AP42 Section: 11.1

Reference Number: 162

Title: Toxic Air Contaminant Emission Inventory Test At Claude C. Wood Company, Clements, California,

Eureka Laboratories, Inc., Sacramento, CA,

January 22, 1991.

APPENDIX E
PLANT #50

TOXIC AIR CONTAMINANT EMISSION INVENTORY TEST AT

CLAUDE C. WOOD COMPANY
Clements, California

Submitted to:

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Revised on:

January 22, 1991

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1.0 INTRODUCTION

On November 7-13 and 21, 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 Claude C. Wood Company Asphalt Concrete Drum Mix Plant. The facility is located in Clements, CA. The test program was conducted to determine toxic air contaminant emission for this source category as required by AB2588, "Air Toxic Hot Spot" regulation. A representative of the San Joaquin County APDC was on site to observe the sampling program.

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

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

2.0 SOURCE TEST TEAM

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

3.0 PROCESS DESCRIPTION

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

The emission control system consists of a wet scrubber. Exhaust gases from the process are manifolded through a wet scrubber to remove the 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 58.5" long and 33" wide with 4 port holes along the width.

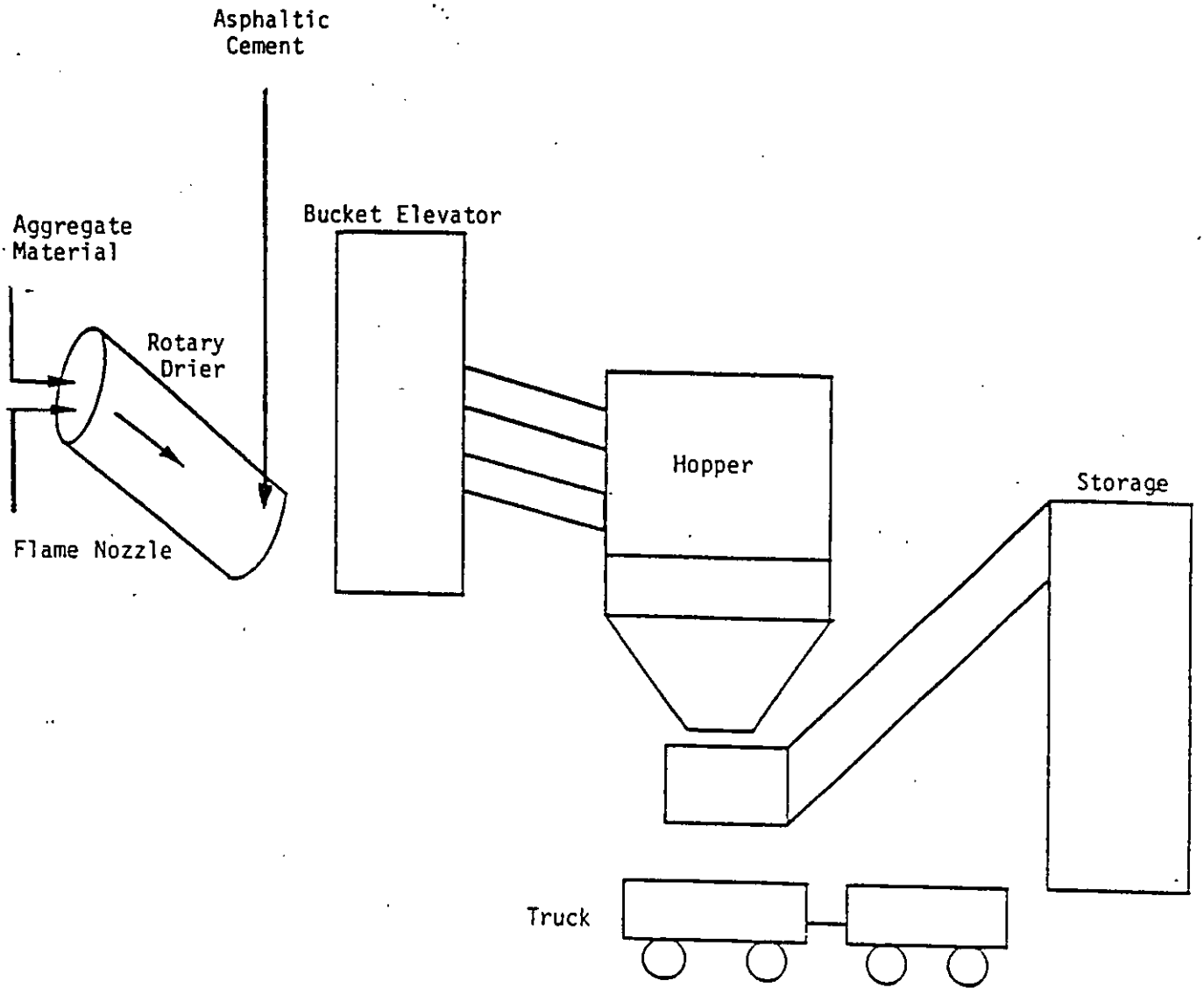


Figure 1. A Typical Asphalt Drum-Mix Plant

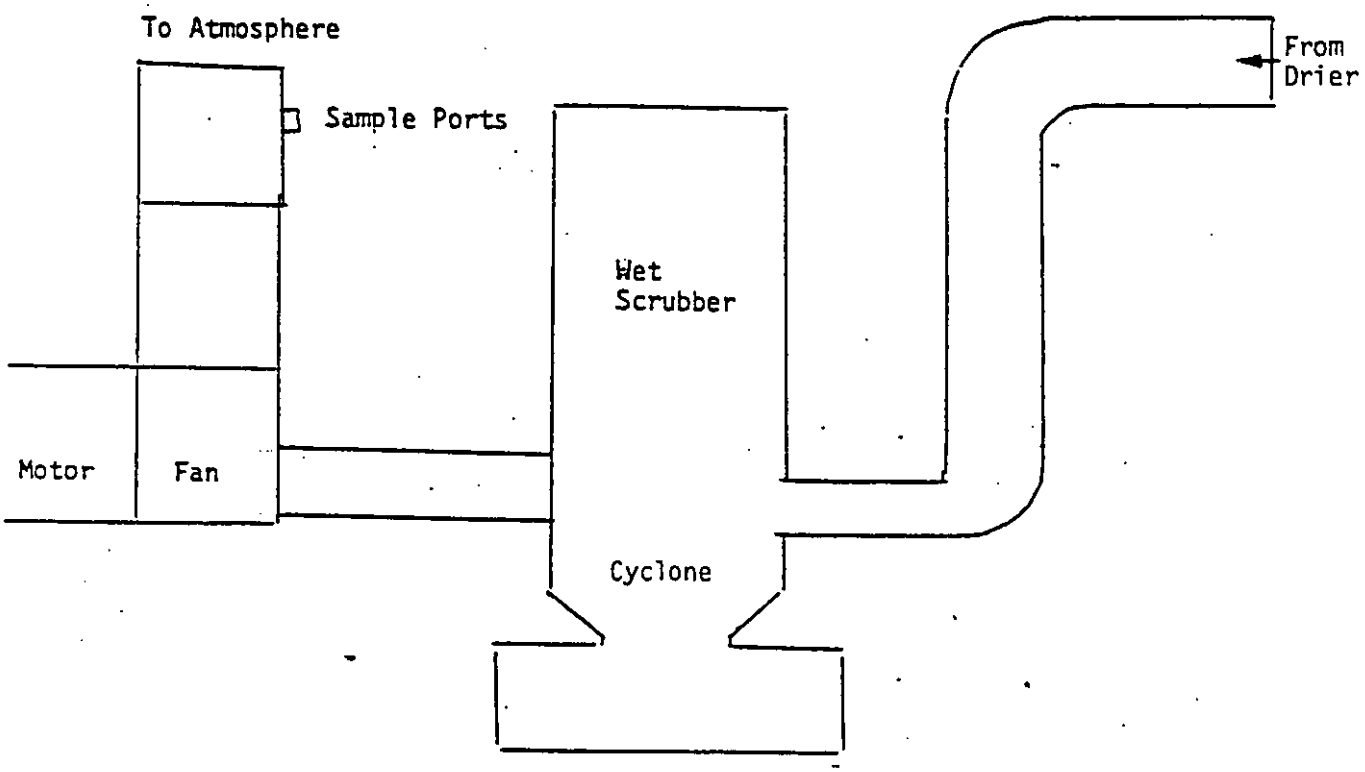


Figure 2. Sampling Location and Control Equipment

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 12 traverse points. The port holes are 1.0 diameters upstream, and 6.0 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

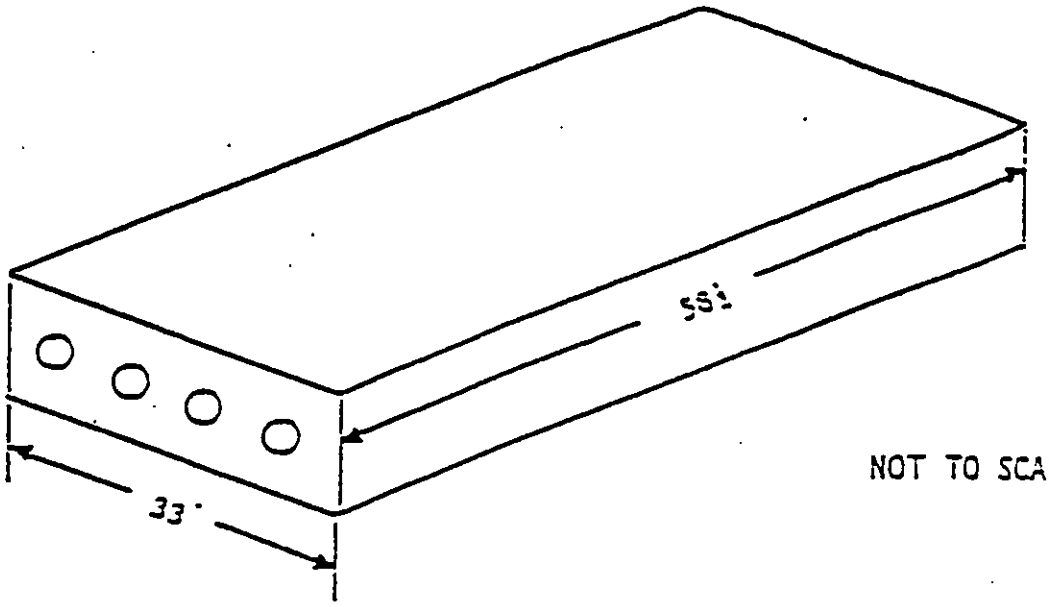
Based on CARB Method 3, multi-point grab sampling was used to extract gas sample from the stack. A precalibrated O2 and CO2 analyzer was used to determine the volume percent of carbon dioxide (CO2) and volume percent of oxygen (O2) in the stack. The CO2 and O2 measurement together with the moisture content 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 12 was used as sampling method for Lead, 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 12 for lead 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). Duplicate sampling runs were performed for each method.



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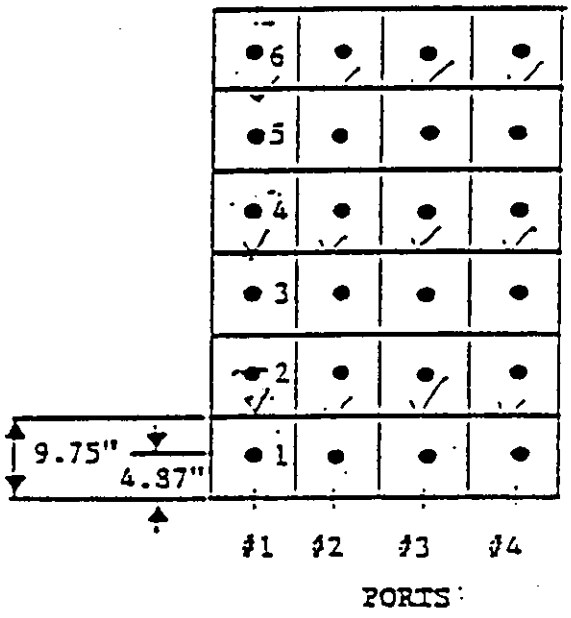


TRAVERSE POINT:	
#1	4 7/8"
#2	14 5/8"
#3	24 3/8"
#4	34 1/8"
#5	43 7/8"
#6	53 5/8"

$$\text{EQ. DIA} = \frac{2LW}{L + W} = \frac{2 \times 58.5 \times 33.0}{58.5 + 33.0} = 42.2"$$

FROM SAMPLING PORTS:

UPSTREAM - 0.85 DIA
DOWNSTREAM - 4.1 DIA

Figure 3. Traverse Points in a Rectangular Stack

5.1 Trace Element - EPA Draft Method

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

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

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

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

5.2 Lead - CARB Method 12

CARB Method 12 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 diluted nitric acid, the third impinger remained empty and the fourth impinger contained 200 grams of silica gel. The absorption train was followed in series with an air tight pump used to maintain a controlled sample flow rate through the system, and a calibrated dry gas meter was used to ensure that a sufficient sample volume was taken. Stack velocity was measured using an S type pitot tube. Orifice differential pressure was adjusted accordingly to maintain sampling rate within 10% of isokinetic ratio variation.

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

5.3 Total and Hexavelent Chromium - CARB Method 425

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

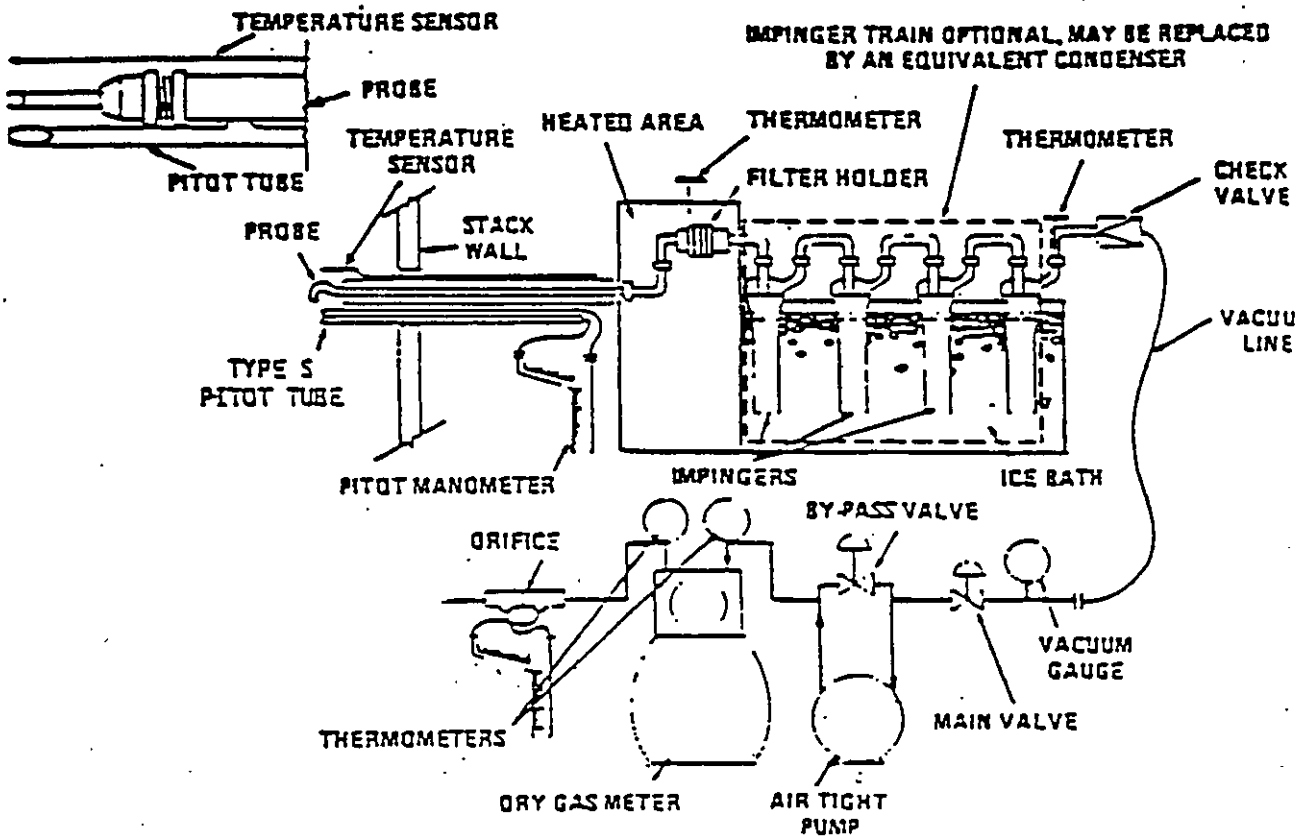


Figure 4. Schematic of Method 5 sampling train.

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

5.4 Polycyclic Aromatic Hydrocarbons - CARB Method 429

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

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

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

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

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

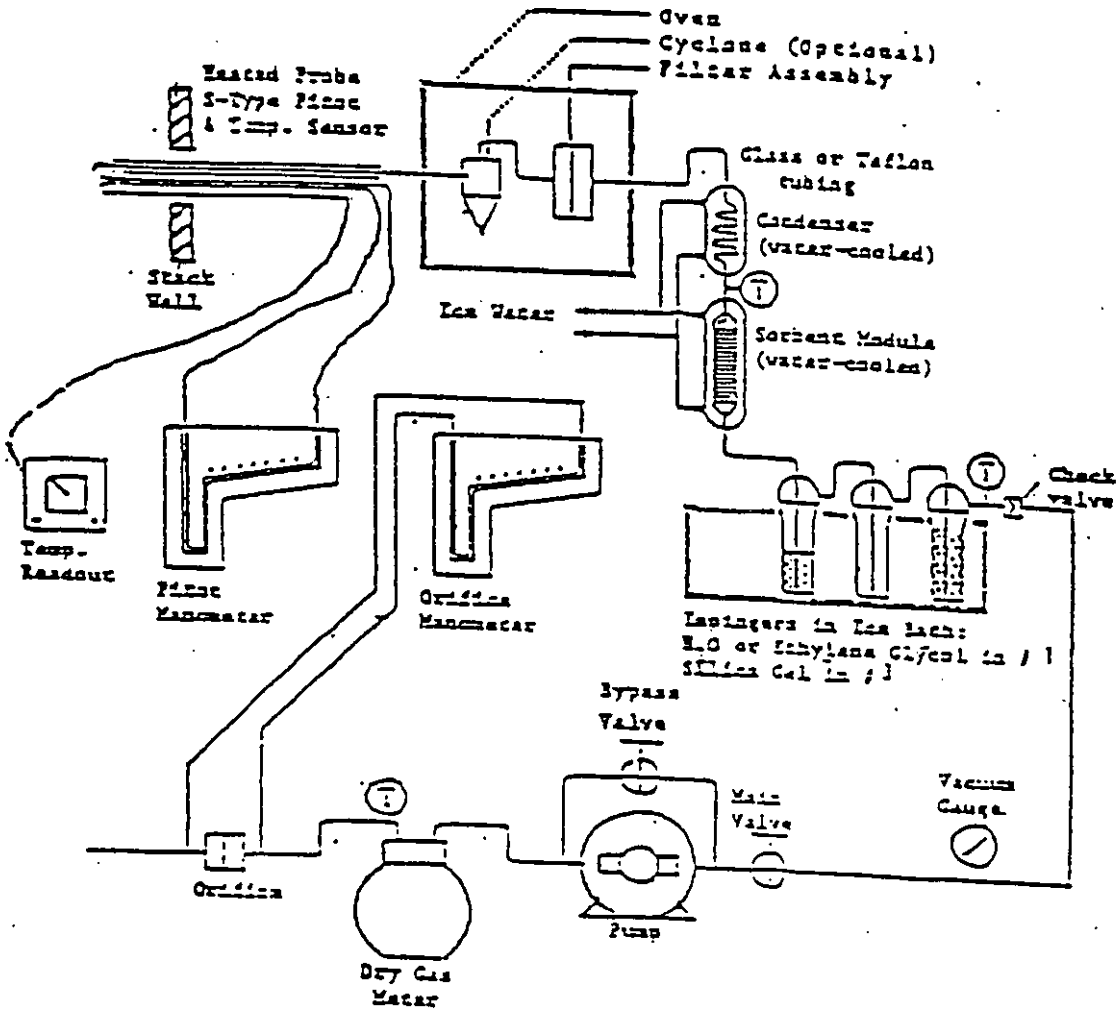
5.5 Formaldehyde - CARB Method 430

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

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

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

FIGURE 8: PAH SAMPLING TRAIN



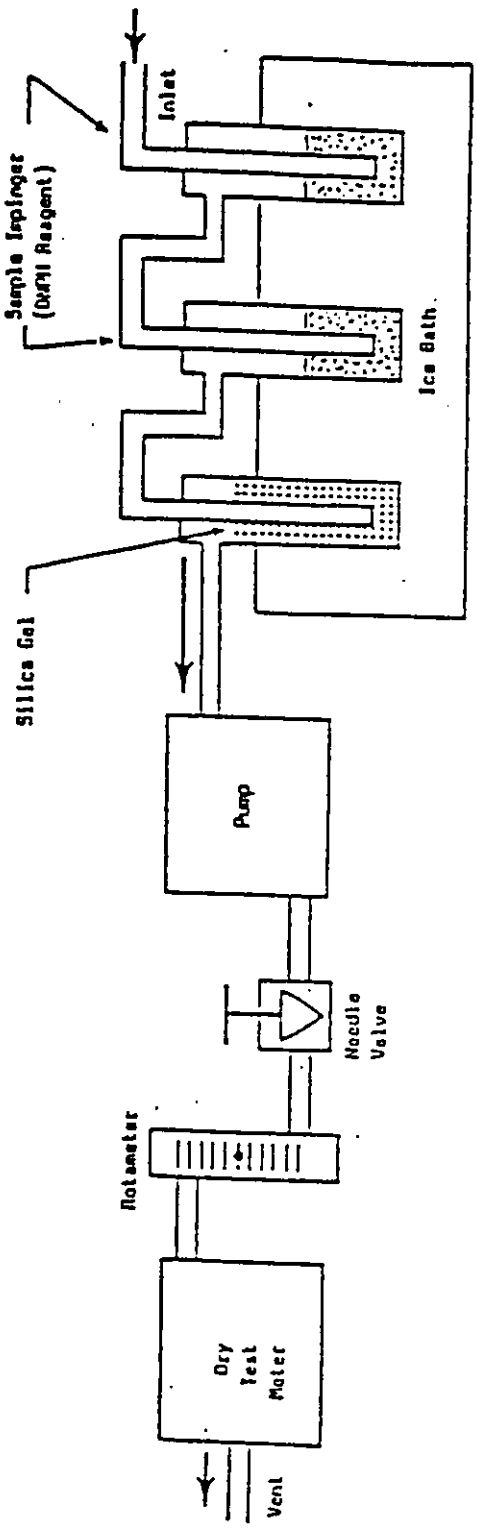


FIGURE 6 Formaldehyde Sampling Train

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

5.6 Benzene - Method 410A

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

6.0 FIELD AND LABORATORY QUALITY ASSURANCE

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

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

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

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

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

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

7.0 SUMMARY OF RESULTS

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

Table 1
Summary of Trace Metals Emissions Data
EPA Draft Method

CLIENT: Central Valley Rock, Sand & Gravel Association, Inc.
PROJECT: C.C. Wood Company Asphalt Plant

Trace Metal	RUN #1 11/13/90 (10-3)lb/hr	RUN #2 11/21/90 (10-3)lb/hr
Arsenic	< 1.04	< 1.09
Beryllium	< 0.10	< 0.11
Cadmium	0.37	< 0.22
Copper	0.11	< 0.11
Mercury	1.14	0.38
Nickel	< 1.04	< 1.09
Lead	0.70	< 0.54
Selenium	< 1.04	< 1.09
Zinc	10.17	17.47
Manganese	5.03	2.09

NOTE: "<" = less than

Table 2
Summary of Lead Emissions Data
CARB METHOD 12

CLIENT: Central Valley Rock, Sand & Gravel Association, Inc.
PROJECT: C.C. Wood Company Asphalt Plant

Compound	RUN #1 11/13/90 (10-3)lb/hr	RUN #2 11/21/90 (10-3)lb/hr
Lead	1.70	0.34

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

CLIENT: Central Valley Rock, Sand & Gravel Associations, Inc.
PROJECT: Claude C. Wood Company Asphalt Plant

Compound	RUN #1 11/09/90 (10-3)lb/hr	RUN #2 11/09/90 (10-3)lb/hr
Total Chromium	0.39	0.34
Hexavalent Chromium	<0.20	<0.19

NOTE: "<" = less than

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

CLIENT: Central Valley Rock, Sand & Gravel Association, Inc.
PROJECT: C.C. Wood Company Asphalt Plant

Compound	RUN #1 11/08/90 (10-3)lb/hr	RUN #2 11/08/90 (10-3)lb/hr
Naphthalene	279.16	157.72
Acenaphtlylene	< 0.15	< 0.15
Acenaphene	< 0.15	< 0.15
Fluorene	< 0.15	< 0.15
Phenanthrene	2.31	0.67
Anthracene	< 0.15	0.49
Flouranthene	< 0.15	< 0.15
Pyrene	< 0.15	< 0.15
Benzo(a)anthracene	< 0.15	< 0.15
Chrysene	< 0.15	< 0.15
Benzo(a)fluoranthene	< 0.15	< 0.15
Benzo(k)fluoranthene	< 0.15	< 0.15
Benzo(a)pyrene	< 0.15	< 0.15
Benzo(g,h,i)perylene	< 0.15	< 0.15
Dibenzo(a,h)anthracene	< 0.15	< 0.15
Indeno(1,2,3-cd)pyrene	< 0.15	< 0.15

NOTE: "<" = less than

Table 5
Summary of Benzene Emissions Data
CARB METHOD 410A

CLIENT: Central Valley Rock, Sand & Gravel Association, Inc.
PROJECT: C.C. Wood Company Asphalt Plant

Compound	RUN #1 11/13/90	RUN #2 11/21/90
Benzene	0.005 lb/hr	< 0.003 lb/hr

NOTE: "<" = less than

Table 6
Summary of Formaldehyde Emissions Data
CARB METHOD 430

CLIENT: Central Valley Rock, Sand & Gravel Association, Inc.
PROJECT: C.C. Wood Company Asphalt Plant

Compound	RUN #1 11/13/90	RUN #2 11/21/90
Formaldehyde	0.010 lb/hr	0.007 lb/hr

8.0 DISCUSSION OF RESULTS

Source test sampling was performed on November 7-13 and 21, 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 72 minutes of sampling time. Continuous source testing for each run was also not possible due to several interruptions of plant operations and power failures that occurred in the middle of a test run.

