check Report

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

Check Standard Data File: >B8482
Injection Time: 900920 19:35

Compound	$\overline{RF}$	RF	%Diff	Calib Meth
Naphthalene-d8	-	-	-	Average
Naphthalene	1.13751	1.34167	17.95	Average
2-Methylnaphthalene-d10	.70079	-	-	Average
Acenaphthene-d10	-	-	-	Average
Acenaphthylene	1.24466	1.27865	2.73	Average
Acenaphthene	.81272	.78450	3.47	Average
Fluorene	.96592	.94333	2.34	Average
Phenanthrene-d10	-	-	-	Average
Phenanthrene	1.29892	1.28165	1.33	Average
Anthracene	1.30912	1.32903	1.52	Average
Fluoranthene	1.48099	1.48516	.28	Average
Pyrene	1.50968	1.48257	1.80	Average
Benzo(a)anthracene-d12	1.08068	-	-	Average
Benzo(a)anthracene	1.49655	1.37489	8.13	Average
Chrysene-d12	-	-	-	Average
Chrysene	1.48349	1.37489	7.32	Average
Benzo(b)fluoranthene	1.77339	1.55411	12.37	Average
Benzo(k)fluoranthene	1.68620	1.49133	11.56	Average
Benzo(a)pyrene	1.68803	1.37281	18.67	Average
Indeno(1,2,3-cd)pyrene	1.57733	1.53591	2.63	Average
Dibenz(a,h)anthracene	1.46357	1.33124	9.04	Average
Benzo(g,h,i)perylene	1.48681	1.38687	6.72	Average

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

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

%Diff - % Difference from original average or curve

F181

E-19

RUN #2

Polycyclic Aromatic Hydrocarbons - September 10, 1990

Calculation Data

Sample I.D.: GRANITE ASPHALT 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)
1-5	0.90	0.64	317.00	76.00	86.00	84.00	4.00	238.00	69.1
1-4	1.20	0.84	316.00	71.00	87.00	84.00	6.00	248.00	79.8
1-3	1.10	0.78	318.00	68.00	89.00	85.00	6.00	255.00	76.5
1-2	0.85	0.60	315.00	71.00	91.00	86.00	5.00	265.00	67.1
1-1	0.68	0.48	313.00	73.00	93.00	86.00	5.00	274.00	59.9
2-5	0.75	0.53	316.00	76.00	94.00	87.00	5.00	278.00	63.1
2-4	1.00	0.70	303.00	74.00	94.00	88.00	6.00	266.00	72.2
2-3	0.96	0.68	301.00	74.00	95.00	88.00	6.00	265.00	70.7
2-2	0.74	0.52	312.00	75.00	95.00	88.00	6.00	265.00	62.5
2-1	0.78	0.55	310.00	77.00	97.00	89.00	5.00	264.00	64.1
3-5	0.90	0.63	312.00	80.00	96.00	90.00	5.00	262.00	68.9
3-4	1.00	0.70	310.00	75.00	96.00	89.00	6.00	262.00	72.5
3-3	1.00	0.70	312.00	77.00	95.00	90.00	6.00	265.00	72.6
3-2	0.90	0.64	309.00	77.00	96.00	90.00	6.00	265.00	68.8
3-1	0.71	0.51	297.00	78.00	96.00	90.00	5.00	266.00	60.6
4-5	1.00	0.70	298.00	83.00	95.00	91.00	6.00	268.00	72.0
4-4	1.20	0.83	310.00	63.00	96.00	91.00	6.00	267.00	79.5
4-3	1.15	0.80	314.00	62.00	96.00	91.00	7.00	269.00	78.0
4-2	1.10	0.76	307.00	62.00	97.00	91.00	7.00	269.00	75.9
4-1	0.95	0.65	307.00	63.00	97.00	92.00	6.00	269.00	70.6
5-5	1.10	0.78	317.00	63.00	97.00	92.00	7.00	271.00	76.4
5-4	1.25	0.86	313.00	63.00	98.00	92.00	7.00	272.00	81.3
5-3	1.25	0.86	315.00	65.00	99.00	93.00	7.00	273.00	81.4
5-2	1.25	0.86	318.00	66.00	101.00	93.00	7.00	276.00	81.5
5-1	1.15	0.80	320.00	67.00	103.00	94.00	7.00	276.00	78.3
6-5	0.95	0.65	320.00	66.00	102.00	95.00	6.00	287.00	71.2
6-4	1.10	0.76	314.00	67.00	103.00	95.00	7.00	285.00	76.3
6-3	1.25	0.83	315.00	68.00	104.00	96.00	8.00	286.00	81.4
6-2	1.20	0.83	297.00	67.00	104.00	96.00	8.00	275.00	78.8
6-1	1.00	0.70	305.00	70.00	105.00	96.00	7.00	281.00	72.3
AVG	1.01	0.71	311	71	97	90	6.2	269	72.8

Granite Asphalt Plant CARB 429 PAHs 2

NOMENCLATURE

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

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

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condenser (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	452 ml	100 ml	352 ml
2	498 ml	100 ml	398 ml
3	0 ml	0 ml	0 ml
4	215 gram	200 gram	15 gram
	TOTAL CONDENSED MOISTURE		765 ml

STACK GAS MOLECULAR WEIGHT

PERCENT CARBON DIOXIDE	=	9.00
PERCENT OXYGEN	=	8.00
PERCENT CARBON MONOXIDE	=	0.00
PERCENT NITROGEN & INERTS	=	83.00

COMPONENT	VOLUME%	* MOISTURE CORR	* MOLWT	= MASS FRAC
WATER	39.13	1.00	18.00	7.04
CARBON DIOXIDE	9.00	0.61	44.00	2.41
OXYGEN	8.00	0.61	32.00	1.56
CARBON MONOXIDE	0.00	0.61	28.00	0.00
NITROGEN & INERTS	83.00	0.61	28.00	14.15
		AVERAGE MOLECULAR WEIGHT	=	25.16

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	571.565 CFT
Dry gas meter, final reading	=	628.718 CFT
Dry gas meter calibration factor	=	1.000
Meter volume uncorrected for Temp & Press	=	57.153 CFT
Barometric pressure at site	=	30.32 in Hg
Meter pressure (barometer + average delta H)	=	30.77 in Hg
Average meter temperature during test	=	93.5 DEG F
Dry sample volume at standard conditions	=	55.228 CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	311.0 DEG F
Volume of condensed water	=	765 ml
Percent moisture of stack gas	=	39.13 %
Pitot tube correction factor	=	0.85
Stack gas molecular weight	=	25.10
Stack gas velocity at stack conditions	=	72.77 FT/SEC
Duration of sampling	=	120 Minute
Nozzle diameter	=	0.206 in
Percent isokinetic variation	=	107.8 %
Area of stack	=	13.87 SQ FEET
Stack flow rate, standard conditions	=	25573 DSCFM

