SOUTH COAST
AIR QUALITY MANAGEMENT DISTRICT
21865 Copley Dr.
Diamond Bar, CA 91765-4178

ALL AMERICAN ASPHALT
IRVINE HOT MIX ASPHALT PLANT
Facility ID #82207
Air Toxics Emissions Inventory Report
Reporting Year 2016

Prepared For:

All American Asphalt
1776 All American Way
Corona, California, 92879

Project No.: ALAMR-18-2445

Date: December 7, 2021

TAYLOR
ENVIRONMENTAL
SERVICES, INC.

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FORM A

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

AB 2588 Program, 21865 COPLEY DR., DIAMOND BAR CA 91765-0949

INVENTORY YEAR 20 16

AB 2588 AIR TOXICS DOCUMENT CERTIFICATION & SUBMITTAL FORM

Please check the appropriate boxes for purpose of submittal:

☐ *INITIAL INFORMATION for ATIR*
☑ *AIR TOXICS INVENTORY REPORT (ATIR)*
☐ *HEALTH RISK ASSESSMENT (HRA)*
☐ *RISK REDUCTION PLAN (RRP)*

☐ *EARLY ACTION REDUCTION PLAN (EARP)*
☐ *VOLUNTARY RISK REDUCTION PLAN (VRRP)*
☐ *IMPLEMENTATION PROGRESS REPORT for VRRP/RRP*
☐ *OTHER:*

☐ *INITIAL*
☐ *REVISION*
☑ *FINAL*

Does your facility participate or wish to participate in VRRP program pursuant to Rule 1402(h)? *YES* ☐ ☒

Please provide the following information:

Facility name: All American Asphalt, Irvine Facility
South Coast AQMD ID: 082207
Facility SIC/NAICS CODE: 324121

Facility Location Address:
10671 Jeffrey Road
Irvine, CA 92602

Mailing Address:
1776 All American Way
Corona CA 92879

Contact Person (Company Official)
Name: John Gardner
Title: Plant Manager
Telephone: 951-736-3844
eMail: jgardner@allamericanasphalt.com

Preparer (if different from above)
Name: John Taylor
Title: Consultant
Company: TES, Inc.
Telephone: 714-587-2595 ext. 104
eMail: john.taylor@tayloresinc.com

FAILURE TO SUBMIT REQUIRED INFORMATION OR KNOWINGLY SUPPLYING FALSE INFORMATION IS PUNISHABLE TO THE EXTENT DEFINED IN HEALTH AND SAFETY CODE SECTIONS 44381(a) AND 44381(b), WHICH INCLUDES MINIMUM FINES OF NOT LESS THAN FIVE HUNDRED DOLLARS.

Signature Of Responsible Company Official:
Date: 12/7/2021

Name Of Responsible Company Official: John Gardner
Title: Plant Manager

EXECUTIVE SUMMARY

The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588 or the "Act") was enacted in September 1987. Under the Act, stationary sources are required to report the types and quantities of certain toxic substances their facilities routinely release into the air. AB 2588 is designed to provide information to state and local agencies and to the general public on the extent of airborne emissions from stationary sources and the potential public health impacts of those emissions. The South Coast Air Quality Management District is mandated by the State to implement AB 2588.

On March 6, 2015, The State Office of Environmental Health Hazard Assessment (OEHHA) adopted changes to the Air Toxics Hot Spots Program Guidance Manual for the Preparation of Health Risk Assessments. These revisions were designed to incorporate three technical support documents and to provide enhanced protection of children as required under state law (SB 25, Escutia, 1999). Additionally, SCAQMD updated Rule 1402 in 2016 to include Voluntary Risk Reduction Program. Due to these recent changes, and the corresponding potential increases in calculated health risk, the District notified All American that a revised report must be prepared.

Pursuant to the Air Toxics "Hot Spots" Information and Assessment Act of 1987, a comprehensive, site-specific Air Toxics Inventory Report has been prepared for reporting year 2016.

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Attachments		**Description**
A	-	Receptor Locations
B	-	Process Flow Diagram
C	-	Toxic Emission Factors/Profiles
D	-	HARP Toxic Emissions Summary
E	-	Material Handling - Detailed Calculations

Part I Project Description

A. Business Background

1. Name

All American Asphalt

2. Owner

All American
1776 All American Way
Corona, CA 92879

3. Contact

John Gardner
(951) 736-3844

4. Business Description

Hot Mix Asphalt Plant

B. Type of Project

Air Toxics Inventory Report

C. Description of Facility

1. Location

The facility is located at 10671 Jeffrey Road, Irvine, CA 92602.

D. Description of Process

1. Hot Mix Plant

This facility produces hot mix asphalt which is comprised of aggregate and asphalt oil. The facility receives aggregate at the plant by truck. The aggregate is received through a drive over hopper and conveyed to one of eight silos for storage. The silos utilized individual feed conveyors which meter the amount of aggregate from each silo on to the collecting conveyor. The collecting conveyor feeds material through a reject screen to ensure no foreign or oversized material is feed to the drum dryer. Once through the screen material is fed to the Dryer where the aggregate is dried by a 125 MMBTU/hr. burner fired on natural gas and prepared to be mixed with asphalt oil that is supplied through one of three asphalt storage tanks to the external drum on the dryer. Emissions from the dryer are vented to the baghouse that is equipped with a knockout box. Once the oil and aggregate are mixed the asphaltic concrete is fed to one of five silos through a bucket elevator and drag slat conveyors located on the top of the silos. Once in the silos, the asphaltic concrete is stored until it is ready to be loaded into asphalt trucks and delivered to the project site.

2. Recycle Crushing and RAP Feed System

The facility also has the ability to receive and process Recycled Asphalt Pavement (RAP) through one of two crushing systems. The Lipman crushing system is feed using an end loader and the material is processed by a horizontal shaft impactor where material is crushed and fed via conveyor to a screen where the material is either fed back to the crusher or fed to the aggregate receiving system for the asphalt plant where the processed material is conveyed to the dedicated recycle silo for storage. Once the plant requires RAP that the material is fed via conveyor to the dryer and blended with the aggregate and asphalt oil. The facility also has a Telsmith crushing system which also is fed using an end loader and uses a horizontal shaft impactor to size material. The processed material is fed directly to the asphalt drum once sized. Note, when RAP is added, the virgin aggregate is reduced by a like amount. Please refer to Attachment B for a process flow diagram which shows the interaction of the equipment.

3. Production Data

The plant production for 2016 was as follows:

Sand and Aggregate Used (tons/yr)	[redacted]
Hot Mix Asphalt Produced (tons/yr)	[redacted]
Hot Mix Asphalt Gas Usage (mmCF)	[redacted]
Hot Oil Tank Gas Usage (mmCF)	[redacted]
Rubber Plant Gas Usage (mmCF)	[redacted]
RAP (tons/yr)	[redacted]
AC Oil (gal/yr)	[redacted]
Diesel Storage (gal/yr)	[redacted]
Stockpile Tons (tons/yr)	[redacted]
Crumb Rubber (tons/yr)	[redacted]
Crumb Rubber Binder (tons/yr)	[redacted]
Welding Electrode E7018 (lbs/yr)	[redacted]
Welding Electrode E6010 (lbs/yr)	[redacted]
Welding Electrode ER316 (lbs/yr)	[redacted]
Haul Roads Paved (vehicle miles traveled)	[redacted]
Brake Cleaner (gal/yr)	[redacted]

Part II Methodology

During the reporting year (2016), All American included the following sources of emissions, which are evaluated pursuant to AB 2588:

A. Permitted Toxic Device ID's

Equipment Description	Permit No.	Toxics Device ID		
		Equipment	**Process Description**	**Process**
Storage Tank Asphalt, ≤ 50,000 gallons	F18783	ES1	Storage Tank	P1
Storage Tank Asphalt, ≤ 50,000 gallons	F18782	ES2	Storage Tank	P1
Storage Tank Asphalt, ≤ 50,000 gallons	F18781	ES3	Storage Tank	P1
Mixing Tank Crumb Rubber, ≤ 30,000 gallons	F57256	ES30	Storage Tank	P2
Mixing Tank Crumb Rubber, 400 gallons	F57256	ES30	Storage Tank	P1
Asphalt Blending/Batching Equipment	G21047	ES11	Dryer	P1
			Baghouse	P2
			Asphalt Silo Filing	P3
			Asphalt Silo Loadout	P4
			Material Transfer	P5
Heater / Furnace Oil, 5-20 MMBTU/HR	---	ES13	External Combustion	P1
Aggregate Production/Crushing, <5,000 TPD	G28645	ES14	Material Transfer	P1
RAP conveying	G28649	ES19	Material Transfer	P1
Crumb Rubber Plant 1	F57254	ES27	Portable Process Heater	P1

B. Permit Exempt Toxic Device ID's

Source Description	Toxics Device ID		
	Equipment	Process Description	Process
Brake Cleaner	ES21	Shop	P1
Diesel Storage	ES22	Shop	P1
Open Storage Pile	ES23	RAP/Aggregate	P1
Welding Rods	ES25	Shop	P1
		Shop	P2
Paved Roads	ES26	Site	P1-P10
Welding Electrode	ES29	Shop	P1

C. Permitted Toxic Emissions Summary

The following reflect the individual permitted devices and processes as listed above (Table 1). Included are the device and process name, emission, annual throughput, and pounds of toxics per year.

ES1 P1, ES2 P1, ES3 P1 (Asphalt Oil Storage)

Chemical	Cas #	AP-42 Table 11.1-15 % Present Compound/ Organic PM cPM	AP-42 Table 11.1-16 % Present Compound/ Organic VOC (%)	x	Total Unontrolled PM + VOC Per Tank (lbs/yr)	x	PM & VOC Control	=	2016 PM Controlled Emissions Per Tank (lbs/yr)	2016 VOC Emissions Per Tank (lbs/yr)	÷	[redacted] (hr/yr)	=	2016 PM Controlled Emissions Per tank (lbs/hr)	2016 VOC Emissions Per Tank (lbs/hr)
1,1,1-Trichloroethane	71556		0		[redacted]		1		0.00E+00	0.00E+00		[redacted]		0.00E+00	0.00E+00
2-Methyl naphthalene [PAH, POM]	91576	5.27			[redacted]		0.01		2.17E-03	0.00E+00		[redacted]		2.47E-07	0.00E+00
Acenaphthene [PAH,POM]	83329	0.47			[redacted]		0.01		1.93E-04	0.00E+00		[redacted]		2.21E-08	0.00E+00
Acenaphthylene [PAH,POM]	208968	0.014			[redacted]		0.01		5.76E-06	0.00E+00		[redacted]		6.57E-10	0.00E+00
Anthracene [PAH,POM]	120127	0.130			[redacted]		0.01		5.35E-05	0.00E+00		[redacted]		6.11E-09	0.00E+00
Benzene	71432		0.032		[redacted]		1		0.00E+00	4.67E-04		[redacted]		0.00E+00	5.33E-08
Bromomethane	74839		0.0049		[redacted]		1		0.00E+00	7.15E-05		[redacted]		0.00E+00	8.16E-09
2-Butanone	78933		0.039		[redacted]		1		0.00E+00	5.69E-04		[redacted]		0.00E+00	6.49E-08
Carbon Disulfide	75150		0.016		[redacted]		1		0.00E+00	2.33E-04		[redacted]		0.00E+00	2.66E-08
Chloroethane	75003		0.004		[redacted]		1		0.00E+00	5.83E-05		[redacted]		0.00E+00	6.66E-09
Benz(a) anthracene [PAH,POM]	56553	0.056			[redacted]		0.01		2.30E-05	0.00E+00		[redacted]		2.63E-09	0.00E+00
Benzo(a) pyrene [PAH, POM]	50328	0			[redacted]		0.01		0.00E+00	0.00E+00		[redacted]		0.00E+00	0.00E+00
Benzo(b) fluoranthene [PAH, POM]	205992	0			[redacted]		0.01		0.00E+00	0.00E+00		[redacted]		0.00E+00	0.00E+00
Benzo(e)pyrene [PAH, POM]	192972	0.0095			[redacted]		0.01		3.91E-06	0.00E+00		[redacted]		4.46E-10	0.00E+00
Benzo(g,h,i) perylene [PAH, POM]	191242	0			[redacted]		0.01		0.00E+00	0.00E+00		[redacted]		0.00E+00	0.00E+00
Benzo(k) fluoranthene [PAH, POM]	207089	0			[redacted]		0.01		0.00E+00	0.00E+00		[redacted]		0.00E+00	0.00E+00
Chrysene [PAH, POM]	218019	0.21			[redacted]		0.01		8.64E-05	0.00E+00		[redacted]		9.86E-09	0.00E+00
Dibenz(a,h)anthracene [PAH, POM]	53703	0			[redacted]		0.01		0.00E+00	0.00E+00		[redacted]		0.00E+00	0.00E+00
Ethyl benzene	100414		0.038		[redacted]		1		0.00E+00	5.54E-04		[redacted]		0.00E+00	6.33E-08
Formaldehyde	50000		0.69		[redacted]		1		0.00E+00	1.01E-02		[redacted]		0.00E+00	1.15E-06
n-Hexane	110543		0.1		[redacted]		1		0.00E+00	1.46E-03		[redacted]		0.00E+00	1.67E-07
Indeno(1,2,3-cd)pyrene [PAH, POM]	193395		0		[redacted]		1		0.00E+00	0.00E+00		[redacted]		0.00E+00	0.00E+00
m-Xylene	108383		0.2		[redacted]		1		0.00E+00	2.92E-03		[redacted]		0.00E+00	3.33E-07
p-Xylene	106423		0		[redacted]		1		0.00E+00	0.00E+00		[redacted]		0.00E+00	0.00E+00
Methylene chloride	75092		0.00027		[redacted]		1		0.00E+00	3.94E-06		[redacted]		0.00E+00	4.50E-10
o-Xylene	95476		0.057		[redacted]		1		0.00E+00	8.31E-04		[redacted]		0.00E+00	9.49E-08
Perylene [PAH, POM]	198550	0.03			[redacted]		0.01		1.23E-05	0.00E+00		[redacted]		1.41E-09	0.00E+00
Phenanthrene [PAH, POM]	85018	1.8			[redacted]		0.01		7.41E-04	0.00E+00		[redacted]		8.45E-08	0.00E+00
Pyrene [PAH, POM]	129000	0.44			[redacted]		0.01		1.81E-04	0.00E+00		[redacted]		2.07E-08	0.00E+00
Styrene	100425		0.0054		[redacted]		1		0.00E+00	7.88E-05		[redacted]		0.00E+00	8.99E-09
Tetrachloroethene	127184				[redacted]				0.00E+00	0.00E+00		[redacted]		0.00E+00	0.00E+00
Toluene	108883		0.062		[redacted]		1		0.00E+00	9.04E-04		[redacted]		0.00E+00	1.03E-07
Trichloroethene	79016		0		[redacted]		1		0.00E+00	0.00E+00		[redacted]		0.00E+00	0.00E+00
Trichlorofluoromethane	75694		0		[redacted]		1		0.00E+00	0.00E+00		[redacted]		0.00E+00	0.00E+00
Fluoranthene	206440	0.15			[redacted]		0.01		6.17E-05	0.00E+00		[redacted]		7.04E-09	0.00E+00
Fluorene	86737	1.01			[redacted]		0.01		4.16E-04	0.00E+00		[redacted]		4.74E-08	0.00E+00
Naphthalene [PAH, POM]	91203	1.82			[redacted]		0.01		7.49E-04	0.00E+00		[redacted]		8.55E-08	0.00E+00

1. TANKS
2. AP-42, Chapter 11.1, Table 11.1-15 and Table 11.1-16
3. See Attachment "C" for Owens Corning Estimates of air emissions from Asphalt Storage Tanks and Truck Loading

ES30 P1 (Rubber Mixing Tank I)