Nothing unusual was encountered during sampling in terms of equipment failure or procedural complications except with the surrounding conditions. The console was located near the rotary kiln and exposed to high ambient temperature.

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

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 * A • 60 = AFCM

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

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

* Particulate Concentration

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

• Emission Flow Rate (lb/hr)

Mm = 0.00857 * C's * Qs

Symbol	Identification
A	- cross sectional area of the stack (square feet)
C'	- particulate concentration, dry basis (grain/SDCF)
Cp	- pitot tube calibration coefficient (0.85)
D	- duct diameter (circular duct),inches
Dn	- nozzle diameter (in.)
dH	- pressure drop across orifice (in. 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)
Qw	- volumetric flow rate CFM
Patm	- atmospheric pressure (in. Hg)
Ps	- absolute pressure in the stack (in. Hg)
Ts	- absolute temperature of stack gas
Vm	- dry gas volume through the meter (cubic feet)
Vmstd	- dry gas volume through the meter at standard conditions in cubic feet.
Vs	- velocity of gas stream (feet/second)
Vwet	- volume of water vapor collected at (cubic feet)
W	- volume of water vapor collected in the impingers (grams)

Subscripts

atm - atmosphere

avg - average

m - at meter

n - at nozzle

S - at stack

SCF - Standard cubic feet

std - standard conditions

APPENDIX B

Trace Metals Data and Calculations

FIELD BLANK

Analytical Data

C.C. Wood Multimetal Field Blank

SUMMARY OF QUANTITATIVE ANALYSIS

Trace Metal	Mass (ug)
Arsenic	< 12.6
Beryllium	< 1.26
Cadmium	< 2.5
Chromium	< 2.5
Copper	< 1.26
Nickel	< 12.6
Lead	< 6.33
Selenium	< 12.6
Zinc	10.78
Manganese	2.76
Mercury	2.0

NOTE: "<" = less than

METALS
EPA MULTIMETAL METHOD

CLIENT : e.c. Wood
PROJECT: Shining Tree
SAMPLING DATE:
SAMPLE I.D.: Train M.M Field BK

COMPOUND	D/L ppm	Filter BK Front Rinse µg/ml	µg	Impingers BK Back Rinse µg/ml	µg	Total
Arsenic	0.1	<0.1	<6	<0.1	<6.67	<12
Beryllium	0.01	<0.01	<0.6	<0.01	<0.66	<1.2
Cadmium	0.02	<0.02	<1.2	<0.02	<1.3	<2.
Chromium	0.02	<0.02	<1.2	<0.02	<1.3	<2.
Copper	0.01	<0.01	<0.6	<0.01	<0.66	<1.2
Nickel	0.1	<0.1	<6	<0.1	<6.67	<12.
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	0.162	9.72	0.016	1.06	10.7
Manganese	0.01	0.046	2.76	<0.01	<0.66	2.76
Mercury (Hg)	0.001	<0.001	<	0.002	2.0	2.0

↑ DF_1 ↑ DF_2

✓ $DF_1 = 50 * \frac{300}{250} = 60$

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

✓ (Hg) $DF = 50 * \frac{200}{10} = 1.000$

RUN #1

Metals - November 13, 1990

Calculation Data

C.C. Wood Multimetals Train 1

Section I: Particulate Sampling Data

Point #	Delta P	Delta H	T S	T i	T in	T out	VAC	Filter Temp.	VEL (FPS)
A-6	1.25	2.25	133	41	43	42	7.0	265	67.9
A-5	1.40	2.50	137	42	44	42	8.5	267	72.1
A-4	1.10	2.00	137	42	48	42	7.0	268	63.9
A-3	0.96	1.75	136	42	51	43	6.5	256	59.6
A-2	0.32	0.57	130	43	48	45	3.0	245	34.3
A-1	0.12	0.21	132	44	50	45	2.0	251	21.0
B-6	0.57	1.02	142	47	56	46	5.0	260	46.2
B-5	0.45	0.81	146	47	59	48	4.0	245	41.2
B-4	0.42	0.75	147	48	59	48	4.0	238	39.8
B-3	0.35	0.63	145	49	60	48	3.8	270	36.3
B-2	0.18	0.32	142	49	60	49	2.2	268	26.0
B-1	0.10	0.18	142	49	60	50	2.0	265	19.3
C-6	1.20	2.16	147	49	67	51	8.0	267	67.3
C-5	0.55	1.05	142	49	68	52	4.8	248	45.4
C-4	0.28	0.50	141	50	68	53	3.0	251	32.3
C-3	0.18	0.32	140	50	68	54	3.0	255	25.9
C-2	0.18	0.32	135	51	69	55	2.8	260	25.8
C-1	0.14	0.25	131	52	69	56	2.2	264	22.7
D-6	1.25	2.25	137	53	73	56	8.0	258	68.1
D-5	0.75	1.35	129	55	74	58	5.5	237	52.4
D-4	0.54	0.97	129	57	73	59	4.5	235	44.5
D-3	0.44	0.79	129	60	73	60	3.8	248	40.1
D-2	0.44	0.80	129	61	73	60	4.0	250	40.1
D-1	0.60	1.08	132	61	75	62	4.6	265	47.0
AVG	0.57	1.03	137	50	62	51	4.6	256	43.3

NOMENCLATURE

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

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

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condensor (oF)

Tin = Dry gas meter inlet temperature

Tout = Dry gas meter outlet temperature

Vac = Sample pump vacuum (in. Hg)

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

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

C.C. Wood Multimetals Train 1

FIELD DATA SHEET

VOLUME OF CONDENSED MOISTURE

Impinger #	Gross	Tare	Net
1	134 ml	0 ml	134 ml
2 & 3	200 ml	200 ml	0 ml
4 & 5	200 ml	200 ml	0 ml
6	211 gram	200 gram	11 gram
	TOTAL CONDENSED MOISTURE		145 ml

STACK GAS MOLECULAR WEIGHT

PERCENT CARBON DIOXIDE	=	3.50
PERCENT OXYGEN	=	17.50
PERCENT CARBON MONOXIDE	=	0.00
PERCENT NITROGEN & INERTS	=	79.00

COMPONENT	VOLUME%	* MOISTURE CORR *	MOLWT =	MASS FRACTION
WATER	14.91	1.00	18.00	2.68
CARBON DIOXIDE	3.50	0.85	44.00	1.31
OXYGEN	17.50	0.85	32.00	4.76
CARBON MONOXIDE	0.00	0.85	28.00	0.00
NITROGEN & INERTS	79.00	0.85	28.00	18.82
		AVERAGE MOLECULAR WEIGHT =		27.58

C.C. Wood Multimetals Train 1

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	181.900	CFT
Dry gas meter, final reading	=	218.950	CFT
Dry gas meter calibration factor	=	1.000	
Meter volume uncorrected for Temp & Press	=	37.050	CFT
Barometric pressure at site	=	30.35	in Hg
Meter pressure (barometer + average delta H)	=	30.68	in Hg
Average meter temperature during test	=	56.5	DEG F
Dry sample volume at standard conditions	=	38.255	CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	137.1	DEG F
Volume of condensed water	=	145	ml
Percent moisture of stack gas	=	14.91	%
Pitot tube correction factor	=	0.85	
Stack gas molecular weight	=	27.67	
Stack gas velocity at stack conditions	=	43.31	FT/SEC
Duration of sampling	=	72	Minute
Nozzle diameter	=	0.220	in
Percent isokinetic variation	=	101.9	%
Area of stack	=	13.40	SQ FEET
Stack flow rate, standard conditions	=	26461	DSCFM

C.C. Wood Multimetals Train 1

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

Compound		Mass (ug)		Emmission rate (10-3 lb/hr)
Arsenic	<	11.40	<	1.04
Beryllium	<	1.14	<	0.10
Cadmium	=	4.10	=	0.37
Copper	=	1.24	=	0.11
Mercury	=	12.48	=	1.14
Nickel	<	11.40	<	1.04
Lead	=	7.72	=	0.70
Selenium	<	11.40	<	1.04
Zinc	=	111.44	=	10.17
Manganese	=	55.06	=	5.03

Field Data

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

Research & Testing
Environmental Studies
Robotics
Toxicology

Abl— FIELD TEST DATA FORM 101.9%

Site: [illegible] Date: 11/13/90 Test No. MM(1)

H_2O: 134 Nozzle I.D. EGL.4 Diameter 0.220 Filter No. MM(1)

Silica 10.1 LEAK CHECKS: Pitot tubes -- Initial ✓ at 3 in H_2O Final ✓ at 4 in H_2O

K: 1.8 Sample train -- Initial ____ Final ____

start at 181.79? Leak check < 0.005 at 10 in Hg for 1 min Leak check < 0.005 at 10 in Hg for 1 min

[TI]ME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
3	A-6	1.25	5.05	133	41	43	41	7.0	265
								184.210	
6	5	1.20	2.5	136	41	44	42	8.5	267
								186.610	
9	4	1.1	2.0	137	42	48	42	7.0	268
								188.95	
12	3	.96	1.75	136	42	51	43	6.5	256
								191.098	
15	2	0.32	0.57	130	43	45	45	3.0	245
								193.210	
15	1	0.12	0.21	132	44	50	45	2.0	251
								193.570	

[TI]ME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
21	B-6	[illegible]	[illegible]	142	47	54	46	5.0	260
								194.710	
24	5	0.45	0.81	146	47	59	48	4.0	245
								196.200	
27	4	0.42	0.75	147	48	59	48	4.0	238
								197.575	
30	3	0.35	0.63	145	49	60	48	3.8	270
								198.190	
33	2	0.18	0.32	142	49	60	49	2.2	268
								199.830	
36	1	0.10	0.18	142	B-1 49	60	50	2.0	265
								200.550	

E36

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SACRAMENTO, CA 95826
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Branch Office
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BELLEVUE, WA 98005
TEL: (206) 885-0284
FAX: (206) 885-6162

FIELD TEST DATA FORM

Site: _____ Date: 11/13/90 Test No. MH(1)

Nozzle I.D. EAL.4 Diameter 0.220 Filter No. MH(1)

LEAK CHECKS: Pitot tubes -- Initial _____ Final _____

Sample train -- Initial _____ Final _____

ME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
39	6	1.20	2.16	147	49	67	51	8.0	216.7
	5	1.15	1.97	142	49	68	52	202.550	
								4.8	243
42	4	0.25	0.50	141	50	68	53	204.220	
								3.0	251
45	3	0.18	0.32	140	50	68	54	205.450	
								3.0	255
48	2	0.18	0.32	135	51	69	55	206.550	
								2.8	260
51	1	0.14	0.25	134	52	69	56	207.150	
								2.2	264
54								208.240	

PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
57	1.25	2.25	137	53	73	58	8.0	235
							210.810	
60	0.75	1.35	129	55	74	58	5.5	237
							212.880	
63	0.54	0.97	128	57	73	59	4.5	235
							214.375	
66	0.44	0.79	129	60	73	60	3.8	248
							215.810	
69	0.44	0.79	129	61	73	60	4.0	250
							217.300	
72	0.60	1.08	132	61	75	62	4.6	265
							218.950	

METALS
EPA MULTIMETAL METHOD

CLIENT : C.C. Wood
PROJECT: Shining Tree
SAMPLING DATE:
SAMPLE I.D.: Train M.M.1

COMPOUND	D/L ppm	Filter + Front Rinse µg/ml	DF1	µg	Filter + Back Rinse µg/ml	DF2	µg	Total µg
Arsenic	0.1	<0.1		<6	<0.1		<5.4	<11.4
Beryllium	0.01	<0.01		<0.6	<0.01		<0.54	<1.14
Cadmium	0.02	0.0503		3.02	<0.02		<1.08	4.10
Chromium	0.02	0.0415		2.49	<0.02		<1.08	3.57
Copper	0.01	0.0117		0.702	<0.01		<0.54	1.24
Nickel	0.1	<0.1		<6	<0.1		<5.4	<11.4
Lead	0.05	0.0836		5.016	<0.05		<2.7	7.72
Selenium	0.1	<0.1		<6	<0.1		<5.4	<11.4
Zinc	0.01	1.271		76.26	0.6515		35.18	111.44
Manganese	0.01	0.8721		52.32	0.0507		2.74	55.06
					µg/ml	DF	µg	
Mercury (Hg)	0.001				0.0033	1215		4.01

✓ $DF_1 = 50 * \frac{300}{250} = 60$

✓ $DF_2 = 50 * \frac{646}{596} = 54.2$

✓ $Hg : DF = 50 * \frac{243}{10} = 1215$

EUREKA LABORATORY INORGANIC REPORT SUMMARY (WATER)

Test: Metals
Method: EPA 6010
Client: Shining Tree
ELI Order: 90-11-105

Date Received: 11-13-90
Date Extracted: 11-15-90
Date Analyzed: 11-19-90
Chemist: Jesse

ELEMENT	MM Field BK	MM Filter BK	MM-1 Filter 1 Front	MM-1 Back Rinse Impinger 1.2.3	Recg. (5)	Recg. (25)	Method BK	Mg/L D/L
Ag	<.0000	<.0000	<.0000	<.0000	118	119	.0037	0.01
As	.0083	.0080	.0169	.0076	103	102	<.0000	0.1
Ba	0.0207	.1006	.4264	.0442	102	102	<.0000	0.02
Be	<.0000	.0005	.0005	<.0000	127	131	<.0000	0.01
Cd	<.0000	.0004	.0503	<.0000	104	103	.0010	0.02
Co	<.0000	<.0000	.0117	<.0000	105	105	<.0000	0.02
Cr	.0060	.0095	.0415	.0056	98	97	.0007	0.0
Cu	.0111	.0220	.2945	.1121	111	110	<.0000	0.01
Hg	.0050	.0140	.0154	.0028	101	99	<.0000	0.05
Mo	.0037	.0051	.0103	.0039	115	115	<.0000	0.02
Ni	.0010	.0116	.0741	.0569	86	89	<.0000	0.1
Pb	<.0000	<.0000	.0836	<.0000	101	100	<.0000	0.05
Sb	<.0000	.0159	.0298	<.0000	103	103	<.0000	0.05
Se	.0159	.0114	.0075	.0067	102	102	<.0000	0.1
Tl	.0018	.0008	.0855	.0095	89	90	<.0000	0.1
V	<.0000	.0056	.0542	<.0000	101	101	.0021	0.01
Zn	.0159	.1623	1.271	.6515	100	100	<.0000	0.01
Mn	.0016	.0462	.8721	.0507	103	103	.0002	0.01

E40

Client: Shining Star 90-11-105

ANALYSIS: Hg - air ~~Water~~ Samples

METHOD: 7470

ELI NO.	SAMPLE ID.	LOCATION	UNITS: ~~mg/L~~ (ppm)
1A	Field Blk Metals		0.0002
2A	Field Blk - Hg		0.0019
3A	Filter Blk		0.0001
4A	Filter + Front Rinse		0.0001
5A	Impinger 1,2,3		0.0002
6A	Impingers 4,5		0.0034
	Impingers 4,5 (S)		90%
	Impingers 4,5 (DS)		85%
	Method Blank		ND
	Detection Limit		0.001 ppm

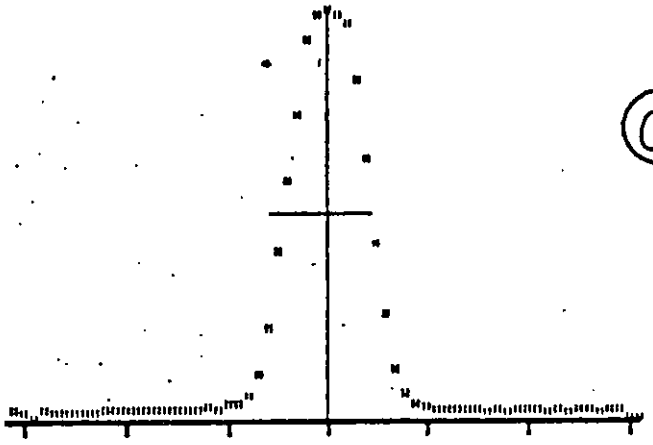
Did you remember to include QA data?, duplicate?, blank?, spike recovery?, detection limits? Thank You!

Analyst: Ramona Jerome

Extraction Date: 11/15/90

Date Reported: 11/23/90

PROFILE FOR PHYSICAL CHANNEL 13
19-NOV-90 09:15



Cu

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

PEAK IS AT POSITION 0
PEAK HAS A WIDTH OF 10.6

MAX = 141 MIN = 13

1) Shining Tree - Air Spls - 90-11-029 — (6)

2) Shining Tree - Air Spls - 90-11-105 — (4)

3) McCL — TCLP — (1) 90-11-061

ACT NAME : CAM TIME:19-NOV-90 13:37 STANDARD NAME : STD1

	I.S.	AG	AS	BA	BE	CD	CO	CR	CU	HG
EXP# 1	1000	.1330	.2480	.0170	.0180	.0540	.2740	.1400	.1250	.08
EXP# 2	1000	.1350	.2460	.0160	.0170	.0540	.2790	.1400	.1270	.07
EXP# 3	1000	.1350	.2480	.0160	.0170	.0560	.2760	.1390	.1260	.08
AVERAGE	1000	.1343	.2473	.0163	.0173	.0547	.2763	.1397	.1260	.08

	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	.2150	.1400	.8140	.6360	.4810	.1100	.1200	.0480	1.238	.20
EXP# 2	.2170	.1240	.7960	.6440	.4780	.1100	.1200	.0480	1.249	.20
EXP# 3	.2150	.1400	.7960	.6320	.4790	.1180	.1210	.0490	1.241	.20
AVERAGE	.2157	.1347	.8020	.6373	.4793	.1127	.1203	.0483	1.243	.20

	CA	MG	NA	MN	K	B
EXP# 1	1.662	1.660	2.006	.0330	1.801	.0380
EXP# 2	1.669	1.652	2.002	.0330	1.808	.0400
EXP# 3	1.665	1.658	1.985	.0330	1.799	.0410
AVERAGE	1.665	1.657	1.998	.0330	1.803	.0397

ACT NAME : CAM TIME:19-NOV-90 13:41 STANDARD NAME : STD2

	I.S.	BA	CD	CO	CU	PB	ZN
EXP# 1	1000	8.411	13.80	21.47	17.27	10.15	9.259
EXP# 2	1000	8.431	13.85	21.61	17.24	10.17	9.306
EXP# 3	1000	8.345	13.82	21.40	17.21	10.18	9.240
AVERAGE	1000	8.396	13.82	21.49	17.24	10.16	9.268

ACT NAME : CAM TIME:19-NOV-90 13:45 STANDARD NAME : STD3

	I.S.	BE	MO	NI	SB	TL
EXP# 1	1000	14.00	19.80	10.18	12.77	3.125
EXP# 2	1000	13.91	19.78	10.27	12.70	3.071
EXP# 3	1000	13.89	19.68	10.14	12.78	3.198
AVERAGE	1000	13.93	19.75	10.20	12.75	3.131

ACT NAME : CAM TIME:19-NOV-90 13:49 STANDARD NAME : STD4

	I.S.	AS	CR	SE
EXP# 1	1000	4.773	9.569	8.012
EXP# 2	1000	4.785	9.664	8.085
EXP# 3	1000	4.786	9.498	8.092
AVERAGE	1000	4.781	9.577	8.063

ACT NAME : CAM TIME:19-NOV-90 13:53 STANDARD NAME : STD5

	I.S.	HG	V
EXP# 1	1000	6.164	11.15
EXP# 2	1000	6.221	11.24
EXP# 3	1000	6.148	11.17
AVERAGE	1000	6.178	11.19

ACT NAME : CAM TIME:19-NOV-90 13:57 STANDARD NAME : STD6

	I.S.	AG
EXP# 1	1000	9.049
EXP# 2	1000	9.098
EXP# 3	1000	9.081
AVERAGE	1000	9.076

ACT NAME : CAM TIME:19-NOV-90 14:00 STANDARD NAME : STD7

	I.S.	AL	FE	CA	MG
EXP# 1	1000	17.97	14.74	8.024	14.35
EXP# 2	1000	17.93	14.76	8.100	14.31
EXP# 3	1000	17.98	14.88	8.106	14.29
AVERAGE	1000	17.96	14.79	8.077	14.32