SECTION IV SUMMARY OF QUANTITATIVE ANALYSIS
AND EMISSION RATE OF PAHS

Compound		Mass (ug)		Emission rate (10-3 lb/hr)
Naphthalene		1890.00		115.50
Acenaphthylene	<	1.50	<	0.09
Acenaphthene	<	1.50	<	0.09
Fluorene		17.00		1.04
Phenanthrene		29.00		1.77
Anthracene	<	1.50	<	0.09
Fluoranthene	<	1.50	<	0.09
Pyrene		1.60		0.10
Benzo(a)anthracene	<	1.50	<	0.09
Chrysene	<	1.50	<	0.09
Benzo(b)fluoranthene	<	1.50	<	0.09
Benzo(k)fluoranthene	<	1.50	<	0.09
Benzo(a)pyrene	<	1.50	<	0.09
Benzo(g,h,i)perylene	<	1.50	<	0.09
Dibenzo(a,h)anthracene	<	1.50	<	0.09
Indeno(1,2,3-cd)pyrene	<	1.50	<	0.09

Field Data

EUREKA LABORATORIES, INC.

Corporate Office:
6790 FLORIN PERKINS ROAD
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Branch Office
12121 NORTHUP WAY, SUITE 212
BELLEVUE, WA 98005
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Air Pollution
Chemical Analysis
Research & Testing
Environmental Studies
Robotics
Toxicology

7.1 863 OP 1

Pbar = 30.32

FIELD TEST DATA FORM

Site: Granite Asphalt Plant Date: 9/10/90 Test No. PAHS 2

Nozzle I.D. EGL 1 Diameter .206 Filter No. PAHS 2

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

Sample train -- Initial Y Final Y

<0.005 CF at 10 in Hg for 1 min <0.005 CF at 10 in Hg for 1 min

TIME	PT #	ΔP	ΔH	Ts	Ti	Tin	Tout	VAC	TEMP
0:40 4	1-5	.90	.64	317	76	86	84	4	238
								572.185	
0:44 8	1-4	1.20	.84	316	71	87	84	6	248
								574.835	
0:48 12	1-3	1.10	.78	318	68	89	85	6	255
								576.875	
0:52 16	1-2	.85	.60	315	71	91	86	5	265
								578.645	
0:56 20	1-1	.68	.48	313	73	93	86	5	274
								580.289	
1:00 24	2-5	.75	.53	316	76	94	87	5	278
off								581.915	

TIME	PT #	ΔP	ΔH	Ts	Ti	Tin	Tout	VAC	TEMP
1:04 28	2-4	1.00	0.70	303	74	94	88	6	266
								583.855	
1:08 32	2-3	.96	.68	301	74	95	88	6	265
								585.750	
1:12 36	2-2	.74	.52	312	75	95	88	5	264
								587.425	
1:16 40	2-1	.78	.55	310	77	97	89	5	264
								589.122	
1:20 44	3-5	.90	.63	312	80	96	90	5	264
								590.915	
1:24 48	3-4	1.00	0.70	310	75	96	89	6	262

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Air Pollution
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P = 063

FIELD TEST DATA FORM

Site: Granite Asphalt plant Date: 9/10/90 Test No. PAHS 2

Nozzle I.D. EGL 1 Diameter 0.206 Filter No. PAHS 2

LEAK CHECKS: Pitot tubes -- Initial _____ Final _____

Sample train -- Initial _____ Final _____

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
3252	3-3	1.00	.070	312	77	95	90	6	265
3656								594.725	
	3-2	.90	.64	309	77	96	90	6	265
4060								596.625	
	3-1	.75	.51	297	78	96	90	6	261
4460								598.278	
	4-5	1.00	.70	298	83	95	91	6	268
4858								600.925	
	4-4	1.20	.83	310	60	96	91	6	267
5272								602.255	
	4-3	1.15	.80	313	63	96	91	7	269
								604.325	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
5676	4-2	1.10	.76	307	62	97	91	7	269
6080								606.330	
	4+1	.95	.65	307	63	97	92	6	269
6484								608.210	
	5-5	1.10	.78	317	63	97	92	7	271
6888								610.255	
	5-4	1.25	.86	313	68	98	92	7	272
7292								612.395	
	5-3	1.25	.86	315	65	99	93	7	273
7696								614.520	
	5-2	1.25	.86	318	E-68	101	93	7	276
								616.670	

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FIELD TEST DATA FORM

Site: Granite Asphalt plant Date: 9/10/90 Test No. PAHS 2

Nozzle I.D. EGL 1 Diameter 0.206 Filter No. PAHS 2

LEAK CHECKS: Pitot tubes -- Initial ____ Final ____

Sample train -- Initial ____ Final ____

TIME	PT #	ΔP	ΔH	T_s	T_i	T_{IN}	T_{OUT}	VAC	TEMP
1:23 100	5-1	1.15	.80	320	67	103	94	7	276
								618.719	
1:28 104	6-5	.95	.65	320	66	102	95	6	287
								620.575	
1:32 108	6-4	1.10	.76	314	67	103	95	7	285
								622.575	
1:36 112	6-3	1.25	.83	315	68	104	96	8	286
								624.645	
1:40 116	6-2	1.20	.83	297	67	104	96	8	275
								626815	
1:44 120	6-1	1.00	0.70	305	70	105	96	7	281
								628.718	
END 12:48									

TIME	PT #	ΔP	ΔH	T_s	T_i	T_{IN}	T_{OUT}	VAC	TEMP

Analytical Data

ARB METHOD 429 POLYCYLIC AROMATIC HYDROCARBONS

UNIT: ug

MATRIX: AIR

SAMPLE ID. TAL(Target Analyte)	M.BK	PAH 1	PAH 2	PAH 3	% Recovery R. spk	% Recovery R. spk Dup		PQL µg/sample
Naphthalene	↑	1970	1890	1980	78	74		1.5 µg
Acenaphthylene		↑ ND	↑ ND	↑ ND	81	75		
Acenaphthene		↓	↓	↓	77	72		
Fluorene		16	17	18	75	70		
Phenanthrene	ND	25	29	32	78	74		
Anthracene		↑	↑ ND	↑ ND	80	74		
Fluoranthene			↓		80	76		
Pyrene			1.6		79	75		
Benz(a)anthracene			↑		74	72		
Chrysene		ND	ND		74	72		
Benzo(b)fluoranthene					74	66		
Benzo(k)fluoranthene					78	64		
Benzo(a)pyrene					84	78		
Benzo(ghi)peryiene					94	86		
Dibenz(ah)anthracene					92	84		
Indeno(1,23-cd)pyrene	↓	↓	↓	↓	85	78		↓