Chemical	Cas #	Average Emissions Rate (lb/hr)[1]	÷	Average Tons/Hr Source Test[1]	x	Annual Production (tons/yr)	x	PM Control Efficiency	x	Proportional Tank Size	=	2016 PM/VOC Controlled Emissions Per Tank (lbs/yr)	÷	[redacted] hr/yr	=	2016 PM/VOC Controlled Emissions Per Tank (lbs/hr)
1,3 Butadiene	106990	[redacted]		[redacted]		[redacted]		1		0.02		0.00E+00		[redacted]		0.00E+00
2,2,4- Trimethylpentane	540841	[redacted]		[redacted]		[redacted]		1		0.02		2.53E-02		[redacted]		9.02E-05
2-Butanone (MEK)	78933	[redacted]		[redacted]		[redacted]		1		0.02		6.73E-02		[redacted]		2.41E-04
4-Methyl-2-pentanone (MIBK)	108101	[redacted]		[redacted]		[redacted]		1		0.02		3.23E-01		[redacted]		1.15E-03
Benzene	71432	[redacted]		[redacted]		[redacted]		1		0.02		6.31E-02		[redacted]		2.25E-04
Carbon disulfide	75150	[redacted]		[redacted]		[redacted]		1		0.02		2.95E-02		[redacted]		1.05E-04
Chlorodifluoromethane (TIC)	75456	[redacted]		[redacted]		[redacted]		1		0.02		0.00E+00		[redacted]		0.00E+00
Cyclohexane	110827	[redacted]		[redacted]		[redacted]		1		0.02		8.84E-02		[redacted]		3.16E-04
Dichlorofluoromethane (TIC)	75434	[redacted]		[redacted]		[redacted]		1		0.02		0.00E+00		[redacted]		0.00E+00
Ethanol	64175	[redacted]		[redacted]		[redacted]		1		0.02		4.35E-01		[redacted]		1.55E-03
Ethylbenzene	100414	[redacted]		[redacted]		[redacted]		1		0.02		1.39E-02		[redacted]		4.96E-05
Heptane	142825	[redacted]		[redacted]		[redacted]		1		0.02		1.16E-01		[redacted]		4.16E-04
Hexane	110543	[redacted]		[redacted]		[redacted]		1		0.02		1.96E-01		[redacted]		7.02E-04
Methanol	67561	[redacted]		[redacted]		[redacted]		1		0.02		7.58E-01		[redacted]		2.71E-03
m-Xylene & p-xylene	1330207	[redacted]		[redacted]		[redacted]		1		0.02		1.82E-01		[redacted]		6.51E-04
o-Xylene	95476	[redacted]		[redacted]		[redacted]		1		0.02		9.12E-03		[redacted]		3.26E-05
Propene	115071	[redacted]		[redacted]		[redacted]		1		0.02		1.82E-01		[redacted]		6.51E-04
Toluene	108883	[redacted]		[redacted]		[redacted]		1		0.02		6.59E-02		[redacted]		2.36E-04
2-Methylnapthalene	91576	[redacted]		[redacted]		[redacted]		0.1		0.02		4.77E-04		[redacted]		1.70E-06
Acenaphthene	83329	[redacted]		[redacted]		[redacted]		0.1		0.02		3.93E-06		[redacted]		1.40E-08
Acenaphthylene	208968	[redacted]		[redacted]		[redacted]		0.1		0.02		1.96E-06		[redacted]		7.02E-09
Anthracene	120127	[redacted]		[redacted]		[redacted]		0.1		0.02		2.81E-06		[redacted]		1.00E-08
Benza(a)anthracene	56553	[redacted]		[redacted]		[redacted]		0.1		0.02		4.63E-09		[redacted]		1.65E-11
Benza(b)fluoranthene	205992	[redacted]		[redacted]		[redacted]		0.1		0.02		1.22E-08		[redacted]		4.36E-11
Benza(k)fluoranthene	207089	[redacted]		[redacted]		[redacted]		0.1		0.02		4.35E-09		[redacted]		1.55E-11
Benzo(a)pyrene	50328	[redacted]		[redacted]		[redacted]		0.1		0.02		1.11E-08		[redacted]		3.96E-11
Benzo(e)pyrene	192972	[redacted]		[redacted]		[redacted]		0.1		0.02		7.72E-08		[redacted]		2.76E-10
Benzo(g,h,i)perylene	191242	[redacted]		[redacted]		[redacted]		0.1		0.02		1.23E-07		[redacted]		4.41E-10
Chrysene	218019	[redacted]		[redacted]		[redacted]		0.1		0.02		3.37E-08		[redacted]		1.20E-10
Dibenzo(a,h)anthracene	53703	[redacted]		[redacted]		[redacted]		0.1		0.02		0.00E+00		[redacted]		0.00E+00
Fluoranthene	206440	[redacted]		[redacted]		[redacted]		0.1		0.02		1.54E-07		[redacted]		5.51E-10
Fluorene	86737	[redacted]		[redacted]		[redacted]		0.1		0.02		2.95E-06		[redacted]		1.05E-08
Indeno(1,2,3-c,d)pyrene	193395	[redacted]		[redacted]		[redacted]		0.1		0.02		1.68E-08		[redacted]		6.01E-11
Napthalene	91203	[redacted]		[redacted]		[redacted]		0.1		0.02		1.36E-03		[redacted]		4.86E-06
Perylene	198550	[redacted]		[redacted]		[redacted]		0.1		0.02		3.93E-09		[redacted]		1.40E-11
Phenanthrene	85018	[redacted]		[redacted]		[redacted]		0.1		0.02		3.93E-06		[redacted]		1.40E-08
Pyrene	129000	[redacted]		[redacted]		[redacted]		0.1		0.02		3.23E-07		[redacted]		1.15E-09
Aluminum	7429905	[redacted]		[redacted]		[redacted]		1		0.02		3.23E-04		[redacted]		1.15E-06
Antimony	7440360	[redacted]		[redacted]		[redacted]		1		0.02		0.00E+00		[redacted]		0.00E+00
Arsenic	7440382	[redacted]		[redacted]		[redacted]		1		0.02		1.68E-06		[redacted]		6.01E-09
Barium	7440393	[redacted]		[redacted]		[redacted]		1		0.02		2.10E-05		[redacted]		7.52E-08
Beryllium	7440417	[redacted]		[redacted]		[redacted]		1		0.02		0.00E+00		[redacted]		0.00E+00
Cadmium	7440439	[redacted]		[redacted]		[redacted]		1		0.02		5.19E-07		[redacted]		1.85E-09
Chromium	7440473	[redacted]		[redacted]		[redacted]		1		0.02		9.12E-06		[redacted]		3.26E-08
Cobalt	7440484	[redacted]		[redacted]		[redacted]		1		0.02		1.82E-07		[redacted]		6.51E-10
Copper	7440508	[redacted]		[redacted]		[redacted]		1		0.02		1.82E-05		[redacted]		6.51E-08
Lead	7439921	[redacted]		[redacted]		[redacted]		1		0.02		2.95E-06		[redacted]		1.05E-08
Manganese	7439965	[redacted]		[redacted]		[redacted]		1		0.02		1.82E-05		[redacted]		6.51E-08
Mercury	7439976	[redacted]		[redacted]		[redacted]		1		0.02		5.05E-06		[redacted]		1.80E-08
Nickel	7440020	[redacted]		[redacted]		[redacted]		1		0.02		1.14E-05		[redacted]		4.06E-08
Phosphorous	7723140	[redacted]		[redacted]		[redacted]		1		0.02		1.01E-04		[redacted]		3.61E-07
Selenium	7782492	[redacted]		[redacted]		[redacted]		1		0.02		9.12E-07		[redacted]		3.26E-09
Silver	7440224	[redacted]		[redacted]		[redacted]		1		0.02		1.54E-06		[redacted]		5.51E-09
Thallium	7440280	[redacted]		[redacted]		[redacted]		1		0.02		0.00E+00		[redacted]		0.00E+00
Vanadium	7440622	[redacted]		[redacted]		[redacted]		1		0.02		0.00E+00		[redacted]		0.00E+00
Zinc	7440666	[redacted]		[redacted]		[redacted]		1		0.02		3.09E-05		[redacted]		1.10E-07

1. Alliance Source Testing, Source Test Report, March 17-19, 2021

ES30 P2 (Rubber Mixing Tank II)

Chemical	Cas #	Average Emissions Rate (lb/hr)[1]	÷	Average Tons/Hr Source Test[1]	x	Annual Production (tons/yr)	x	PM Control Efficiency	x	Proportional Tank Size 0.98	=	2016 PM/VOC Controlled Emissions Per tank (lbs/yr)	÷	[redacted] (hr/yr)	=	2016 PM/VOC Controlled Emissions Per tank (lbs/hr)
1,3 Butadiene	106990	[redacted]		[redacted]		[redacted]		1		0.98		0.00E+00		[redacted]		0.00E+00
2,2,4- Trimethylpentane	540841	[redacted]		[redacted]		[redacted]		1		0.98		1.24E+00		[redacted]		4.42E-03
2-Butanone (MEK)	78933	[redacted]		[redacted]		[redacted]		1		0.98		3.30E+00		[redacted]		1.18E-02
4-Methyl-2-pentanone (MIBK)	108101	[redacted]		[redacted]		[redacted]		1		0.98		1.58E+01		[redacted]		5.65E-02
Benzene	71432	[redacted]		[redacted]		[redacted]		1		0.98		3.09E+00		[redacted]		1.10E-02
Carbon disulfide	75150	[redacted]		[redacted]		[redacted]		1		0.98		1.44E+00		[redacted]		5.16E-03
Chlorodifluoromethane (TIC)	75456	[redacted]		[redacted]		[redacted]		1		0.98		0.00E+00		[redacted]		0.00E+00
Cyclohexane	110827	[redacted]		[redacted]		[redacted]		1		0.98		4.33E+00		[redacted]		1.55E-02
Dichlorofluoromethane (TIC)	75434	[redacted]		[redacted]		[redacted]		1		0.98		0.00E+00		[redacted]		0.00E+00
Ethanol	64175	[redacted]		[redacted]		[redacted]		1		0.98		2.13E+01		[redacted]		7.61E-02
Ethylbenzene	100414	[redacted]		[redacted]		[redacted]		1		0.98		6.81E-01		[redacted]		2.43E-03
Heptane	142825	[redacted]		[redacted]		[redacted]		1		0.98		5.71E+00		[redacted]		2.04E-02
Hexane	110543	[redacted]		[redacted]		[redacted]		1		0.98		9.63E+00		[redacted]		3.44E-02
Methanol	67561	[redacted]		[redacted]		[redacted]		1		0.98		3.71E+01		[redacted]		1.33E-01
m-Xylene & p-xylene	1330207	[redacted]		[redacted]		[redacted]		1		0.98		8.94E+00		[redacted]		3.19E-02
o-Xylene	95476	[redacted]		[redacted]		[redacted]		1		0.98		4.47E-01		[redacted]		1.60E-03
Propene	115071	[redacted]		[redacted]		[redacted]		1		0.98		8.94E+00		[redacted]		3.19E-02
Toluene	108883	[redacted]		[redacted]		[redacted]		1		0.98		3.23E+00		[redacted]		1.15E-02
2-Methylnapthalene	91576	[redacted]		[redacted]		[redacted]		0.1		0.98		2.34E-02		[redacted]		8.35E-05
Acenaphthene	83329	[redacted]		[redacted]		[redacted]		0.1		0.98		1.93E-04		[redacted]		6.88E-07
Acenaphthylene	208968	[redacted]		[redacted]		[redacted]		0.1		0.98		9.63E-05		[redacted]		3.44E-07
Anthracene	120127	[redacted]		[redacted]		[redacted]		0.1		0.98		1.38E-04		[redacted]		4.91E-07
Benza(a)anthracene	56553	[redacted]		[redacted]		[redacted]		0.1		0.98		2.27E-07		[redacted]		8.10E-10
Benza(b)fluoranthene	205992	[redacted]		[redacted]		[redacted]		0.1		0.98		5.98E-07		[redacted]		2.14E-09
Benza(k)fluoranthene	207089	[redacted]		[redacted]		[redacted]		0.1		0.98		2.13E-07		[redacted]		7.61E-10
Benzo(a)pyrene	50328	[redacted]		[redacted]		[redacted]		0.1		0.98		5.43E-07		[redacted]		1.94E-09
Benzo(e)pyrene	192972	[redacted]		[redacted]		[redacted]		0.1		0.98		3.78E-06		[redacted]		1.35E-08
Benzo(g,h,i)perylene	191242	[redacted]		[redacted]		[redacted]		0.1		0.98		6.05E-06		[redacted]		2.16E-08
Chrysene	218019	[redacted]		[redacted]		[redacted]		0.1		0.98		1.65E-06		[redacted]		5.89E-09
Dibenzo(a,h)anthracene	53703	[redacted]		[redacted]		[redacted]		0.1		0.98		0.00E+00		[redacted]		0.00E+00
Fluoranthene	206440	[redacted]		[redacted]		[redacted]		0.1		0.98		7.56E-06		[redacted]		2.70E-08
Fluorene	86737	[redacted]		[redacted]		[redacted]		0.1		0.98		1.44E-04		[redacted]		5.16E-07
Indeno(1,2,3-c,d)pyrene	193395	[redacted]		[redacted]		[redacted]		0.1		0.98		8.25E-07		[redacted]		2.95E-09
Napthalene	91203	[redacted]		[redacted]		[redacted]		0.1		0.98		6.67E-02		[redacted]		2.38E-04
Perylene	198550	[redacted]		[redacted]		[redacted]		0.1		0.98		1.93E-07		[redacted]		6.88E-10
Phenanthrene	85018	[redacted]		[redacted]		[redacted]		0.1		0.98		1.93E-04		[redacted]		6.88E-07
Pyrene	129000	[redacted]		[redacted]		[redacted]		0.1		0.98		1.58E-05		[redacted]		5.65E-08
Aluminum	7429905	[redacted]		[redacted]		[redacted]		1		0.98		1.58E-02		[redacted]		5.65E-05
Antimony	7440360	[redacted]		[redacted]		[redacted]		1		0.98		0.00E+00		[redacted]		0.00E+00
Arsenic	7440382	[redacted]		[redacted]		[redacted]		1		0.98		8.25E-05		[redacted]		2.95E-07
Barium	7440393	[redacted]		[redacted]		[redacted]		1		0.98		1.03E-03		[redacted]		3.68E-06
Beryllium	7440417	[redacted]		[redacted]		[redacted]		1		0.98		0.00E+00		[redacted]		0.00E+00
Cadmium	7440439	[redacted]		[redacted]		[redacted]		1		0.98		2.54E-05		[redacted]		9.09E-08
Chromium	7440473	[redacted]		[redacted]		[redacted]		1		0.98		4.47E-04		[redacted]		1.60E-06
Cobalt	7440484	[redacted]		[redacted]		[redacted]		1		0.98		8.94E-06		[redacted]		3.19E-08
Copper	7440508	[redacted]		[redacted]		[redacted]		1		0.98		8.94E-04		[redacted]		3.19E-06
Lead	7439921	[redacted]		[redacted]		[redacted]		1		0.98		1.44E-04		[redacted]		5.16E-07
Manganese	7439965	[redacted]		[redacted]		[redacted]		1		0.98		8.94E-04		[redacted]		3.19E-06
Mercury	7439976	[redacted]		[redacted]		[redacted]		1		0.98		2.48E-04		[redacted]		8.84E-07
Nickel	7440020	[redacted]		[redacted]		[redacted]		1		0.98		5.57E-04		[redacted]		1.99E-06
Phosphorous	7723140	[redacted]		[redacted]		[redacted]		1		0.98		4.95E-03		[redacted]		1.77E-05
Selenium	7782492	[redacted]		[redacted]		[redacted]		1		0.98		4.47E-05		[redacted]		1.60E-07
Silver	7440224	[redacted]		[redacted]		[redacted]		1		0.98		7.56E-05		[redacted]		2.70E-07
Thallium	7440280	[redacted]		[redacted]		[redacted]		1		0.98		0.00E+00		[redacted]		0.00E+00
Vanadium	7440622	[redacted]		[redacted]		[redacted]		1		0.98		0.00E+00		[redacted]		0.00E+00
Zinc	7440666	[redacted]		[redacted]		[redacted]		1		0.98		1.51E-03		[redacted]		5.40E-06

1. Alliance Source Testing, Source Test Report, March 17-19, 2021

ES11 P1 (Dryer)

Pollutant	Cas #	PR (MMcf/yr)	x	Eftac (lbs/MMcf)	=	Annual E_{LS} (lbs/yr)	÷	Operating Schedule (hr/yr)	=	Hourly E_{LS} (lbs/hr)
Ammonia	7664417	[redacted]		[redacted]		507.2		[redacted]		2.11E-01
Acrolein	107028	[redacted]		[redacted]		0.126800		[redacted]		5.28E-05

1. AB2588 Quadrennial Air Toxic Emissions Inventory Reproting Procedures-AER Program Appendix B, Table B-1: Default for Natural Gas Cmbutions (LB/MMSCF)

2. Polutants measured during the toxics stack test on the Baghouse were removed to avoid double counting toxics

ES11 P2 (Asphalt Plant)