ACT NAME : CAM TIME:19-NOV-90 14:04 STANDARD NAME : STD8

	I.S.	NA	MN
EXP# 1	1000	72.81	15.16
EXP# 2	1000	83.87	14.76
EXP# 3	1000	77.23	14.99
AVERAGE	1000	77.97	14.97

ACT NAME : CAM TIME:19-NOV-90 14:08 STANDARD NAME : STD9

	I.S.	K	B
EXP# 1	1000	5.178	2.526
EXP# 2	1000	4.941	2.544
EXP# 3	1000	5.395	2.538
AVERAGE	1000	5.171	2.536

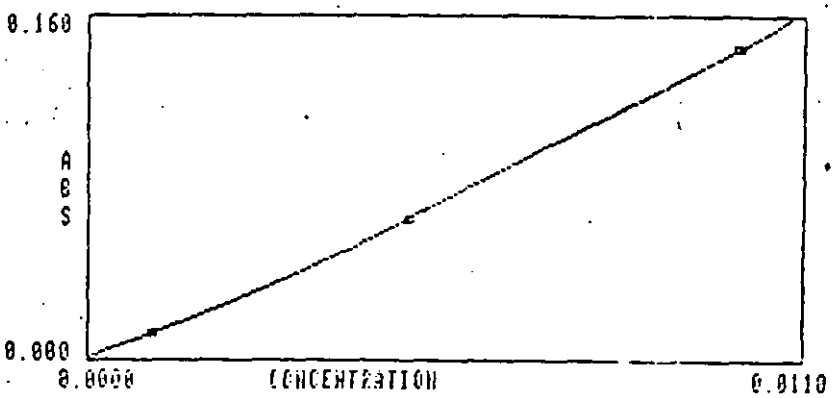
ACT NAME : CAM TIME : 19-NOV-90 14:17 SAMPLE NAME: SAMPLE-1 ✓
CAL.CK

	I.S.	AG	AS	BA	BE	CD	CO	CR	CU	HG
EXP# 1	1000	.0196	2.438	2.536	2.505	2.588	2.570	2.593	2.655	2.5
EXP# 2	1000	.0185	2.438	2.534	2.478	2.549	2.533	2.547	2.696	2.4
EXP# 3	1000	.0207	2.427	2.539	2.505	2.561	2.566	2.586	2.665	2.5
AVERAGE	1000	.0196	2.434	2.536	2.496	2.566	2.556	2.575	2.672	2.5

OPERATOR TAMARA JEROME
DATE 11-23-90
BATCH HG

PROGRAM 2 Hg COLD VAPOR

SAMPLE	CONC	%RSD	MEAN ABS	READINGS		
BLANK	0.0000		-0.001	-0.001	-0.001	-0.000
STANDARD 1	0.0010	2.7	0.011	0.012	0.011	0.011
STANDARD 2	0.0050	0.6	0.067	0.068	0.066	0.067
STANDARD 3	0.0100	0.3	0.146	0.145	0.146	0.146



SAMPLE 1	ICV	0.0051		1.0	0.069	0.068	0.070	0.069
SAMPLE 2	ICB	-.0001		8.9	-0.002	-0.002	-0.001	-0.002
SAMPLE 3	RS	0.0024	120%	0.6	0.028	0.028	0.028	0.029
SAMPLE 4	RSL	0.0024	120%	0.2	0.029	0.029	0.029	0.029
SAMPLE 5		0.0029	110%	0.2	0.036	0.036	0.036	0.036 GW-10 (5)
SAMPLE 6		0.0028	105%	0.3	0.034	0.034	0.034	0.035 GW-10 (5c)
SAMPLE 7	BL	-.0001		17.1	-0.002	-0.001	-0.002	-0.002
SAMPLE 8	GW-100	0.0009		0.6	0.010	0.010	0.010	0.010
SAMPLE 9	GW-101	0.0001		23.2	0.002	0.002	0.001	0.001
SAMPLE 10	GW-102	0.0004		4.6	0.004	0.004	0.004	0.004
SAMPLE 11	GW103	0.0001		0.0	0.001	0.001	0.001	0.001
SAMPLE 12	GW-104	0.0005		3.2	0.005	0.005	0.005	0.006
SAMPLE 13	CCV	0.0058	✓OK	0.7	0.079	0.078	0.079	0.079
SAMPLE 14	CCB	-.0002		7.1	-0.002	-0.002	-0.002	-0.002
SAMPLE 15	GW-9	0.0007		1.4	0.008	0.009	0.008	0.009
SAMPLE 16	GW-11	0.0004		2.2	0.005	0.005	0.005	0.005

RUN #2

Metals - November 21, 1990

Calculation Data

C.C. Wood Multimetal Train 2

Section I: Particulate Sampling Data

Point #	Delta P	Delta H	T S	T i	T in	T out	VAC	Filter Temp.	VEL (FPS)
A-6	1.30	2.34	142	39	42	41	6.8	275	69.6
A-5	1.50	2.77	143	40	45	41	9.0	272	74.8
A-4	1.30	2.34	143	40	48	42	9.0	268	69.6
A-3	1.10	2.00	142	40	49	43	9.0	270	64.0
A-2	0.60	1.08	136	42	51	44	9.0	265	47.0
A-1	0.17	0.29	132	43	53	45	9.0	263	24.9
B-6	1.30	2.34	143	43	59	47	9.0	270	69.6
B-5	0.78	1.40	143	44	59	47	9.0	273	53.9
B-4	0.52	0.93	143	45	59	50	4.0	270	44.0
B-3	0.39	0.70	138	46	61	50	3.0	268	38.0
B-2	0.13	0.61	132	47	64	51	3.0	265	22.2
B-1	0.18	0.32	127	47	66	52	3.0	260	25.6
C-6	1.30	2.34	141	48	73	54	6.0	258	69.5
C-5	0.68	1.22	140	48	73	55	4.0	250	50.2
C-4	0.29	0.52	137	49	72	56	3.0	255	32.7
C-3	0.18	0.32	136	51	71	57	2.0	260	25.8
C-2	0.20	0.36	131	51	72	58	2.0	250	27.0
C-1	0.20	0.36	130	51	73	59	2.0	245	27.0
D-6	1.50	2.70	129	51	78	60	8.0	250	73.9
D-5	0.75	1.35	139	51	78	61	4.0	250	52.7
D-4	0.48	0.86	136	51	77	62	3.5	260	42.1
D-3	0.38	0.68	132	51	77	63	3.0	265	37.3
D-2	0.45	0.81	130	51	77	64	3.0	270	40.5
D-1	0.45	0.81	129	52	78	65	3.0	270	40.5
AVG	0.67	1.23	136	47	65	53	5.3	263	46.8

NOMENCLATURE

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

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

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condensor (oF)

Tin = Dry gas meter inlet temperature

Tout = Dry gas meter outlet temperature

Vac = Sample pump vacuum (in. Hg)

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

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

C.C. Wood Multimetal Train 2

FIELD DATA SHEET

VOLUME OF CONDENSED MOISTURE

Impinger #	Gross	Tare	Net
1	131 ml	0 ml	131 ml
2 & 3	200 ml	200 ml	0 ml
4 & 5	200 ml	200 ml	0 ml
6	210 gram	200 gram	10 gram
	TOTAL CONDENSED MOISTURE		141 ml

STACK GAS MOLECULAR WEIGHT

PERCENT CARBON DIOXIDE	=	3.50
PERCENT OXYGEN	=	17.50
PERCENT CARBON MONOXIDE	=	0.00
PERCENT NITROGEN & INERTS	=	79.00

COMPONENT	VOLUME%	• MOISTURE CORR *	MOLWT =	MASS FRAC
WATER	14.00	1.00	18.00	2.52
CARBON DIOXIDE	3.50	0.86	44.00	1.32
OXYGEN	17.50	0.86	32.00	4.82
CARBON MONOXIDE	0.00	0.86	28.00	0.00
NITROGEN & INERTS	79.00	0.86	28.00	19.02
		AVERAGE MOLECULAR WEIGHT =		27.68

C.C. Wood Multimetal Train 2

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	284.800	CFT
Dry gas meter, final reading	=	323.835	CFT
Dry gas meter calibration factor	=	1.000	
Meter volume uncorrected for Temp & Press	=	39.035	CFT
Barometric pressure at site	=	30.35	in Hg
Meter pressure (barometer + average delta H)	=	30.74	in Hg
Average meter temperature during test	=	58.8	DEG F
Dry sample volume at standard conditions	=	40.195	CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	136.4	DEG F
Volume of condensed water	=	141	ml
Percent moisture of stack gas	=	14.00	%
Pitot tube correction factor	=	0.85	
Stack gas molecular weight	=	27.77	
Stack gas velocity at stack conditions	=	46.73	FT/SEC
Duration of sampling	=	72	Minute
Nozzle diameter	=	0.220	in
Percent isokinetic variation	=	97.9	%
Area of stack	=	13.40	SQ FEET
Stack flow rate, standard conditions	=	28938	DSCFM

C.C. Wood Multimetal Train 2

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

Compound		Mass (ug)		Emmission rate (10-3 lb/hr)
Arsenic	<	11.50	<	1.09
Beryllium	<	1.15	<	0.11
Cadmium	<	2.30	<	0.22
Copper	<	1.15	<	0.11
Mercury	=	3.96	=	0.38
Nickel	<	11.50	<	1.09
Lead	<	5.70	<	0.54
Selenium	<	11.50	<	1.09
Zinc	=	183.89	=	17.47
Manganese	=	21.98	=	2.09

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

Environmental Studies
Robotics
Toxicology

FIELD TEST DATA FORM

Site: [illegible] CC Wood Date: 11/21/90 Test No. YH (2)

Nozzle I.D. CGC-4 Diameter .220 Filter No. YH121

LEAK CHECKS: Pitot tubes -- Initial: y Final y at 4 in Hg

K-I-S Sample train -- Initial ___ Final ___

start at 284.800 Leak check < .005 at 10 in Hg for 1 min Leak check < .005 at 10 in Hg for 1 min

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
35	A-6	1.2	2.34	143	39	42	41	6.8	27.5
								287.000	
4	5	1.15	2.77	143	40	45	41	9.0	27.2
								289.500	
9	4	1.3	2.34	143	40	48	42	—	26.8
								292.000	
12	3	1.1	2.00	142	40	49	43	—	27.0
								294.000	
15	2	1.00	1.65	136	42	51	40	9.5	26.5
								296.000	
18	1	0.74	1.19	132	43	53	45	9.0	26.3
								298.950	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
21	5-6	1.3	2.34	143	43	54	47	—	27.0
								299.300	
24	5	1.075	1.4	143	44	54	47	—	27.0
								300.800	
27	4	0.52	0.93	143	45	54	50	4.0	27.0
								301.900	
30	3	.39	1.10	138	46	61	50	3.0	26.5
								303.200	
	2	.134	.161	132	47	64	51	3.0	26.5
								304.500	
36	1	.14	.32	1.27	1.25	66	52	3.0	26.0
								305.50	

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FIELD TEST DATA FORM

Site: cc wood Date: 11/21/90 Test No. MM(2)

Nozzle I.D. Eight Diameter 0.22 Filter No. MM(2)

LEAK CHECKS: Pitot tubes -- Initial ____ Final ____

Sample train -- Initial ____ Final ____

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
39	C	1.3	2.34	141	48	73	54	6.0	258
								307.160	
42	5	0.85	1.32	141	48	73	55	4.0	250
								309.400	
45	4	0.29	0.52	137	49	72	56	3.0	255
								310.600	
48	3	0.15	0.32	134	51	71	57	2.0	246
								311.600	
51	2	0.25	0.61	131	51	72	58	2.5	250
								312.160	
54	E	0.20	0.34	130	51	73	59	2.0	245
								313.65	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
57	D	1.6	2.7	129	51	78	60	8.0	250
								316.060	
60	5	0.75	1.55	139	51	78	61	4.0	250
								318.000	
63	4	0.45	0.86	136	51	77	62	3.5	260
								317.500	
66	3	0.38	0.68	132	51	77	63	3.0	265
								3210.850	
69	2	0.45	0.81	130	51	77	64	3.0	270
								322.350	
72	1	0.44	0.81	129	52	78	65	3.0	270
								323.350	

Analytical Data

METALS
EPA MULTIMETAL METHOD

CLIENT : C.C. Wood
PROJECT: Shining Tree
SAMPLING DATE:
SAMPLE I.D.: Train : M.M. 2

COMPOUND	D/L ppm	Filter Front Rinse µg/ml	DF, µg	Impinger Back Rinse µg/ml	DF, µg	Total µg
Arsenic	0.1	<0.1	<6	<0.1	<55	<11.5
Beryllium	0.01	<0.01	<0.6	<0.01	<.55	<1.15
Cadmium	0.02	<0.02	<1.2	<0.02	<1.1	<2.3
Chromium	0.02	0.0307	1.852	0.066	3.622	5.67
Copper	0.01	<0.01	<0.6	<0.01	<0.55	<1.15
Nickel	0.1	<0.1	<6	<0.1	<5.5	<11.5
Lead	0.05	<0.05	3	<0.05	<2.7	<5.7
Selenium	0.1	<0.1	<6	<0.1	<5.5	<11.5
Zinc	0.01	1.527	91.62	1.681	92.27	183.89
Manganese	0.01	0.293	17.58	0.0803	4.40	21.98
Mercury	0.001		0.0033	DF3 1200	396	396

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

$DF_2 = 50 \times \frac{561}{511} = 54.89$

Hg : $DF_3 = 50 \times \frac{240}{10} = 1200$

US 933-2900

Sept/19 Met 2 6:15 - 10:00
① C.C.W.C.
②

EUREKA LABORATORY INORGANIC REPORT SUMMARY (WATER)

Test: Metals
Method: EPA 6010
Client: Shimmo Trac
EL Order: 90-11-177

Date Received: 11-21-90
Date Extracted: 11-26-90
Date Analyzed: 11-27-90
Chemist: Jose Guiamboo

ELEMENT	FILTER Bk	FIELD BK	MM-2 Filter + Front Rinse	MM-3 Back-Rinse Impinger-1,2,3	Recg. (S)	Recg (d)	Method Bk	Mg/L D/L
Ag	<.0000	<.0000	<.0000	<.0000	115%	114%	.0042	0.01
As	.0013	<.0000	<.0000	<.0000	106	107	.0033	0.1
Ba	.1134	.0266	.2687	.0545	100	101	.0008	0.02
Be	.0006	<.0000	.0006	<.0000	131	132	.0004	0.01
Cd	<.0000	<.0000	.0118	.0064	107	106	.0005	0.02
Co	<.0000	<.0000	.0052	<.0000	108	108	.0025	0.02
Cr	.0117	.0044	.0342	.0060	102	102	.0041	0.02
Cu	.0219	.0095	.6085	.4793	105	106	.0002	0.01
Hg	.0129	<.0000	.0097	.0004	103	102	.0001	0.05
Mo	.0035	<.0000	.0059	.0017	117	118	.0020	0.02
Ni	.0091	<.0000	.0590	.0387	92	91	.0021	0.1
Pb	.0008	<.0000	.0271	<.0000	102	102	.0163	0.05
Sb	.0230	<.0000	.0310	<.0000	104	103	.0196	0.05
Se	.0385	<.0000	.0246	.0019	108	108	.0320	0.1
Tl	<.0000	<.0000	.0100	<.0000	89	89	.0093	0.1
V	.0089	<.0000	.0244	<.0000	104	102	.0025	0.01
Zn	.3781	.2428	1.527	1.681	101	100	.0097	0.01
Mn	.0256	.0219	.2930	.0803	106	105	.0009	0.01

Client: Shining Star 70-11-177

ANALYSIS: Hg Air ~~Water~~ Samples

METHOD: 7470

ELI NO.	SAMPLE ID.	LOCATION	UNITS: ~~mg/L~~ (ppm)
1A	mm-Filter Bk		0.0004
2A	mm-Field Bk-Metals		0.0002
3A	mm-Field Bk-Hg		0.0028
4A	mm-2 (Filter + Front Rinse)		0.0000
5A	mm-2 (Bk Rinse + Imp 1,2,3)		0.0001
6A	mm-2 Impngr. 4,5		0.0033 ✓
	Reag - (S)		108%
	Reag - (ds)		110%
	Method Blank		
	Detection Limit		0.001 ppm

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

Analyst: Tamara Ohm

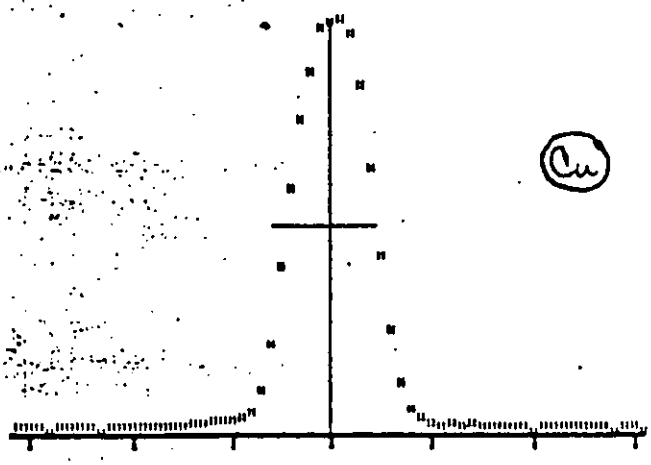
Extraction Date: 11/26/90

Date Reported: 11/27/90

E58

Calibration Data

PROFILE FOR PHYSICAL CHANNEL 13
27-NOV-90 08:26



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

PEAK IS AT POSITION 0
PEAK HAS A WIDTH OF 10.6

MAX = 152 MIN = 18

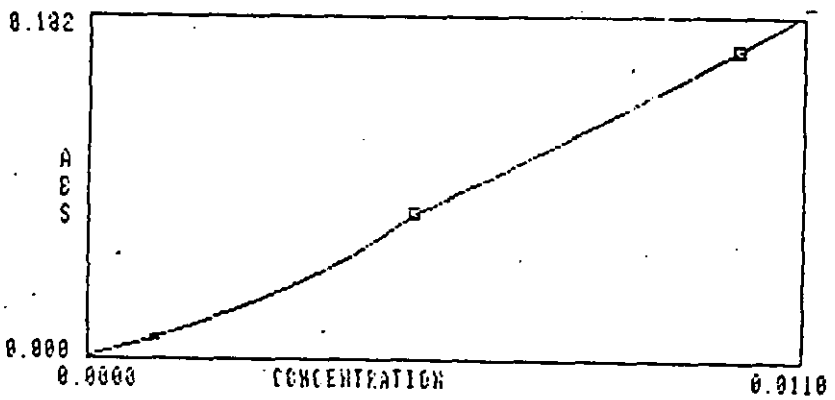
1) Anderson Geo - 106 - (3)
2) Charge Army - 194 - (2)
3) Shining Tree - 104 - (7) oil splr
4) Shining Tree - 177 - (4) air splr
5) Tetra Tech - 109 - (3)
6) Noel - - - - - 114 - (4)
7) Nore - - - - 141 - (3)
8) Nore - 135 - (2)
9) Nore - - 119 - (2)
10) Nore - 126 - (2)

Varian SpectrAA 30/40 System Report

OPERATOR TAMARA JEROME
DATE 11-27-90
BATCH HG

PROGRAM 2 Hg COLD VAPOR

SAMPLE	CONC	%RSD	MEAN ABS	READINGS			
BLANK	0.0000		-0.001	-0.001	-0.001	-0.001	
STANDARD 1	0.0010	0.0	0.010	0.010	0.010	0.010	
STANDARD 2	0.0050	1.6	0.077	0.076	0.077	0.079	
STANDARD 3	0.0100	0.6	0.166	0.165	0.166	0.166	



SAMPLE 1 ICV	0.0052	VOK	1.1	0.080	0.079	0.081	0.081
SAMPLE 2 ICB	-.0000		64.6	-0.001	-0.000	-0.001	-0.000
SAMPLE 3 LCS	0.0054	108%	0.6	0.084	0.084	0.084	0.085 RE
SAMPLE 4 LCS Dup	0.0055	110%	0.5	0.086	0.086	0.087	0.087 RE(DS)
SAMPLE 5	0.0034		1.1	0.043	0.044	0.043	0.043 mm-2 Imping (S)
SAMPLE 6	0.0048		0.2	0.074	0.074	0.074	0.074 mm-2 Imping (DS)
SAMPLE 7	0.0000		99.9	-0.000	0.000	0.000	-0.000 BK
SAMPLE 8	0.0004		1.3	0.005	0.004	0.005	0.005 mm - Filter BK
SAMPLE 9	0.0002		9.3	0.002	0.003	0.002	0.002 mm 2 Field BK Metals
SAMPLE 10	0.0028		0.8	0.034	0.034	0.034	0.034 mm Field BK Hg
SAMPLE 11	0.0000		23.3	0.001	0.001	0.000	0.001 mm 2 Filter + Front Rs
SAMPLE 12	0.0001		16.0	0.001	0.001	0.001	0.002 mm 2 Back Rinse Imp 1,
SAMPLE 13 CCV	0.0053	VOK	0.3	0.083	B-39 0.083	0.083	0.083
SAMPLE 14 CCB	0.0000		99.9	0.000	-0.000	0.000	0.000
SAMPLE 15	0.0033		0.5	0.042	E63 0.042	0.042	0.042 mm-2 Imp 4,5
SAMPLE 16 CCV	0.0052						

ACT NAME : CAM TIME:27-NOV-90 09:00 STANDARD NAME : STD5

	I.S.	HG	V
EXP# 1	1000	8.295	13.35
EXP# 2	1000	8.288	13.30
EXP# 3	1000	8.230	13.32
AVERAGE	1000	8.271	13.32

ACT NAME : CAM TIME:27-NOV-90 09:04 STANDARD NAME : STD6

	I.S.	AG
EXP# 1	1000	11.98
EXP# 2	1000	12.27
EXP# 3	1000	12.25
AVERAGE	1000	12.17

ACT NAME : CAM TIME:27-NOV-90 09:08 STANDARD NAME : STD7

	I.S.	AL	FE	CA	MG
EXP# 1	1000	19.15	17.91	11.79	14.91
EXP# 2	1000	19.14	17.85	11.73	14.91
EXP# 3	1000	19.04	17.87	11.76	14.84
AVERAGE	1000	19.11	17.88	11.76	14.89

ACT NAME : CAM TIME:27-NOV-90 09:12 STANDARD NAME : STD8

	I.S.	NA	MN
EXP# 1	1000	56.27	18.64
EXP# 2	1000	55.77	18.57
EXP# 3	1000	56.43	18.70
AVERAGE	1000	56.16	18.64

ACT NAME : CAM TIME:27-NOV-90 09:16 STANDARD NAME : STD9

	I.S.	K	B
EXP# 1	1000	4.721	2.888
EXP# 2	1000	4.724	2.890
EXP# 3	1000	4.738	2.927
AVERAGE	1000	4.728	2.902

ACT NAME : CAM TIME:27-NOV-90 08:44 STANDARD NAME : STD1

	I.S.	AG	AS	BA	BE	CD	CO	CR	CU	HG
EXP# 1	1000	.1690	.3150	.0170	.0190	.0680	.3560	.1740	.1600	.102
EXP# 2	1000	.1710	.3230	.0180	.0190	.0690	.3560	.1780	.1570	.101
EXP# 3	1000	.1710	.3210	.0180	.0190	.0710	.3590	.1770	.1570	.097
AVERAGE	1000	.1703	.3197	.0177	.0190	.0693	.3570	.1763	.1580	.100

	MO	NI	PB	SB	SE	TL	V	ZN	AL	FE
EXP# 1	.2700	.1640	1.035	.7970	.6040	.1510	.1520	.0600	1.484	.258
EXP# 2	.2730	.1670	1.048	.8100	.6040	.1480	.1530	.0590	1.489	.259
EXP# 3	.2730	.1750	1.048	.8150	.6110	.1460	.1530	.0580	1.493	.260
AVERAGE	.2720	.1687	1.044	.8073	.6063	.1483	.1527	.0590	1.489	.259