SURROGATE/SPIKE REVOVERY

Benzo(a)anthracene-d_{12}	100	106	132	115	94	95		
Methyl-Naphthalene-d_{10}	–	12	42	41	–	–		

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
Naphthalene-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
Acenaphthene-d10	-	-	-	-	-	-	-	-	-	-
Acenaphthylene	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
Fluorene	1.07961	1.04781	.99382	.91966	.89291	.83578	.99184	1.197	.96592	9.014
Phenanthrene-d10	-	-	-	-	-	-	-	-	-	-
Phenanthrene	1.50299	1.46274	1.37641	1.22249	1.19852	1.08949	1.23980	1.343	1.29892	11.666
Anthracene	1.52986	1.47263	1.37199	1.24535	1.24035	1.09023	1.21345	1.350	1.30912	11.886
Fluoranthene	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
Benzo(a)anthracene	1.67047	1.60835	1.52736	1.45235	1.43517	1.28879	1.49337	1.753	1.49655	8.301
Chrysene-d12	-	-	-	-	-	-	-	-	-	-
Chrysene	1.63916	1.57476	1.49822	1.46292	1.42096	1.29505	1.49337	1.760	1.48349	7.421
Benzo(b)fluoranthene	1.75036	1.70565	1.67854	1.79378	1.78517	1.55818	2.14204	1.993	1.77339	10.215
Benzo(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
Indeno(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
Dibenz(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

$\overline{RF}$ - Response Factor (Subscript is amount in ug/ml)

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

$\overline{RF}$ - Average Response Factor

%RSD - Percent Relative Standard Deviation

Calibration Check Report

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

Check Standard Data File: >BB482
Injection Time: 900920 19:35

Compound	$\overline{RF}$	RF	%Diff	Calib Meth
Naphthalene-d8	-	-	-	Average
Naphthalene	1.13751	1.34167	17.95	Average
2-Methylnaphthalene-d10	.70079	-	-	Average
Acenaphthene-d10	-	-	-	Average
Acenaphthylene	1.24466	1.27865	2.73	Average
Acenaphthene	.81272	.78450	3.47	Average
Fluorene	.96592	.94333	2.34	Average
Phenanthrene-d10	-	-	-	Average
Phenanthrene	1.29892	1.28165	1.33	Average
Anthracene	1.30912	1.32903	1.52	Average
Fluoranthene	1.48099	1.48516	.28	Average
Pyrene	1.50968	1.48257	1.80	Average
Benzo(a)anthracene-d12	1.08068	-	-	Average
Benzo(a)anthracene	1.49655	1.37489	8.13	Average
Chrysene-d12	-	-	-	Average
Chrysene	1.48349	1.37489	7.32	Average
Benzo(b)fluoranthene	1.77339	1.55411	12.37	Average
Benzo(k)fluoranthene	1.68620	1.49133	11.56	Average
Benzo(a)pyrene	1.68803	1.37281	18.67	Average
Indeno(1,2,3-cd)pyrene	1.57733	1.53591	2.63	Average
Dibenz(a,h)anthracene	1.46357	1.33124	9.04	Average
Benzo(g,h,i)perylene	1.48681	1.38687	6.72	Average

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

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

%Diff - % Difference from original average or curve

RUN #3

Polycyclic Aromatic Hydrocarbons - September 10, 1990

Calculation Data

Granite Asphalt Plant CARB 429 PAHs 3

Sample I.D.:GRANITE ASPHALT 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)
1-5	0.58	0.40	310.00	75.00	98.00	99.00	3.00	220.00	55.0
1-4	0.66	0.48	311.00	66.00	98.00	97.00	10.00	250.00	58.7
1-3	0.66	0.48	314.00	68.00	98.00	97.00	10.00	251.00	58.8
1-2	0.62	0.45	313.00	69.00	98.00	96.00	10.00	261.00	56.9
1-1	0.55	0.38	310.00	65.00	98.00	96.00	10.00	275.00	53.5
2-5	0.66	0.48	322.00	68.00	99.00	97.00	10.00	281.00	59.1
2-4	0.85	0.59	322.00	70.00	100.00	97.00	5.00	277.00	67.0
2-3	0.85	0.59	318.00	71.00	102.00	97.00	4.00	275.00	66.9
2-2	0.65	0.45	306.00	73.00	103.00	97.00	4.00	268.00	58.0
2-1	0.60	0.42	304.00	75.00	102.00	97.00	4.00	265.00	55.7
3-5	0.80	0.55	315.00	63.00	101.00	97.00	4.00	266.00	64.7
3-4	0.90	0.62	312.00	67.00	102.00	97.00	4.00	262.00	68.5
3-3	0.95	0.66	315.00	66.00	103.00	97.00	5.00	263.00	70.6
3-2	0.80	0.55	316.00	67.00	102.00	98.00	4.00	265.00	64.8
3-1	0.75	0.52	309.00	68.00	103.00	98.00	4.00	270.00	62.4
4-5	1.00	0.69	319.00	70.00	103.00	98.00	5.00	269.00	72.6
4-4	1.00	0.69	317.00	68.00	103.00	98.00	5.00	273.00	72.5
4-3	1.10	0.76	315.00	70.00	104.00	98.00	5.00	275.00	75.9
4-2	1.10	0.76	312.00	71.00	104.00	98.00	5.00	277.00	75.8
'4-1	0.95	0.66	305.00	73.00	103.00	98.00	5.00	274.00	70.1
'5-5	1.00	0.69	306.00	74.00	103.00	99.00	5.00	271.00	72.0
5-4	1.20	0.83	309.00	71.00	104.00	99.00	5.00	281.00	79.0
5-3	1.20	0.83	316.00	70.00	106.00	100.00	5.00	282.00	79.3
5-2	1.20	0.83	319.00	69.00	106.00	100.00	5.00	283.00	79.5
5-1	0.95	0.65	312.00	68.00	106.00	100.00	5.00	282.00	70.4
6-5	0.65	0.45	312.00	72.00	105.00	100.00	4.00	282.00	58.2
6-4	1.10	0.76	310.00	72.00	105.00	100.00	5.00	282.00	75.7
6-3	1.10	0.76	314.00	71.00	105.00	100.00	5.00	282.00	75.9
6-2	1.10	0.76	313.00	71.00	105.00	100.00	5.00	279.00	75.8
6-1	1.05	0.73	309.00	72.00	105.00	100.00	5.00	278.00	73.9
AVG	0.89	0.62	313	70	102	98	5.5	271	67.6