Pollutant	Cas #	PR (ktons/yr)	x	EF[1] (lbs/kton)	=	Annual E_{LS} (lbs/yr)	÷	Operating Schedule (hr/yr)	=	Hourly E_{LS} (lbs/hr)
Arsenic	7440382	[redacted]		[redacted]		0.00E+00		[redacted]		0.00E+00
1,3 Butadiene	106990	[redacted]		[redacted]		1.86E+02		[redacted]		7.77E-02
124 Trimethylbenze	95636	[redacted]		[redacted]		0.00E+00		[redacted]		0.00E+00
2-Methyl Naphthalene	91576	[redacted]		[redacted]		3.80E+00		[redacted]		1.58E-03
Acenaphthene	83329	[redacted]		[redacted]		1.82E-01		[redacted]		7.57E-05
Acenaphthylene	208968	[redacted]		[redacted]		7.60E-01		[redacted]		3.17E-04
Acetaldehyde	75070	[redacted]		[redacted]		1.15E+02		[redacted]		4.78E-02
Anthracene	120127	[redacted]		[redacted]		2.05E-02		[redacted]		8.53E-06
Barium	7440393	[redacted]		[redacted]		4.05E-01		[redacted]		1.69E-04
Benz[a} anthracene	56553	[redacted]		[redacted]		1.73E-04		[redacted]		7.20E-08
Benzene	71432	[redacted]		[redacted]		4.32E+02		[redacted]		1.80E-01
Benzo(a)pyrene	50328	[redacted]		[redacted]		0.00E+00		[redacted]		0.00E+00
Benzo(g,h,i)perylene	191242	[redacted]		[redacted]		0.00E+00		[redacted]		0.00E+00
Benzo[e]pyrene	192972	[redacted]		[redacted]		0.00E+00		[redacted]		0.00E+00
Benzo[k]fluoranthene	207089	[redacted]		[redacted]		0.00E+00		[redacted]		0.00E+00
Benzon[b]fluoranthene	205992	[redacted]		[redacted]		1.57E-04		[redacted]		6.53E-08
Beryllium	7440417	[redacted]		[redacted]		0.00E+00		[redacted]		0.00E+00
Cadmium	7440439	[redacted]		[redacted]		1.76E-02		[redacted]		7.32E-06
Carbon Disulfide	75150	[redacted]		[redacted]		4.64E+01		[redacted]		1.93E-02
Chromium, Hexavalent	18540299	[redacted]		[redacted]		2.57E-03		[redacted]		1.07E-06
Chrysene	218019	[redacted]		[redacted]		1.01E-03		[redacted]		4.22E-07
Cobalt	7440484	[redacted]		[redacted]		5.34E+00		[redacted]		2.22E-03
Copper	7440508	[redacted]		[redacted]		5.27E+01		[redacted]		2.19E-02
Dibenz(a,h)anthracene	53703	[redacted]		[redacted]		0.00E+00		[redacted]		0.00E+00
Ethanol	64175	[redacted]		[redacted]		4.41E+01		[redacted]		1.84E-02
Ethyl Benzene	100414	[redacted]		[redacted]		0.00E+00		[redacted]		0.00E+00
Fluoranthene	206440	[redacted]		[redacted]		9.45E-04		[redacted]		3.94E-07
Fluorene	86737	[redacted]		[redacted]		2.26E-01		[redacted]		9.40E-05
Formaldehyde	50000	[redacted]		[redacted]		5.00E+02		[redacted]		2.08E-01
Hexane	110543	[redacted]		[redacted]		0.00E+00		[redacted]		0.00E+00
Hydrogen Sulfide	7783064	[redacted]		[redacted]		0.00E+00		[redacted]		0.00E+00
Indeo[1,2,3-cd]pyrene	193395	[redacted]		[redacted]		2.24E-04		[redacted]		9.31E-08
Lead compunds (inorganic)	1128	[redacted]		[redacted]		0.00E+00		[redacted]		0.00E+00
Manganese	7439965	[redacted]		[redacted]		1.82E+02		[redacted]		7.60E-02
MEK	78933	[redacted]		[redacted]		4.87E+01		[redacted]		2.03E-02
Mercury	7439976	[redacted]		[redacted]		0.00E+00		[redacted]		0.00E+00
Methanol	67561	[redacted]		[redacted]		1.79E+02		[redacted]		7.44E-02
Methly Chloroform	71556	[redacted]		[redacted]		0.00E+00		[redacted]		0.00E+00
Naphthalene	91203	[redacted]		[redacted]		1.12E+01		[redacted]		4.66E-03
Nickel	7440020	[redacted]		[redacted]		4.79E+00		[redacted]		2.00E-03
Perylene	198550	[redacted]		[redacted]		0.00E+00		[redacted]		0.00E+00
Phenanthrene	85018	[redacted]		[redacted]		2.53E-01		[redacted]		1.06E-04
Phosphorus	7723140	[redacted]		[redacted]		5.07E+02		[redacted]		2.11E-01
propene	115071	[redacted]		[redacted]		1.03E+03		[redacted]		4.28E-01
Pyrene	129000	[redacted]		[redacted]		8.98E-03		[redacted]		3.74E-06
Selenium	7782492	[redacted]		[redacted]		0.00E+00		[redacted]		0.00E+00
Styrene	100425	[redacted]		[redacted]		3.51E+02		[redacted]		1.46E-01
Toluene	108883	[redacted]		[redacted]		1.82E+02		[redacted]		7.60E-02
Total PAH	1151	[redacted]		[redacted]		0.00E+00		[redacted]		0.00E+00
Xylenes	1330207	[redacted]		[redacted]		7.43E+01		[redacted]		3.10E-02
Zink	7440666	[redacted]		[redacted]		6.75E+02		[redacted]		2.81E-01

1. AIRX Testing Services, Inc. Source Test Emssion Report, June 2, 3, 7, July 14, 25, 17

ES11 P3 (Silo Filling)

Pollutant	Cas #	Asphaltic Concrete Manufactured (tons/yr)	x	AP42 Emission Factor (%)	x	Organic PM/VOC Emission Factor (lbs/yr)	x	Filter Efficiency (%)	=	Annual Toxic Emissions (lbs/yr)	÷	Operating Schedule (hr/yr)	=	Hourly E_{LS} (lbs/hr)
Acenaphthene	83329	[redacted]		0.00470		[redacted]		0.1		8.06E-02		[redacted]		3.36E-05
Acenaphthylene	208968	[redacted]		0.00014		[redacted]		0.1		2.40E-03		[redacted]		1.00E-06
Anthracene	120127	[redacted]		0.00130		[redacted]		0.1		2.23E-02		[redacted]		9.29E-06
Benzo(a) anthracene	56553	[redacted]		0.00056		[redacted]		0.1		9.61E-03		[redacted]		4.00E-06
Benzo(b) fluoranthene	205992	[redacted]		0.00000		[redacted]		0.1		0.00E+00		[redacted]		0.00E+00
Benzo(k) fluoranthene	207089	[redacted]		0.00000		[redacted]		0.1		0.00E+00		[redacted]		0.00E+00
Benzo(g,h,i) perylene	191242	[redacted]		0.00000		[redacted]		0.1		0.00E+00		[redacted]		0.00E+00
Benzo(a) pyrene	50328	[redacted]		0.00000		[redacted]		0.1		0.00E+00		[redacted]		0.00E+00
Benzo(e) pyrene	192972	[redacted]		0.00010		[redacted]		0.1		1.63E-03		[redacted]		6.79E-07
Chrysene	218019	[redacted]		0.00210		[redacted]		0.1		3.60E-02		[redacted]		1.50E-05
Dibenz(a,h) anthracene	53703	[redacted]		0.00000		[redacted]		0.1		0.00E+00		[redacted]		0.00E+00
Fluoranthene	206440	[redacted]		0.00150		[redacted]		0.1		2.57E-02		[redacted]		1.07E-05
Fluorene	86737	[redacted]		0.01010		[redacted]		0.1		1.73E-01		[redacted]		7.22E-05
Indeno(1,2,3-cd)pyrene	193395	[redacted]		0.00000		[redacted]		0.1		0.00E+00		[redacted]		0.00E+00
2-Methylnaphthalene	91576	[redacted]		0.05270		[redacted]		0.1		9.04E-01		[redacted]		3.77E-04
Naphthalene	91203	[redacted]		0.01820		[redacted]		0.1		3.12E-01		[redacted]		1.30E-04
Perylene	198550	[redacted]		0.00030		[redacted]		0.1		5.15E-03		[redacted]		2.14E-06
Phenanthrene	85018	[redacted]		0.01800		[redacted]		0.1		3.09E-01		[redacted]		1.29E-04
Pyrene	129000	[redacted]		0.00440		[redacted]		0.1		7.55E-02		[redacted]		3.14E-05
Benzene*	71432	[redacted]		0.00032		[redacted]		1		2.63E+00		[redacted]		1.10E-03
Ethylbenzene	100414	[redacted]		0.00038		[redacted]		1		3.13E+00		[redacted]		1.30E-03
Formaldehyde*	50000	[redacted]		0.00690		[redacted]		1		5.68E+01		[redacted]		2.37E-02
n-hexane	110543	[redacted]		0.00100		[redacted]		1		8.23E+00		[redacted]		3.43E-03
Styrene	100425	[redacted]		0.00005		[redacted]		1		4.44E-01		[redacted]		1.85E-04
Toluene	108883	[redacted]		0.00062		[redacted]		1		5.10E+00		[redacted]		2.13E-03
Trichloroflurometthane**	75694	[redacted]		0.00000		[redacted]		1		0.00E+00		[redacted]		0.00E+00
m-Xylene	108383	[redacted]		0.00200		[redacted]		1		1.65E+01		[redacted]		6.86E-03
p-Xylene	106423	[redacted]		0.00000		[redacted]		1		0.00E+00		[redacted]		0.00E+00
o-Xylene	95476	[redacted]		0.00057		[redacted]		1		4.69E+00		[redacted]		1.95E-03
Methylene Chloride	75092	[redacted]		0.00000		[redacted]		1		2.22E-02		[redacted]		9.26E-06

1. AP-42, Chapter 11.1, Table 11.1-15 and 11.1-16

ES11 P4 (Silo Loadout)

Pollutant	Cas #	Asphaltic Concrete Manufactured (tons/yr)	x	AP42 Emission Factor (%)	x	Organic PM/VOC Emission Factor (lbs/yr)	x	Filter Efficiency (%)	=	Annual Toxic Emissions (lbs/yr)	÷	Operating Schedule (hr/yr)	=	Hourly E_{LS} (lbs/hr)
Acenaphthene	83329	[redacted]		0.0026		[redacted]		0.1		5.99E-02		[redacted]		2.49E-05
Acenaphthylene	208968	[redacted]		0.00028		[redacted]		0.1		6.45E-03		[redacted]		2.69E-06
Anthracene	120127	[redacted]		0.0007		[redacted]		0.1		1.61E-02		[redacted]		6.72E-06
Benzo(a) anthracene	56553	[redacted]		0.00019		[redacted]		0.1		4.37E-03		[redacted]		1.82E-06
Benzo(b) fluoranthene	205992	[redacted]		0.000076		[redacted]		0.1		1.75E-03		[redacted]		7.29E-07
Benzo(k) fluoranthene	207089	[redacted]		0.000022		[redacted]		0.1		5.07E-04		[redacted]		2.11E-07
Benzo(g,h,i) perylene	191242	[redacted]		0.000019		[redacted]		0.1		4.37E-04		[redacted]		1.82E-07
Benzo(a) pyrene	50328	[redacted]		0.000023		[redacted]		0.1		5.30E-04		[redacted]		2.21E-07
Benzo(e) pyrene	192972	[redacted]		0.000078		[redacted]		0.1		1.80E-03		[redacted]		7.48E-07
Chrysene	218019	[redacted]		0.00103		[redacted]		0.1		2.37E-02		[redacted]		9.88E-06
Dibenz(a,h) anthracene	53703	[redacted]		3.7E-06		[redacted]		0.1		8.52E-05		[redacted]		3.55E-08
Fluoranthene	206440	[redacted]		0.0005		[redacted]		0.1		1.15E-02		[redacted]		4.80E-06
Fluorene	86737	[redacted]		0.0077		[redacted]		0.1		1.77E-01		[redacted]		7.39E-05
Indeno(1,2,3-cd)pyrene	193395	[redacted]		4.7E-06		[redacted]		0.1		1.08E-04		[redacted]		4.51E-08
2-Methylnaphthalene	91576	[redacted]		0.0238		[redacted]		0.1		5.48E-01		[redacted]		2.28E-04
Naphthalene	91203	[redacted]		0.0125		[redacted]		0.1		2.88E-01		[redacted]		1.20E-04
Perylene	198550	[redacted]		0.00022		[redacted]		0.1		5.07E-03		[redacted]		2.11E-06
Phenanthrene	85018	[redacted]		0.0081		[redacted]		0.1		1.87E-01		[redacted]		7.77E-05
Pyrene	129000	[redacted]		0.0015		[redacted]		0.1		3.45E-02		[redacted]		1.44E-05
Benzene	71432	[redacted]		0.00052		[redacted]		1		1.46E+00		[redacted]		6.09E-04
Ethylbenzene	100414	[redacted]		0.0028		[redacted]		1		7.86E+00		[redacted]		3.28E-03
Formaldehyde	50000	[redacted]		0.00088		[redacted]		1		2.47E+00		[redacted]		1.03E-03
n-hexane	110543	[redacted]		0.0015		[redacted]		1		4.21E+00		[redacted]		1.76E-03
Styrene	100425	[redacted]		0.000073		[redacted]		1		2.05E-01		[redacted]		8.54E-05
Toluene	108883	[redacted]		0.0021		[redacted]		1		5.90E+00		[redacted]		2.46E-03
Trichlorofluromethane	75694	[redacted]		0.000013		[redacted]		1		3.65E-02		[redacted]		1.52E-05
m-Xylene	108383	[redacted]		0.0041		[redacted]		1		1.15E+01		[redacted]		4.80E-03
p-Xylene	106423	[redacted]		0		[redacted]		1		0.00E+00		[redacted]		0.00E+00
o-Xylene	95476	[redacted]		0.0008		[redacted]		1		2.25E+00		[redacted]		9.36E-04

1. AP-42, Chapter 11.1, Table 11.1-15 and 11.1-16

ES11 P5 (Material Transfer)

Pollutant	Cas #	PM^3 (lbs_{pm}/yr)	x	SF_{ks*} (lbs/lbs_{pm})	=	Annual E_{LS} (lbs/yr)	÷	Operating Schedule (hr/yr)	=	Hourly E_{LS} (lbs/hr)
Arsenic[1]	7440382	[redacted]		[redacted]		9.21E-03		[redacted]		3.84E-06
Berrylium[1]	7440417	[redacted]		[redacted]		5.63E-04		[redacted]		2.35E-07
Cadmium[1]	7440439	[redacted]		[redacted]		9.81E-04		[redacted]		4.09E-07
Chrystaline Silica[2]	1175	[redacted]		[redacted]		3.90E+01		[redacted]		1.63E-02
Copper[1]	7440508	[redacted]		[redacted]		6.40E-02		[redacted]		2.67E-05
Hex Chrome[1]	18540299	[redacted]		[redacted]		1.16E-03		[redacted]		4.83E-07
Lead[1]	7439921	[redacted]		[redacted]		2.99E-02		[redacted]		1.24E-05
Mercury[1]	7439976	[redacted]		[redacted]		9.55E-05		[redacted]		3.98E-08
Nickel[1]	7440020	[redacted]		[redacted]		3.07E-02		[redacted]		1.28E-05
Selenium[1]	7782492	[redacted]		[redacted]		0.00E+00		[redacted]		0.00E+00
Barium[1]	7440393	[redacted]		[redacted]		6.09E-02		[redacted]		2.54E-05
Chromium[1]	7440473	[redacted]		[redacted]		6.99E-02		[redacted]		2.91E-05
Cobalt[1]	7440484	[redacted]		[redacted]		2.13E-02		[redacted]		8.89E-06
Zinc[1]	7440666	[redacted]		[redacted]		5.37E-01		[redacted]		2.24E-04
Molybdenum[1]	7439987	[redacted]		[redacted]		1.60E-03		[redacted]		6.68E-07
Vandium[1]	7440622	[redacted]		[redacted]		1.29E-01		[redacted]		5.37E-05

1. RMA Group Meterials Test Report from All American, Irvine, August 18, 2021
2. CRNOS-PM4 Crystaline Silica Emissions Factors and Ambient Concentrations November 2009
3. Based on AP-42 11.19, Table 11.19.2.2 Emission Factors For Crushed Stone Processing Operations

ES13 P1 (Heater, Oil)