	CA	MG	NA	MN	K	B
EXP# 1	.4690	1.205	.8730	.0400	2.309	.0550
EXP# 2	.4740	1.220	.8550	.0400	2.327	.0530
EXP# 3	.4730	1.223	.8740	.0410	2.330	.0530
AVERAGE	.4720	1.216	.8673	.0403	2.322	.0537

ACT NAME : CAM TIME:27-NOV-90 08:48 STANDARD NAME : STD2

	I.S.	BA	CD	CO	CU	PB	ZN
EXP# 1	1000	8.329	18.49	27.34	16.95	13.06	12.12
EXP# 2	1000	8.291	18.50	27.26	16.88	13.06	12.10
EXP# 3	1000	8.220	18.45	27.15	16.77	13.02	12.06
AVERAGE	1000	8.280	18.48	27.25	16.87	13.05	12.10

ACT NAME : CAM TIME:27-NOV-90 08:52 STANDARD NAME : STD3

	I.S.	BE	MO	NI	SB	TL
EXP# 1	1000	15.51	24.85	12.67	15.47	4.022
EXP# 2	1000	15.73	25.02	12.73	15.64	4.062
EXP# 3	1000	15.60	24.86	12.63	15.60	4.001
AVERAGE	1000	15.62	24.91	12.64	15.57	4.028

ACT NAME : CAM TIME:27-NOV-90 08:56 STANDARD NAME : STD4

	I.S.	AS	CR	SE
EXP# 1	1000	6.077	12.36	9.531
EXP# 2	1000	6.049	12.31	9.541
EXP# 3	1000	6.051	12.28	9.486
AVERAGE	1000	6.059	12.31	9.519

APPENDIX C

Lead Data and Calculations

FIELD BLANK

Analytical Data

Analytical Data

C.C. Wood Lead Field Blank

SUMMARY OF QUANTITATIVE ANALYSIS

Lead	Mass (ug)
Lead	0.25

METALS
EPA MULTIMETAL METHOD

CLIENT : CC Wood
PROJECT: Shiming Tree
SAMPLING DATE:
SAMPLE I.D.: Train : Lead BK (method-12)

COMPOUND	D/L ppm		Filter BK impingers and rinses µg/L	DF	Total µg.	
Arsenic	0.1					
Beryllium	0.01					
Cadmium	0.02					
Chromium	0.02					
Copper	0.01					
Nickel	0.1					
Lead	~~0.05~~ 0.003		0.005	50	0.25	
Selenium	0.1					
Zinc	0.01					
Manganese	0.01					
Mercury	0.001					

DF = 50

RUN #1

Lead - November 13, 1990

Calculation Data

C.C. Wood Lead Train 1

Section I: Particulate Sampling Data

Point #	Delta P	Delta H	T S	T i	T in	T out	VAC	Filter Temp.	VEL (FPS)
A-6	1.80	3.20	134	56	66	63	9.0	230	81.3
A-5	1.50	2.70	134	55	67	63	13.0	232	74.2
A-4	1.10	1.98	134	55	68	64	10.0	240	69.2
A-3	0.95	1.71	133	54	69	64	10.0	255	59.0
A-2	0.75	1.35	131	53	71	65	8.0	266	52.4
A-1	0.30	0.54	127	52	72	65	5.0	262	33.1
B-6	1.10	1.98	132	52	75	66	8.0	265	63.4
B-5	0.70	1.26	139	55	70	69	4.0	240	50.6
B-4	0.55	0.99	136	56	71	69	3.5	249	44.8
B-3	0.38	0.68	132	57	74	69	3.0	251	37.2
B-2	0.30	0.54	129	57	76	70	2.5	255	33.1
B-1	0.18	0.32	125	57	77	71	2.0	258	25.6
C-6	1.30	2.34	135	58	84	72	6.5	260	69.0
C-5	0.65	1.20	135	58	84	72	4.2	261	48.8
C-4	0.72	1.92	245	58	80	73	6.0	248	51.4
C-3	0.20	0.36	134	65	84	78	2.0	238	27.1
C-2	0.17	0.30	133	62	84	78	2.0	232	24.9
C-1	0.17	0.30	130	53	88	80	2.0	260	24.8
D-6	1.50	2.70	132	54	93	80	7.2	268	74.0
D-5	0.82	1.47	132	54	93	81	4.5	270	55.1
D-4	0.50	0.90	131	54	94	82	3.0	256	42.9
D-3	0.38	0.68	130	54	95	83	3.0	240	37.3
D-2	0.42	0.75	130	53	96	84	3.0	235	39.1
D-1	0.38	0.68	130	54	97	85	2.5	232	37.0
AVG	0.70	1.23	130	56	80	73	5.2	250	48.1

NOMENCLATURE

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

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

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condensor (oF)

Tin = Dry gas meter inlet temperature

Tout = Dry gas meter outlet temperature

Vac = Sample pump vacuum (in. Hg)

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

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

C.C. Wood Lead Train 1

FIELD DATA SHEET

VOLUME OF CONDENSED MOISTURE

Impinger #	Gross	Tare	Net
1	192 ml	100 ml	92 ml
2	100 ml	100 ml	0 ml
3	0 ml	0 ml	0 ml
4	210 gram	200 gram	10 gram

TOTAL CONDENSED MOISTURE 102 ml

STACK GAS MOLECULAR WEIGHT

PERCENT CARBON DIOXIDE	=	3.50
PERCENT OXYGEN	=	17.50
PERCENT CARBON MONOXIDE	=	0.00
PERCENT NITROGEN & INERTS	=	79.00

COMPONENT	VOLUME% *	MOISTURE CORR •	MOLWT =	MASS FRACTION
WATER	10.26	1.00	18.00	1.85
CARBON DIOXIDE	3.50	0.90	44.00	1.38
OXYGEN	16.00	0.90	32.00	4.59
CARBON MONOXIDE	0.00	0.90	28.00	0.00
NITROGEN & INERTS	78.00	0.90	28.00	19.60
		AVERAGE MOLECULAR WEIGHT =		27.42

C.C. Wood Lead Train 1

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	219.275	CFT
Dry gas meter, final reading	=	261.390	CFT
Dry gas meter calibration factor	=	1.000	
Meter volume uncorrected for Temp & Press	=	42.115	CFT
Barometric pressure at site	=	29.95	in Hg
Meter pressure (barometer + average delta H)	=	30.33	in Hg
Average meter temperature during test	=	76.5	DEG F
Dry sample volume at standard conditions	=	41.376	CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	130.0	DEG F
Volume of condensed water	=	102	ml
Percent moisture of stack gas	=	10.26	%
Pitot tube correction factor	=	0.85	
Stack gas molecular weight	=	28.19	
Stack gas velocity at stack conditions	=	47.79	FT/SEC
Duration of sampling	=	72	Minute
Nozzle diameter	=	0.220	in
Percent isokinetic variation	=	94.7	%
Area of stack	=	13.40	SQ FEET
Stack flow rate, standard conditions	=	30805	DSCFM

C.C. Wood Lead Train 1

SECTION IV SUMMARY OF QUANTITATIVE ANALYSIS
EMISSION RATE OF LEAD

Compound		Mass (ug)		Emmission rate (10-3 lb/hr)
Lead	=	17.30	=	1.70

Field Data

Corporate Office:
6790 FLORIN PERKINS ROAD
SACRAMENTO, CA 95828
TEL: (916) 381-7953
FAX: (916) 381-9013

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

Environmental Studies
Robotics
Toxicology

FIELD TEST DATA FORM

Site: [illegible] Date: 11/13/95 Test No. Pb Lead (1)

Nozzle I.D. .615 Diameter .220 Filter No. Pb Lead (1)

LEAK CHECKS: Pitot tubes -- Initial yes/no Final yes/no

Sample train -- Initial ____ Final ____

start at .219.275 Leak check @ .005 at 10 in Hg for 1 min leak check @ at 10 min

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
02 3	4.6	1.8	2.29	134	56	66	.63	9.0	230
								222.00	
6	5	1.5	2.7	134	55	67	63	13.0	232
								224.750	
9	4	1.1	1.98	134	55	68	64	10.0	240
								227.00	
12	3	0.95	1.71	133	54	69	64	10.0	25
								229.1[illegible]	
15	2	0.75	1.35	131	53	71	65	8.0	261
								231.[illegible]0	
18	1	0.30	0.54	127	52	72	67	5.0	262
								232.350	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
2	1	1.1	1.98	132	52	75	69	8.0	267
								234.550	
24	14	1.70	1.26	139	55	70	69	4.0	240
								236.30	
27	4	0.55	0.99	136	56	71	69	3.5	249
								237.900	
30	3	0.38	0.68	132	57	74	69	3.0	251
								2:39 3:00	
33	2	0.30	0.54	129	57	76	70	2.5	255
								241.55	
36	1	0.18	0.32	125	57	77	71	2.0	258
								241.600	

C-13

E76

6790 FLORIN PERKINS ROAD
SACRAMENTO, CA 95826
TEL: (916) 381-7953
FAX: (916) 381-4013

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

Environmental Studies
Robotics
Toxicology

FIELD TEST DATA FORM

continued.

Site: SC wood Date: 11/13/90 Test No. load (1)

Nozzle I.D. Fol. 4 Diameter 0.220 Filter No. load (1)

LEAK CHECKS: Pitot tubes -- Initial ____ Final ____

Sample train -- Initial ____ Final ____

IME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
39	16	1.3	2.34	1355	58	84	72	6.5	250
10.43								243.90	
42	4	1.65	1.20	1355	58	84	72	4.2	261
11.02								245.865	
45	5	0.72	1.30	132	60	83	77	4.0	248
								247.710	
48	3	0.20	0.136	1314	65	84	78	2.0	2321
								248.855	
51	12	1.17	1.30	1331	62	84	78	2.0	2318
								249.355	
54	1	0.17	1.50	1310	53	84	80	2.6	2610
								253.80	

ME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
57	16	1.5	2.7	1322	54	93	88	7.1	266
								256.415	
60	15	1.82	1.47	1321	54	93	81	4.5	276
								255.40	
63	4	0.5	0.9	131	54	94	82	3.0	256
								257.00	
66	2	0.38	1.62	1330	54	95	83	3.0	240
								258.140	
69	7	1.42	1.75	1336	51	91	84	3.5	2335
								259.800	
14	1	0.38	0.68	1330	54	97	85	2.5	232
								261.390	

Analytical Data

METALS
EPA MULTIMETAL METHOD

CLIENT : C.C. Wood
PROJECT: shining Tree
SAMPLING DATE:
SAMPLE I.D.: Train Lead-1 (Method 12)

COMPOUND	D/L ppm		Filter + Imp + Rinses µg/ml	DF	µg	
Arsenic	0.1					
Beryllium	0.01					
Cadmium	0.02					
Chromium	0.02					
Copper	0.01					
Nickel	0.1					
Lead	0.0031 ~~0.05~~		0.346	50	17.3	
Selenium	0.1					
Zinc	0.01					
Manganese	0.01					
Mercury	0.001					

DF = 50 ml

Client: Thiming Chee 401105

ANALYSIS: Pb - air ~~SOIL~~ SAMPLES

METHOD: 7421

ELI NO.	SAMPLE ID.	LOCATION	UNITS: ~~mg/kg~~ (ppm)
	Pb-Field BK		0.002
	Pb-Filter BK		0.003
	Pb-1 (FLT, PAF Rinse)		0.346 * DL=0.060 ppm
			* This reflects a 20x after digest dilution.
	Reag (s)		110%
	Reag (ds)		100%
	Method Blank		<
	Detection Limit		0.003 ppm

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

Analyst: Mamata Verma
Date Reported: 11/19/90
Extraction Date: 11/15/90

Calibration Data

R-99879

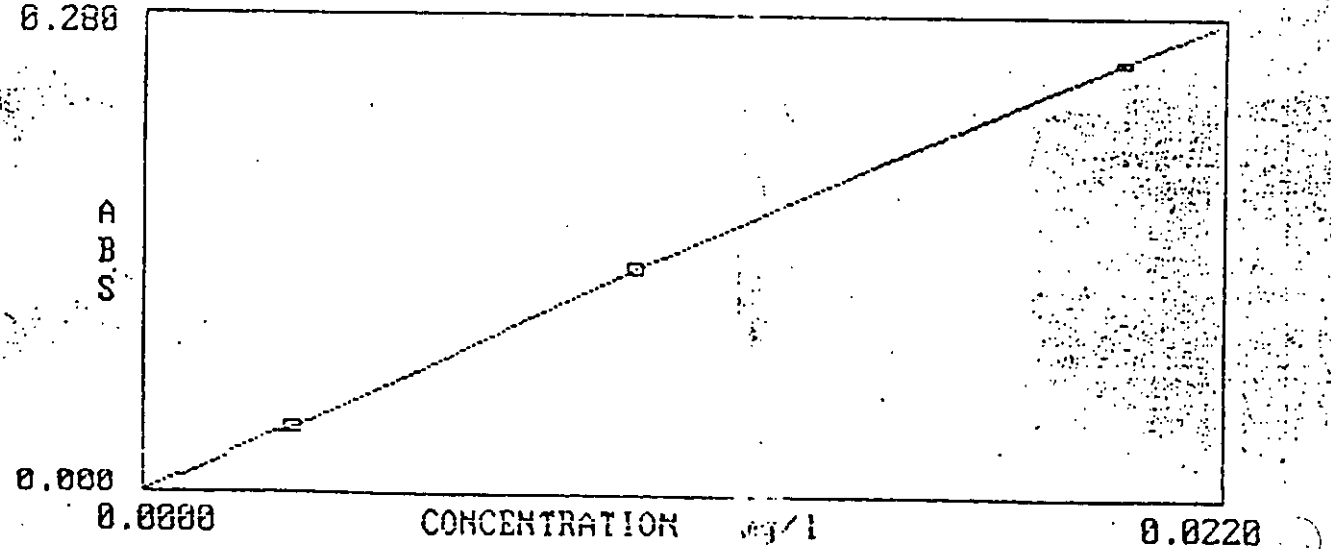
Varian SpectrAA 300/400 Zeeman Report

EUREKA LABORATORIES, INC.

OPERATOR tamara jerome
DATE 11-19-90
BATCH PB

PROGRAM 1 Pb no mod

SAMPLE	CONC mg/l	%RSD	MEAN ABS	READINGS	
BLANK	0.0000		0.014	0.023	0.004
BLANK	0.0000		-0.012	-0.011	-0.012
STANDARD 1	0.0030	2.8	0.038	0.037	0.038
STANDARD 2	0.0100	1.6	0.132	0.133	0.131
STANDARD 3	0.0200	1.2	0.255	0.254	0.255



RUN #2

Lead - November 21, 1990

Calculation Data

C.C. Wood Lead Train 2

Section I: Particulate Sampling Data

Point #	Delta P	Delta H	T S	T i	T in	T out	VAC	Filter Temp.	VEL (FPS)
A-6	1.50	2.70	141	55	73	68	6.0	230	74.5
A-5	1.34	2.34	139	55	74	68	6.0	265	70.4
A-4	1.50	2.70	137	54	76	69	8.0	260	74.3
A-3	1.10	2.00	138	54	77	69	7.0	255	63.7
A-2	0.62	1.10	131	53	71	65	8.0	266	47.5
A-1	0.18	0.32	125	54	77	70	3.0	245	25.6
B-6	1.70	3.06	137	53	78	70	10.0	248	78.8
B-5	0.83	1.50	138	53	78	70	7.0	251	55.3
B-4	0.50	0.90	136	53	77	71	5.0	255	43.0
B-3	0.32	0.57	135	54	77	71	5.0	260	34.3
B-2	0.30	0.54	127	54	78	71	3.0	262	33.2
B-1	0.18	0.32	127	54	78	71	2.0	271	25.6
C-6	1.70	3.06	133	55	81	71	8.0	268	79.9
C-5	0.80	1.45	133	55	80	71	5.0	270	54.7
C-4	0.22	0.40	130	55	78	72	3.0	272	28.6
C-3	0.22	0.40	130	55	78	72	2.5	270	28.7
C-2	0.20	0.36	123	57	78	72	2.0	268	27.2
C-1	0.22	0.40	124	59	79	73	2.0	258	28.4
D-6	1.70	3.06	125	56	82	73	8.0	255	79.6
D-5	0.75	1.35	130	54	82	73	8.0	250	52.9
D-4	0.46	0.83	132	56	82	73	3.0	248	41.4
D-3	0.45	0.81	130	56	82	74	3.0	250	40.9
D-2	0.48	0.86	129	57	83	74	4.0	245	42.0
D-1	0.45	0.81	123	58	83	75	3.0	240	40.6
AVG	0.74	1.27	130	55	78	71	5.1	257	48.8

NOMENCLATURE

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

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

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condensor (oF)

Tin = Dry gas meter inlet temperature

Tout = Dry gas meter outlet temperature

Vac = Sample pump vacuum (in. Hg)

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

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

FIELD DATA SHEET

VOLUME OF CONDENSED MOISTURE

Impinger #	Gross	Tare	Net
1	226 ml	100 ml	126 ml
2	101 ml	100 ml	1 ml
3	0 ml	0 ml	0 ml
4	207 gram	200 gram	7 gram

TOTAL CONDENSED MOISTURE 134 ml

STACK GAS MOLECULAR WEIGHT

PERCENT CARBON DIOXIDE	=	3.50
PERCENT OXYGEN	=	17.50
PERCENT CARBON MONOXIDE	=	0.00
PERCENT NITROGEN & INERTS	=	79.00

COMPONENT	VOLUME%	* MOISTURE CORR	* MOLWT =	MASS FRAC
WATER	13.08	1.00	18.00	2.35
CARBON DIOXIDE	3.50	0.87	44.00	1.34
OXYGEN	16.00	0.87	32.00	4.45
CARBON MONOXIDE	0.00	0.87	28.00	0.00
NITROGEN & INERTS	78.00	0.87	28.00	18.98
		AVERAGE MOLECULAR WEIGHT =		27.13

C.C. Wood Lead Train 2

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	324.162	CFT
Dry gas meter, final reading	=	366.100	CFT
Dry gas meter calibration factor	=	1.000	
Meter volume uncorrected for Temp & Press	=	41.938	CFT
Barometric pressure at site	=	29.95	in Hg
Meter pressure (barometer + average delta H)	=	30.32	in Hg
Average meter temperature during test	=	74.8	DEG F
Dry sample volume at standard conditions	=	41.330	CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	130.0	DEG F
Volume of condensed water	=	134	ml
Percent moisture of stack gas	=	13.08	%
Pitot tube correction factor	=	0.85	
Stack gas molecular weight	=	27.87	
Stack gas velocity at stack conditions	=	48.72	FT/SEC
Duration of sampling	=	72	Minute
Nozzle diameter	=	0.220	in
Percent isokinetic variation	=	95.8	%
Area of stack	=	13.40	SQ FEET
Stack flow rate, standard conditions	=	30414	DSCFM

C.C. Wood Lead Train 2

SECTION IV SUMMARY OF QUANTITATIVE ANALYSIS
EMISSION RATE OF LEAD

Compound		Mass (ug)		Emmission rate (10-3 lb/hr)
Lead	=	3.55	=	0.34

Field Data

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

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

Research & Testing
Environmental Studies
Robotics
Toxicology

FIELD TEST DATA FORM

Bar: 29.62

H2O silica

Site: CC Wood Date: 11/21/90 Test No. Pb(2)

Nozzle I.D. .614 Diameter .12 Filter No. Pb (2)

LEAK CHECKS: Pitot tubes -- Initial Y at 3 in H2O Final Y at 5 in H2O
K-1.8

Sample train -- Initial ____ Final ____
start at 324.162 leak check 0.00 at 10 in Hg 3.2 l/m leak check 0.00 at 10 in Hg 3.2 l/m

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
17 3	6	1.5	2.7	114	55	73	68	6.0	230
4	5	1.35	2.34	139	55	74	68	326.700	
								6.0	265
9	4	1.5	2.70	137	54	76	69	329.100	
								8.0	260
12	3	1.1	2.02	138	54	77	69	331.700	
								7.0	255
14	2	0.62	1.1	134	54	77	70	334.000	
								6.0	250
18	1	0.18	0.32	125	54	77	70	335.700	
								3.0	245
								336.750	

PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
2 6	1.7	3.16	137	53	78	70	10	248
24 5	1.83	1.50	138	53	78	70	339.300	
							7.0	251
4	0.50	0.90	136	53	77	71	341.250	
							5	255
3	0.32	0.57	135	54	77	71	343.000	
							3.0	260
32 2	0.20	0.54	127	54	78	71	344.200	
							3.0	262
1	0.15	0.32	127	54	78	71	345.500	
							2.0	271
							346.450	

Corporate Office:
6790 FLORIN PERKINS ROAD
SACRAMENTO, CA 95828
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12121 NORTHUP WAY, SUITE 212
BELLEVUE, WA 98005
TEL: (206) 885-0284
FAX: (206) 885-6162

Research & Testing
Environmental Studies
Robotics
Toxicology

Alk

FIELD TEST DATA FORM

p.2 of 2

Site: CC Wood Date: 11/21/90 Test No. PB(2)

Nozzle I.D. EGL.U Diameter 0.220 Filter No. PB(2)

LEAK CHECKS: Pitot tubes -- Initial _____ Final _____

Sample train -- Initial _____ Final _____

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
39	C 6	1.7	3.06	133	55	81	71	8.0	268
								349.040	
42	5	0.80	1.45	133	55	80	71	5.0	270
								350.950	
45	4	0.32	0.57	130	55	78	72	3.0	272
								352.250	
48	3	0.22	0.40	130	55	78	72	2.5	270
								353.350	
51	2	0.42	0.76	123	57	78	72	4.0	268
								354.300	
54	1	0.22	0.40	124	57	79	73	2.0	258
								355.450	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
57	D 6	1.7	3.06	125	56	82	73	8.0	255
								358.160	
60	5	0.75	1.35	130	55	82	73	4.0	250
								360.000	
63	4	0.46	0.83	132	56	82	73	3.0	248
								361.600	
66	3	0.45	0.81	130	56	82	74	3.0	250
								363.100	
69	2	0.45	0.81	129	57	83	74	4.0	245
								364.600	
72	1	0.45	0.81	123	55	83	75	3.0	245
								366.100	

Analytical Data

METALS
EPA MULTIMETAL METHOD

CLIENT : C.C. Wood
PROJECT: Shimmy Tier
SAMPLING DATE:
SAMPLE I.D.: Train Lead (P6.2).