NOMENCLATURE

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

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

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condenser (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	434 ml	100 ml	334 ml
2	400 ml	100 ml	300 ml
3	0 ml	0 ml	0 ml
4	212 gram	200 gram	12 gram
	TOTAL CONDENSED MOISTURE		646 ml

STACK GAS MOLECULAR WEIGHT

PERCENT CARBON DIOXIDE	=	9.00
PERCENT OXYGEN	=	8.00
PERCENT CARBON MONOXIDE	=	0.00
PERCENT NITROGEN & INERTS	=	83.00

COMPONENT	VOLUME%	• MOISTURE CORR	* MOLWT	= MASS FRACTIO
WATER	36.43	1.00	18.00	6.56
CARBON DIOXIDE	9.00	0.64	44.00	2.52
OXYGEN	8.00	0.64	32.00	1.63
CARBON MONOXIDE	0.00	0.64	28.00	0.00
NITROGEN & INERTS	83.00	0.64	28.00	14.77
		AVERAGE MOLECULAR WEIGHT =		25.48

F200

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	628.942 CFT
Dry gas meter, final reading	=	683.820 CFT
Dry gas meter calibration factor	=	1.000
Meter volume uncorrected for Temp & Press	=	54.878 CFT
Barometric pressure at site	=	30.32 in Hg
Meter pressure (barometer + average delta H)	=	30.72 in Hg
Average meter temperature during test	=	100.3 DEG F
Dry sample volume at standard conditions	=	52.300 CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	312.8 DEG F
Volume of condensed water	=	646 ml
Percent moisture of stack gas	=	36.43 %
Pitot tube correction factor	=	0.85
Stack gas molecular weight	=	25.41
Stack gas velocity at stack conditions	=	67.57 FT/SEC
Duration of sampling	=	120 Minute
Nozzle diameter	=	0.206 in
Percent isokinetic variation	=	105.7 %
Area of stack	=	13.87 SQ FEET
Stack flow rate, standard conditions	=	24698 DSCFM

SECTION IV SUMMARY OF QUANTITATIVE ANALYSIS AND EMISSION RATE OF PAHS

Compound		Mass (ug)		Emission rate (10-3 lb/hr)
Naphthalene		1980.00		123.40
Acenaphthylene	<	1.50	<	0.09
Acenaphthene	<	1.50	<	0.09
Fluorene		18.00		1.12
Phenanthrene		32.00		1.99
Anthracene	<	1.50	<	0.09
Fluoranthene	<	1.50	<	0.09
Pyrene	<	1.50	<	0.09
Benzo(a)anthracene	<	1.50	<	0.09
Chrysene	<	1.50	<	0.09
Benzo(b)fluoranthene	<	1.50	<	0.09
Benzo(k)fluoranthene	<	1.50	<	0.09
Benzo(a)pyrene	<	1.50	<	0.09
Benzo(g,h,i)perylene	<	1.50	<	0.09
Dibenzo(a,h)anthracene	<	1.50	<	0.09
Indeno(1,2,3-cd)pyrene	<	1.50	<	0.09

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

Pbar = 30.2

silica gel | 162.4 − 150 = 12.4g
Impiger 1 | 250 + 154 = 234 ml
Impiger 2 | 300 ml
Total | 754 ml

FIELD TEST DATA FORM

Site: Granite Asphalt Plant Date: 9/10/90 Test No. PAHS 3

Nozzle I.D. EGL 1 Diameter .206 Filter No. PAHS 3

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

Start at 628.942

Sample train -- Initial Y Final Y

ok <0.005 CF at 10 in Hg for 1 min ok <0.005 CF at 10 in Hg

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
:20 4	1-5	.58	.40	310	75	98	99	3	220
								630.525	
:24 3	1-4	.66	.48	311	66	98	97	10	250
								632.145	
:28 12	1-3	.66	.48	314	68	98	97	10	25,
								633.760	
:32 16	1-2	.62	.415	313	69	98	96	10	261
								635.335	
:36 20	1-1	.55	.38	310	65	98	96	10	275
								636.800	
4:24	2-5	.66	.48	322	68	99	97	10	28[illegible]
								638.475	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
5:28	2-4	.85	.59	322	70	100	97	5	277
								640.295	
1932	2-3	.85	.59	318	71	102	97	4	275
								642.055	
3:36	2-2	.65	.45	306	73	103	97	4	268
								643.645	
5:40	2-1	.60	.415	304	75	102	97	4	265
								645.172	
01 44	3-5	.80	.55	315	63	101	97	4	266
								646.915	
5:48	3-4	.90	.62	312	67	102	97	4	270

E-42
F204

EUREKA LABORATORIES, INC.

Corporate Office:
6790 FLORIN PERKINS ROAD
SACRAMENTO, CA 95828
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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
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FIELD TEST DATA FORM

Site: Granite Asphalt plant Date: 9/10/90 Test No. DAHS 3

Nozzle I.D. EGL 1 Diameter .206 Filter No. DAHS 3

LEAK CHECKS: Pitot tubes -- Initial _____ Final _____

Sample train -- Initial _____ Final _____

TIME	PT #	ΔP	ΔH	T_S	T_i	T_{IN}	T_{OUT}	VAC	TEMP
0952	3-3	.95	.66	315	66	103	97	5	263
								650.615	
1354	3-2	.80	.55	316	67	102	98	4	265
								652.385	
1740	3-1	.75	.52	309	68	103	98	4	270
								654.076	
2164	4-5	1.00	.69	319	70	103	98	5	269
								655.985	
2665	4-4	1.00	.69	317	68	103	98	5	273
								657.945	
3072	4-3	1.10	.76	315	70	104	98	5	275
								659.970	

TIME	PT #	ΔP	ΔH	T_S	T_i	T_{IN}	T_{OUT}	VAC	TEMP
3476	4-2	1.10	.76	312	71	104	98	5	277
								662.015	
3880	4-1	.95	.66	305	73	103	98	5	274
								663.925	
4384	5-5	1.0	.69	306	74	103	99	5	277
								665.875	
4788	5-4	1.2	.83	309	71	104	99	5	281
								668.025	
5221	5-3	1.2	.83	316	70	106	100	5	282
								670.215	
5615	5-2	1.2	.83	319	69	106	100	5	283