Pollutant	Cas #	PR (MMcf/yr)	x	Eftac (lbs/MMcf)	=	Annual E_{LS} (lbs/yr)	÷	Operating Schedule (hr/yr)	=	Hourly E_{LS} (lbs/hr)
Ammonia	7664417	[redacted]		[redacted]		4.18E+01		[redacted]		4.79E-03
Benzene	71432	[redacted]		[redacted]		2.22E-02		[redacted]		2.55E-06
Formaldehyde	50000	[redacted]		[redacted]		4.70E-02		[redacted]		5.39E-06
Naphthalene	91203	[redacted]		[redacted]		3.92E-03		[redacted]		4.49E-07
Total PAHs	1151	[redacted]		[redacted]		1.31E-03		[redacted]		1.50E-07
Acetaldehyde	75070	[redacted]		[redacted]		1.18E-02		[redacted]		1.35E-06
Acrolein	107028	[redacted]		[redacted]		1.04E-02		[redacted]		1.20E-06
Ethyl benzene	100414	[redacted]		[redacted]		2.61E-02		[redacted]		3.00E-06
Hexane	110543	[redacted]		[redacted]		1.70E-02		[redacted]		1.95E-06
Toluene	108883	[redacted]		[redacted]		1.02E-01		[redacted]		1.17E-05
Xylene	1330207	[redacted]		[redacted]		7.57E-02		[redacted]		8.69E-06

1. AB2588 Quadrennial Air Toxic Emissions Inventory Reportin Procedures-AER Program Appendix B, Table B-1: Default for Natoural Gas Combustion (LB/MMSCF)

ES14 P1 (RAP Processing)

Pollutant	Cas #	PM[3] (lbs_{pm}/yr)	x	SF_{ks*} (lbs/lbs_{pm})	=	Annual E_{LS} (lbs/yr)	÷	Operating Schedule (hr/yr)	=	Hourly E_{LS} (lbs/hr)
Arsenic[1]	7440382	[redacted]		[redacted]		2.72E-03		[redacted]		1.13E-06
Berrylium[1]	7440417	[redacted]		[redacted]		1.26E-04		[redacted]		5.24E-08
Cadmium[1]	7440439	[redacted]		[redacted]		3.20E-04		[redacted]		1.34E-07
Chrystaline Silica[2]	1175	[redacted]		[redacted]		9.27E+00		[redacted]		3.86E-03
Copper[1]	7440508	[redacted]		[redacted]		1.34E-02		[redacted]		5.58E-06
Hex Chrome[1]	18540299	[redacted]		[redacted]		4.06E-04		[redacted]		1.69E-07
Lead[1]	7439921	[redacted]		[redacted]		1.01E-02		[redacted]		4.23E-06
Mercury[1]	7439976	[redacted]		[redacted]		0.00E+00		[redacted]		0.00E+00
Nickel[1]	7440020	[redacted]		[redacted]		1.18E-02		[redacted]		4.90E-06
Selenium[1]	7782492	[redacted]		[redacted]		0.00E+00		[redacted]		0.00E+00
Barium[1]	7440393	[redacted]		[redacted]		3.37E-02		[redacted]		1.40E-05
Chromium[1]	7440473	[redacted]		[redacted]		1.34E-02		[redacted]		5.58E-06
Cobalt[1]	7440484	[redacted]		[redacted]		3.33E-03		[redacted]		1.39E-06
Zinc[1]	7440666	[redacted]		[redacted]		3.12E-02		[redacted]		1.30E-05
Molybdenum[1]	7439987	[redacted]		[redacted]		8.92E-04		[redacted]		3.72E-07
Vandium[1]	7440622	[redacted]		[redacted]		2.15E-02		[redacted]		8.96E-06

1. RMA Group Meterials Test Report from All American, Irvine, August 18, 2021
2. CRNOS-PM4 Crystaline Silica Emissions Factors and Ambient Concentrations November 2009
3. Based on AP-42 11.19, Table 11.19.2.2 Emission Factors For Crushed Stone Processing Operations

ES19 P1 (Aggregate Handling)

Pollutant	Cas #	PM[3] (lbs_{pm}/yr)	x	SF_{ks*} (lbs/lbs_{pm})	=	Annual E_{LS} (lbs/yr)	÷	Operating Schedule (hr/yr)	=	Hourly E_{LS} (lbs/hr)
Arsenic[1]	7440382	[redacted]		[redacted]		1.86E-03		[redacted]		7.75E-07
Berrylium[1]	7440417	[redacted]		[redacted]		1.14E-04		[redacted]		4.74E-08
Cadmium[1]	7440439	[redacted]		[redacted]		1.98E-04		[redacted]		8.25E-08
Chrystaline Silica[2]	1175	[redacted]		[redacted]		7.88E+00		[redacted]		3.28E-03
Copper[1]	7440508	[redacted]		[redacted]		1.29E-02		[redacted]		5.38E-06
Hex Chrome[1]	18540299	[redacted]		[redacted]		2.34E-04		[redacted]		9.76E-08
Lead[1]	7439921	[redacted]		[redacted]		6.03E-03		[redacted]		2.51E-06
Mercury[1]	7439976	[redacted]		[redacted]		1.93E-05		[redacted]		8.04E-09
Nickel[1]	7440020	[redacted]		[redacted]		6.20E-03		[redacted]		2.58E-06
Selenium[1]	7782492	[redacted]		[redacted]		0.00E+00		[redacted]		0.00E+00
Barium[1]	7440393	[redacted]		[redacted]		1.23E-02		[redacted]		5.12E-06
Chromium[1]	7440473	[redacted]		[redacted]		1.41E-02		[redacted]		5.89E-06
Cobalt[1]	7440484	[redacted]		[redacted]		4.31E-03		[redacted]		1.79E-06
Zinc[1]	7440666	[redacted]		[redacted]		1.085E-01		[redacted]		4.52E-05
Molybdenum[1]	7439987	[redacted]		[redacted]		3.24E-04		[redacted]		1.35E-07
Vandium[1]	7440622	[redacted]		[redacted]		2.60E-02		[redacted]		1.08E-05

1. RMA Group Materials Test Report from All American, Irvine, August 18, 2021
2. CRNOS-PM4 Crystaline Silica Emissions Factors and Ambient Concentration, November 2009
3. Based on AP-42 11.19, Table 11.19.2-2 Emission Factors For Crushed Stone Processing Operations

ES27 P1 (Heater, Crumb Rubber)

Pollutant	Cas #	PR (MMcf/yr)	x	Eftac (lbs/MMcf)	=	Annual E_{LS} (lbs/yr)	÷	Operating Schedule (hr/yr)	=	Hourly E_{LS} (lbs/hr)
Ammonia	7664417	[redacted]		[redacted]		2.50E+01		[redacted]		8.94E-02
Benzene	71432	[redacted]		[redacted]		1.33E-02		[redacted]		4.75E-05
Formaldehyde	50000	[redacted]		[redacted]		2.82E-02		[redacted]		1.01E-04
Naphthalene	91203	[redacted]		[redacted]		2.35E-03		[redacted]		8.38E-06
Total PAHs	1151	[redacted]		[redacted]		7.82E-04		[redacted]		2.79E-06
Acetaldehyde	75070	[redacted]		[redacted]		7.04E-03		[redacted]		2.51E-05
Acrolein	107028	[redacted]		[redacted]		6.26E-03		[redacted]		2.23E-05
Ethyl benzene	100414	[redacted]		[redacted]		1.56E-02		[redacted]		5.59E-05
Hexane	110543	[redacted]		[redacted]		1.02E-02		[redacted]		3.63E-05
Toluene	108883	[redacted]		[redacted]		6.10E-02		[redacted]		2.18E-04
Xylene	1330207	[redacted]		[redacted]		4.54E-02		[redacted]		1.62E-04

1. AB2588 Quadrennial Air Toxic Emissions Inventory Reporting Procedures-AER Program Appendix B, Table B-1: Default for Natural Gas Combustion (LB/MMSCF)

D. Permit Exempt Toxic Emissions Summary

ES21 P1 (Brake Cleaner)

Pollutant	Cas #	PR (mgal/yr)	x	Eftac (lbs/mgal)	x	Percent Present (%)	=	Annual (lbs/yr)	÷	Operating (hr/yr)	=	Hourly E_{LS} (lbs/hr)
Toluene	108883	5		7.2		27%		9.72		52		1.87E-01
Methanol	67561	5		6.6		20%		6.6		52		1.27E-01

1. Safety Data Sheet

ES22 P1 (Diesel Storage)

Pollutant	Cas #	PR (kgal/yr)	x	Eftac (lbs/kgal)	=	Annual E_{LS} (lbs/yr)	÷	Operating Schedule (hr/yr)	=	Hourly E_{LS} (lbs/hr)
Benzene	71432	[redacted]		[redacted]		5E-05		[redacted]		6.27E-08
n-hexane	110543	[redacted]		[redacted]		0.03		[redacted]		3.64E-05
Toluene	108883	[redacted]		[redacted]		0.07		[redacted]		8.48E-05
Ethylbenzene	100414	[redacted]		[redacted]		0.03		[redacted]		3.64E-05
m-xylene	108383	[redacted]		[redacted]		0.1		[redacted]		1.21E-04
1,2,4-trimethylbenzene	95636	[redacted]		[redacted]		0.02		[redacted]		2.42E-05
Naphtalene	91203	[redacted]		[redacted]		0.04		[redacted]		4.85E-05
2,2,3-Trimethylpentane	98828	[redacted]		[redacted]		0.01		[redacted]		1.21E-05
Isopropyl Benzene	108383	[redacted]		[redacted]		0.01		[redacted]		1.21E-05
Cyclorhexane	110827	[redacted]		[redacted]		0.05		[redacted]		6.06E-05

1. TANKS with Vapor Weight Speciation

ES23 P1 (Storage Piles)

Pollutant	Cas #	PM[3] (lbs$_{pm}$/yr)	x	SF$_{LS}$ Emission Factor (lbs/lbs$_{pm}$)	=	Annual E$_{LS}$ (lbs/yr)	÷	Operating Schedule (hr/yr)	=	Hourly E$_{LS}$ (lbs/hr)
Arsenic[1]	7440382	[redacted]		[redacted]		4.53E-02		[redacted]		1.89E-05
Berrylium[1]	7440417	[redacted]		[redacted]		2.10E-03		[redacted]		8.74E-07
Cadmium[1]	7440439	[redacted]		[redacted]		5.35E-03		[redacted]		2.23E-06
Chrystaline Silica[2]	1175	[redacted]		[redacted]		1.33E+02		[redacted]		5.53E-02
Copper[1]	7440508	[redacted]		[redacted]		2.23E-01		[redacted]		9.30E-05
Hex Chrome[1]	18540299	[redacted]		[redacted]		6.77E-03		[redacted]		2.82E-06
Lead[1]	7439921	[redacted]		[redacted]		1.69E-01		[redacted]		7.05E-05
Mercury[1]	7439976	[redacted]		[redacted]		0.00E+00		[redacted]		0.00E+00
Nickel[1]	7440020	[redacted]		[redacted]		1.96E-01		[redacted]		8.18E-05
Selenium[1]	7782492	[redacted]		[redacted]		0.00E+00		[redacted]		0.00E+00
Barium[1]	7440393	[redacted]		[redacted]		5.62E-01		[redacted]		2.34E-04
Chromium[1]	7440473	[redacted]		[redacted]		2.23E-01		[redacted]		9.30E-05
Cobalt[1]	7440484	[redacted]		[redacted]		5.55E-02		[redacted]		2.31E-05
Zinc[1]	7440666	[redacted]		[redacted]		5.21E-01		[redacted]		2.17E-04
Molybdenum[1]	7439987	[redacted]		[redacted]		1.49E-02		[redacted]		6.20E-06
Vandium[1]	7440622	[redacted]		[redacted]		3.59E-01		[redacted]		1.49E-04

1. RMA Group Meterials Test Report from All American, Irvine, August 18, 2021
2. CRNOS-PM4 Crystaline Silica Emissions Factors and Ambient Concentrations November 2009
3. Based on SCAQMD's Particulate Matter (PM) Emission Factors for Process/Equipment at Asphalt, Cement and Aggregate Product Plants interpretation of AP-42 11-19.1, Table 4-1

ES25-P1 (Welding)

Pollutant	Cas #	Throughput (lbs/yr)	x	SF$_{LS}$ Emission Factor (lbs/lbs$_{pm}$)	=	Annual E$_{LS}$ (lbs/yr)	÷	Operating Schedule (hr/yr)	=	Hourly E$_{LS}$ (lbs/hr)
Nickel	7440020	[redacted]		2.00E-06		1.80E-04		[redacted]		1.00E-06
Hex chromium	18540299	[redacted]		0.00E+00		0.00E+00		[redacted]		0.00E+00
Manganese	7439965	[redacted]		1.03E-03		9.27E-02		[redacted]		5.15E-04

1. AP-42 Chapter 12.19, Table 12.19-1 and 12.19-2

ES25-P2 (Welding)

Pollutant	Cas #	Throughput (lbs/yr)	x	SF$_{LS}$ Emission Factor (lbs/lbs$_{pm}$)	=	Annual E$_{LS}$ (lbs/yr)	÷	Operating Schedule (hr/yr)	=	Hourly E$_{LS}$ (lbs/hr)
Nickel	7440020	[redacted]		4.00E-06		4.40E-04		[redacted]		3.33E-06
Hex chromium	18540299	[redacted]		1.00E-05		1.10E-03		[redacted]		8.33E-06
Manganese	7439965	[redacted]		9.91E-04		1.09E-01		[redacted]		8.26E-04

1. AP-42 Chapter 12.19, Table 12.19-1 and 12.19-2

ES26-P1 (Unpaved Roads)

Pollutant	Cas #	PM[2] (lbs_{pm}/yr)	x	SF_{ks} (lbs/lbs_{pm})	÷	Individual Road Segments	=	Annual E_{LS} (lbs/yr)	÷	Operating Schedule (hr/yr)	=	Hourly E_{LS} (lbs/hr)
Aluminum[1]	7429905	[redacted]		[redacted]		11		5.30E+01		[redacted]		2.21E-02
Antimony[1]	7440360	[redacted]		[redacted]		11		4.70E-03		[redacted]		1.96E-06
Arsenic[1]	7440382	[redacted]		[redacted]		11		1.01E-02		[redacted]		4.20E-06
Barium[1]	7440393	[redacted]		[redacted]		11		6.39E-01		[redacted]		2.66E-04
Bromine[1]	7726956	[redacted]		[redacted]		11		1.41E-02		[redacted]		5.87E-06
Cadmium[1]	7440439	[redacted]		[redacted]		11		1.68E-02		[redacted]		6.99E-06
Chromium[1]	7440473	[redacted]		[redacted]		11		1.64E-01		[redacted]		6.85E-05
Cobalt[1]	7440484	[redacted]		[redacted]		11		1.00E-01		[redacted]		4.17E-05
Copper[1]	7440508	[redacted]		[redacted]		11		5.84E-02		[redacted]		2.43E-05
Chlorine[1]	7782505	[redacted]		[redacted]		11		8.74E-01		[redacted]		3.64E-04
Lead[1]	7439921	[redacted]		[redacted]		11		6.05E-01		[redacted]		2.52E-04
Manganese[1]	7439965	[redacted]		[redacted]		11		7.06E-01		[redacted]		2.94E-04
Nickel[1]	7440020	[redacted]		[redacted]		11		4.23E-02		[redacted]		1.76E-05
Mercury[1]	7439976	[redacted]		[redacted]		11		1.01E-02		[redacted]		4.20E-06
Phosphorus[1]	7723140	[redacted]		[redacted]		11		1.08		[redacted]		4.48E-04
Selenium[1]	7782492	[redacted]		[redacted]		11		6.71E-04		[redacted]		2.80E-07
Vanadium (Fume Or Dust)[1]	7440622	[redacted]		[redacted]		11		2.09E-01		[redacted]		8.73E-05
Silver[1]	7440224	[redacted]		[redacted]		11		6.04E-03		[redacted]		2.52E-06
Zinc[1]	7440666	[redacted]		[redacted]		11		4.18E-01		[redacted]		1.74E-04

1. CARB's database Profile 416 for Windblown Dust- Unpaved RD/AREA

2. Based on SCAQMD's Particulate Matter (PM) Emission Factors for Process/Equipment at Asphalt, Cement and Aggregate Product Plants interpretation of AP-42 13.2.1, Equation 1

ES29 P1 (Welding)

Pollutant	Cas #	Throughput (lbs/yr)	x	SF_{LS} Emission Factor (lbs/lbs_{pm})	=	Annual E_{LS} (lbs/yr)	÷	Operating Schedule (hr/yr)	=	Hourly E_{LS} (lbs/hr)
Nickel	7440020	[redacted]		2.26E-04		2.26E-02		[redacted]		1.88E-04
Hex chromium	18540299	[redacted]		1.00E-05		1.00E-03		[redacted]		8.33E-06
Manganese	7439965	[redacted]		2.45E-03		2.45E-01		[redacted]		2.04E-03

1. AP-42 Chapter 12.19, Table 12.19-1 and 12.19-2

Part III Receptors

Attachment A Figure 1 details the receptor distances relative to the site location.

A. Residential Receptor

The closest residential receptor is located to the Southwest of the facility at 2,700 feet.

B. Worker Receptor

The closest worker receptor is located to the Southeast of the facility at 4,600 feet.