COMPOUND	D/L ppm		Total µg/ml	DF2	Total µg	
Arsenic	0.1					
Beryllium	0.01					
Cadmium	0.02					
Chromium	0.02					
Copper	0.01					
Nickel	0.1					
Lead	~~0.05~~ 0.003		0.0710	50	3.55	
Selenium	0.1					
Zinc	0.01					
Manganese	0.01					
Mercury	0.001					

$V = 50 \times \frac{644}{644} = 50 ml.$

Client: [illegible]

ANALYSIS: Pb — Air Samples

METHOD: 7421

ELI NO.	SAMPLE ID.	LOCATION	UNITS: ~~mg/L~~ (ppm)
7A	Pb-Filter Blk		0.0006
8A	Pb-Field Blk		0.0027
JPJJ 10A~~FA~~	Pb-2(Frnt + Back Rinse (Imp)		0.0710 *DL = 0.0150 ppm
			* NOTE 3 This reflects a(5x) after digest dilution factor.
	Reag - (5)		88%
	Reag - (ds)		85%
	Method Blank		<
	Detection Limit		0.003 ppm

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

Analyst: Tamara Thomas
Extraction Date: 11/26/90
Date Reported: 11/27/90

Calibration Data

BLANK 0.0000 0.033 0.054 0.007

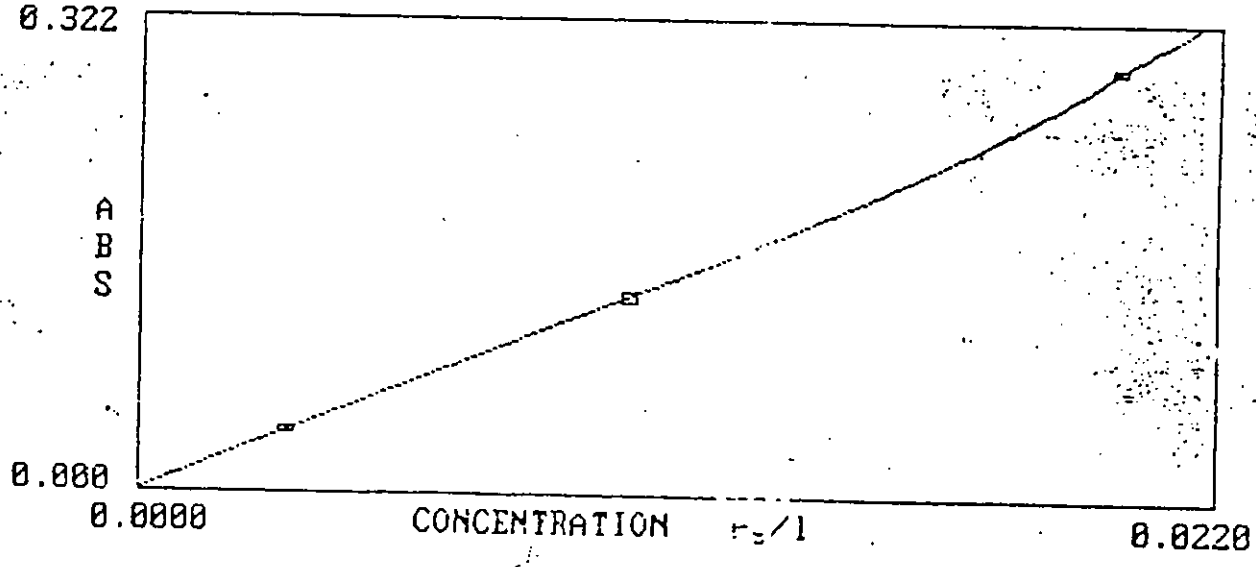
Varian SpectrAA 300/400 Zeeman Report

EUREKA LABORATORIES, INC.

OPERATOR tamara jerome
DATE 11-27-90
BATCH PB

PROGRAM 1 Pb no mod

SAMPLE	CONC -mg/l	%RSD	MEAN ABS	READINGS		
BLANK	0.0000		0.007	0.005	0.009	
STANDARD 1	0.0030	0.6	0.041	0.041	0.041	
STANDARD 2	0.0100	1.5	0.132	0.134	0.131	
STANDARD 3	0.0200	0.2	0.293	0.294	0.293	



SAMPLE 1 ICV	0.0109 OK	6.9	0.145	0.138	0.152
SAMPLE 2 ICB	0.0000	99.9	-0.000	-0.001	0.000
SAMPLE 3 RB	0.0002		0.033		0.108
SAMPLE 4 RB					

APPENDIX D

Chromium Data and Calculations

FIELD BLANK

Analytical Data

C.C. Wood Chromium & Hexavalent Chromium Field Blank

SUMMARY OF QUANTITATIVE ANALYSIS

Chromium	Mass (ug)
Chromium	1.3
Hexavalent Chromium	< 2

NOTE: "<" = less than

METALS
EPA MULTIMETAL METHOD

CLIENT : C.C.Wood
PROJECT: Shining Tree
SAMPLING DATE:
SAMPLE I.D.: Train ($Cr + Cr^{+6}$) BK Field Method 425

COMPOUND	D/L ppm	Filter BK 1 rinses µg/ml	DF	µg	Impinger BK µg/ml	DF_2	µg	Total µg.
Arsenic	0.1							
Beryllium	0.01							
Cadmium	0.02							
Chromium	~~0.02~~ 0.004	0.008		0.8	0.005		0.5	1.3
Copper	0.01							
Nickel	0.1							
Lead	0.05							
Selenium	0.1							
Zinc	0.01							
Manganese	0.01							
Mercury	0.001							
Cr^{+6}	0.005	<0.005		<1	<0.005		<1	<2

Cr: $DF_1 = DF_2 = ppm(\mu g/ml) * 50 * 2$

Cr^{+6}: $DF_1 = DF_2 = ppm(\mu g/ml) * 100 * 2$

RUN #1

Chromium - November 9, 1990

Calculation Data

C.C. Wood CARB 425 Train 1

Section I: Particulate Sampling Data

Point #	Delta P	Delta H	T S	T i	T in	T out	VAC	Filter Temp.	VEL (FPS)
A-6	1.50	2.70	125	44	44	44	4.0	263	73.4
A-5	1.50	2.70	126	44	45	44	4.2	266	73.3
A-4	1.30	2.30	125	45	47	44	4.0	267	68.3
A-3	1.05	1.70	125	45	50	45	3.8	263	61.4
A-2	0.54	0.97	126	46	53	45	2.5	247	44.0
A-1	0.23	0.41	121	47	54	46	2.0	235	28.7
B-6	1.40	2.50	127	47	57	46	4.5	243	71.0
B-5	0.75	1.35	126	48	59	47	3.0	252	51.9
B-4	0.40	0.72	125	48	58	48	2.0	265	37.9
B-3	0.33	0.59	120	50	59	48	2.0	254	34.4
B-2	0.35	0.63	120	51	59	49	2.0	240	35.4
B-1	0.22	0.40	119	51	59	49	2.0	255	28.0
C-6	1.40	2.50	123	53	63	50	4.2	265	71.0
C-5	0.59	1.06	122	55	63	50	3.5	260	46.2
C-4	0.30	0.54	122	55	62	51	2.0	258	32.9
C-3	0.21	0.76	122	56	62	52	2.0	252	27.5
C-2	0.20	0.36	121	57	62	52	2.0	247	26.9
C-1	0.18	0.32	120	58	63	52	2.0	240	25.4
D-6	1.40	2.50	124	59	67	53	4.2	242	71.2
D-5	0.72	1.30	123	58	67	54	3.0	249	51.0
D-4	0.48	0.84	123	58	67	54	2.5	253	41.6
D-3	0.45	0.81	123	58	68	55	2.0	261	40.1
D-2	0.42	0.75	122	59	68	56	2.0	260	38.7
D-1	0.36	0.64	120	60	70	56	2.0	250	35.8
AVG	0.68	1.17	121	52	59	50	2.8	254	46.5

NOMENCLATURE

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

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

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condensor (oF)

Tin = Dry gas meter inlet temperature

Tout = Dry gas meter outlet temperature

Vac = Sample pump vacuum (in. Hg)

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

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

FIELD DATA SHEET

VOLUME OF CONDENSED MOISTURE

Impinger #	Gross	Tare	Net
1	174 ml	100 ml	74 ml
2	100 ml	100 ml	0 ml
3	0 ml	0 ml	0 ml
4	207 gram	200 gram	7 gram

TOTAL CONDENSED MOISTURE 81 ml

STACK GAS MOLECULAR WEIGHT

PERCENT CARBON DIOXIDE	=	3.50
PERCENT OXYGEN	=	17.50
PERCENT CARBON MONOXIDE	=	0.00
PERCENT NITROGEN & INERTS	=	79.00

COMPONENT	VOLUME%	* MOISTURE CORR *	MOLWT =	MASS FRAC
WATER	8.40	1.00	18.00	1.51
CARBON DIOXIDE	3.50	0.92	44.00	1.41
OXYGEN	17.50	0.92	32.00	5.13
CARBON MONOXIDE	0.00	0.92	28.00	0.00
NITROGEN & INERTS	79.00	0.92	28.00	20.26
		AVERAGE MOLECULAR WEIGHT =		28.31

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	98.900	CFT
Dry gas meter, final reading	=	139.500	CFT
Dry gas meter calibration factor	=	1.000	
Meter volume uncorrected for Temp & Press	=	40.600	CFT
Barometric pressure at site	=	29.68	in Hg
Meter pressure (barometer + average delta H)	=	29.89	in Hg
Average meter temperature during test	=	54.5	DEG F
Dry sample volume at standard conditions	=	40.989	CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	121.0	DEG F
Volume of condensed water	=	81	ml
Percent moisture of stack gas	=	8.40	%
Pitot tube correction factor	=	0.85	
Stack gas molecular weight	=	28.66	
Stack gas velocity at stack conditions	=	46.42	FT/SEC
Duration of sampling	=	72	Minute
Nozzle diameter	=	0.220	in
Percent isokinetic variation	=	94.5	%
Area of stack	=	13.40	SQ FEET
Stack flow rate, standard conditions	=	30563	DSCFM

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

Compound		Mass (ug)		Emmssion rate (10-3 lb/hr)
Chromium	=	4.00	=	0.39
Hexavalent Chromium	<	2.00	<	0.20

Field Data

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

FIELD TEST DATA FORM

Site: _____ Date: 11/7/90 Test No. _____

Nozzle I.D. _____ Diameter _____ Filter No. _____

LEAK CHECKS: Pitot tubes -- Initial _____ Final _____

Sample train -- Initial _____ Final _____

PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
A-6								
5								
4	1.3	2.3	125	45	47	44	4.0	267
3								
2								

PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
B-6								
5								
4								
3								
2								

Corporate Office
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Environmental Studies
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Toxicology

FIELD TEST DATA FORM

continued.

Site: G C [illegible] Date: 11/7/[illegible] Test No. [illegible](1)

Nozzle I.D. [illegible] Diameter 0.220 Filter No. [illegible](1)

LEAK CHECKS: Pitot tubes -- Initial ____ Final ____

Sample train -- Initial ____ Final ____

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
39	C 6	1.4	2.5	123	53	63	50	4.2	265
								123.38	
42	5	0.59	1.06	122	55	63	50	3	260
								125.070	
45	4	0.30	0.54	122	55	62	51	2.0	258
								126.350	
48	3	0.21	0.36	122	56	62	52	2.0	252
								127.360	
51	2	0.20	0.36	121	57	62	52	2.5	247
								128.400	
54	1	0.18	0.32	120	58	63	52	2.0	240
								129.370	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
57	D 6	1.4	2.5	124	59	67	[illegible]	4.2	242
								131.79	
60	5	0.72	1.30	123	58	67	54	3.0	249
								133.60	
63	4	0.48	0.84	123	55	67	54	2.5	253
								135.10	
66	3	0.45	0.81	122	58	68	55	2.0	261
								136.160	
69	2	0.42	0.75	122	59	68	54	2.0	260
								138.10	
72	1	0.36	0.64	122	60	70	56	2.0	250
								139.50	

Analytical Data

METALS
EPA MULTIMETAL METHOD

CLIENT : C.C. Wood
PROJECT: shining Tree
SAMPLING DATE:
SAMPLE I.D.: Train Method 425 ($Cr + Cr^{+6}$) -1

COMPOUND	D/L ppm	Filter Rinses µg/ml	DF	µg	DF2 Impingers µg/ml	µg	Total µg
Arsenic	0.1						
Beryllium	0.01						
Cadmium	0.02						
Chromium	~~0.02~~ 0.004	0.029	2.9	0.011	1.1	4.0
Copper	0.01						
Nickel	0.1						
Lead	0.05						
Selenium	0.1						
Zinc	0.01						
Manganese	0.01						
Mercury	0.001						
Cr^{+6}	0.005	<0.005	<1	<0.005	<1	<2

Cr^{+6} DF = ppm * 100 * 2

Total Cr DF = ppm * 50 * 2

Client: Shining Star 9011-105

ANALYSIS: Cr in Water Samples

METHOD: 7191

ELI NO.	SAMPLE ID.	LOCATION	UNITS: ~~mg/L~~ (ppm)
	Cr Bk		0.008
13A	Cr Filter Bk		0.008
14A	Cr Field Bk		0.005
15A	Cr-1 Filter		0.016
16A	Cr-1 Rinse		0.013
17A	Cr-1 Impinger		0.011
18A	Cr-2 Filter		0.014
19A	Cr-2 Rinse		0.013
20A	Cr-2 Impinger		0.009
	Recg (S)		89%
	Recg (DS)		98%
	Method Blank		
	Detection Limit		0.004 ppm

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

Analyst: Tamara Jerome

Extraction Date: 11/15/90

Date Reported: 11/21/90

Client: SHANKS TREE (90-11-105)

ANALYSIS: CHROMIUM VI

METHOD: CARB 425 (diphenylcarbazide colorimetric method)

ELI. NO.	SAMPLE I.D.		CONCENTRATION (~~mg/L~~) (~~mg/Kg~~)
	CR-FILTER BK		<
	CR-FIELD BK		<
	CR 1-FILTER		<
	CR-1 RINSE		<
	CR 1 IMPINGER		<
	CR 2 FILTER		<
	CR 2 RINSE		<
	CR 2 IMPINGER		<
	REAGENT (5)		102%
	REAGENT (25)		96%
	METHOD BLANK		<
	D/L		0.005 ppm

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

Analyst: Benjamin Hanks

Date Reported: 11/19/90

Extraction Date: 11/15/90

CLIENT Stanislaus Tree (10-11-10S)

TEST CR VI

METHOD CARB 425

SAMPLE I.D.	ABSORBANCE	CONCENTRATION
BLANK	0.000	
STANDARD 1	0.004	0.005 ppm
STANDARD 2	0.010	0.010 ppm
STANDARD 3	0.024	0.025 ppm
STANDARD 4	0.050	0.050 ppm
STANDARD 5	0.074	0.075 ppm
STANDARD 6	0.092	0.100 ppm
REAGENT SPIKE	0.049	0.051 102%
REAGENT DUP SPIKE	0.046	0.048 96%
CR- FILTER BK	0.001	0.001
CR- FIELD BK	0.001	~~0.002~~ 0.001
CR-1 FILTER	0.003	0.003
CR-1 RINSE	0.003	0.003
CR-1 & IMPINGER	0.000	0.000
CR-2 FILTER	0.003	0.003
CR-2 RINSE	0.002	0.002
CR-2 IMPINGER	0.000	0.000
D/L		0.005

Benjamin Andrews
ANALYST

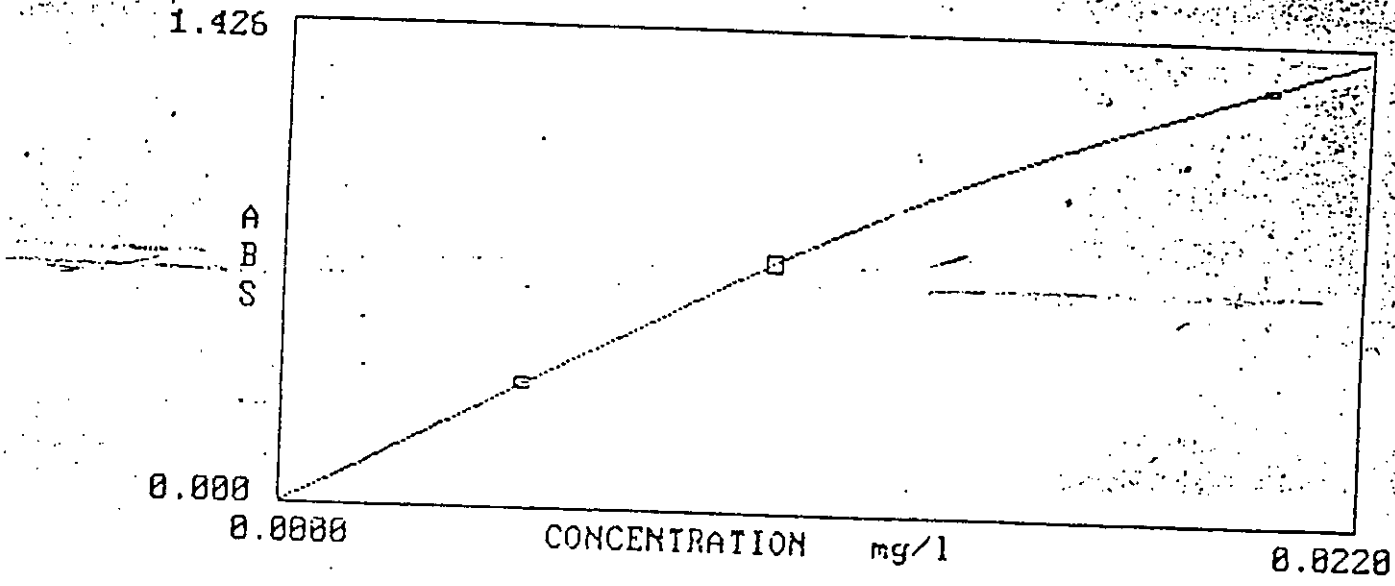
11/17/10
DATE

LABORATORIES, INC.

OPERATOR tamara jerome
DATE 11-21-90
BATCH CR

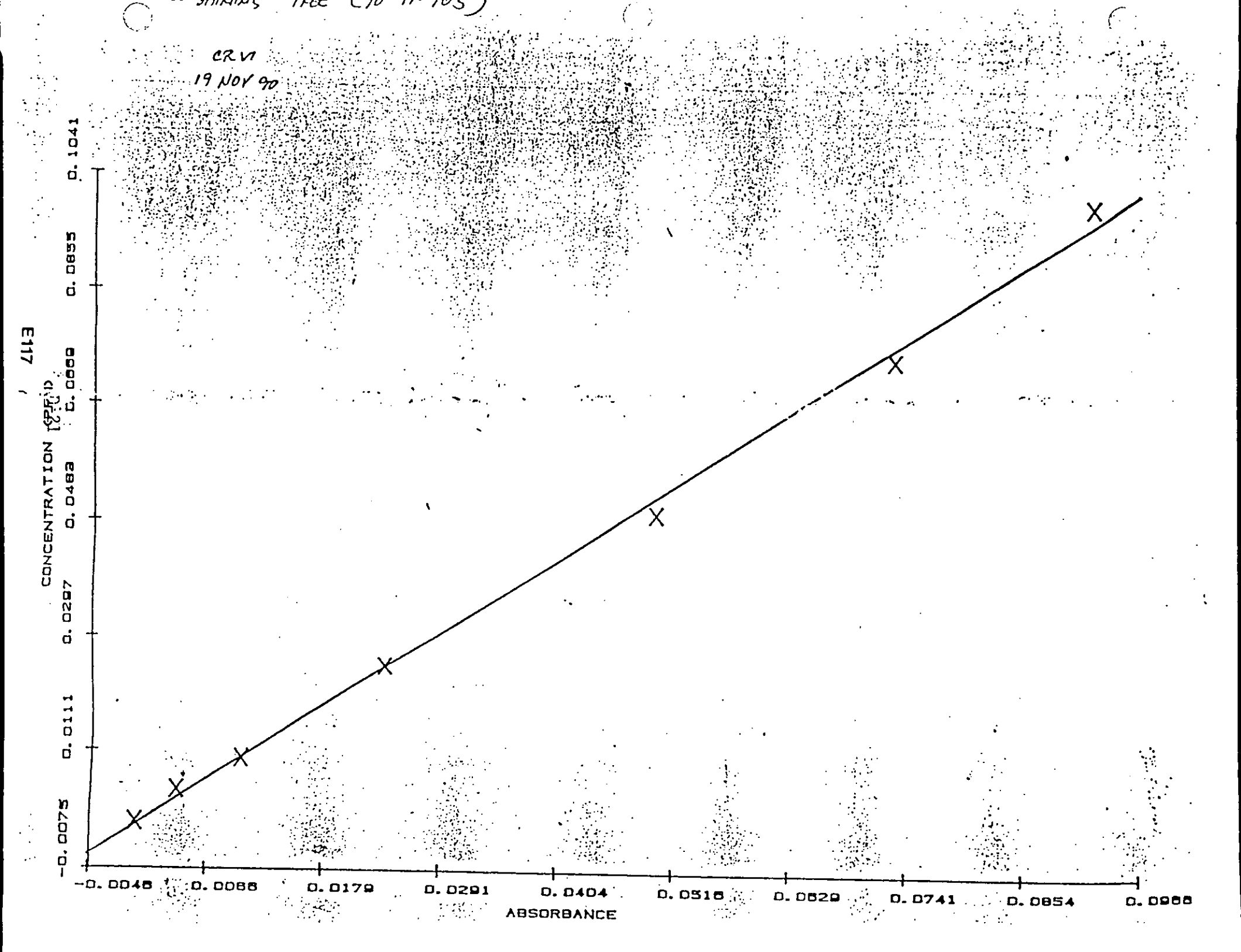
PROGRAM 9 Cr

SAMPLE	CONC mg/l	%RSD	MEAN ABS	READINGS	
BLANK	0.0000		0.009	0.009	0.009
STANDARD 1	0.0050	2.3	0.360	0.354	0.366
STANDARD 2	0.0100	1.9	0.734	0.743	0.724
STANDARD 3	0.0200	0.2	1.296	1.298	1.295



BLANK	0.0000			0.001	0.000	0.001
SAMPLE 1 ICV	0.0095		0.5	0.694	0.696	0.692
SAMPLE 2 ICB	0.0002		32.7	0.014	0.013	0.011
SAMPLE 3	0.0079		0.4	0.575	0.574	0.577 105-CR BK
SAMPLE 4 RS	0.016889%		0.9	1.142	1.141	1.155
SAMPLE 5 RDS	0.017798%		1.2	1.191	1.201	1.181
SAMPLE 6 BK	0.0016		3.5	0.114	0.116	0.111
SAMPLE 7	0.0031		0.1	0.592	0.592	0.592 105-Cr Filter Blk

RS & RDS - 105-CR-BK was subtracted from original RS & RDS readings


CR VI
19 NOV 90
E117
CONCENTRATION (PPM)
-0.0075
0.0111
0.0297
0.0483
0.0669
0.0855
0.1041
-0.0048
0.0066
0.0179
0.0291
0.0404
0.0516
0.0629
0.0741
0.0854
0.0966
ABSORBANCE

RUN #2

Chromium - November 9, 1990

Calculation Data

C.C. Wood CARB 425 Train 2

Section I: Particulate Sampling Data

Point #	Delta P	Delta H	T S	T i	T in	T out	VAC	Filter Temp.	VEL (FPS)
A-6	1.40	2.50	124	64	69	67	3.0	265	71.1
A-5	1.50	2.70	124	56	71	67	3.0	270	73.7
A-4	1.40	2.50	123	65	73	68	3.2	253	71.2
A-3	1.10	2.00	124	54	75	70	3.0	241	63.0
A-2	0.58	1.05	124	54	78	71	2.0	250	45.7
A-1	0.22	0.39	121	58	80	71	2.0	255	28.1
B-6	1.40	2.50	135	57	85	73	3.5	260	71.1
B-5	0.75	1.35	134	55	87	74	2.5	250	51.9
B-4	0.45	0.81	133	56	87	75	2.0	248	40.2
B-3	0.25	0.45	133	57	88	76	2.0	235	29.9
B-2	0.27	0.48	132	57	88	77	2.0	259	31.1
B-1	0.20	0.36	133	58	89	78	2.0	271	26.7
C-6	1.30	2.34	134	58	93	79	3.2	265	67.9
C-5	0.72	1.30	136	58	93	80	2.5	251	50.5
C-4	0.25	0.45	136	59	94	81	2.0	243	29.8
C-3	0.18	0.32	134	60	93	82	2.0	235	25.3
C-2	0.12	0.21	132	62	93	91	1.5	230	20.6
C-1	0.10	0.18	132	55	93	91	1.5	250	18.8
D-6	1.40	2.50	135	53	95	91	3.8	265	71.1
D-5	0.75	2.50	131	58	96	91	2.5	257	52.0
D-4	0.42	0.75	132	56	98	92	2.2	251	38.9
D-3	0.38	0.68	130	55	99	93	2.0	236	37.0
D-2	0.38	0.68	131	55	100	93	2.0	250	37.0
D-1	0.32	0.57	128	55	101	94	2.0	268	34.0
AVG	0.66	1.18	134	57	88	80	2.4	252	45.3