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Air Pollution
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P. 3 of 3

FIELD TEST DATA FORM

Site: Granite Asphalt Plant Date: 9/10/90 Test No. PAHS 3

Nozzle I.D. E&L 1 Diameter .206 Filter No. PAHS 3

LEAK CHECKS: Pitot tubes -- Initial ____ Final ____

Sample train -- Initial ____ Final ____

TIME	PT #	ΔP	ΔH	T_S	T_i	T_{IN}	T_{OUT}	VAC	TEMP
0D 100	5-1	.95	.65	312	68	106	100	5	282
								674.327	
04 104	6-5	.65	.45	312	72	105	100	4	282
								675.820	
08 108	6-4	1.10	.76	310	72	105	100	5	281
								677.785	
12 112	6-3	1.10	.76	314	70	105	100	5	282
								679.825	
16 116	6-2	1.10	.76	313	71	105	100	5	279
								681.845	
20 120	6-1	1.05	.73	309	72	105	100	5	278
								683.818	

TIME	PT #	ΔP	ΔH	T_S	T_i	T_{IN}	T_{OUT}	VAC	TEMP
D 24									
IME									

Analytical Data

ARB METHOD 429 POLYCYLIC AROMATIC HYDROCARBONS

UNIT: ug

MATRIX: Air

% Recovery

SAMPLE ID. TAL(Target Analyte)	M.BK	PAH 1	PAH 2	PAH 3	R. spk	R. spk Dup		PQL µg/sample
Naphthalene	↑	1970	1890	1980	78	74		1.5 µg
Acenaphthylene		↑ ND	↑ ND	↑ ND	81	75		
Acenaphthene		↓	↓	↓	77	72		
Fluorene		16	17	18	75	70		
Phenanthrene	ND	25	29	32	78	74		
Anthracene		↑	↑ ND	↑ ND	80	74		
Fluoranthene			↓		80	76		
Pyrene			1.6		79	75		
Benz(a)anthracene			↑		74	72		
Chrysene		ND	ND		74	72		
Benzo(b)fluoranthene					74	66		
Benzo(k)fluoranthene					78	64		
Benzo(a)pyrene					84	78		
Benzo(ghi)peryiene					94	86		
Dibenz(ah)anthracene					92	84		
Indeno(1,23-cd)pyrene	↓	↓	↓	↓	82	78		↓

SURROGATE/SPIKE REVOVERY

Benzo(a)anthracene-d_{12}	100	106	132	115	94	95		
Methyl-Naphthalene-d_{10}	–	12	42	41	–	–		

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
Naphthalene-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
Acenaphthene-d10	-	-	-	-	-	-	-	-	-	-
Acenaphthylene	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
Fluorene	1.07961	1.04781	.99382	.91966	.89291	.83578	.99184	1.197	.96592	9.014
Phenanthrene-d10	-	-	-	-	-	-	-	-	-	-
Phenanthrene	1.50299	1.46274	1.37641	1.22249	1.19852	1.08949	1.23980	1.343	1.29892	11.666
Anthracene	1.52986	1.47263	1.37199	1.24535	1.24035	1.09023	1.21345	1.350	1.30912	11.886
Fluoranthene	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	1.22893	1.748	1.08068	7.752
Benzo(a)anthracene	1.67047	1.60835	1.52736	1.45235	1.43517	1.28879	1.49337	1.753	1.49655	8.301
Chrysene-d12	-	-	-	-	-	-	-	-	-	-
Chrysene	1.63916	1.57476	1.49822	1.46292	1.42096	1.29505	1.49337	1.760	1.48349	7.421
Benzo(b)fluoranthene	1.75036	1.70565	1.67854	1.79378	1.78517	1.55818	2.14204	1.993	1.77339	10.215
Benzo(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
Indeno(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
Dibenz(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)

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

$\overline{RF}$ - Average Response Factor

%RSD - Percent Relative Standard Deviation

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Calibration Check Report

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

Check Standard Data File:)B8482
Injection Time: 900920 19:35

Compound	$\overline{RF}$	RF	%Diff	Calib Meth
Naphthalene-d8	-	-	-	Average
Naphthalene	1.13751	1.34167	17.95	Average
2-Methylnaphthalene-d10	.70079	-	-	Average
Acenaphthene-d10	-	-	-	Average
Acenaphthylene	1.24466	1.27865	2.73	Average
Acenaphthene	.81272	.78450	3.47	Average
Fluorene	.96592	.94333	2.34	Average
Phenanthrene-d10	-	-	-	Average
Phenanthrene	1.29892	1.28165	1.33	Average
Anthracene	1.30912	1.32903	1.52	Average
Fluoranthene	1.48099	1.48516	.28	Average
Pyrene	1.50968	1.48257	1.80	Average
Benzo(a)anthracene-d12	1.08068	-	-	Average
Benzo(a)anthracene	1.49655	1.37489	8.13	Average
Chrysene-d12	-	-	-	Average
Chrysene	1.48349	1.37489	7.32	Average
Benzo(b)fluoranthene	1.77339	1.55411	12.37	Average
Benzo(k)fluoranthene	1.68620	1.49133	11.56	Average
Benzo(a)pyrene	1.68803	1.37281	18.67	Average
Indeno(1,2,3-cd)pyrene	1.57733	1.53591	2.63	Average
Dibenz(a,h)anthracene	1.46357	1.33124	9.04	Average
Benzo(g,h,i)perylene	1.48681	1.38687	6.72	Average

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

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

%Diff - % Difference from original average or curve

Calculation Data

APPENDIX F

Benzene Data and Calculations

Granite Asphalt Plant

SUMMARY OF QUANTITATIVE ANALYSIS AND EMISSION RATE OF BENZENE

	Concentration ug/L	Emission Rate lb/hr
Train 1	0.09	0.010
Train 2	0.07	0.008

Emission Rate = [(ug/L)/1000000]*Qs*28.3*60*(1/454)
Qs = 30378 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: 90-09-077
Hazardous Waste Testing
Certification: E765

CLIENT: SHINING TREE
PROJECT: GRANITE ASPHALT PLANT
PROJECT NO:
SAMPLE ID: METHOD BLANK

DATE RECEIVED: 09/12/1990
DATE ANALYZED: 09/20/1990
DATE COMPLETED: 09/26/1990
DATE SAMPLED: 09/12/1990

TARGET COMPOUNDS	ug/L (ppb)	DETECTION LIMIT ug/L (ppb)
Benzene	<0.03	0.03
	% Surrogate Spike Recovery	
Bromochloromethane	116%	
1,3-Dibromochloropropane	53%	