Part IV Summary

The 2016 annual emissions have been summarized in HARP. Attached you will find the HARP summary (Refer to Attachment “D”). Based on the proximity to nearest Acute receptor location proposed by SCAQMD for this project is 500 ft from the asphalt plant baghouse stack. The Acute priority Score is 0.3904 at this location. The Highest Score at the Residential Receptor location which is 2,700 ft from the plant is 0.74. Based on the receptor distances at these two locations, the facility is considered a low priority for all Prioritization Categories. Included with this report is the electronic files for the HARP emission inventory module (Refer to attachment "E").

ATTACHMENT “A”

RECEPTOR LOCATIONS

Description:

07/17/2020

GS, AeroGRID, IGN, and the GIS User

Job No.
ALAMR-18-2445

Dwg. No.
Figure 1

ATTACHMENT “B”

PROCESS FLOW DIAGRAM

[redacted]

ATTACHMENT “C”

TOXIC EMISSION FACTORS

Asphalt Tank

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	All American Asphalt Oil Tank-Irvine 2016
City:	Irvine
State:	California
Company:	All American Asphalt
Type of Tank:	Horizontal Tank
Description:	

Tank Dimensions

Shell Length (ft):	52.00
Diameter (ft):	11.00
Volume (gallons):	35,000.00
Turnovers:	[redacted]
Net Throughput(gal/yr):	[redacted]
Is Tank Heated (y/n):	Y
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good

Breather Vent Settings

Vacuum Settings (psig):	0.00
Pressure Settings (psig)	0.00

Meterological Data used in Emissions Calculations: Los Angeles AP, California (Avg Atmospheric Pressure = 14.67 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

All American Asphalt Oil Tank-Irvine 2016 - Horizontal Tank
Irvine, California

Mixture/Component	Month	Daily Liquid Surf Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Residual oil no. 6	All	350.00	328.00	400.00	350.00	0.0002	0.0002	0.0002	190.0000			387.00	

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

All American Asphalt Oil Tank-Irvine 2016 - Horizontal Tank
Irvine, California

Annual Emission Calcaulations	
Standing Losses (lb):	0.4421
Vapor Space Volume (cu ft):	3,147.5957
Vapor Density (lb/cu ft):	0.0000
Vapor Space Expansion Factor:	0.0926
Vented Vapor Saturation Factor:	0.9999
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	3,147.5957
Tank Diameter (ft):	11.0000
Effective Diameter (ft):	26.9937
Vapor Space Outage (ft):	5.5000
Tank Shell Length (ft):	52.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0000
Vapor Molecular Weight (lb/lb-mole):	190.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0002
Daily Avg. Liquid Surface Temp. (deg. R):	809.6700
Daily Average Ambient Temp. (deg. F):	62.9500
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	809.6700
Tank Paint Solar Absorptance (Shell):	0.1700
Daily Total Solar Insulation Factor (Btu/sqft day):	1,594.0000
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0926
Daily Vapor Temperature Range (deg. R):	75.0000
Daily Vapor Pressure Range (psia):	0.0000
Breather Vent Press. Setting Range(psia):	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0002
Vapor Pressure at Daily Minimum Liquid Surface Temperature(psia):	0.0002
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0002
Daily Avg. Liquid Surface Temp. (deg R):	809.6700
Daily Min. Liquid Surface Temp. (deg R):	784.6700
Daily Max. Liquid Surface Temp. (deg R):	859.6700
Daily Ambient Temp. Range (deg. R):	14.6500
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9999
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0002
Vapor Space Outage (ft):	5.5000
Working Losses (lb):	1.4264
Vapor Molecular Weight (lb/lb-mole):	190.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	[redacted]
Annual Net Throughput (gal/yr.):	[redacted]
Annual Turnovers:	[redacted]
Turnover Factor:	[redacted]

Tank Diameter (ft):	11.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	1.8685

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

All American Asphalt Oil Tank-Irvine 2016 - Horizontal Tank
Irvine, California

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Residual oil no. 6	1.43	0.44	1.87

Diesel Storage

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	All American Irvine Diesel Tank 2016
City:	Irvine
State:	California
Company:	All American Asphalt
Type of Tank:	Horizontal Tank
Description:	

Tank Dimensions

Shell Length (ft):		27.00
Diameter (ft):		8.00
Volume (gallons):		10,000.00
Turnovers:		[redacted]
Net Throughput(gal/yr):		
Is Tank Heated (y/n):	N	
Is Tank Underground (y/n):	N	

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Los Angeles AP, California (Avg Atmospheric Pressure = 14.67 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

All American Irvine Diesel Tank 2016 - Horizontal Tank
Irvine, California

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Distillate fuel oil no. 2	All	65.10	60.53	69.67	62.97	0.0078	0.0066	0.0089	130.0000			188.00	Option 1: VP60 = .0065 VP70 = .009
1,2,4-Trimethylbenzene						0.0250	0.0209	0.0296	120.1900	0.0131	0.0033	120.19	Option 2: A=7 04383, B=1573.267, C=208.56
2,2,3-Trimethylpentane						0.4403	0.3842	0.5032	114.2300	0.0002	0.0010	114.23	Option 2: A=6.8254, B=1294.88, C=218.42
Cyclohexane						1.3887	1.2290	1.5652	84.1600	0.0005	0.0070	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1293	0.1106	0.1506	106.1700	0.0031	0.0040	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.1817	1.9401	2.4474	86.1700	0.0002	0.0040	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0581	0.0491	0.0686	120.2000	0.0017	0.0010	120.20	Option 2: A=6.93666, B=1460.793, C=207.78
Naphthalene						0.0031	0.0025	0.0039	128.2000	0.1914	0.0060	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.3863	0.3356	0.4432	92.1300	0.0026	0.0100	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						0.0074	0.0072	0.0073	132.1618	0.7713	0.9457	169.21	
Xylene (-m)						0.1079	0.0921	0.1260	106.1700	0.0129	0.0140	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

All American Irvine Diesel Tank 2016 - Horizontal Tank
Irvine, California

Annual Emission Calculations	
Standing Losses (lb):	1.7470
Vapor Space Volume (cu ft):	864.4382
Vapor Density (lb/cu ft):	0.0002
Vapor Space Expansion Factor:	0.0309
Vented Vapor Saturation Factor:	0.9984
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	864.4382
Tank Diameter (ft):	8.0000
Effective Diameter (ft):	16.5879
Vapor Space Outage (ft):	4.0000
Tank Shell Length (ft):	27.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0002
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0078
Daily Avg. Liquid Surface Temp. (deg. R):	524.7719
Daily Average Ambient Temp. (deg. F):	62.9500
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	522.6400
Tank Paint Solar Absorptance (Shell):	0.1700
Daily Total Solar Insulation Factor (Btu/sqft day):	1,594.0000
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0309
Daily Vapor Temperature Range (deg. R):	18.2784
Daily Vapor Pressure Range (psia):	0.0023
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature(psia):	0.0078
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0068
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0089
Daily Avg. Liquid Surface Temp. (deg R):	524.7719
Daily Min. Liquid Surface Temp. (deg R):	520.2021
Daily Max. Liquid Surface Temp. (deg R):	529.3418
Daily Ambient Temp. Range (deg. R):	14.8500
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9984
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0078
Vapor Space Outage (ft):	4.0000
Working Losses (lb):	5.5618
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	[redacted]
Annual Net Throughput (gal/yr.):	[redacted]
Annual Turnovers:	[redacted]
Turnover Factor:	[redacted]

Tank Diameter (ft):	8.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	7.3088

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

All American Irvine Diesel Tank 2016 - Horizontal Tank
Irvine, California

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Distillate fuel oil no. 2	5.56	1.75	7.31
Hexane (-n)	0.02	0.01	0.03
Naphthalene	0.03	0.01	0.04
2,2,3-Trimethylpentane	0.01	0.00	0.01
Toluene	0.05	0.02	0.07
Ethylbenzene	0.02	0.01	0.03
Xylene (-m)	0.08	0.02	0.10
Isopropyl benzene	0.01	0.00	0.01
1,2,4-Trimethylbenzene	0.02	0.01	0.02
Cyclohexane	0.04	0.01	0.05
Unidentified Components	5.26	1.65	6.91

Mixing Tank I

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification	
User Identification:	All American Mixing Tank Irvine 2016
City:	Irvine
State:	California
Company:	All American Asphalt
Type of Tank:	Vertical Fixed Roof Tank
Description:	400 gallon tank
Tank Dimensions	
Shell Height (ft):	5.00
Diameter (ft):	4.00
Liquid Height (ft) :	4.00
Avg. Liquid Height (ft):	4.00
Volume (gallons):	400.00
Turnovers:	[redacted]
Net Throughput(gal/yr):	
Is Tank Heated (y/n):	Y
Paint Characteristics	
Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good
Roof Characteristics	
Type:	Dome
Height (ft)	0.00
Radius (ft) (Dome Roof)	4.00
Breather Vent Settings	
Vacuum Settings (psig):	0.00
Pressure Settings (psig):	0.00

Meterological Data used in Emissions Calculations: Los Angeles AP, California (Avg Atmospheric Pressure = 14.67 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

All American Mixing Tank Irvine 2016 - Vertical Fixed Roof Tank
Irvine, California

		Daily Liquid Surf Temperature (deg F)			Liquid Bulk Temp	Vapor Pressure (psia)			Vapor Mol.	Liquid Mass	Vapor Mass	Mol.	Basis for Vapor Pressure
Mixture/Component	Month	Avg.	Min.	Max.	(deg F)	Avg.	Min.	Max.	Weight.	Fract.	Fract.	Weight	Calculations
Residual oil no. 6	All	350.00	300.00	400.00	400.00	0.0002	0.0002	0.0002	190.0000			387.00	
1,2,4-Trimethylbenzene						17.6284	8.4887	33.1613	120.1900	0.0000	0.0033	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,3-Trimethylpentane						68.2853	38.5895	112.1043	114.2300	0.0000	0.0010	114.23	Option 2: A=6.8254, B=1294.88, C=218.42
Cyclohexane						131.3470	76.2452	208.1200	84.1600	0.0000	0.0070	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						40.5764	21.2840	70.8669	106.1700	0.0000	0.0040	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						174.7111	105.9338	270.0582	86.1700	0.0000	0.0040	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropylbenzene						26.5043	13.4086	47.7927	120.2000	0.0000	0.0010	120.20	Option 2: A=6.93666, B=1460.793, C=207.78
Naphthalene						5.3638	2.2954	11.2236	128.2000	0.0000	0.0060	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						70.0944	38.6774	118.9628	92.1300	0.0000	0.0100	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						0.0002	0.0002	0.0002	200.0857	1.0000	0.9457	387.00	
Xylene (-m)						38.5585	16.9740	64.5807	106.1700	0.0000	0.0140	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

All American Mixing Tank Irvine 2016 - Vertical Fixed Roof Tank
Irvine, California

Annual Emission Calcaulations	
Standing Losses (lb):	0.0030
Vapor Space Volume (cu ft):	16.0141
Vapor Density (lb/cu ft):	0.0000
Vapor Space Expansion Factor:	0.1235
Vented Vapor Saturation Factor:	1.0000
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	16.0141
Tank Diameter (ft):	4.0000
Vapor Space Outage (ft):	1.2744
Tank Shell Height (ft):	5.0000
Average Liquid Height (ft):	4.0000
Roof Outage (ft):	0.2744
Roof Outage (Dome Roof)	
Roof Outage (ft):	0.2744
Dome Radius (ft):	4.0000
Shell Radius (ft):	2.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0000
Vapor Molecular Weight (lb/lb-mole):	190.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0002
Daily Avg. Liquid Surface Temp. (deg. R):	609.6700
Daily Average Ambient Temp. (deg. F):	62.9500
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	559.6700
Tank Paint Solar Absorptance (Shell):	0.1700
Tank Paint Solar Absorptance (Roof):	0.1700
Daily Total Solar Insulation Factor (Btu/sqft day):	1,594.0000
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.1235
Daily Vapor Temperature Range (deg. R):	100.0000
Daily Vapor Pressure Range (psia):	0.0000
Breather Vent Press. Setting Range(psia):	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0002
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0002
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0002
Daily Avg. Liquid Surface Temp. (deg R):	609.6700
Daily Min. Liquid Surface Temp. (deg R):	559.6700
Daily Max. Liquid Surface Temp. (deg R):	659.6700
Daily Ambient Temp. Range (deg. R):	14.8500
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	1.0000
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0002
Vapor Space Outage (ft):	1.2744
Working Losses (lb):	0.2163

Vapor Molecular Weight (lb/lb-mole):	190.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0002
Annual Net Throughput (gal/yr.):	[redacted]
Annual Turnovers:	[redacted]
Turnover Factor:	[redacted]
Maximum Liquid Volume (gal):	400.0000
Maximum Liquid Height (ft):	4.0000
Tank Diameter (ft):	4.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	0.2193

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

**All American Mixing Tank Irvine 2016 - Vertical Fixed Roof Tank
Irvine, California**

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Residual oil no. 6	0.22	0.00	0.22
Hexane (-n)	0.00	0.00	0.00
Naphthalene	0.00	0.00	0.00
2,2,3-Trimethylpentane	0.00	0.00	0.00
Toluene	0.00	0.00	0.00
Ethylbenzene	0.00	0.00	0.00
Xylene (-m)	0.00	0.00	0.00
Isopropyl benzene	0.00	0.00	0.00
1,2,4-Trimethylbenzene	0.00	0.00	0.00
Cyclohexane	0.00	0.00	0.00
Unidentified Components	0.20	0.00	0.21

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Mixing Tank II

Identification

User Identification:	All American Mixing Tank II 2016
City:	Irvine
State:	California
Company:	All American Asphalt
Type of Tank:	Horizontal Tank
Description:	

Tank Dimensions

Shell Length (ft):	45.00
Diameter (ft):	10.00
Volume (gallons):	26,300.00
Turnovers:	[redacted]
Net Throughput(gal/yr):	
Is Tank Heated (y/n):	Y
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good

Breather Vent Settings

Vacuum Settings (psig):	0.00
Pressure Settings (psig)	0.00

Meterological Data used in Emissions Calculations: Los Angeles AP, California (Avg Atmospheric Pressure = 14.67 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

All American Mixing Tank II 2016 - Horizontal Tank
Irvine, California

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Residual oil no. 6	All	350.00	300.00	400.00	0.00	0.0002	0.0002	0.0002	190.0000			387.00	
1,2,4-Trimethylbenzene						17.8264	8.4887	33.1813	120.1900	0.0000	0.0033	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,3-Trimethylpentane						68.2853	38.5895	112.1043	114.2300	0.0000	0.0010	114.23	Option 2: A=6.8254, B=1294.86, C=216.42
Cyclohexane						131.3470	78.2452	208.1200	84.1600	0.0000	0.0070	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						40.5784	21.2840	70.9899	106.1700	0.0000	0.0040	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						174.7111	106.9336	270.0562	86.1700	0.0000	0.0040	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						26.5043	13.4068	47.7627	120.2000	0.0000	0.0010	120.20	Option 2: A=6.93666, B=1460.793, C=207.78
Naphthalene						5.3638	2.2954	11.2236	128.2000	0.0000	0.0080	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						70.0944	38.8774	116.9826	92.1300	0.0000	0.0100	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						0.0002	0.0002	0.0002	200.0857	1.0000	0.9457	387.00	
Xylene (-m)						38.5566	18.8740	64.6807	106.1700	0.0000	0.0140	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

All American Mixing Tank II 2016 - Horizontal Tank
Irvine, California

Annual Emission Calculations	
Standing Losses (lb):	0.4216
Vapor Space Volume (cu ft):	2,251.1412
Vapor Density (lb/cu ft):	0.0000
Vapor Space Expansion Factor:	0.1235
Vented Vapor Saturation Factor:	0.9999
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	2,251.1412
Tank Diameter (ft):	10.0000
Effective Diameter (ft):	23.9426
Vapor Space Outage (ft):	5.0000
Tank Shell Length (ft):	45.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0000
Vapor Molecular Weight (lb/lb-mole):	190.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0002
Daily Avg. Liquid Surface Temp. (deg. R):	809.6700
Daily Average Ambient Temp. (deg. F):	62.9500
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	459.6700
Tank Paint Solar Absorptance (Shell):	0.1700
Daily Total Solar Insulation Factor (Btu/sqft day):	1,594.0000
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.1235
Daily Vapor Temperature Range (deg. R):	100.0000
Daily Vapor Pressure Range (psia):	0.0000
Breather Vent Press. Setting Range (psia):	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0002
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0002
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0002
Daily Avg. Liquid Surface Temp. (deg R):	809.6700
Daily Min. Liquid Surface Temp. (deg R):	759.6700
Daily Max. Liquid Surface Temp. (deg R):	859.6700
Daily Ambient Temp. Range (deg. R):	14.6500
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9999
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0002
Vapor Space Outage (ft):	5.0000
Working Losses (lb):	0.8841
Vapor Molecular Weight (lb/lb-mole):	190.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0002
Annual Net Throughput (gal/yr.):	[redacted]
Annual Turnovers:	[redacted]
Turnover Factor:	[redacted]