NOMENCLATURE

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

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

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condensor (oF)

Tin = Dry gas meter inlet temperature

Tout = Dry gas meter outlet temperature

Vac = Sample pump vacuum (in. Hg)

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

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

C.C. Wood CARB 425 Train 2

FIELD DATA SHEET

VOLUME OF CONDENSED MOISTURE

Impinger #	Gross	Tare	Net
1	192 ml	100 ml	92 ml
2	100 ml	100 ml	0 ml
3	0 ml	0 ml	0 ml
4	206 gram	200 gram	6 gram
	TOTAL CONDENSED MOISTURE		98 ml

STACK GAS MOLECULAR WEIGHT

PERCENT CARBON DIOXIDE	=	3.50
PERCENT OXYGEN	=	17.50
PERCENT CARBON MONOXIDE	=	0.00
PERCENT NITROGEN & INERTS	=	79.00

COMPONENT	VOLUME%	• MOISTURE CORR *	MOLWT =	MASS FRACTION
WATER	10.07	1.00	18.00	1.81
CARBON DIOXIDE	3.50	0.90	44.00	1.38
OXYGEN	17.50	0.90	32.00	5.04
CARBON MONOXIDE	0.00	0.90	28.00	0.00
NITROGEN & INERTS	79.00	0.90	28.00	19.89
		AVERAGE MOLECULAR WEIGHT =		28.13

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	139.860	CFT
Dry gas meter, final reading	=	181.315	CFT
Dry gas meter calibration factor	=	1.000	
Meter volume uncorrected for Temp & Press	=	41.455	CFT
Barometric pressure at site	=	30.35	in Hg
Meter pressure (barometer + average delta H)	=	30.53	in Hg
Average meter temperature during test	=	84.2	DEG F
Dry sample volume at standard conditions	=	40.412	CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	133.5	DEG F
Volume of condensed water	=	98	ml
Percent moisture of stack gas	=	10.07	%
Pitot tube correction factor	=	0.85	
Stack gas molecular weight	=	28.47	
Stack gas velocity at stack conditions	=	45.36	FT/SEC
Duration of sampling	=	72	Minute
Nozzle diameter	=	0.220	in
Percent isokinetic variation	=	97.2	%
Area of stack	=	13.40	SQ FEET
Stack flow rate, standard conditions	=	29316	DSCFM

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

Compound		Mass (ug)		Emmission rate (10-3 lb/hr)
Chromium	=	3.60	=	0.34
Hexavalent Chromium	<	2.00	<	0.19

Field Data

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

Research & Testing
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FIELD TEST DATA FORM

I: 97.6%

Site: CC Wood

Date: 11/9/90 Test No. CI 1116 (2)

Nozzle I.D. EGL.4 Diameter 0.220 Filter No. CG+CI (2)

LEAK CHECKS: Pitot tubes -- Initial yes at 3 in H2O Final yes at 3 in H2O

Sample train -- Initial ______ Final ______

start at 139.560
leak check < 0.005 at 10 in Hg for 1 min
leak check < 0.005 at 10 in Hg for 1 min

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
3	A-6	1.4	2.5	124	64	69	67		
								3.0	265
6	5	1.5	2.7	124	65	71	67	142.310	
								3.0	270
9	4	1.4	2.5	123	65	73	68	145.0	
								3.2	253
	3	1.1	2.0	124	54	75	70	147.691	
								3.0	241
15	2	0.58	1.05	124	57	78	71	149.80	
								2.6	251
18	1	0.22	0.39	121	58	80	71	151.55	
								2.6	251
								152.700	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
21	B1-6	1.4	2.5	135	57	85	73		
								3.5	260
24	5	0.75	1.35	134	55	87	74	155.14	
								2.5	250
	4	0.45	0.81	133	56	87	75	157.20	
								2.0	248
	3	0.25	0.45	133	57	88	76	155.45	
								2.0	255
	2	0.27	0.45	132	57	88	77	160.60	
								2.5	259
	1	0.20	0.36	133	58	89	78	161.26	
								2.0	271
								162.35	

E125

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

FIELD TEST DATA FORM

Site: R C Wood Date: 11/9/90 Test No. CLC1 6(2)

Nozzle I.D. EGL-4 Diameter 0.72 Filter No. CLC192

LEAK CHECKS: Pitot tubes -- Initial ____ Final ____

Sample train -- Initial ____ Final ____

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
39	6	1.3	1.234	113.4	58.	93	79	3.2	264
								164.760	
42	5	0.72	1.31	1135	58	93	8101	.25	2.51
								166.65	
45	4	0.25	0.45	136	59	94	81	2.0	243
								168.00	
48	3	0.18	0.32	1134	60	93	82	2.0	235
								169.150	
51	2	0.12	0.21	1132	62	931	91	1.5	231
								170.00	
54	1	0.10	0.18	1132	55	931	91	1.5	251
								170.90	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
57	6	1.4	2.5	135	53	95	91	3.8	265
								173.40	
60	5	0.95	1.25	131	54	96	91	2.2	257
								175.350	
63	4	0.42	075	132	56	98	92	2.2	251
								176.600	
66	3	0.38	0.68	130	55	99	93	2.0	236
								178.420	
69	2	0.38	0.68	131	55	106	93	2.0	251
								179.900	
	1	0.32	0.57	128	55	101	94	2.0	268
								181.315	

Analytical Data

METALS
EPA MULTIMETAL METHOD

CLIENT : C C. Wood
PROJECT: Shining Tree
SAMPLING DATE:
SAMPLE I.D.: Train Method 425 ($Cr + Cr^{+6}$) - 2

COMPOUND	D/L ppm	Filter + Rinse µg/ml	DF	µg	Impingers µg/ml	DF	µg	Total µg
Arsenic	0.1							
Beryllium	0.01							
Cadmium	0.02							
Chromium	0.004 ~~0.02~~	0.027	2.7		0.009	0.9		3.6
Copper	0.01							
Nickel	0.1							
Lead	0.05							
Selenium	0.1							
Zinc	0.01							
Manganese	0.01							
Mercury	0.001							
Cr^{+6}	0.005	<0.005	<1		<0.005	<1		<2

DF Cr^{+6} = ppm × 100 × 2

DF Cr = ppm × 50 × 2

Client: Kleinfelder 9011-105

ANALYSIS: Cr as -~~Water~~ Samples

METHOD: 7191

ELI NO.	SAMPLE ID.	LOCATION	UNITS: ~~mg/L~~ (ppm)
	Cr Bk		0.008
13A	Cr Filter Bk		0.008
14A	Cr Field Bk		0.005
15A	Cr-1 Filter		0.016
16A	Cr-1 Rinse		0.013
17A	Cr-1 Impinger		0.011
18A	Cr-2 Filter		0.014
19A	Cr-2 Rinse		0.013
20A	Cr-2 Impinger		0.009
	Reag (S)		89%
	Reag (DS)		98%
	Method Blank		
	Detection Limit		0.004 ppm

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

Analyst: Adriana Jerome

Extraction Date: 11/15/90

Date Reported: 11/21/90

Client: SHRINK TREE (90-11-105)

ANALYSIS: CHROMIUM VI

METHOD: CARB 425 (diphenylcarbazide colorimetric method)

ELI. NO.	SAMPLE I.D.		CONCENTRATION (~~mg/L~~) (~~mg/Kg~~)
	CR-FILTER BK		<
	CR-FIELD BK		<
	CR 1-FILTER		<
	CR-1 RINSE		<
	CR 1 IMPINGER		<
	CR 2 FILTER		<
	CR 2 RINSE		<
	CR 2 IMPINGER		<
	REAGENT (5)		102%
	REAGENT (25)		96%
	METHOD BLANK		<
	D/L		0.005 ppm

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

Analyst: [signature]
Date Reported: 11/19/90
Extraction Date: 11/15/90

CLIENT Sterling Tree (90-11-105)

TEST CR VI

METHOD CARB 425

SAMPLE I.D.	ABSORBANCE	CONCENTRATION
BLANK	0.000	
STANDARD 1	0.004	0.005 ppm
STANDARD 2	0.010	0.010 ppm
STANDARD 3	0.024	0.025 ppm
STANDARD 4	0.050	0.050 ppm
STANDARD 5	0.077	0.075 ppm
STANDARD 6	0.092	0.100 ppm
REAGENT SPIKE	0.049	0.051 102%
REAGENT DUP SPIKE	0.044	0.048 96%
CR- FILTER BK	0.001	0.001
CR- RINSE BK	0.001	~~0.003~~ 0.001
CR-1 FILTER	0.003	0.003
CR-1 RINSE	0.003	0.003
CR-1 IMPINGER	0.000	0.000
CR-2 FILTER	0.003	0.003
CR-2 RINSE	0.002	0.002
CR-2 IMPINGER	0.000	0.000
D/L		0.005

Benjamin Mendoza
ANALYST

11/19/90
DATE

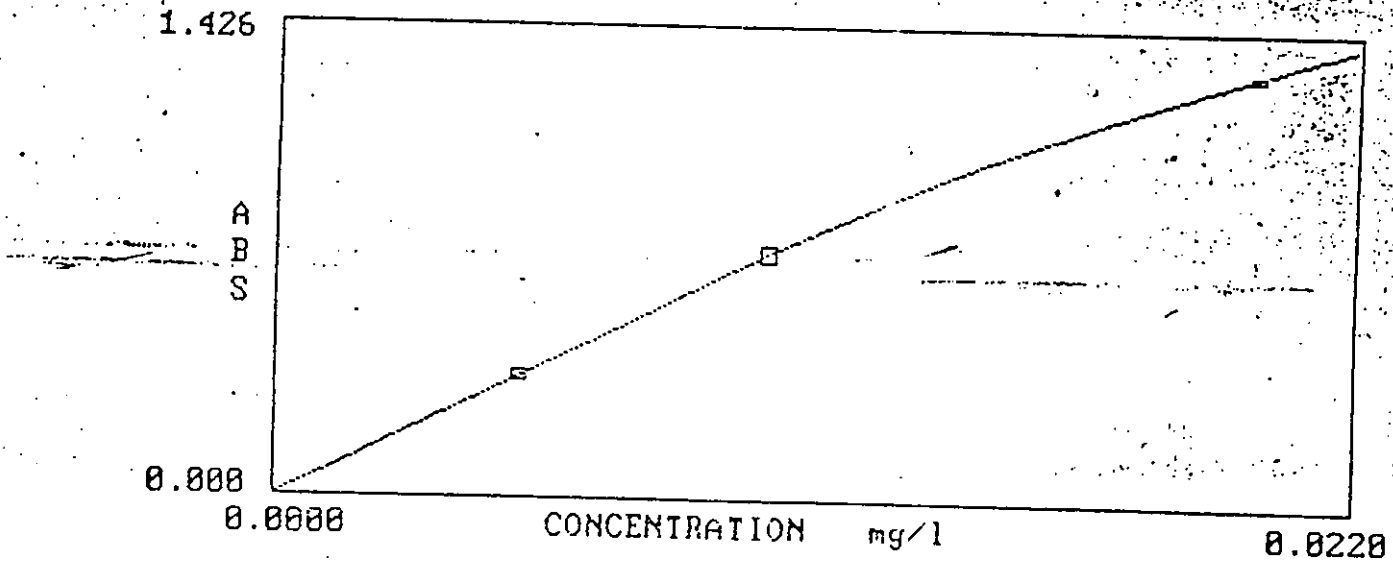
Calibration Data

LABORATORIES, INC.

OPERATOR tamara jerome
DATE 11-21-90
BATCH CR

PROGRAM 9 Cr

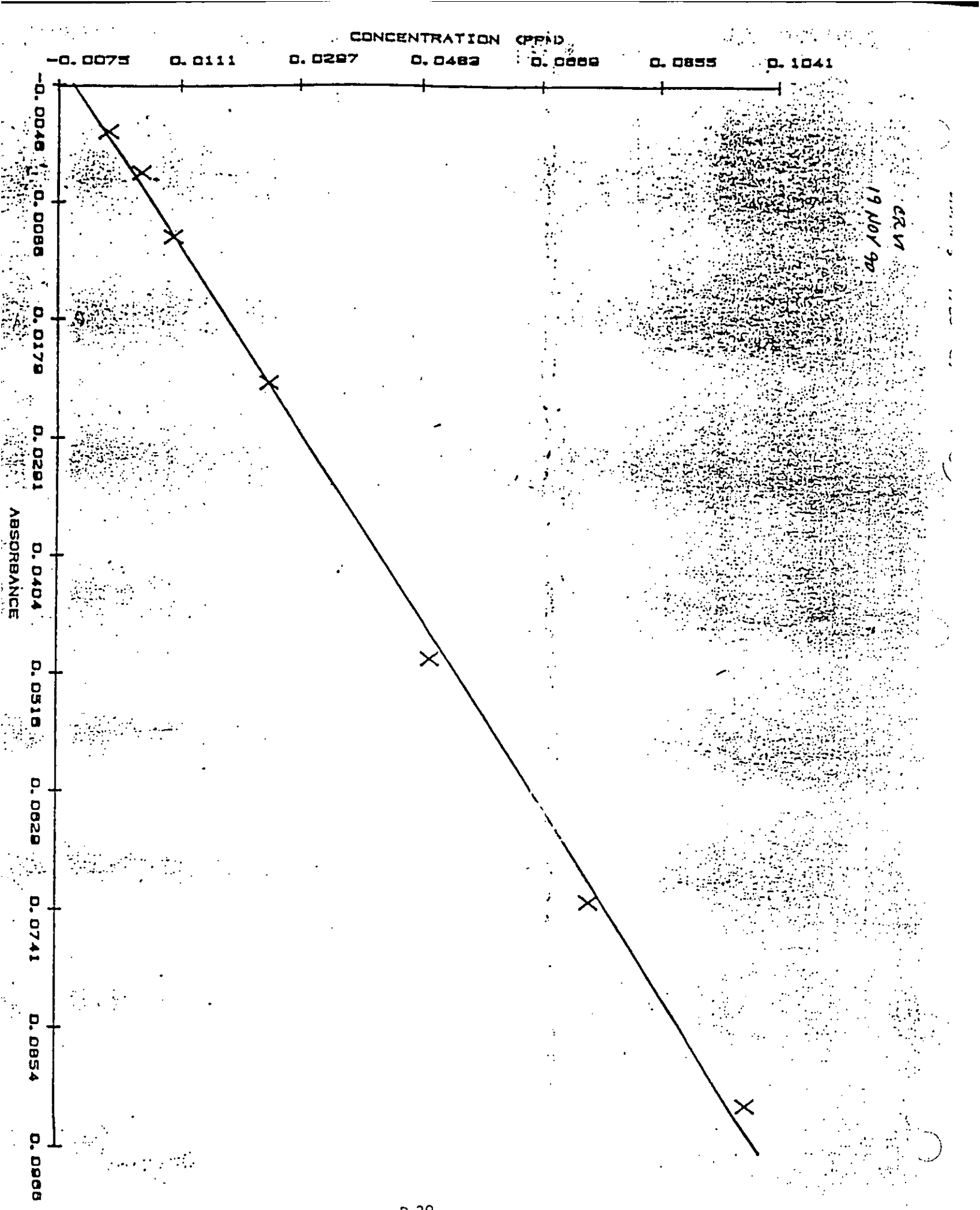
SAMPLE	CONC mg/l	%RSD	MEAN ABS	READINGS	
BLANK	0.0000		0.009	0.009	0.009
STANDARD 1	0.0050	2.3	0.360	0.354	0.366
STANDARD 2	0.0100	1.9	0.734	0.743	0.724
STANDARD 3	0.0200	0.2	1.296	1.298	1.295



BLANK	0.0000		0.001	0.000	0.001	
SAMPLE 1 ICV	0.0095	0.5	0.694	0.696	0.692	
SAMPLE 2 ICB	0.0002	32.7	0.014	0.016	0.011	
SAMPLE 3	0.0079	0.4	0.575	0.574	0.577	105-CR BK
SAMPLE 4 RS	0.016889%	0.9	1.148	1.143	1.155	
SAMPLE 5 RDS	0.017798%	1.2	1.191	1.201	1.181	
SAMPLE 6 BK	0.0016	3.2	0.113	0.116	0.111	
SAMPLE 7	0.0021	0.1	0.592	0.592	0.592	105 Cr Filter BK

E133
D-37

RS & RDS - 105-CR-BK was subtracted from original RS & RDS readings


CONCENTRATION (PPM)
-0.0075
0.0111
0.0297
0.0482
0.0668
0.0855
0.1041
ABSORBANCE
-0.0048
0.0086
0.0179
0.0291
0.0404
0.0516
0.0629
0.0741
0.0854
0.0966
19 NOV 96
CRV

APPENDIX E

Polycylic Aromatic Hydrocarbons Data and Calculations

FIELD BLANK

Analytical Data

C.C. Wood Polycyclic Aromatic Hydrocarbons Field Blank

SUMMARY OF QUANTITATIVE ANALYSIS

Compound	Mass (ug)
Napthalene	621
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: µg/emit

MATRIX: _____

SAMPLE ID. / TAL(Target Analyte)	MBLK	Field Blank	PAH-1	PAH-2	R.Spike	R.Spike Dup.		PQL µg
Naphthalene	↑	621	2780	1580	65	64		1.5
Acenaphthylene		↑	↑	↑	83	85		
Acenaphthene				ND	82	79		
Fluorene			ND	↓	82	85		
Phenanthrene	ND	ND	23	6.7	93	89		
Anthracene			ND	~~4.9~~	94	95		
Fluoranthene				↑	90	90		
Pyrene					86	77		
Benz(a)anthracene				ND	81	73		
Chrysene					76	85		
Benzo(b)fluoranthene					80	82		
Benzo(k)fluoranthene					79	85		
Benzo(a)pyrene					78	86		
Benzo(ghi)perylene					77	81		
Dibenz(ah)anthracene					78	83		
Indeno(1,23-cd/pyrene	↓	↓	↓	↓	91	86		↓

SURROGATE/SPIKE REVOVERY

Benzo(a)anthracene-d_{12}	60	104	104	120	103	101		
Methyl-Naphthalene-d_{10}	—	49	70	81	—	—		

RUN #1

Polycylic Aromatic Hydrocarbons - November 8, 1990

Calculation Data

C.C. Wood PAHs Train 1

Section I: Particulate Sampling Data

Point #	Delta P	Delta H	T S	T i	T in	T out	VAC	Filter Temp.	VEL (FPS)
1-6	1.30	2.34	138	52	68	66	4.8	236	68.8
1-5	1.50	2.70	139	52	70	66	6.0	244	74.0
1-4	1.40	2.52	140	50	74	67	6.0	258	71.5
1-3	1.05	1.90	138	51	77	68	5.0	261	61.9
1-2	0.55	1.00	133	52	79	69	3.8	257	44.6
1-1	0.18	0.32	128	53	80	69	2.5	260	25.4
2-6	1.40	2.52	132	54	84	70	6.0	255	71.1
2-5	0.72	1.30	131	55	85	71	4.0	249	50.9
2-4	0.42	0.75	129	56	86	72	3.5	242	38.8
2-3	0.37	0.66	128	52	87	73	3.0	247	36.4
2-2	0.32	0.57	128	57	88	74	3.0	249	33.9
2-1	0.18	0.32	124	58	91	77	2.5	241	25.3
3-6	1.40	2.52	129	59	92	76	5.8	239	70.9
3-5	0.53	0.95	128	53	92	78	3.5	237	43.6
3-4	0.25	0.45	128	54	92	77	2.8	235	29.9
3-3	0.18	0.32	128	54	92	79	2.5	236	25.4
3-2	0.17	0.30	126	55	92	80	2.2	241	24.6
3-1	0.16	0.29	129	57	91	80	2.3	244	24.0
4-6	1.40	2.50	130	58	97	82	6.0	249	70.9
4-5	0.82	1.40	128	59	97	83	5.5	250	54.2
4-4	0.45	0.81	128	60	96	84	4.5	252	40.2
4-3	0.39	0.70	128	60	95	84	3.2	241	37.4
4-2	0.38	0.68	127	60	95	85	3.0	239	36.9
4-1	0.35	0.63	127	60	96	86	3.0	235	35.4
AVG	0.66	1.19	130	55	87	76	3.9	246	45.7

NOMENCLATURE

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

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

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condensor (oF)

Tin = Dry gas meter inlet temperature

Tout = Dry gas meter outlet temperature

Vac = Sample pump vacuum (in. Hg)

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

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

FIELD DATA SHEET

VOLUME OF CONDENSED MOISTURE

Impinger #	Gross	Tare	Net
1	174 ml	100 ml	74 ml
2	100 ml	100 ml	0 ml
3	0 ml	0 ml	0 ml
4	208 gram	200 gram	8 gram
	TOTAL CONDENSED MOISTURE		82 ml

STACK GAS MOLECULAR WEIGHT

PERCENT CARBON DIOXIDE	=	3.50
PERCENT OXYGEN	=	17.50
PERCENT CARBON MONOXIDE	=	0.00
PERCENT NITROGEN & INERTS	=	79.00

COMPONENT	VOLUME%	• MOISTURE CORR *	MOLWT =	MASS FRAC
WATER	12.40	1.00	18.00	2.23
CARBON DIOXIDE	3.50	0.88	44.00	1.35
OXYGEN	17.50	0.88	32.00	4.93
CARBON MONOXIDE	0.00	0.88	28.00	0.00
NITROGEN & INERTS	79.00	0.88	28.00	19.47
		AVERAGE MOLECULAR WEIGHT =		27.97

C.C. Wood PAHs Train 1

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	18.190	CFT
Dry gas meter, final reading	=	58.550	CFT
Dry gas meter calibration factor	=	1.000	
Meter volume uncorrected for Temp & Press	=	40.360	CFT
Barometric pressure at site	=	30.35	in Hg
Meter pressure (barometer + average delta H)	=	30.64	in Hg
Average meter temperature during test	=	81.5	DEG F
Dry sample volume at standard conditions	=	39.690	CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	130.2	DEG F
Volume of condensed water	=	82	ml
Percent moisture of stack gas	=	8.75	%
Pitot tube correction factor	=	0.85	
Stack gas molecular weight	=	28.28	
Stack gas velocity at stack conditions	=	45.62	FT/SEC
Duration of sampling	=	72	Minute
Nozzle diameter	=	0.220	in
Percent isokinetic variation	=	92.6	%
Area of stack	=	13.40	SQ FEET
Stack flow rate, standard conditions	=	30199	DSCFM