Harlan Loui
Chemist

September 26, 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: 90-09-077
Hazardous Waste Testing
Certification: E765

CLIENT: SHINING TREE
PROJECT: GRANITE ASPHALT PLANT
PROJECT NO:
SAMPLE ID: FIELD BLANK

DATE RECEIVED: 09/12/1990
DATE ANALYZED: 09/20/1990
DATE COMPLETED: 09/26/1990
DATE SAMPLED: 09/12/1990

TARGET COMPOUNDS	ug/L (ppb)	DETECTION LIMIT ug/L (ppb)
Benzene	<0.03	0.03
	% Surrogate Spike Recovery	
Bromochloromethane	104%	
1,3-Dibromochloropropane	127%	

Harlan Loui
Chemist

September 26, 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: 90-09-077
Hazardous Waste Testing
Certification: E765

CLIENT: SHINING TREE
PROJECT: GRANITE ASPHALT PLANT
PROJECT NO:
SAMPLE ID: BENZENE 1

DATE RECEIVED: 09/12/1990
DATE ANALYZED: 09/20/1990
DATE COMPLETED: 09/26/1990
DATE SAMPLED: 09/12/1990

TARGET COMPOUNDS	ug/L (ppb)	DETECTION LIMIT ug/L (ppb)
Benzene	0.09	0.03
	% Surrogate Spike Recovery	
Bromochloromethane	112%	
1,3-Dibromochloropropane	101%	

Harlan Loui
Chemist

September 26, 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: 90-09-077
Hazardous Waste Testing
Certification: E765

CLIENT: SHINING TREE
PROJECT: GRANITE ASPHALT PLANT
PROJECT NO:
SAMPLE ID: BENZENE 2

DATE RECEIVED: 09/12/1990
DATE ANALYZED: 09/20/1990
DATE COMPLETED: 09/26/1990
DATE SAMPLED: 09/12/1990

TARGET COMPOUNDS	ug/L (ppb)	DETECTION LIMIT ug/L (ppb)
Benzene	0.07	0.03
	% Surrogate Spike Recovery	
Bromochloromethane	119%	
1,3-Dibromochloropropane	130%	

Harlan Loui
Chemist

September 26, 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: 90-09-077
Hazardous Waste Testing
Certification: E765

CLIENT: SHINING TREE
PROJECT: GRANITE ASPHALT PLANT
PROJECT NO:
SAMPLE ID: REAGENT SPIKE

DATE RECEIVED: 09/12/1990
DATE ANALYZED: 09/20/1990
DATE COMPLETED: 09/26/1990
DATE SAMPLED: 09/12/1990

TARGET COMPOUNDS	% Recovery
Benzene	64%
	% Surrogate Spike Recovery
Bromochloromethane	102%
1,3-Dibromochloropropane	58%

Harlan Loui
Chemist

September 26, 1990
Date

Calibration 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: 90-09-077
Hazardous Waste Testing
Certification: E765

CLIENT: SHINING TREE
PROJECT: GRANITE ASPHALT PLANT
PROJECT NO:
SAMPLE ID: REAGENT SPIKE DUPLICATE

DATE RECEIVED: 09/12/1990
DATE ANALYZED: 09/20/1990
DATE COMPLETED: 09/26/1990
DATE SAMPLED: 09/12/1990

TARGET COMPOUNDS	% Recovery
Benzene	65%
	% Surrogate Spike Recovery
Bromochloromethane	110%
1,3-Dibromochloropropane	60%

Harlan Loui
Chemist

September 26, 1990
Date

Calibration Report

Title: GAS POLLUTANT ID FILE
Calibrated: 900920 07:19

Compound	Files: >FA778 RF 25.00	>FA779 RF 50.00	>FA780 RF 100.00	$\overline{RF}$	% RSD	
Vinyl chloride	1.15580	1.12809	1.17197	1.15195	1.926	(Conc=63.5,127.0,254.0)
Methylene chloride	.99653	1.19844	1.18816	1.12771	10.084	(Conc=89.0,178.0,356.0)
Chloroform	2.32228	2.53491	2.69784	2.51834	7.478	(Conc=129.0,258.0,516.0)
1,1,2-Trichlorofluoroethane	.17887	.20274	.20797	.19653	7.892	
1,2-Dichloroethane	1.88742	2.05899	2.16955	2.03866	6.973	(Conc=108.0,216.0,432.0)
1,1,1-Trichloroethane	2.14499	2.25959	2.41355	2.27271	5.929	(Conc=143.0,286.0,572.0)
Carbon tetrachloride	2.11579	2.26821	2.43729	2.27376	7.073	(Conc=160.0,320.0,640.0)
Trichloroethene	7.88544	8.78423	8.55232	8.40733	5.550	(Conc=141.0,282.0,564.0)
Benzene	22.6745	25.1865	24.0881	23.9830	5.251	(Conc=85.0,170.0,340.0)
1,2-Dibromoethane	8.94231	9.68811	9.60008	9.41017	4.331	(Conc=210.5,421.0,842.0)
Tetrachloroethene	6.56632	7.35987	7.15431	7.02683	5.861	(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

F223

QUANT REPORT

Operator ID: HARLAN Quant Rev: 6 Quant Time: 900920 07:34
Output File: ^FA778::QT Injected at: 900920 04:15
Data File: >FA778::L1 Dilution Factor: 1.00000
Name: GAS CALIB STD
Misc: 25ML STD + 2ML IS

ID File: IGAS1E::L1
Title: GAS POLLUTANT ID FILE
Last Calibration: 900920 07:26

	Compound	R.T.	Q ion	Area	Conc	Units	q
1)	*Bromochloromethane	10.05	49.0	6109	118.70	ng	100
2)	Vinyl chloride	3.92	62.0	3742	63.12	ng	100
3)	Methylene chloride	6.93	84.0	4522	77.91	ng	90
4)	Chloroform	12.15	83.0	15274	117.85	ng	98
5)	1,1,2-Trichlorofluoroethane	12.55	151.0	228	22.54	ng	86
6)	1,2-Dichloroethane	12.86	62.0	10393	99.06	ng	99
7)	1,1,1-Trichloroethane	14.17	97.0	15639	133.70	ng	100
8)	Carbon tetrachloride	14.57	117.0	17260	147.49	ng	99
9)	*1,2-Dibromochloropropane	20.35	77.0	5172	729.20	ng	80
10)	Trichloroethene	17.26	130.0	7886	132.25	ng	97
11)	Benzene	17.77	78.0	13670	80.36	ng	100
12)	1,2-Dibromoethane	18.84	107.0	13351	200.03	ng	99
13)	Tetrachloroethene	22.84	164.0	8616	172.88	ng	89