Tank Diameter (ft):	10.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	1.3057

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

All American Mixing Tank II 2016 - Horizontal Tank
Irvine, California

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Residual oil no. 6	0.88	0.42	1.31
Hexane (-n)	0.00	0.00	0.01
Naphthalene	0.01	0.00	0.01
Cyclohexane	0.01	0.00	0.01
Unidentified Components	0.84	0.40	1.23
2,2,3-Trimethylpentane	0.00	0.00	0.00
Toluene	0.01	0.00	0.01
Ethylbenzene	0.00	0.00	0.01
Xylene (-m)	0.01	0.01	0.02
Isopropyl benzene	0.00	0.00	0.00
1,2,4-Trimethylbenzene	0.00	0.00	0.00

Table 11.1-14. PREDICTIVE EMISSION FACTOR EQUATIONS FOR LOAD-OUT AND SILO FILLING OPERATIONS[a]

EMISSION FACTOR RATING: C

Source	Pollutant	Equation
Drum mix or batch mix plant load-out (SCC 3-05-002-14)	Total PM[b]	$EF = 0.000181 + 0.00141(-V)e^{((0.0251)(T + 460) - 20.43)}$
	Organic PM[c]	$EF = 0.00141(-V)e^{((0.0251)(T + 460) - 20.43)}$
	TOC[d]	$EF = 0.0172(-V)e^{((0.0251)(T + 460) - 20.43)}$
	CO	$EF = 0.00558(-V)e^{((0.0251)(T + 460) - 20.43)}$
Silo filling (SCC 3-05-002-13)	Total PM[b]	$EF = 0.000332 + 0.00105(-V)e^{((0.0251)(T + 460) - 20.43)}$
	Organic PM[c]	$EF = 0.00105(-V)e^{((0.0251)(T + 460) - 20.43)}$
	TOC[d]	$EF = 0.0504(-V)e^{((0.0251)(T + 460) - 20.43)}$
	CO	$EF = 0.00488(-V)e^{((0.0251)(T + 460) - 20.43)}$

[a] Emission factor units are lb/ton of HMA produced. SCC = Source Classification Code. To convert from lb/ton to kg/Mg, multiply by 0.5. EF = emission factor; V = asphalt volatility, as determined by ASTM Method D2872-88 "Effects of Heat and Air on a Moving Film of Asphalt (Rolling Thin Film Oven Test - RTFOT)," where a 0.5 percent loss-on-heating is expressed as "-0.5." Regional- or site-specific data for asphalt volatility should be used, whenever possible; otherwise, a default value of -0.5 should be used for V in these equations. T = HMA mix temperature in °F. Site-specific temperature data should be used, whenever possible; otherwise a default temperature of 325°F can be used. Reference 1, Tables 4-27 through 4-31, 4-34 through 4-36, and 4-38 through 4-41.

[b] Total PM, as measured by EPA Method 315 (EPA Method 5 plus the extractable organic particulate from the impingers). Total PM is assumed to be predominantly PM-2.5 since emissions consist of condensed vapors.

[c] Extractable organic PM, as measured by EPA Method 315 (methylene chloride extract of EPA Method 5 particulate plus methylene chloride extract of impinger particulate).

[d] TOC as propane, as measured with an EPA Method 25A sampling train or equivalent sampling train.

Table 11.1-15. SPECIATION PROFILES FOR LOAD-OUT, SILO FILLING, AND ASPHALT STORAGE EMISSIONS–ORGANIC PARTICULATE-BASED COMPOUNDS

EMISSION FACTOR RATING: C

Pollutant	CASRN[a]	Speciation Profile for Load-out and Yard Emissions[b] Compound/Organic PM[c]	Speciation Profile for Silo Filling and Asphalt Storage Tank Emissions Compound/Organic PM[c]
PAH HAPs			
Acenaphthene	83-32-9	0.26%	0.47%
Acenaphthylene	208-96-8	0.028%	0.014%
Anthracene	120-1207	0.070%	0.13%
Benzo(a)anthracene	56-55-3	0.019%	0.056%
Benzo(b)fluoranthene	205-99-2	0.0076%	ND[d]
Benzo(k)fluoranthene	207-08-9	0.0022%	ND[d]
Benzo(g,h,i)perylene	191-24-2	0.0019%	ND[d]
Benzo(a)pyrene	50-32-8	0.0023%	ND[d]
Benzo(e)pyrene	192-97-2	0.0078%	0.0095%
Chrysene	218-01-9	0.103%	0.21%
Dibenz(a,h)anthracene	53-70-3	0.00037%	ND[d]
Fluoranthene	206-44-0	0.050%	0.15%
Fluorene	86-73-7	0.77%	1.01%
Indeno(1,2,3-cd)pyrene	193-39-5	0.00047%	ND[d]
2-Methylnaphthalene	91-57-6	2.38%	5.27%
Naphthalene	91-20-3	1.25%	1.82%
Perylene	198-55-0	0.022%	0.030%
Phenanthrene	85-01-8	0.81%	1.80%
Pyrene	129-00-0	0.15%	0.44%
Total PAH HAPs		5.93%	11.40%
Other semi-volatile HAPs			
Phenol		1.18%	ND[d]

[a] Chemical Abstract Service Registry Number.

[b] Emissions from loaded trucks during the period between load-out and the time the truck departs the plant.

[c] Emission factor for compound is determined by multiplying the percentage presented for the compound by the emission factor for extractable organic particulate (organic PM) as determined from Table 11.1-14.

[d] ND = Measured data below detection limits.

Table 11.1-16. SPECIATION PROFILES FOR LOAD-OUT, SILO FILLING, AND ASPHALT STORAGE EMISSIONS–ORGANIC VOLATILE-BASED COMPOUNDS

EMISSION FACTOR RATING: C

Pollutant	CASRN	Speciation Profile for Load-Out and Yard Emissions Compound/TOC[a]	Speciation Profile for Silo Filling and Asphalt Storage Tank Emissions Compound/TOC (%)[a]
VOC[b]		94%[b]	100%
Non-VOC/non-HAPs			
Methane	74-82-8	6.5%	0.26%
Acetone	67-64-1	0.046%	0.055%
Ethylene	74-85-1	0.71%	1.1%
Total non-VOC/non-HAPS		7.3%	1.4%
Volatile organic HAPS			
Benzene	71-43-2	0.052%	0.032%
Bromomethane	74-83-9	0.0096%	0.0049%
2-Butanone	78-93-3	0.049%	0.039%
Carbon Disulfide	75-15-0	0.013%	0.016%
Chloroethane	75-00-3	0.00021%	0.0040%
Chloromethane	74-87-3	0.015%	0.023%
Cumene	92-82-8	0.11%	ND[c]
Ethylbenzene	100-41-4	0.28%	0.038%
Formaldehyde	50-00-0	0.088%	0.69%
n-Hexane	100-54-3	0.15%	0.10%
Isooctane	540-84-1	0.0018%	0.00031%
Methylene Chloride	75-09-2	0.0%[d]	0.00027%
MTBE	596899	0.0%[d]	ND[c]
Styrene	100-42-5	0.0073%	0.0054%
Tetrachloroethene	127-18-4	0.0077%	ND[c]
Toluene	100-88-3	0.21%	0.062%
1,1,1-Trichloroethane	71-55-6	0.0%[d]	ND[c]
Trichloroethene	79-01-6	0.0%[d]	ND[c]
Trichlorofluoromethane	75-69-4	0.0013%	ND[c]
m-/p-Xylene	1330-20-7	0.41%	0.2%
o-Xylene	95-47-6	0.08%	0.057%
Total volatile organic HAPs		1.5%	1.3%

Table 11.1-16 (cont.)

[a] Emission factor for compound is determined by multiplying the percentage presented for the compound by the emission factor for total organic compounds (TOC) as determined from Table 11.1-14.

[b] The VOC percentages are equal to 100 percent of TOC minus the methane, acetone, methylene chloride, and 1,1,1-trichloroethane percentages.

[c] ND = Measured data below detection limits. Additional compounds that were not detected are: acrylonitrile, allyl chloride, bromodichloromethane, bromoform, 1,3-butadiene, carbon tetrachloride, chlorobenzene, chloroform, dibromochloromethane, 1,2-dibromoethane, 1,1-dichloroethane, 1,2-dichloroethane, 1,1-dichloroethene, cis-1,2-dichloroethene, trans-1,2-dichloroethene, 1,2-dichloropropane, cis-1,3-dichloropropene, trans-1,3-dichloropropene, 1,2-epoxybutane, ethyl acrylate, 2-hexanone, iodomethane, methyl methacrylate, 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, vinyl acetate, vinyl bromide, and vinyl chloride

[d] Values presented as 0.0% had background concentrations higher than the capture efficiency-corrected measured concentration.

Table 12.19-1 (Metric And English Units). PM-10 EMISSION FACTORS FOR WELDING OPERATIONS[a]

Welding Process	Electrode Type (With Last 2 Digits Of SCC)	Total Fume Emission Factor (g/kg [lb/10^3 lb] Of Electrode Consumed)[b]	EMISSION FACTOR RATING
SMAW[c] (SCC 3-09-051)	14Mn-4Cr (-04)	81.6	C
	E11018 (-08)[h]	16.4	C
	E308 (-12)[j]	10.8	C
	E310 (-16)[k]	15.1	C
	E316 (-20)[m]	10.0	C
	E410 (-24)[n]	13.2	D
	E6010 (-28)	25.6	B
	E6011 (-32)	38.4	C
	E6012 (-36)	8.0	D
	E6013 (-40)	19.7	B
	E7018 (-44)	18.4	C
	E7024 (-48)	9.2	C
	E7028 (-52)	18.0	C
	E8018 (-56)[p]	17.1	C
	E9015 (-60)[q]	17.0	D
	E9018 (-64)[r]	16.9	C
	ECoCr (-68)[s]	27.9	C
	ENi-Cl (-72)	18.2	C
	ENiCrMo (-76)[t]	11.7	C
	ENi-Cu (-80)[u]	10.1	C
GMAW[d,e] (SCC 3-09-052)	E308L (-12)[v]	5.4	C
	E70S (-54)[w]	5.2	A
	ER1260 (-10)	20.5	D
	ER5154 (-26)	24.1	D
	ER316 (-20)[x]	3.2	C
	ERNiCrMo (-76)[y]	3.9	C
	ERNiCu (-80)[z]	2.0	C

Table 12.19-1 (cont.).

Welding Process	Electrode Type (With Last 2 Digits Of SCC)		Total Fume Emission Factor (g/kg [lb/10^3 lb] Of Electrode Consumed)[b]	EMISSION FACTOR RATING
FCAW[f,g] (SCC 3-09-053)	E110	(-06)[aa]	20.8	D
	E11018	(-08)	57.0	D
	E308LT	(-12)[bb]	9.1	C
	E316LT	(-20)[cc]	8.5	B
	E70T	(-54)[dd]	15.1	B
	E71T	(-55)[ee]	12.2	B
SAW[g] (SCC 3-09-054)	EM12K	(-10)[ff]	0.05	C

[a] References 7-18. SMAW = shielded metal arc welding; GMAW = gas metal arc welding; FCAW = flux cored arc welding; SAW = submerged arc welding. SCC = Source Classification Code.

[b] Mass of pollutant emitted per unit mass of electrode consumed. All welding fume is considered to be PM-10 (particles ≤ 10 µm in aerodynamic diameter).

[c] Current = 102 to 229 A; voltage = 21 to 34 V.

[d] Current = 160 to 275 A; voltage = 20 to 32 V.

[e] Current = 275 to 460 A; voltage = 19 to 32 V.

[f] Current = 450 to 550 A; voltage = 31 to 32 V.

[g] Type of shielding gas employed will influence emission factor.

[h] Includes E11018-M

[j] Includes E308-16 and E308L-15

[k] Includes E310-16

[m] Includes E316-15, E316-16, and E316L-16

[n] Includes E410-16

[p] Includes E8018C3

[q] Includes E9015B3

[r] Includes E9018B3 and E9018G

[s] Includes ECoCr-A

[t] Includes ENiCrMo-4

[u] Includes ENi-Cu-2

[v] Includes E308LSi

[w] Includes E70S-3, E70S-5, and E70S-6

[x] Includes ER316I-Si and ER316L-Si

[y] Includes ENiCrMo-3 and ENi-CrMo-4

[z] Includes ERNiCu-7

[aa] Includes E110TS-K3

[bb] Includes E308LT-3

[cc] Includes E316LT-3

[dd] Includes E70T-1, E70T-2, E70T-4, E70T-5, E70T-7, and E70T-G

[ee] Includes E71T-1 and E71T-11

[ff] Includes EM12K1 and F72-EM12K2

Table 12.19-2. HAZARDOUS AIR POLLUTANT (HAP) EMISSION FACTORS FOR WELDING OPERATIONS[a]

Welding Process	Electrode Type (With Last 2 Digits Of SCC)	HAP Emission Factor (10^{-1} g/kg [10^{-1} lb/10^{3} lb] Of Electrode Consumed)[b]						EMISSION FACTOR RATING
		Cr	Cr(VI)	Co	Mn	Ni	Pb	
SMAW[c] (SCC 3-09-051)	14Mn-4Cr (-04)	13.9	ND	ND	232	17.1	ND	C
	E11018 (-08)[h]	ND	ND	ND	13.8	ND	ND	C
	E308 (-12)[j]	3.93	3.59	0.01	2.52	0.43	ND	D
	E310 (-16)[k]	25.3	18.8	ND	22.0	1.96	0.24	C
	E316 (-20)[m]	5.22	3.32	ND	5.44	0.55	ND	D
	E410 (-24)[n]	ND	ND	ND	6.85	0.14	ND	C
	E6010 (-28)	0.03	0.01	ND	9.91	0.04	ND	B
	E6011 (-32)	0.05	ND	0.01	9.98	0.05	ND	C
	E6012 (-36)	ND	ND	ND	ND	ND	ND	ND
	E6013 (-40)	0.04	ND	< 0.01	9.45	0.02	ND	B
	E7018 (-44)	0.06	ND	< 0.01	10.3	0.02	ND	C
	E7024 (-48)	0.01	ND	ND	6.29	ND	ND	C
	E7028 (-52)	0.13	ND	ND	8.4612	ND	1.62	C
	E8018 (-56)[p]	0.17	ND	ND	0.3	0.51	ND	C
	E9016 (-60)	ND	ND	ND	ND	ND	ND	ND
	E9018 (-64)[q]	2.12	ND	ND	7.83	0.13	ND	C
	ECoCr (-68)	ND	ND	ND	ND	ND	ND	ND
	ENi-Cl (-72)	ND	ND	ND	0.39	8.90	ND	C
	ENiCrMo (-76)[r]	4.20	ND	ND	0.43	2.47	ND	C
	ENi-Cu-2 (-80)[s]	ND	ND	ND	2.12	4.23	ND	C
GMAW[d,e] (SCC 3-09-052)	E308 (-12)[t]	5.24	ND	< 0.01	3.46	1.84	ND	C
	E70S (-54)[u]	0.01	ND	< 0.01	3.18	0.01	ND	A
	ER1260 (-10)	0.04	ND	ND	ND	ND	ND	D
	ER5154 (-26)	0.10	ND	ND	0.34	ND	ND	D
	ER316 (-20)[v]	5.28	0.10	ND	2.45	2.26	ND	D
	ERNiCrMo (-76)[w]	3.53	ND	ND	0.70	12.5	ND	B
	ERNiCu (-80)[x]	< 0.01	ND	ND	0.22	4.51	ND	C

Table 12.19-2 (cont.).

Welding Process	Electrode Type (With Last 2 Digits Of SCC)	HAP Emission Factor (10^{-1} g/kg [10^{-1} lb/10^3 lb] Of Electrode Consumed)[b]						EMISSION FACTOR RATING
		Cr	Cr(VI)	Co	Mn	Ni	Pb	
FCAW[f,g] (SCC 3-09-053)	E110 (-06)[y]	0.02	ND	ND	20.2	1.12	ND	D
	E11018 (-08)[z]	9.69	ND	ND	7.04	1.02	ND	C
	E308 (-12)	ND	ND	ND	ND	ND	ND	ND
	E316 (-20)[aa]	9.70	1.40	ND	5.90	0.93	ND	B
	E70T (-54)[bb]	0.04	ND	ND	8.91	0.05	ND	B
	E71T (-55)[cc]	0.02	ND	< 0.01	6.62	0.04	ND	B
SAW[h] (SCC 3-09-054)	EM12K (-10)	ND	ND	ND	ND	ND	ND	ND

[a] References 7-18. SMAW = shielded metal arc welding; GMAW = gas metal arc welding; FCAW = flux cored arc welding; SAW = submerged arc welding. SCC = Source Classification Code. ND = no data.