C.C. Wood PAHs Train 1

SECTION IV SUMMARY OF QUANTITATIVE ANALYSIS EMISSION RATE OF PAHS

Compound		Mass (ug)		Emmission rate (10-3 lb/hr)
Naphthalene	=	2780.00	=	279.16
Acenaphthylene	<	1.50	<	0.15
Acenaphthene	<	1.50	<	0.15
Fluorene	<	1.50	<	0.15
Phenanthrene	=	23.00	=	2.31
Anthracene	<	1.50	<	0.15
Fluoranthene	<	1.50	<	0.15
Pyrene	<	1.50	<	0.15
Benzo(a)anthracene	<	1.50	<	0.15
Chrysene	<	1.50	<	0.15
Benzo(b)fluoranthene	<	1.50	<	0.15
Benzo(k)fluoranthene	<	1.50	<	0.15
Benzo(a)pyrene	<	1.50	<	0.15
Benzo(g,h,i)perylene	<	1.50	<	0.15
Dibenzo(a,h)anthracene	<	1.50	<	0.15
Indeno(1,2,3-cd)pyrene	<	1.50	<	0.15

Field Data

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

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

FIELD TEST DATA FORM

Abelin

Site: [illegible] Island Date: 11/5/90 Test No. PAH(1)

Nozzle I.D. F6.1.4 Diameter .220 Filter No. PAH (1)

LEAK CHECKS: Pitot tubes -- Initial y at 3 in H2O Final y at 3 in H2O

Sample train -- Initial ____ Final ____

K. 180 start. 15:19 leak check < 0.01 at 12 in Hg for 1 min leak check < 0.01 at 11 in Hg for 1 min

silica .6.2

PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
A 6	1.3	1.34	138	52	68	66	4.8	236
5	1.15	2.7	139	52	70	66	20 50	
							.60	247
4	1.4	2.52	140	50	74	67	23 10	
							6.0	258
3	1.05	1.90	138	51	71	68	25.60	
							5.0	26F
2	1.05	1.10	133	52	79	69	27.82	
							3.8	2517
1	0.13	0.32	128	53	81	69	29 50	
							2.5	2610
							32.56	

PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
BL 6	1.4	2.52	132	54	84	70	6 10	255
							33 20	
4	1.72	1.30	131	55	85	71	4.4	247
							35 10	
4	0.42	0.75	129	56	86	72	3 5	242
							36.50	
3	0.37	0.66	128	57	87	73	3.0	247
							37 85	
2	0.32	0.57	128	57	88	74	13 0	249
							39.15	
1	0.18	0.32	124	58	91	77	2 5	241
							40 20	

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

FIELD TEST DATA FORM

continued

Site: RE Wood Date: 11/5/90 Test No. PAH(1)

Nozzle I.D. EGL.4 Diameter 0.220 Filter No. PAH(1)

LEAK CHECKS: Pitot tubes -- Initial ____ Final ____

K 1.5 Sample train -- Initial ____ Final ____

ME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
39	6 6	1.4	2.52	129	59	92	76	5.8	239
								42.40	
42	5	0.53	0.95	128	53	92	77	3.5	237
								44.10	
45	4	0.25	0.45	128	54	92	78	2.8	235
								45.30	
	3	0.18	0.32	128	54	92	79	2.5	236
								46.36	
51	2	0.17	0.30	126	55	92	80	2.2	241
								47.37	
54	1	0.16	0.28	129	57	91	80	2.2	244
								48.34	

E	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
57	DL 6	1.4	2.50	129	58	97	82	6.0	249
								51.20	
60	5	0.82	1.40	126	59	97	83	5.57	250
								53.00	
63	4	0.45	0.81	128	60	96	84	4.5	252
								54.51	
66	3	0.39	0.70	128	66	95	84	3.2	241
								55.90	
	1	0.38	0.68	127	60	95	85	3.10	239
								57.30	
	1	0.35	0.63	127	60	96	86	3.0	237
								58.55	

E-13

Analytical Data

ARB METHOD 429 POLYCYLIC AROMATIC HYDROCARBONS

UNIT: µg/emit

MATRIX: _____

SAMPLE ID. TAL(Target Analyte)	MBLK	Field Blank	PAH-1	PAH-2	R.Spike	R.Spike Dup.		PQL µg
Naphthalene	↑	621	2780	1580	65	64		1.5
Acenaphthylene		↑	↑	↑	83	85		
Acenaphthene				ND	82	79		
Fluorene			ND	↓	82	85		
Phenanthrene	ND	ND	23	6.7	93	89		
Anthracene			ND	49	94	95		
Fluoranthene				↑	90	90		
Pyrene					86	77		
Benz(a)anthracene				ND	81	73		
Chrysene					76	85		
Benzo(b)fluoranthene					80	82		
Benzo(k)fluoranthene					79	85		
Benzo(a)pyrene					78	86		
Benzo(ghi)perylene					77	81		
Dibenz(ah)anthracene					78	83		
Indeno(1,23-cd/pyrene	↓	↓	↓	↓	91	86		↓

SURROGATE/SPIKE REVOVERY

Benzo(a)anthracene-d_{12}	60	104	104	120	103	101		
Methyl-ilaphthalene-d_{10}	—	49	70	81	—	—		

Calibration Data

Calibration Report

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

5

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	$\overline{RF}$	% RSD
Naphthalene-d8	-	-	-	-	-	-	-	-	-
Naphthalene	1.21409	1.13187	1.34576	1.14081	1.11955	.95550	1.05496	1.13751	10.739
2-Methylnaphthalene-d10	.80384	.75610	.71124	.66338	.63861	.60754	.72478	.70079	9.804
Acenaphthene-d10	-	-	-	-	-	-	-	-	-
Acenaphthylene	1.48175	1.41388	1.33795	1.17956	1.16471	1.01317	1.12157	1.24466	13.639
Acenaphthene	.93983	.87042	.83240	.75977	.73939	.69996	.84730	.81272	10.290
Fluorene	1.07961	1.04781	.99382	.91966	.89291	.83578	.99184	.96592	9.014
Phenanthrene-d10	-	-	-	-	-	-	-	-	-
Phenanthrene	1.50299	1.46274	1.37641	1.22249	1.19852	1.08949	1.23980	1.29892	11.666
Anthracene	1.52986	1.47263	1.37199	1.24535	1.24035	1.09023	1.21345	1.30912	11.886
Fluoranthene	1.73778	1.65695	1.55768	1.40527	1.38071	1.23059	1.39794	1.48099	11.958
Pyrene	1.78300	1.68662	1.56893	1.44858	1.39387	1.26195	1.42485	1.50968	11.949
Benzo(a)anthracene-d12	1.12941	1.10933	1.05849	1.05351	1.00311	.98209	1.22883	1.08068	7.752
Benzo(a)anthracene	1.67047	1.60835	1.52736	1.45235	1.43517	1.28879	1.49337	1.49655	8.301
Chrysene-d12	-	-	-	-	-	-	-	-	-
Chrysene	1.63916	1.57476	1.49822	1.46292	1.42096	1.29505	1.49337	1.48349	7.421
Benzo(b)fluoranthene	1.75036	1.70565	1.67854	1.79378	1.78517	1.55818	2.14204	1.77339	10.215
Benzo(k)fluoranthene	1.76417	1.72580	1.59199	1.67018	1.57093	1.49952	1.98083	1.68620	9.431
Benzo(a)pyrene	1.61997	1.68703	1.59130	1.73887	1.62249	1.56872	1.98786	1.68803	8.551
Indeno(1,2,3-cd)pyrene	1.31775	1.55565	1.49082	1.64889	1.59260	1.65706	1.77852	1.57733	9.243
Dibenz(a,h)anthracene	1.28718	1.48992	1.39705	1.56665	1.56157	1.55004	1.39259	1.46357	7.326
Benzo(g,h,i)perylene	1.29621	1.55890	-	1.62836	1.19519	1.62046	1.62178	1.48681	12.856

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

$\overline{RF}$ - 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: >BB869
Injection Time: 901115 16:03

Compound	$\overline{RF}$	RF	%Diff	Calib Meth
Naphthalene-d8	-	-	-	Average
Naphthalene	1.13751	1.33266	17.16	Average
2-Methylnaphthalene-d10	.70079	-	-	Average
Acenaphthene-d10	-	-	-	Average
Acenaphthylene	1.24466	1.48488	19.30	Average
Acenaphthene	.81272	.86853	6.87	Average
Fluorene	.96592	1.06050	9.79	Average
Phenanthrene-d10	-	-	-	Average
Phenanthrene	1.29892	1.47380	13.46	Average
Anthracene	1.30912	1.40187	7.08	Average
Fluoranthene	1.48099	1.58096	6.75	Average
Pyrene	1.50968	1.62507	7.64	Average
Benzo(a)anthracene-d12	1.08068	-	-	Average
Benzo(a)anthracene	1.49655	1.43191	4.32	Average
Chrysene-d12	-	-	-	Average
Chrysene	1.48349	1.35351	8.76	Average
Benzo(b)fluoranthene	1.77339	1.31714	25.73	Average
Benzo(k)fluoranthene	1.68620	1.42690	15.38	Average
Benzo(a)pyrene	1.68803	1.29918	23.04	Average
Indeno(1,2,3-cd)pyrene	1.57733	1.24908	20.81	Average
Dibenz(a,h)anthracene	1.46357	1.15764	20.90	Average
Benzo(g,h,i)perylene	1.48681	1.25851	15.36	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

E152

RUN #2

Polycylic Aromatic Hydrocarbons - November 8, 1990

Calculation Data

C.C. Wood PAHs Train 2

Section I: Particulate Sampling Data

Point #	Delta P	Delta H	T S	T i	T in	T out	VAC	Filter Temp.	VEL (FPS)
1-6	1.30	2.30	128	60	92	88	4.2	233	68.8
1-5	1.40	2.50	128	60	93	88	4.5	235	71.4
1-4	1.30	2.30	128	61	95	88	4.8	246	68.8
1-3	1.05	1.90	127	60	96	89	5.0	265	61.8
1-2	0.68	1.22	127	59	97	90	4.8	260	49.7
1-1	0.22	0.39	127	58	97	90	3.0	252	28.3
2-6	1.30	2.30	127	58	99	90	6.5	235	68.7
2-5	0.75	1.35	127	58	99	91	4.8	259	52.2
2-4	0.44	0.79	129	58	98	91	4.0	262	40.1
2-3	0.35	0.63	128	57	97	90	3.8	265	35.7
2-2	0.27	0.48	129	57	98	91	3.0	260	31.4
2-1	0.20	0.36	127	57	98	91	3.0	251	27.0
3-6	1.30	2.30	126	57	100	91	4.0	238	68.7
3-5	0.55	1.00	126	57	99	92	4.2	235	44.7
3-4	0.26	0.47	127	58	98	92	3.5	258	30.7
3-3	0.15	0.27	127	58	98	92	3.0	260	23.4
3-2	0.14	0.25	126	59	98	93	3.0	262	22.5
3-1	0.11	0.20	125	60	99	93	2.8	264	20.0
4-6	1.30	2.30	128	60	103	94	7.0	260	68.8
4-5	0.65	1.18	128	60	103	94	5.0	252	48.7
4-4	0.40	0.72	128	61	103	94	4.0	248	38.2
4-3	0.38	0.68	129	61	102	95	3.8	247	37.2
4-2	0.40	0.72	128	61	102	95	4.0	243	38.2
4-1	0.38	0.68	126	60	102	96	4.0	240	37.1
AVG	0.64	1.14	127	59	99	92	4.2	251	45.1

NOMENCLATURE

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

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

Ts = Stack temperature (oF)

Ti = Temperature of gas leaving condensor (oF)

Tin = Dry gas meter inlet temperature

Tout = Dry gas meter outlet temperature

Vac = Sample pump vacuum (in. Hg)

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

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

FIELD DATA SHEET

VOLUME OF CONDENSED MOISTURE

Impinger #	Gross	Tare	Net
1	200 ml	100 ml	100 ml
2	100 ml	100 ml	0 ml
3	0 ml	0 ml	0 ml
4	221 gram	200 gram	21 gram
	TOTAL CONDENSED MOISTURE		121 ml

STACK GAS MOLECULAR WEIGHT

PERCENT CARBON DIOXIDE	=	3.50
PERCENT OXYGEN	=	17.50
PERCENT CARBON MONOXIDE	=	0.00
PERCENT NITROGEN & INERTS	=	79.00

COMPONENT	VOLUME%	• MOISTURE CORR •	MOLWT =	MASS FRACTION
WATER	12.40	1.00	18.00	2.23
CARBON DIOXIDE	3.50	0.88	44.00	1.35
OXYGEN	17.50	0.88	32.00	4.93
CARBON MONOXIDE	0.00	0.88	28.00	0.00
NITROGEN & INERTS	79.00	0.88	28.00	19.47
		AVERAGE MOLECULAR WEIGHT =		27.97

Section II: SAMPLE VOLUME CALCULATIONS

Dry gas meter, initial reading	=	58.960 CFT
Dry gas meter, final reading	=	98.400 CFT
Dry gas meter calibration factor	=	1.000
Meter volume uncorrected for Temp & Press	=	39.440 CFT
Barometric pressure at site	=	30.35 in Hg
Meter pressure (barometer + average delta H)	=	30.66 in Hg
Average meter temperature during test	=	95.1 DEG F
Dry sample volume at standard conditions	=	37.856 CFT

Section III: STACK GAS CALCULATION

Average stack temperature during test	=	127.3 DEG F
Volume of condensed water	=	121 ml
Percent moisture of stack gas	=	12.92 %
Pitot tube correction factor	=	0.85
Stack gas molecular weight	=	27.81
Stack gas velocity at stack conditions	=	45.08 FT/SEC
Duration of sampling	=	72 Minute
Nozzle diameter	=	0.220 in
Percent isokinetic variation	=	93.2 %
Area of stack	=	13.40 SQ FEET
Stack flow rate, standard conditions	=	28633 DSCFM

C.C. Wood PAHs Train 2

SECTION IV SUMMARY OF QUANTITATIVE ANALYSIS EMISSION RATE OF PAHS

Compound		Mass (ug)		Emmission rate (10-3 lb/hr)
Naphthalene	=	1580.00	=	157.72
Acenaphthylene	<	1.50	<	0.15
Acenaphthene	<	1.50	<	0.15
Fluorene	<	1.50	<	0.15
Phenanthrene	=	6.70	=	0.67
Anthracene	=	4.90	=	0.49
Fluoranthene	<	1.50	<	0.15
Pyrene	<	1.50	<	0.15
Benzo(a)anthracene	<	1.50	<	0.15
Chrysene	<	1.50	<	0.15
Benzo(b)fluoranthene	<	1.50	<	0.15
Benzo(k)fluoranthene	<	1.50	<	0.15
Benzo(a)pyrene	<	1.50	<	0.15
Benzo(g,h,i)perylene	<	1.50	<	0.15
Dibenzo(a,h)anthracene	<	1.50	<	0.15
Indeno(1,2,3-cd)pyrene	<	1.50	<	0.15

Field Data

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

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

I-89

FIELD TEST DATA FORM

Site: [illegible] Island Date: 11/9/13 Test No. PAH (2)

Nozzle I.D. EGLY Diameter 0.220 Filter No. PAH (2)

LEAK CHECKS: Pitot tubes -- Initial Y at 4 in H2O Final Y at 4 in H2O

Sample train -- Initial ____ Final ____

H2O/100 ml Silica gel

Stand at: 55.960 leak check < 0.01 at 11 in Hg for 1 min leak check < 0.02 at 11 in Hg for 1 min

PT #	ΔP	ΔH	Ts	Ti	TIN	TOUT	VAC	TEMP
A-6	1.3	2.3	128	60	92	88	4.2	233
5	1.4	2.5	128	60	93	88	61.210	
							4.5	235
4	1.3	2.3	128	61	95	84	63.480	
							4.8	246
3	1.05	1.40	129	60	96	89	65.60	
							5.0	255
2	0.68	1.20	127	59	97	90	67.770	
							4.8	260
1	0.22	0.39	127	58	97	90	69.650	
							3.0	251
							70.902	

PT #	ΔP	ΔH	Ts	Ti	TIN	TOUT	VAC	TEMP
B-6	1.3	2.3	127	58	99	90	6.5	235
5	0.75	1.35	127	58	99	91	73.30	
							4.8	257
4	0.44	0.77	127	57	98	91	75.20	
							4.5	262
3	0.35	0.63	126	57	97	90	76.82	
							3.8	252
2	0.27	0.48	127	57	98	91	78.150	
							3.5	260
1	0.20	0.36	125	57	98	91	79.331	
							2.0	25
							80.53	

F-26

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

FIELD TEST DATA FORM

continued

Site: [illegible] Wood Date: 11/9/91 Test No. PAH (2)

Nozzle I.D. EGL 4 Diameter 0.220 Filter No. PAH (2)

LEAK CHECKS: Pitot tubes -- Initial ____ Final ____

Sample train -- Initial ____ Final ____

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
39	1.6	1.3	2.3	1216	57	108	91	7.0	238
42	1.5	0.59	1.0	1216	57	99	92	52.80	
								4.2	235
45	4	0.26	0.47	126	58	98	92	84.60	
								3.5	258
	3	0.15	0.27	1217	58	98	92	85.80	
								3.0	260
51	2	0.14	0.25	1216	59	98	93	86.760	
								3.0	262
54	1	0.11	0.20	125	60	99	95	87.650	
								2.8	264
								88.462	

TIME	PT #	ΔP	ΔH	Ts	Ti	T IN	T OUT	VAC	TEMP
51	1.6	1.3	2.9	127	60	103	94	7.0	260
0	1.5	0.65	1.18	128	60	103	94	90.90	
								5.0	252
	4	0.40	0.72	125	61	103	95	92.65	
								4.0	248
6	3	0.38	0.68	125	61	102	95	94.15	
								3.8	247
	2	0.40	0.72	127	61	102	95	95.55	
								4.0	243
	1	0.38	0.68	126	62	102	96	97.00	
								4.0	240

Analytical Data

ARB METHOD 429 POLYCYLIC AROMATIC HYDROCARBONS

UNIT: µg/emit

MATRIX: _____

SAMPLE ID. TAL(Target Analyte)	MBLK	Field Blank	PAH-1	PAH-2	R.Spike	R.Spike Dup.		PQL µg
Naphthalene	↑	621	2780	1580	65	64		1.5
Acenaphthylene		↑	↑	↑	83	85		
Acenaphthene				ND	82	79		
Fluorene			ND	↓	82	85		
Phenanthrene	ND	ND	23	6.7	93	89		
Anthracene			ND	4.9	94	95		
Fluoranthene				↑	90	90		
Pyrene					86	77		
Benz(a)anthracene				ND	81	73		
Chrysene					76	85		
Benzo(b)fluoranthene					80	82		
Benzo(k)fluoranthene					79	85		
Benzo(a)pyrene					78	86		
Benzo(ghi)perylene					77	81		
Dibenz(ah)anthracene					78	83		
Indeno(1,23-cd)pyrene	↓	↓	↓	↓	91	86		↓

SURROGATE/SPIKE RECOVERY

Benzo(a)anthracene-d_{12}	60	104	104	120	103	101		
Methyl-Napnthalene-d_{10}	—	49	70	81	—	—		

Calibration Data

Calibration Report

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

5

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

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

$\overline{RF}$ - Average Response Factor

RSD - Percent Relative Standard Deviation

E165

Calibration Check Report

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

Check Standard Data File: >88869
Injection Time: 901115 16:03

Compound	$\overline{RF}$	RF	%Diff	Calib Meth
Naphthalene-d8	-	-	-	Average
Naphthalene	1.13751	1.33266	17.16	Average
2-Methylnaphthalene-d10	.70079	-	-	Average
Acenaphthene-d10	-	-	-	Average
Acenaphthylene	1.24466	1.48488	19.30	Average
Acenaphthene	.81272	.86853	6.87	Average
Fluorene	.96592	1.06050	9.79	Average
Phenanthrene-d10	-	-	-	Average
Phenanthrene	1.29892	1.47380	13.46	Average
Anthracene	1.30912	1.40187	7.08	Average
Fluoranthene	1.48099	1.58096	6.75	Average
Pyrene	1.50968	1.62507	7.64	Average
Benzo(a)anthracene-d12	1.08068	-	-	Average
Benzo(a)anthracene	1.49655	1.43191	4.32	Average
Chrysene-d12	-	-	-	Average
Chrysene	1.48349	1.35351	8.76	Average
Benzo(b)fluoranthene	1.77339	1.31714	25.73	Average
Benzo(k)fluoranthene	1.68620	1.42690	15.38	Average
Benzo(a)pyrene	1.68803	1.29918	23.04	Average
Indeno(1,2,3-cd)pyrene	1.57733	1.24908	20.81	Average
Dibenz(a,h)anthracene	1.46357	1.15764	20.90	Average
Benzo(g,h,i)perylene	1.48681	1.25851	15.36	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

APPENDIX F

Benzene Data and Calculations

Calculation Data

C.C. Wood Benzene Trains

SUMMARY OF QUANTITATIVE ANALYSIS AND EMISSION RATE OF BENZENE

	Concentration ug/L	Emission Rate lb/hr
Train 1	0.04	0.005
Train 2	< 0.03	< 0.003

Emission Rate = [(ug/L)/1000000]*Qs*28.3*60*(1/454)
Qs = 30805 SDCFM

TRACE ORGANICS
AMBIENT AIR IN TELDR BAG
METHOD - CAR 410

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

Order No: 90-11-105
Hazardous Waste Testing
Certification: E765

CLIENT: SHINING TREE
PROJECT: C.C. WOODS
PROJECT NO:
SAMPLE ID: METHOD BLANK

DATE RECEIVED: 11/13/1990
DATE ANALYZED: 11/13/1990
DATE COMPLETED: 11/13/1990
DATE SAMPLED: 11/13/1990

TARGET COMPOUNDS	ug/L (ppb)	DETECTION LIMIT ug/L (ppb)
Benzene	<0.03	0.03
	% Surrogate Spike Recovery	
Bromochloromethane	121%	
1,3-Dibromochloropropane	121%	

Harlan Loui
Chemist

November 14, 1990
Date

TRACE ORGANICS
AMBIENT AIR IN TELDR BAG
METHOD - CAR 410

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

Order No: 90-11-105
Hazardous Waste Testing
Certification: E765

CLIENT: SHINING TREE
PROJECT: C.C. WOODS
PROJECT NO:
SAMPLE ID: BENZENE-BLK

DATE RECEIVED: 11/13/1990
DATE ANALYZED: 11/13/1990
DATE COMPLETED: 11/13/1990
DATE SAMPLED: 11/13/1990

TARGET COMPOUNDS	ug/L (ppb)	DETECTION LIMIT ug/L (ppb)
Benzene	<0.03	0.03
	% Surrogate Spike Recovery	
Bromochloromethane	93%	
1,3-Dibromochloropropane	89%	

Harlan Loui
Chemist

November 1, 1990
Date

TRACE ORGANICS
AMBIENT AIR IN TELDR BAG
METHOD - CAR 410

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

Order No: 90-11-105
Hazardous Waste Testing
Certification: E765

CLIENT: SHINING TREE
PROJECT: C.C. WOODS
PROJECT NO:
SAMPLE ID: BENZENE-1

DATE RECEIVED: 11/13/1990
DATE ANALYZED: 11/13/1990
DATE COMPLETED: 11/13/1990
DATE SAMPLED: 11/13/1990

TARGET COMPOUNDS	ug/L (ppb)	DETECTION LIMIT ug/L (ppb)
Benzene	0.04	0.03
	% Surrogate Spike Recovery	
Bromochloromethane	121%	
1,3-Dibromochloropropane	123%	

Harlan Loui
Chemist

November 14, 1990
Date

TRACE ORGANICS
AMBIENT AIR IN TELDR BAG
METHOD - CAR 410

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

Order No: 90-11-105
Hazardous Waste Testing
Certification: E765

CLIENT: SHINING TREE
PROJECT: C.C. WOODS
PROJECT NO:
SAMPLE ID: BENZENE-2

DATE RECEIVED: 11/13/1990
DATE ANALYZED: 11/13/1990
DATE COMPLETED: 11/13/1990
DATE SAMPLED: 11/13/1990

TARGET COMPOUNDS	ug/L (ppb)	DETECTION LIMIT ug/L (ppb)
Benzene	<0.03	0.03
	% Surrogate Spike Recovery	
Bromochloromethane	98%	
1,3-Dibromochloropropane	78%	

Harlan Loui
Chemist

November 14, 1990
Date

TRACE ORGANICS
AMBIENT AIR IN TELDR BAG
METHOD - CAR 410

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

Order No: 90-11-208
Hazardous Waste Testing
Certification: E765

CLIENT: SHINING TREE
PROJECT: C.C. WOODS
PROJECT NO:
SAMPLE ID: REAGENT SPIKE

DATE RECEIVED: 11/05/1990
DATE ANALYZED: 11/07/1990
DATE COMPLETED: 11/14/1990
DATE SAMPLED: 11/07/1990

TARGET COMPOUNDS	% Recovery
Benzene	90%

% Surrogate Spike Recovery	
Bromochloromethane	85%
1,3-Dibromochloropropane	74%

Harlan Loui
Chemist

November 14, 1990
Date

TRACE ORGANICS
AMBIENT AIR IN TELDR BAG
METHOD - CAR 410

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

Order No: 90-11-208
Hazardous Waste Testing
Certification: E765

CLIENT: SHINING TREE
PROJECT: C.C. WOODS
PROJECT NO:
SAMPLE ID: REAGENT SPIKE DUP.