* Compound is ISTD

6

QUANT REPORT

Operator ID: HARLAN Quant Rev: 6 Quant Time: 900920 07:34
Output File: ^FA779::QT Injected at: 900920 05:02
Data File: >FA779::L1 Dilution Factor: 1.00000
Name: GAS CALIB STD
Misc: 50ML STD + 2ML IS

ID File: IGAS1E::L1
Title: GAS POLLUTANT ID FILE
Last Calibration: 900920 07:26

	Compound	R.T.	Q ion	Area	Conc	Units	q
1)	*Bromochloromethane	10.09	49.0	6054	118.70	ng	100
2)	Vinyl chloride	4.04	62.0	7307	124.37	ng	100
3)	Methylene chloride	7.05	84.0	10880	189.16	ng	90
4)	Chloroform	12.15	83.0	33356	259.70	ng	96
5)	1,1,2-Trichlorofluoroethane	12.55	151.0	517	51.58	ng	96
6)	1,2-Dichloroethane	12.90	62.0	22683	218.15	ng	95
7)	1,1,1-Trichloroethane	14.17	97.0	32960	284.35	ng	100
8)	Carbon tetrachloride	14.57	117.0	37019	319.22	ng	96
9)	*1,2-Dibromochloropropane	20.39	77.0	5140	729.20	ng	79
10)	Trichloroethene	17.30	130.0	17461	294.64	ng	99
11)	Benzene	17.81	78.0	30181	178.53	ng	100
12)	1,2-Dibromoethane	18.88	107.0	28750	433.43	ng	94
13)	Tetrachloroethene	22.84	164.0	19195	387.54	ng	90

* Compound is ISTD

8

QUANT REPORT

Operator ID: HARLAN Quant Rev: 6 Quant Time: 900920 07:35
Output File: ^FA780::QT Injected at: 900920 05:47
Data File: >FA780::L1 Dilution Factor: 1.00000
Name: GAS CALIB STD
Misc: 100ML STD + 2ML IS

ID File: IGASIE::L1
Title: GAS POLLUTANT ID FILE
Last Calibration: 900920 07:26

	Compound	R.T.	Q ion	Area	Conc	Units	q
1)	*Bromochloromethane	10.09	49.0	5679	118.70	ng	100
2)	Vinyl chloride	4.00	62.0	14242	258.41	ng	100
3)	Methylene chloride	7.01	84.0	20237	375.08	ng	89
4)	Chloroform	12.15	83.0	66602	552.78	ng	97
5)	1,1,2-Trichlorofluoroethane	12.51	151.0	995	105.82	ng	95
6)	1,2-Dichloroethane	12.90	62.0	44841	459.74	ng	99
7)	1,1,1-Trichloroethane	14.17	97.0	66050	607.45	ng	100
8)	Carbon tetrachloride	14.57	117.0	74629	686.03	ng	98
9)	*1,2-Dibromochloropropane	20.35	77.0	5475	729.20	ng	81
10)	Trichloroethene	17.26	130.0	36216	573.73	ng	99
11)	Benzene	17.77	78.0	61492	341.49	ng	100
12)	1,2-Dibromoethane	18.84	107.0	60691	858.99	ng	98
13)	Tetrachloroethene	22.88	164.0	39750	753.42	ng	93

* Compound is ISTD

APPENDIX G

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 But 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	~~0~~	"
4. ____	48	~~0~~	"
5. ----	71	~~0~~	"
6. ____	97	.1 Fast.	"
	130	.1 Fast.	"
	150	.1 Fast.	"

REMARKS 3hrs - Total

TESTED BY Roger Okamoto STATE LICENSE # 2-0984

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 1, 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 Last Impinger Identification No. 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								366	
2			365								367	
3			365								367	
4			365								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 EL82-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 IDENTIFICATION NUMBER EL-2

PITOT TUBE TYPE Type S

CALIBRATED BY RSC

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	.26	.35	.8452	0.0051
2	.75	1.00	.8666	0.0133
3	1.00	1.39	.8412	0.0051
			$\bar{C}_{PB} = .8533$	.00883 AVG. =

STANDARD DEVIATION OF AVG. DEV. = (Must be <.02)

CALCULATIONS: $\left| \bar{C}_{p\,a} - \bar{C}_{P\,B} \right| =$ 0.0033 (Must be <.01)

AVERAGE DEVIATION = $\frac{\sum_{1}^{3} \left| C_{P\ (S)} - \bar{C}_{P\ (A \text{ or } B)} \right|}{3}$ (Must be <.01)

DEVIATION (DEV.) = $C_{P\ (S)} - \bar{C}_{P\ (A \text{ or } B)}$

$C_{P\ (S)} = C_{P\ (STD)} \sqrt{\frac{\Delta P_{STD}}{\Delta P_S}}$ Where $C_{P\ (STD)} = 0.99$

TABLE IV

Orifice Meter Calibration

Operator(s) Shan-Li YD Date 9/5/90

Meter Console No. Eureka 1 DGM No. Eureka 1

Barometric Pressure (P_m) ≥9.98 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	827.269	5	833.855	1.317	80	.681
					Average ($\bar{K}_m$)	.714

$$Q_m \text{ (cfm)} = \frac{(V_2 - V_1) \times DGMCF}{\Theta \text{(minutes)}}$$

$$K_m = Q_m \left[\frac{P_m M_m}{T_m \Delta H} \right]^{\frac{1}{2}}$$

$$\Delta H_@ = \frac{0.9244}{(\bar{K}_m)^2} = 1.813$$

TABLE IV

Orifice Meter Calibration

Operator(s) Abdul Date 9/11/90

Meter Console No. #1 DGM No. [illegible]

Barometric Pressure (P_m) 30.01 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) In / Out	K_m
0.25	121.44	5	122.52	0.278	67 / 67	0.715
0.5	122.82	5	124.95	0.410	68 / 67	0.744
1.0	—	—	—	—	/	—
2.0	126.90	5	129.83	0.592	70 / 67	0.537
4.0	129.83	5	135.33	1.111	73 / 68	0.711
6.0	135.33	5	141.94	1.335	77 / 68	0.697
					Average ($\bar{K}_m$)	0.681

$$Q_m \underset{(cfm)}{=} \frac{(V_2 - V_1) \times DGMCF}{\theta(minutes)}$$

$$K_m = Q_m \left[\frac{P_m M_m}{T_m \Delta H}\right]^{\frac{1}{2}}$$

$$\Delta H_@ = \frac{0.9244}{(\bar{K}_m)^2} = 1.99$$

$P_m = 30.01$ in Hg

$T_m = t_m + 460$

$M_m = 29$ g/mol

Conversion of Production Data into Corrected Test Tonnage and Emission Rates into Pounds per Ton of Asphalt Concrete Produced.