[b] Mass of pollutant emitted per unit mass of electrode consumed. Cr = chromium. Cr(VI) = chromium +6 valence state. Co = cobalt. Mn = manganese. Ni = nickel. Pb = lead. All HAP emissions are in the PM-10 size range (particles ≤ 10 µm in aerodynamic diameter).

[c] Current = 102 to 225 A; voltage = 21 to 34 V.

[d] Current = 275 to 460 A; voltage = 19 to 32 V.

[e] Type of shielding gas employed will influence emission factors.

[f] Current = 160 to 275 A; voltage = 22 to 34 V.

[g] Current = 450 to 550 A; voltage = 31 to 32 V.

[h] Includes E11018-M

[j] Includes E308-16 and E308L-15

[k] Includes E310-15

[m] Includes E316-15, E316-16, and E316L-16

[n] Includes E410-16

[p] Includes 8018C3

[q] Includes 9018B3

[r] Includes ENiCrMo-3 and ENiCrMo-4

[s] Includes ENi-Cu-2

[t] Includes E308LSi

[u] Includes E70S-3, E70S-5, and E70S-6

[v] Includes ER316I-Si

[w] Includes ERNiCrMo-3 and ERNiCrMo-4

[x] Includes ERNiCu-7

[y] Includes E110TS-K3

[z] Includes E11018-M

[aa] Includes E316LT-3

[bb] Includes E70T-1, E70T-2, E70T-4, E70T-5, E70T-7, and E70T-G

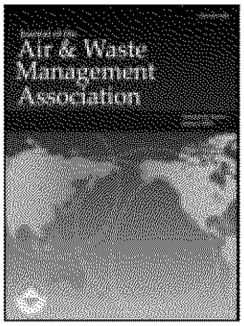
[cc] Includes E71T-1 and E71T-11

CARB Toxic Emssion Factors
Speciation Profiles Used in CARB Modeling
Profile 416

WINDBLOWN DUST-UNPAVED RD/AREA

CARB PM Profile	CARB SAROAD ID	Pollutant	CAS	PM Fraction[1] (%)	PM Fraction (lbs/lbs)
416	11102	Organic Cor	#N/A	0.030366	0.000304
416	12000	Unknown	#N/A	0.554	0.00554
416	12101	Aluminum	7429905	0.078902	0.000789
416	12102	Antimony	7440360	0.000007	7E-08
416	12103	Arsenic	7440382	0.000015	1.5E-07
416	12107	Barium	7440393	0.000952	9.52E-06
416	12109	Bromine	7726956	0.000021	2.1E-07
416	12110	Cadmium	7440439	0.000025	2.5E-07
416	12111	Calcium	#N/A	0.038106	0.000381
416	12112	Chromium	7440473	0.000245	2.45E-06
416	12113	Cobalt	7440484	0.000149	1.49E-06
416	12114	Copper	7440508	0.000087	8.7E-07
416	12115	Chlorine	7782505	0.001302	1.3E-05
416	12116	Elemental C	#N/A	0.000942	9.42E-06
416	12124	Gallium	#N/A	0.000001	1E-08
416	12126	Iron	#N/A	0.056832	0.000568
416	12128	Lead	7439921	0.000901	9.01E-06
416	12131	Indium	#N/A	0.000011	1.1E-07
416	12132	Manganese	7439965	0.001051	1.05E-05
416	12134	Molybdenu	#N/A	0.000004	4E-08
416	12136	Nickel	7440020	0.000063	6.3E-07
416	12142	Mercury	7439976	0.000015	1.5E-07
416	12146	Lanthanum	#N/A	0.000021	2.1E-07
416	12151	Palladium	#N/A	0.000009	9E-08
416	12152	Phosphorus	7723140	0.001602	1.6E-05
416	12154	Selenium	7782492	0.000001	1E-08
416	12160	Tin	#N/A	0.000005	5E-08
416	12161	Titanium	#N/A	0.005476	5.48E-05
416	12164	Vanadium (	7440622	0.000312	3.12E-06
416	12165	Silicon	#N/A	0.197936	0.001979
416	12166	Silver	7440224	0.000009	9E-08
416	12167	Zinc	7440666	0.000622	6.22E-06
416	12168	Strontium	#N/A	0.000326	3.26E-06
416	12169	Sulfur	#N/A	0.001343	1.34E-05
416	12176	Rubidium	#N/A	0.000158	1.58E-06
416	12180	Potassium	#N/A	0.021351	0.000214
416	12182	Insol Potass	#N/A	0.020022	0.0002
416	12183	Yttrium	#N/A	0.000028	2.8E-07
416	12184	Sodium	#N/A	0.001021	1.02E-05
416	12185	Zirconium	#N/A	0.000105	1.05E-06
416	12301	Ammonium	#N/A	0.000098	9.8E-07
416	12306	Nitrates	#N/A	0.001078	1.08E-05
416	12403	Sulfates	9960	0.002266	2.27E-05
416	12404	Non-sulfate	#N/A	0.000588	5.88E-06
416	12501	Carbonate I	#N/A	0.002991	2.99E-05
416	65312	Potassium I	#N/A	0.001329	1.33E-05
416	99999	Unidentifie	#N/A		0

1. PM Speciation Profile contains the weigh fraction data expressed as a percent for ease of display of each chemical in the profile, within each of the specified size fractions. (CARB Website Exerpt)



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PM_4 Crystalline Silica Emission Factors and Ambient Concentrations at Aggregate-Producing Sources in California

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ABSTRACT

The California Construction and Industrial Minerals Association and the National Stone, Sand, & Gravel Association have sponsored tests at three sand and gravel plants in California to compile crystalline silica emission factors for particulate matter (PM) of aerodynamic diameter of 4 μm or less (PM_4) and ambient concentration data. This information is needed by industrial facilities to evaluate compliance with the Chronic Reference Exposure Level (REL) for ambient crystalline silica adopted in 2005 by the California Office of Environmental Health Hazard Assessment. The REL applies to PM_4 respirable PM. Air Control Techniques, P.C. sampled for PM_4 crystalline silica using a conventional sampler for PM of aerodynamic diameter of 2.5 μm or less ($PM_{2.5}$), which met the requirements of 40 *Code of Federal Regulations* Part 50, Appendix L. The sample flow rate was adjusted to modify the 50% cut size to 4 μm instead of 2.5 μm. The filter was also changed to allow for crystalline silica analyses using National Institute for Occupational Safety and Health (NIOSH) Method 7500. The particle size-capture efficiency curve for the modified Appendix L instrument closely matched the performance curve of NIOSH Method 0600 for PM_4 crystalline silica and provided a minimum detection limit well below the levels attainable with NIOSH Method 0600. The results of the tests indicate that PM_4 crystalline silica emissions range from 0.000006 to 0.000110 lb/t for screening operations, tertiary crushers, and conveyor transfer points. The PM_4 crystalline silica emission factors were proportional to the crystalline silica content of the material handled in the process equipment. Measured ambient concentrations ranged from 0 (below detectable limit) to 2.8 $\mu g/m^3$. All values measured above 2 $\mu g/m^3$ were at locations upwind of the facilities being tested. The ambient PM_4 crystalline silica concentrations measured during this study were below the California REL of 3 $\mu g/m^3$. The measured ambient concentrations in the PM_4 size range are consistent with previously published ambient crystalline silica data applicable to the $PM_{2.5}$ and PM of aerodynamic diameter of 10 μm or less (PM_{10}) size ranges.

IMPLICATIONS

Mineral processing facilities need PM_4 crystalline silica emission factor data to evaluate compliance with the 3 $\mu g/m^3$ Chronic REL for PM_4 ambient crystalline silica adopted in 2005 by the California Office of Environmental Health Hazard Assessment. Emission tests at three sand and gravel plants have provided PM_4 crystalline silica data for screens, crushers, and conveyors. Mineral processing facilities can use the emission factor data to evaluate compliance with the stringent ambient PM_4 crystalline silica limit.

INTRODUCTION

Crystalline Silica Emission Factors of Particulate Matter of Aerodynamic Diameter of 4 μm or Less

There are no previously published data concerning particulate matter (PM) of aerodynamic diameter of 4 μm or less (PM_4) crystalline silica emissions from aggregate producing plants or other mineral industry sources. The PM_4 crystalline silica emission factors can be estimated based on published data concerning emission factors for PM of aerodynamic diameter of 10 μm (PM_{10}) or 2.5 μm ($PM_{2.5}$) or less for aggregate producing plants.[1–9] The U.S. Environmental Protection Agency (EPA) AP42 Section 11.19-2 emission factors for tertiary crushers, screens, and conveyor transfer points indicate that the $PM_{2.5}$ emissions range from 0.000013 to 0.000100 lb/t of stone. The AP42 Section 11.19-2 PM_{10} emission factors for these three types of processing equipment range from 0.000046 to 0.00074 lb/t.

These emission factors provide a starting point for evaluating possible PM_4 crystalline silica emission factors. It is reasonable to expect the PM_4 total emission factors to be between the $PM_{2.5}$ and PM_{10} emission factors. The PM_4

crystalline silica emission factors will depend on the crystalline silica content of the PM_4 total PM.

Ambient Crystalline Silica Concentrations

No PM_4 ambient concentration or emission factor data have been published. All previous crystalline silica ambient concentration data applied to the $PM_{2.5}$, PM_{10}, and/or PM of 15-μm or less (PM_{15}) size ranges.

One of the first studies of ambient crystalline silica concentrations was conducted by Davis et al.[10] This study focused on urban areas. Ambient crystalline silica concentrations were measured in 22 urban areas using dichotomous samplers that separate ambient PM into the 0- to 2.5-μm range ("fine PM") and the 2.5- to 15-μm range (termed here as "coarse/supercoarse PM"). Davis et al. measured mean 24-hr average ambient crystalline silica concentrations ranging from 0.9 to 8 $\mu g/M^3$ in the coarse/supercoarse size range. Crystalline silica was 1–9% of the coarse/supercoarse PM and 0–2.6% of the fine (<2.5 μm) PM.

EPA[11] used the data of Davis et al. to derive estimates of the annual average crystalline silica levels in urban areas. The city-specific crystalline silica content values were multiplied by annual average PM_{10} concentrations in these areas to estimate the annual average PM_{10} crystalline silica levels. EPA also calculated an annual average of 1.9 $\mu g/m^3$ with a range of 0.8–5 $\mu g/m^3$ in the PM_{10} size range. The crystalline silica content in the $PM_{2.5}$ size range was consistently less than 1 $\mu g/m^3$ because of the low crystalline silica content of the $PM_{2.5}$ PM and the low total concentration of $PM_{2.5}$ PM.

In 2000, the National Stone, Sand, & Gravel Association (NSSGA) sponsored upwind-downwind studies of ambient crystalline silica concentrations at four stone crushing plants processing high-quartz-content rock.[12] Air Control Techniques, P.C. used Rupprecht & Patashnick Co, Inc. Federal Reference Method (FRM)-2000 samplers that fully met the stringent design and operating specifications of 40 *Code of Federal Regulations* (CFR) Part 50, Appendix L.[13] The measured 8-hr working-shift PM_{10} crystalline silica concentrations at the collocated downwind PM_{10} samplers ranged from 1 to 10.9 $\mu g/m^3$. These values are similar to the range of mean 24-hr concentration values of 0.9–8 $\mu g/m^3$ for 24-hr concentrations measured by Davis et al. in the coarse/supercoarse size range. The measured upwind and downwind concentrations were similar. The crystalline silica levels of 5.07–6.24% by weight of the PM_{10} were similar to the 4.9 ± 2.3% levels in coarse/supercoarse PM reported by Davis et al.

Various other studies have provided limited data for urban, rural, and industrial areas. Puledda[14] measured PM_{10} crystalline silica levels in Rome, Italy of 0.11–2.27 $\mu g/m^3$. These levels were 1.7–3.4% of the measured PM_{10}. Norton and Gunter[15] measured PM_{10} crystalline silica levels averaging 10% in Moscow, ID. They also extracted PM from PM_{10} samples from numerous areas throughout Idaho and estimated crystalline silica levels to be between 7 and 16% of PM_{10} in various urban and rural areas in Idaho. Various other studies described by EPA[11] at urban, rural, and industrial areas indicated 24-hr average crystalline silica levels and crystalline silica contents in PM_{10} that were similar to those in Davis et al.,[10] Air Control Techniques, P.C.,[12] Puledda,[14] and Norton and Gunter.[15] These other studies include Schipper,[16] Goldsmith,[17] Chow et al.,[18] Chow,[19] and Chow.[20] Only the study of Shakari and Holmen[21] reported crystalline silica levels and PM_{10} crystalline silica contents outside of the range of the various papers summarized above. There are insufficient data in Shakari and Holmen to identify the possible reasons for the differences between their data and other studies.

On the basis of the available ambient crystalline silica data, the study participants concluded that there was a need for a monitoring technique having a minimum detectable limit of 0.3 $\mu g/m^3$. This is at or below the concentrations anticipated in this project. This minimum detectable concentration is also 10% of the California Relative Exposure Limit. An evaluation of National Institute for Occupational Safety and Health (NIOSH) Method 0600 used for in-plant industrial hygiene tests indicated that this method was not sufficiently precise at the necessary detection limit. Accordingly, the California Construction and Industrial Minerals Association (CalCIMA) and NSSGA sponsored the development of a more accurate and precise PM_4 crystalline silica monitoring method for this project. Information concerning the development of the PM_4 crystalline silica monitoring method on the basis of the validated $PM_{2.5}$ test method is described in the project report.[22]

TEST LOCATIONS AND PROCEDURES

PM_4 Crystalline Silica Measurement Test Locations

Study participants selected facilities for testing on the basis of (1) the representativeness of a vibrating screen, tertiary crusher, and conveyor transfer point of other California plants; (2) the representativeness of the crystalline silica content of the minerals processed; (3) the accessibility of the equipment for testing; (4) the capability to isolate the process unit tested from adjacent process units; and (5) the geographical location. The plants included the Service Rock Products, Inc. plant in Barstow; the Vulcan Materials, Inc. Carroll Canyon plant near San Diego; and the Teichert Aggregates, Inc. Vernalis plant near Tracy. These plants had crystalline silica levels ranging from 16.5 to 35.3% by weight in the minerals being processed.

PM_{10} data were compiled to provide a comparison of measured PM_4 crystalline silica emissions with measured PM_{10} emissions. The scope of the programs at each of these three facilities included PM_{10} emission factor tests on the crushers, vibrating screens, and conveyor transfer points.

The specific sources tested at Barstow included (1) a 16- by 5-ft flat vibrating screening operation, (2) a short-head crusher, and (3) a conveyor transfer point. The equipment tested at Carroll Canyon included (1) a 16- by 8-ft flat vibrating screen, (2) a set of two cone crushers, and (3) a conveyor transfer point. The sources tested at Vernalis included (1) a 20- by 8-ft triple deck sloped vibrating screen, (2) a set of two cone crushers, and (3) a conveyor transfer point. Water sprays controlled all of the units with the exception of the Carroll Canyon cone crushers. A fabric filter supplemented wet suppression control at the Carroll Canyon cone crushers.

PM_4 Crystalline Silica Measurement Procedures

The PM_4 crystalline silica emission concentrations were measured using TECO Model 2000 FRMs modified to have a 50% cut point of 4 μm rather than 2.5 μm. This monitoring method was developed for CalCIMA and NSSGA by Air Control Techniques, P.C. in accordance with a protocol submitted to the California Air Resources Board in July 2005. The authors consider this method to be an extension of the $PM_{2.5}$ ambient monitoring procedures specified by EPA in 40 CFR Part 50, Appendix L because of the use of identical sampling equipment, sampling procedures, and quality assurance procedures.

The main adjustment necessary to an Appendix L qualifying instrument is a change in the 50% cut size of this instrument from $PM_{2.5}$ to PM_4. The 50% cut size was adjusted by reducing the sample airflow rate into the TECO sharp cut cyclone to 11.1 L/min from the 16.67 L/min used for $PM_{2.5}$ monitoring. The adequacy of the cut size was confirmed using National Institute for Standards and Technology (NIST) traceable microspheres.

A calculated sampling time of 1–3 hr was required to meet the minimum detection limits of NIOSH 7500 for crystalline silica during tests on the process equipment. These sampling time estimates were based on (1) the NIOSH Method 7500 detection limit of 5 μg, (2) the TECO FRM 2000 sample gas flow rate of 11.1 L/min that was used to collect PM_4, and (3) the estimated crystalline silica content of the stone material being processed. Crystalline silica was detected in all but one filter sample, which confirmed the adequacy of the 1- to 3-hr sampling periods used in the study. The filter samples were weighted at R.J. Lee Group, Inc. using a microbalance and analyzed for crystalline silica using NIOSH Method 7500.