DATE RECEIVED: 11/05/1990
DATE ANALYZED: 11/07/1990
DATE COMPLETED: 11/14/1990
DATE SAMPLED: 11/07/1990

TARGET COMPOUNDS	% Recovery
Benzene	94%
	% Surrogate Spike Recovery
Bromochloromethane	91%
1,3-Dibromochloropropane	76%

Harlan Loui
Chemist

November 14, 1990
Date

Calibration Data

Title: GAS POLLUTANT ID FILE
Calibrated: 901107 14:14

Compound	Files: >FB101 RF 25.00	>FB102 RF 50.00	>FB104 RF 100.00	$\overline{RF}$	% RSD	
Vinyl chloride	.72950	.81621	.95843	.83471	13.847	(Conc=63.5,127.0,254.0)
Methylene chloride	.69654	.70446	.72495	.70865	2.069	(Conc=89.0,178.0,356.0)
Chloroform	2.30762	2.37251	2.63781	2.43932	7.172	(Conc=129.0,258.0,516.0)
1,1,2-Trichlorofluoroethane	-	-	-	-	-	
1,2-Dichloroethane	2.22863	2.30867	2.56886	2.36872	7.510	(Conc=108.0,216.0,432.0)
1,1,1-Trichloroethane	2.64685	2.75190	3.05076	2.81650	7.441	(Conc=143.0,286.0,572.0)
Carbon tetrachloride	2.55719	2.72993	3.12067	2.80260	10.301	(Conc=160.0,320.0,640.0)
Trichloroethene	4.04948	3.71115	3.84178	3.86747	4.412	(Conc=141.0,282.0,564.0)
Benzene	7.16431	6.50034	6.74265	6.80243	4.939	(Conc=85.0,170.0,340.0)
1,2-Dibromoethane	4.44605	4.05827	4.32814	4.27749	4.647	(Conc=210.5,421.0,842.0)
Tetrachloroethene	4.46757	4.03482	4.25192	4.25144	5.089	(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

Calibration Check Report

Title: GAS POLLUTANT ID FILE
Calibrated: 901107 14:14

Check Standard Data File: >FB141
Injection Time: 901113 14:59

Compound	$\overline{RF}$	RF	%Diff	Calib Meth
Vinyl chloride	.83471	.80086	4.06	Average
Methylene chloride	.70865	.65048	8.21	Average
Chloroform	2.43932	2.49099	2.12	Average
1,1,2-Trichlorofluoroethane	-	-	-	Average
1,2-Dichloroethane	2.36872	2.52040	6.40	Average
1,1,1-Trichloroethane	2.81650	2.75675	2.12	Average
Carbon tetrachloride	2.80260	2.96897	5.94	Average
Trichloroethene	3.86747	4.41197	14.08	Average
Benzene	6.80243	7.29729	7.27	Average
1,2-Dibromoethane	4.27749	4.33155	1.26	Average
Tetrachloroethene	4.25144	4.65934	9.59	Average
Toluene	-	-	-	Average
Ethylbenzene	-	-	-	Average
M-Xylene	-	-	-	Average
o,p-Xylene,total	-	-	-	Average

RF - Response Factor from daily standard file at 100.00 ng

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

%Diff - % Difference from original average or curve

QUANT REPORT

Operator ID: HARLAN
Output File: ^FB141::D2
Data File: >FB141::L1
Name: GAS CALIB. STD
Misc: 50ML + 2ML IS

Quant Rev: 6 Quant Time: 901113 15:25
Injected at: 901113 14:59
Dilution Factor: 1.00000

ID File: IGAS1F::L1
Title: GAS POLLUTANT ID FILE
Last Calibration: 901107 14:16

	Compound	R.T.	Q ion	Area	Conc	Units	q
1)	*Bromochloromethane	10.25	49.0	305520	118.70	ng	100
2)	Vinyl chloride	4.06	62.0	206133	95.94	ng	100
3)	Methylene chloride	7.13	84.0	167426	91.79	ng	93
4)	Chloroform	12.28	83.0	641152	102.12	ng	99
6)	1,2-Dichloroethane	13.00	62.0	648722	106.40	ng	99
7)	1,1,1-Trichloroethane	14.28	97.0	709556	97.88	ng	100
8)	Carbon tetrachloride	14.68	117.0	764178	105.94	ng	92
9)	*1,2-Dibromochloropropane	20.43	77.0	465972	729.20	ng	86
10)	Trichloroethene	17.39	130.0	281933	114.08	ng	97
11)	Benzene	17.91	78.0	466310	107.27	ng	100
12)	1,2-Dibromoethane	18.91	107.0	276794	101.26	ng	97
13)	Tetrachloroethene	22.94	164.0	297740	109.59	ng	94

* Compound is ISTD

APPENDIX G

Formaldehyde Data and Calculations

C.C. Wood Formaldehyde Trains

SUMMARY OF QUANTITATIVE ANALYSIS AND EMISSION RATE OF FORMALDEHYDE

	Concentration ug/L	Emission Rate lb/hr
Train 1	0.09	0.010
Train 2	0.06	0.007

Emission Rate = [(ug/L)/1000000]*Qs*28.3*60*(1/454)
Qs = 30805 SDCFM

Analytical Data

C Wood

Formaldehyde Analysis
By
DNPH Derivatization and HPLC (Method CAR 430)

Dn = 11-26-90

EL I	BK	Field BK	1	2	#7 RS/RSD		D/L (µg/L
Sample ID	<0.007	<0.007	0.091	0.062	101/95		0.007

Date: 11-26-90 Chemist: Yu Test: FAD (HPLC)

Client: Shining Tree ELI Order #: 90-11-105

Sample Type/Size: Air Std Book #: 7 Page: 29

Date Received: 11-13-90 Unit:

Date Extracted: 11-14-90 MR Work Book #: 1 Page: 50

Date Analyzed: 11-20-90 MS GC: HPLC Column: RP-18

Confirmation GC: Column:

ID	Cpd	RT	AC	RF/ Slope	I	Conc ppm ng	DF	Final Conc ug/sample	Note
BlK	FAD	5.688	134,043					N.D	
Field BlK	FAD	5.51	107,457	0.002491	0.16	3.573		N.D	
1	N.D	5.384	1512.062	1378.019					
2	FAD	5.684	1062,623	928.58		2.45	x2 x 30/210 / 11.17	= 0.0626	ug/(air) p/b
RS	FAD	5.720	8190,846	8056.803		20.20/		101%	
RSD	FAD	5.741	7699,231	7565.188		18.94/20		95%	

D/L = 0.3 x 2/11.17 x 30/210 = 0.007 (ug/l)

E186

Calibration Data

10-26-90 std curve by HPLC-RP-18

cpd	R.T	0.8	2 ppm	4 ppm	8 ppm	40 ppm
Formaldehyde	5.024	332441	866933	1768465	3571945	16965584

slope = 0.00236

I = -0.1497

11-20-90 FAD std curve by HPLC-RP-18

cpd	RT	2	4	8	40
FAD	5.770	749135	1581017	3121763	16008718

s = 0.002491 I = 0.14

APPENDIX H

Sampling QA/QC Documents

13329 STOCKTON BLVD.
GALT, CA. 95632

ACCURATE DEPENDABLE GAS METER SERVICE

209 745-4644
STA. LIC. #0984

VAPOR METER TEST DATA

OWNER Eureka Lab. MAKE Rockwell

ADDRESS _____ MODEL T110

TESTED AT Elk Grove Loc. SERIAL # 27324

TEMPERATURE 72° LAST TESTED _____

CONDITION Reconditioned SIZE 1½

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 Peter Okamoto STATE LICENSE # 2-0984

TABLE IV

Orifice Meter Calibration

Operator(s) Sonny Date 11/6

Meter Console No. 1 DGM No. Fluke - 1

Barometric Pressure (P_m) 30.30 in.Hg. DGM Correction Factor (DGMCF) 1.01

ΔH in H_2O	V_1 Initial DGM Dial Reading	θ Minutes	V_2 Final DGM Dial Reading	Q_m (CFM)	Tin / t_m (°F)	K_m
0.25	979.800	5	981.250	0.293	66/66	0.752
0.5	981.250	5	983.240	0.402	73/67	0.730
1.0	983.240	5	985.990	0.553	77/67	0.710
2.0	985.990	5	989.790	0.768	81/67	0.697
4.0	989.790	5	995.100	1.073	84/69	0.689
6.0	995.100	5	001.545	1.302	86/70	0.683
					Average ($\bar{K}_m$)	0.710

$$Q_{m\,(cfm)} = \frac{(V_2 - V_1) \times DGMCF}{\theta(\text{minutes})}$$

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

$$\Delta H_@ = \frac{0.9244}{(\bar{K}_m)^2} \quad 1.32$$

$P_m = 30.30$ in Hg

$T_m = t_m + 460 =$

$M_m = 29$ mol

$\bar{t}_m = 72.9 \qquad \bar{T}_m = 532.9$

TABLE IV

Orifice Meter Calibration

Operator(s) Benjamin V. Mendoza Jr. Date 20 Nov 90

Meter Console No. 1 DGM No. 621

Barometric Pressure (P_m) 30.32 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)	T_m / t_m (°F)	K_m
0.25	~~262.110~~ 262.110	5	263.540	0.289	65/64	0.744
0.5	263.540	5	265.540	0.404	69/65	0.735
1.0	265.546	5	268.300	0.557	74/65	0.719
2.0	268.300	5	272.150	0.778	78/66	0.708
4.0	272.150	5	~~274~~ 274.450	1.071	83/67	0.689
6.0	277.450	5	283.875	1.298	85/68	0.682
					Average ($\bar{K}_m$)	0.713

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

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

$$\Delta H_@ = \frac{0.9244}{(\bar{K}_m)^2} = 1.82$$

$P_m = 30.32$ in Hg

~~ΔH~~ $\bar{t}_m = 70.75$

$T_m = \bar{t}_m + 460$

$= 530.75$

$M_m = 29$ g/mole

TABLE IV

Orifice Meter Calibration

Operator(s) Benjamin Y. Mendoza Jr Date 11-21-90

Meter Console No. 1 DGM No. 611

Barometric Pressure (P_m) 30.49 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)	t_m (°F) Tin / Tout	K_m
0.25	367.500	5	368.920	0.287	66/65	0.740
0.5	368.920	5	370.880	0.396	70/65	0.722
1.0	370.880	5	373.600	0.549	76/66	0.708
2.0	373.600	5	377.440	0.776	80/66	0.708
4.0	377.440	5	382.770	1.077	84/68	0.694
6.0	382.770	5	389.285	1.314	86/69	0.693
					Average ($\bar{K}_m$)	0.711

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

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

$$\Delta H_@ = \frac{0.9244}{(\bar{K}_m)^2} = 1.83$$

$P_m = 30.49$ inches Hg

$M_m = 29$ g/mol

$\bar{t}_m = 71.75$

$T_m = \bar{t}_m + 460°$

$= 71.75° + 460°$

$= 531.75° K$

TEMPERATURE CALIBRATION

Name Joe W McNeal Date Aug 12, 1990

Barometric Pressure 30.25 Land Elevation

ICE BATH

Hg in Glass Thermometer Temperature				Corrected Hg in Glass Temperature				Temperature Device Identification No. Probe Thermo Co. EL1-TC Temperature			
°C	°K	°F	°R	°C	°K	°F	°R	°C	°K	°F	°R
2		35.5						1.4			
2		35.5						1.8		35.1	
2		35.5						1.8		35.1	

BOILING WATER BATH

Hg in Glass Temperature				Corrected Temperature				Device No.			
°C	°K	°F	°R	°C	°K	°F	°R	°C	°K	°F	°R
		210						100.5			
		210						100.6			
		210						100.8			

MINERAL OIL BATH

Point	Hg in Glass Temperature				Corrected Temperature				Device No.			
	°C	°K	°F	°R	°C	°K	°F	°R	°C	°K	°F	°R
1		375	375						192.8		375	
2		375	375						192.6		376	
3			375						192.8		376	
4			375						192.8		376	

Form for temperature calibration.

TEMPERATURE CALIBRATION

Name Joe W McNeal Date Aug 12 1990

Barometric Pressure 30.25 Land Elevation

ICE BATH

Hg in Glass Thermometer Temperature				Corrected Hg in Glass Temperature				Temperature Device Identification No. Last Impinger EL3-TC J Temperature			
°C	°K	°F	°R	°C	°K	°F	°R	°C	°K	°F	°R
5.2								5.8			
5.4								5.8			
5.7								6.0			

BOILING WATER BATH

Hg in Glass Temperature				Corrected Temperature				Device No. Last Impinger EL3-TC J			
°C	°K	°F	°R	°C	°K	°F	°R	°C	°K	°F	°R
		211						100.6			
		211						100.5			
		211						101.1			

MINERAL OIL BATH

Point	Hg in Glass Temperature				Corrected Temperature				Device No. Last Impinger EL3-TC J			
	°C	°K	°F	°R	°C	°K	°F	°R	°C	°K	°F	°R
1			360								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 ELSR - TC Temperature			
°C	°K	°F	°R	°C	°K	°F	°R	°C	°K	°F	°R
2.1								1.8			
2.2								2.1			
2.1								2.2			

BOILING WATER BATH

Hg in Glass Temperature				Corrected Temperature				Device No.			
°C	°K	°F	°R	°C	°K	°F	°R	°C	°K	°F	°R
		210						100.5			
		210						100.6			
		210						100.8			

MINERAL OIL BATH

Point	Hg in Glass Temperature				Corrected Temperature				Device No.			
	°C	°K	°F	°R	°C	°K	°F	°R	°C	°K	°F	°R
1			372								376	
2			374								375	
3			375								376	
4			375								376	

Form for temperature calibration.

PITOT TUBE TYPE Type S

CALIBRATED BY RSC

DATE Feb. 7, 1990 $\bar{C}_p = \frac{\bar{C}_{pA} + \bar{C}_{pB}}{2} = 0.8549$

A SIDE CALIBRATION

RUN	ΔP_{STD}	ΔP (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}	ΔP (S)	C_p (S)	DEV.
1	.25	.35	.8452	0.0081
2	.75	1.00	.8666	0.0133
3	1.00	1.39	.8412	0.0051
			$\bar{C}_{PB}$ = .8533	.10883 AVG. =
STANDARD DEVIATION OF AVG. DEV. =			(Must be <.02)	

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

CALCULATIONS:

AVERAGE DEVIATION = $\frac{\sum_{i}^{3} |C_p\,(S) - \bar{C}_p\,(A \text{ or } B)|}{3}$ (Must be <.01)

DEVIATION (DEV.) = C_p (S) - $\bar{C}_p$ (A or B)

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

NOZZLE CALIBRATION

Date 11/20/90 Calibrated by Joe W McNeal

Nozzle identification #	D_1, in.	D_2, in.	D_3, in.	ΔD, in.	D_{avg}
ELG-23	.221	.220	.219	.001	.220

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.

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

The preceding portions of Appendix E, 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 E200 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 E201 converts the hourly metals emissions into metals emissions per ton of AC produced by the tested type facility.

Page E202 converts the hourly PAHs emissions into PAHs emissions per ton of AC produced by the tested type facility.

Page E203 converts the hourly Benzene, (& Formaldehyde for oil burning plants) emissions into Benzene & Formaldehyde emissions per ton of AC produced by the tested type facility.

CENTRAL VALLEY ROCK SAND & GRAVEL ASSOCIATION
AB2588 ASPHALT CONCRETE POOLED SOURCE TESTING PROGRAM
Prepared by: D.E. DEEM, R.E.A.,R.G.
PLANT: CC WOOD - CLEMENTS PLANT

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
11/8/90	1031	1144	73	72	73	345	516	168.66	0.01	PAH (1)
11/8/90	1205	1317	72	72	72	558	689	131.00	0.00	PAH (2)
11/9/90	0726	0842	76	72	76	23	170	139.26	0.05	Chromium (1)
11/9/90	1030	1240	130	72	90	190	364	139.20	40.14	Chromium (2)
11/13/90	0723	0847	84	72	84	29	280	215.14	0.14	Multi-Metals (1)
11/13/90	0902	1133	151	72	61	320	481	143.11	70.06	Lead (1)
11/21/90	0735	0849	73	72	73	0	281	277.15	0.01	Multi-Metals (2)
11/21/90	0907	1019	72	72	72	325	558	233.00	0.00	Lead (2)

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
AB2588 ASPHALT CONCRETE POOLED SOURCE TESTING PROGRAM
Prepared By: D. E. DEEM, R.E.A., R.G.
PLANT #: 50
PLANT TYPE: DRUM
FUEL TYPE: OIL
COLLECTOR TYPE: WET SCRUBBER

TONS PRODUCED EPA TRAIN # 1	215	TONS PROD. Chromium TRAIN # 1	139
TONS PRODUCED EPA TRAIN # 2	277	TONS PROD. Chromium TRAIN # 2	139
TONS PRODUCED EPA TRAIN # 3	0	TONS PROD. Chromium TRAIN # 3	0
TEST TIME(min.)EPA TRAIN #1	72	TEST TIME(min.)CR+ TRAIN # 1	72
TEST TIME(min.)EPA TRAIN #2	72	TEST TIME(min.)CR+ TRAIN # 2	72
TEST TIME(min.)EPA TRAIN #3	0	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	N/A	0.0E+00	0.0E+00	0.0E+00
Beryllium	*	ND	ND	N/A	0.0E+00	0.0E+00	0.0E+00
Cadmium		3.7E-04	ND	N/A	2.1E-06	0.0E+00	0.0E+00
Copper		1.1E-04	ND	N/A	6.1E-07	0.0E+00	0.0E+00
Mercury		1.1E-03	3.8E-04	N/A	6.4E-06	1.6E-06	0.0E+00
Nickel	*	ND	ND	N/A	0.0E+00	0.0E+00	0.0E+00
Lead		7.0E-04	ND	N/A	3.9E-06	0.0E+00	0.0E+00
Selenium	*	ND	ND	N/A	0.0E+00	0.0E+00	0.0E+00
Zinc		1.0E-02	1.7E-02	N/A	5.6E-05	7.6E-05	0.0E+00
Manganese		5.0E-03	2.1E-03	N/A	2.8E-05	9.1E-06	0.0E+00
Total Chromium		3.9E-04	3.4E-04	N/A	3.4E-06	2.9E-06	0.0E+00
Hexavalent Chromium	*	ND	ND	N/A	0.0E+00	0.0E+00	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 #: 50
PLANT TYPE: DRUM
FUEL TYPE: OIL
COLLECTOR TYPE: WET SCRUBBER

TONS PRODUCED TRAIN # 1	169
TONS PRODUCED TRAIN # 2	131
TONS PRODUCED TRAIN # 3	0
TEST TIME (min.) TRAIN # 1	72
TEST TIME (min.) TRAIN # 2	72
TEST TIME (min.) TRAIN # 3	0

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		2.8E-01	1.6E-01	N/A	2.0E-03	1.4E-03	0.0E+00
Acenaphtlylene	*	ND	ND	N/A	0.0E+00	0.0E+00	0.0E+00
Acenaphene	*	ND	ND	N/A	0.0E+00	0.0E+00	0.0E+00
Fluorene	*	ND	ND	N/A	0.0E+00	0.0E+00	0.0E+00
Phenanthrene		2.3E-03	6.7E-04	N/A	1.6E-05	6.1E-06	0.0E+00
Anthracene		ND	4.9E-04	N/A	0.0E+00	4.5E-06	0.0E+00
Fluoranthene	*	ND	ND	N/A	0.0E+00	0.0E+00	0.0E+00
Pyrene	*	ND	ND	N/A	0.0E+00	0.0E+00	0.0E+00
Benzo(a)anthracene	*	ND	ND	N/A	0.0E+00	0.0E+00	0.0E+00
Chrysene	*	ND	ND	N/A	0.0E+00	0.0E+00	0.0E+00
Benzo(b)fluoranthene	*	ND	ND	N/A	0.0E+00	0.0E+00	0.0E+00
Benzo(k)fluoranthene	*	ND	ND	N/A	0.0E+00	0.0E+00	0.0E+00
Benzo(a)pyrene	*	ND	ND	N/A	0.0E+00	0.0E+00	0.0E+00
Benzo(g,h,i)perylene	*	ND	ND	N/A	0.0E+00	0.0E+00	0.0E+00
Dibenzo(a,h)anthracene	*	ND	ND	N/A	0.0E+00	0.0E+00	0.0E+00
Indeno(1,2,3-cd)pyrene	*	ND	ND	N/A	0.0E+00	0.0E+00	0.0E+00
DETECTION LIMIT		1.5E-04	1.5E-04				
TOTAL PAHS/TON ASPHALT CONCRETE					2.0E-03	1.5E-03	0.0E+00
TOTAL PAHS/ 100,000 tons Asphalt Concrete					2.0E+02	1.5E+02	0.0E+00

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

BENZENE (CARB 410A) / FORMALDEHYDE (430)
REVISED ON: 2/6/91

CENTRAL VALLEY ROCK SAND & GRAVEL ASSOCIATION
AB2588 ASPHALT CONCRETE POOLED SOURCE TESTING PROGRAM
Prepared By: D. E. DEEM, R.E.A., R.G.
PLANT #: 50
PLANT TYPE: DRUM
FUEL TYPE: OIL
COLLECTOR TYPE: WET SCRUBBER

TONS/HR BENZENE TRAIN #1	181
TONS/HR BENZENE TRAIN #2	181
TONS/HR BENZENE TRAIN #3	0
TONS/HR FORMALDEHYDE TRAIN #1	139
TONS/HR FORMALDEHYDE TRAIN #2	139
TONS/HR FORMALDEHYDE TRAIN #3	0

COMPOUND	EMISSION RATES lb/hr. TRAIN 1	TRAIN 2	TRAIN 3	EMISSION RATES lb/ton TRAIN 1	TRAIN 2	TRAIN 3
Benzene	5.000E-03	3.000E-03	0.000E+00	2.8E-05	1.7E-05	0.0E+00
Formaldehyde	1.000E-02	7.000E-03	0.000E+00	7.2E-05	5.0E-05	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