The preceding portions of Appendix F, 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 F238 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 F239 converts the hourly metals emissions into metals emissions per ton of AC produced by the tested type facility.

Page F240 converts the hourly PAHs emissions into PAHs emissions per ton of AC produced by the tested type facility.

Page F241 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 PODLED SOURCE TESTING PROGRAM
Prepared by: D.E. DEEM, R.E.A.,R.G.
PLANT: Granite Construction Company - Sacramento

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	
9/5/90	1120	1305	105	90	75	2300	2778	573.60	29.86	Chromium (1)	
9/6/90	1100	1230	90	90	90	2871	3585	714.00	0.00	Multi-Metals (1)	
9/6/90	1310	1457	107	90	107	3936	4807	732.62	0.16	Beryllium (1)	
9/7/90	0810	0936	86	90	86	1503	2267	799.53	-0.05	Chromium (2)	
9/7/90	1015	1158	103	90	103	2590	3142	482.33	0.13	Multi-Metals (2)	
9/7/90	1236	1315	39	39	39	3377	3542	165.00	0.00	Beryllium (2)	
9/10/90	0750	0951	121	120	121	845	1811	958.02	0.01	PAH (1)	
9/10/90	1040	1248	128	120	128	2187	3205	954.37	0.06	PAH (2)	
9/10/90	1320	1525	125	120	125	3460	4393	895.68	0.04	PAH (3)	
9/11/90	0818	0952	94	90	94	1137	1769	605.11	0.04	Multi-Metals (3)	
9/11/90	1033	1204	91	90	91	1999	2579	573.63	0.01	Beryllium	(3)

Don E. Deem 12/27/90

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
A82588 ASPHALT CONCRETE POOLED SOURCE TESTING PROGRAM
Prepared By: D. E. DEEM, R.E.A., R.G.
PLANT #: 53
PLANT TYPE: DRUM
FUEL TYPE: NATURAL GAS
COLLECTOR TYPE: BAGHOUSE

TONS PRODUCED EPA TRAIN # 1	714	TONS PROD. Chromium TRAIN # 1	574
TONS PRODUCED EPA TRAIN # 2	482	TONS PROD. Chromium TRAIN # 2	809
TONS PRODUCED EPA TRAIN # 3	605	TONS PROD. Chromium TRAIN # 3	0
TEST TIME(min.)EPA TRAIN #1	90	TEST TIME(min.)CR+ TRAIN # 1	90
TEST TIME(min.)EPA TRAIN #2	90	TEST TIME(min.)CR+ TRAIN # 2	90
TEST TIME(min.)EPA TRAIN #3	90	TEST TIME(min.)CR+ TRAIN # 3	0

COMPOUND		EMISSION RATES lb/hr. TEST 1	TEST 2	TEST 3	EMISSION RATES lb/ton 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		1.4E-03	9.7E-04	1.6E-03	3.0E-06	3.0E-06	4.1E-06
Mercury		1.7E-04	1.5E-04	2.4E-04	3.6E-07	4.7E-07	6.0E-07
Nickel		1.9E-03	4.9E-03	3.7E-03	4.1E-06	1.5E-05	9.2E-06
Lead	*	ND	ND	ND	0.0E+00	0.0E+00	0.0E+00
Selenium	*	ND	ND	ND	0.0E+00	0.0E+00	0.0E+00
Zinc		2.0E-02	1.2E-02	1.5E-02	4.3E-05	3.7E-05	3.8E-05
Manganese		4.5E-03	7.8E-03	4.2E-03	9.5E-06	2.4E-05	1.0E-05
Total Chromium		2.9E-03	7.0E-04	N/A	7.7E-06	1.3E-06	0.0E+00
Hexavalent Chromium		ND	3.6E-04	N/A	0.0E+00	6.7E-07	0.0E+00

* = EMISSION is LESS THAN DETECTION LIMIT FOR ALL TRAINS
ND = NOT DETECTED
N/A= NOT TESTED

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 #: 53
PLANT TYPE: DRUM
FUEL TYPE: NATURAL GAS
COLLECTOR TYPE: BAGHOUSE

TONS PRODUCED TRAIN # 1	958
TONS PRODUCED TRAIN # 2	954
TONS PRODUCED TRAIN # 3	896
TEST TIME (min.) TRAIN # 1	120
TEST TIME (min.) TRAIN # 2	120
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		1.2E-01	1.2E-01	1.2E-01	2.5E-04	2.4E-04	2.8E-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		9.6E-04	1.0E-03	1.2E-03	2.0E-06	2.2E-06	2.7E-06
Phenanthrene		1.5E-03	1.8E-03	2.0E-03	3.1E-06	3.7E-06	4.4E-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	1.0E-04	ND	0.0E+00	2.1E-07	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(a)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		9.0E-05	9.0E-05	9.0E-05			
TOTAL PAHS/TON ASPHALT CONCRETE					2.5E-04	2.5E-04	2.8E-04
TOTAL PAHS/ 100.000 tons Asphalt Concrete					2.5E+01	2.5E+01	2.8E+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 #: 53
PLANT TYPE: DRUM
FUEL TYPE: NATURAL GAS
COLLECTOR TYPE: BAGHOUSE

TONS/HR BENZENE TRAIN #1	477
TONS/HR BENZENE TRAIN #2	382
TONS/HR BENZENE TRAIN #3	0
TONS/HR FORMALDEHYDE TRAIN #1	0
TONS/HR FORMALDEHYDE TRAIN #2	0
TONS/HR FORMALDEHYDE TRAIN #3	0

	EMISSION RATES lb/hr.			EMISSION RATES lb/ton		
COMPOUND	TRAIN 1	TRAIN 2	TRAIN 3	TRAIN 1	TRAIN 2	TRAIN 3
Benzene	1.000E-02	8.000E-03	0.000E+00	2.1E-05	2.1E-05	0.0E+00
Formaldehyde	0.000E+00	0.000E+00	0.000E+00	0.0E-00	0.0E+00	0.0E+00

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