The fugitive PM_{10} PM emissions from the process equipment sources tested in Barstow were measured using a TECO tapered element oscillating microbalance (TEOM) in accordance with EPA Reference Method IO-3. For the tests at Carroll Canyon and Vernalis, the fugitive PM_{10} PM emissions were measured using TECO Model 2000 FRMs modified for PM_{10}.

Sampling arrays designed based on EPA Method 5D (40 CFR Part 60, Appendix A) captured process equipment PM_4 crystalline silica emissions. The mass fluxes

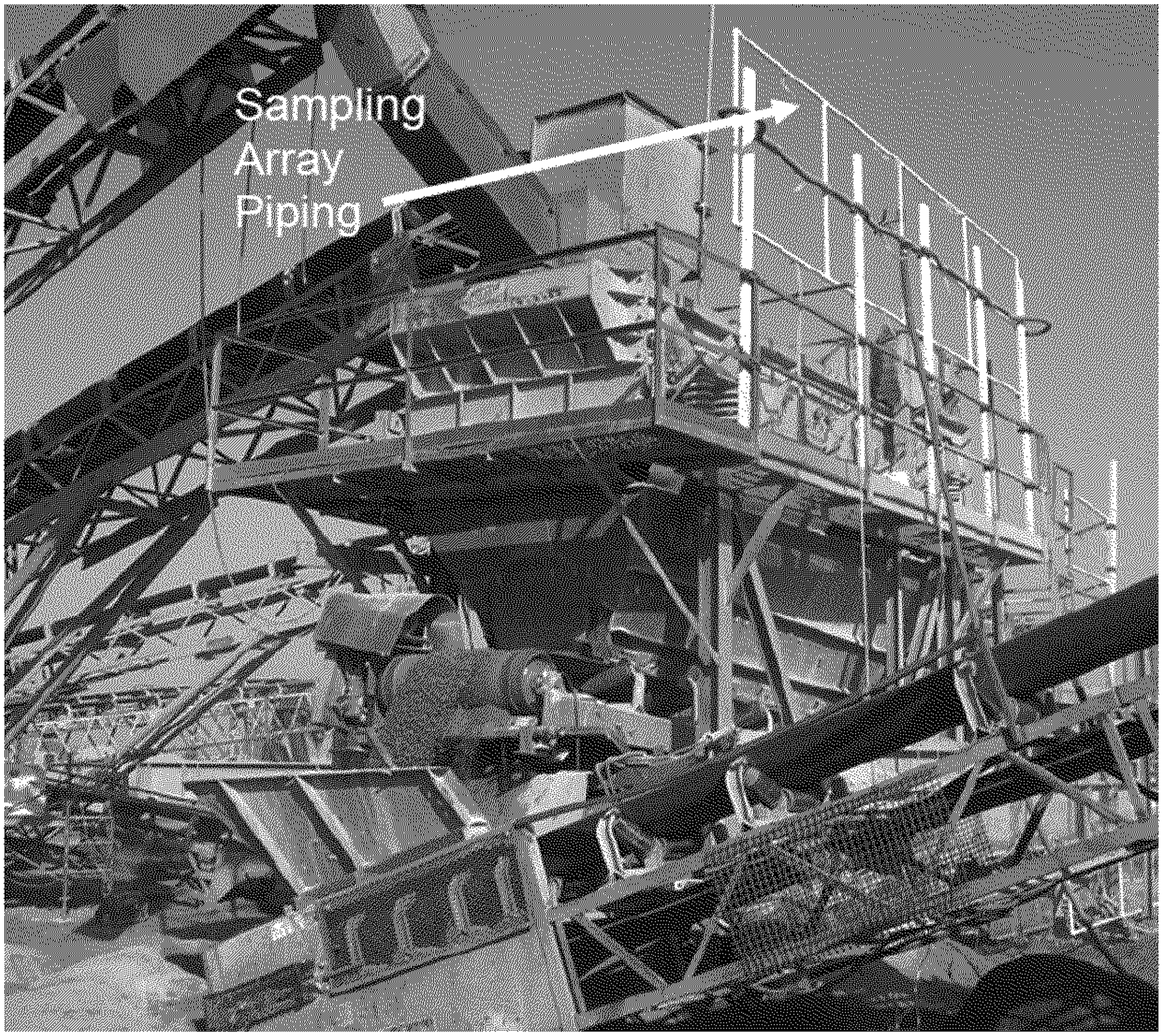

Figure 1. Side view of the sampling array on the downwind side of the vibrating sizing screen at the Barstow plant.

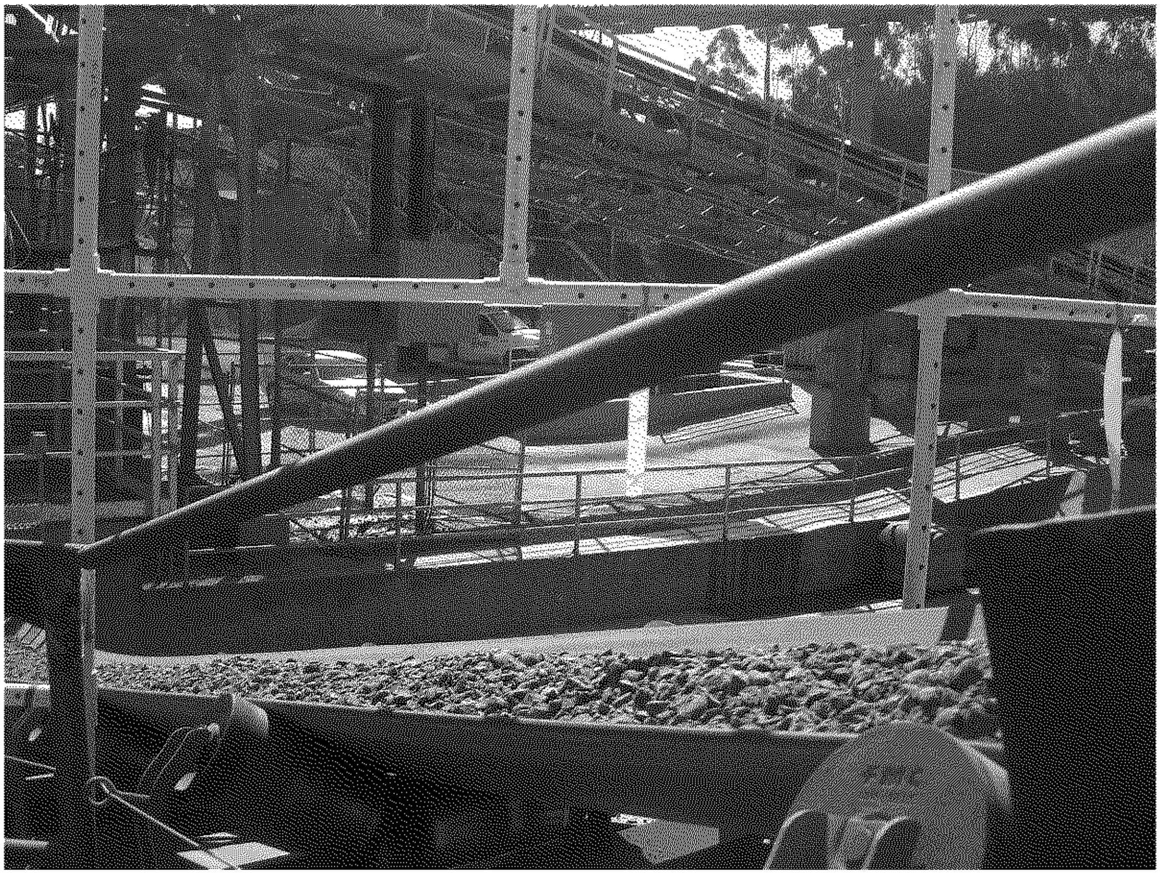

Figure 2. South-side view of sampling array on downwind side of the conveyor transfer point at the Barstow plant.

of PM_4 and PM_{10} fugitive PM through the arrays were calculated by multiplying the total area of the array by the ambient wind speed and the measured PM_4 and PM_{10} concentrations.

The arrays for the vibrating screens, tertiary crushers, and conveyor transfer points were mounted within 5 ft of the locations of PM entrainment by ambient air. Because of this close spacing of the arrays to the source, the "plume" did not have time to substantially disperse in the horizontal or vertical direction. Accordingly, the dispersing PM was captured from the sources even as the ambient winds shifted direction within an angle of approximately 90°.

Each sampling array had more than 100 sampling points. This substantially exceeds the 30 sampling points specified in EPA Method 5D for testing open-top sources. The area monitored by the sampling array exceeded the area subject to dispersion of the PM on the downwind side of the process unit being tested. Each array consisted of manifolds having equally spaced nozzles for air sampling. The gas transport velocities through all sampling tubes and ductwork were above a minimum of 3200 ft/min to prevent any gravitational settling of dust. The sampling manifolds and ductwork were visually inspected after each test run. Following each set of emission tests, the sampling array piping and flex ducts were disassembled and checked for solids deposits. No deposits were present in any sections of the sampling system. Wind speed data and wind direction data demonstrated that each test run was consistent with study requirements.

Each of the array sampling manifolds was ducted together to yield a single sample gas stream. This gas stream flowed through a round duct 12 in. in diameter with sampling ports for a TECO FRM 2000 (modified for PM_4) sampling head and a PM_{10} sampling head. This duct size was the minimum necessary to accommodate the relatively large inlet heads for the TECO FRM 2000 and the TEOM. The gas velocity through the portion of the duct with the sampling ports for the monitoring instruments was less than 10 mph to be consistent with typical ambient wind velocities.

The actual sample gas flow rates through the sampling arrays provided near-isokinetic sampling velocities in the nozzles of the sampling arrays. The nozzles provided isokinetic sampling velocities equal to or lower than 110% at an average ambient wind speed of 5 mph. At isokinetic sampling rates below 100%, there is a slight bias to higher-than-true PM_4 concentrations because of the inertia of the PM_4 particles; however, this isokinetic effect is small for PM_4 particles because of their extremely low mass. Figures 1–3 show the sampling array arrangements.

The ambient airflow rate through each array was calculated based on the area of the array and the measured ambient wind speed. The tests were conducted only when the ambient winds were moving across the process being tested and through the downwind array. The adequacy of fugitive dust capture by the array was documented on a continuous basis using visible wind direction indicators and on an intermittent basis using a nephelometer continuous PM concentration analyzer inside and outside of the array.

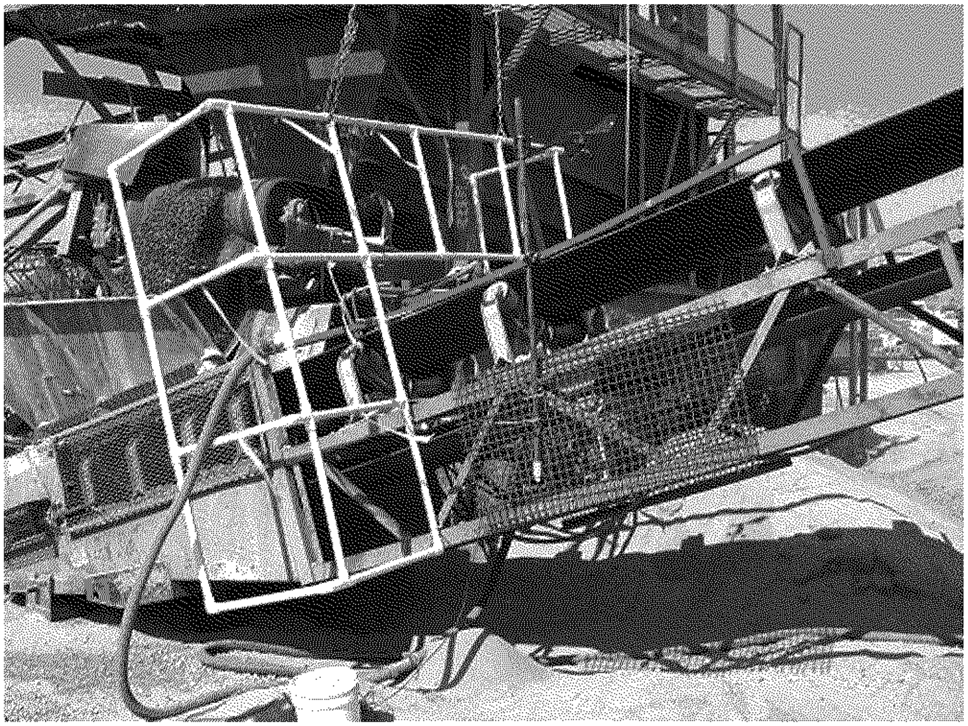

Figure 3. Close-up view of the sampling orifices in the conveyor transfer point array at the Carroll Canyon plant.

As part of this testing program, meteorological monitoring stations were installed to measure the following parameters during the process equipment test programs.

- Average and peak wind speeds
- Wind direction
- Ambient temperature

The sample gas velocities and volumetric flow rates through the main sampling duct during the PM_4 and PM_{10} tests were determined according to the procedures outlined in EPA Reference Method 2.

The authors believe that this fugitive dust capture technique provides the most accurate means possible to quantify fugitive dust emissions without affecting the rate of fugitive dust emissions and without interfering with safe plant operations.

PM_4 Emission Factor Test Program Process Data

During each of the test runs, study participants compiled data concerning the process operating conditions and the characteristics of the materials being handled.

- Crystalline silica content of aggregate being processed through the tested units
- Material moisture content (% wt)
- Material particle size distribution (sieve analyses)
- Material throughput (t/hr)

Ambient PM_4 Crystalline Silica Measurements

The PM_4 crystalline silica ambient concentrations were measured using TECO Model 2000 FRMs adjusted for PM_4 monitoring. Two Model 2000 FRMs were located

Table 1. PM_{10}, PM_4, and PM_4 crystalline silica emission factors at Barstow.

		Emission Factor Values (lb/t) of Stone Throughput		
Equipment Tested	**Emission Factor**	**Measured Value**	**Ambient Upwind Equivalent**[b]	**Emission Factor**
Vibrating screen	PM_{10}	0.000167[a,c]	NA[c]	0.000167[a,c]
	PM_4	0.000079[c]	NA[c]	0.000079[c]
	PM_4 crystalline silica	0.000006[c]	NA[c]	0.000006[c]
Crusher	PM_{10}	0.002753	0.000172	0.002581
	PM_4	0.001442	0.000172	0.001270
	PM_4 crystalline silica	0.000111	0.000028	0.000083
Conveyor transfer point	PM_{10}	0.000625	0.000050	0.000575
	PM_4	0.000402	0.000050	0.000352
	PM_4 crystalline silica	0.000035	0.000006	0.000029

Notes: [a]PM_{10} emission factors were calculated based on TEOM data. [b]Ambient levels of PM_4 PM and PM_4 crystalline silica upwind of the units tested were subtracted from the emission factors to account for material not emitted by the source. [c]Ambient levels of PM and crystalline silica upwind of the vibrating screens were not subtracted because the upwind samplers were below the elevation of the screens; therefore, the air quality at this elevation was not necessarily representative of air quality on the inlet side of the screen.

Table 2. PM_{10}, PM_4, and PM_4 crystalline silica emission factors at Carroll Canyon.

		Emission Factor Values (lb/t) of Stone Throughput		
Equipment Tested	**Emission Factor**	**Measured Value**	**Ambient Upwind Equivalent**	**Emission Factor**
Vibrating screen	PM_{10}	0.000930	0.000100	0.000831
	PM_4	0.000386	0.000029	0.000356
	PM_4 crystalline silica	0.000048	0.000001	0.000046
Crusher	PM_{10}	0.001271	0.000039	0.001232
	PM_4	0.000611	0.000017	0.000593
	PM_4 crystalline silica	0.000099	0.000002	0.000098
Conveyor transfer point	PM_{10}	0.000552	0.000026	0.000525
	PM_4	0.000245	0.000009	0.000236
	PM_4 crystalline silica	0.000031	0.00000	0.000031

Table 3. PM_{10}, PM_4, and PM_4 crystalline silica emission factors at Vernalis.

		Emission Factor Values (lb/t) of Stone Throughput		
Equipment Tested	**Emission Factor**	**Measured Value**	**Ambient Upwind Equivalent**	**Emission Factor**
Vibrating screen	PM_{10}	0.001754	0.000061	0.001693
	PM_4	0.000888	0.000006	0.000882
	PM_4 crystalline silica	0.000083	0.000002	0.000081
Crusher	PM_{10}	0.001767	0.000089	0.001677
	PM_4	0.000788	0.000021	0.000767
	PM_4 crystalline silica	0.000110	0.000001	0.000110
Conveyor transfer point	PM_{10}	0.001193	0.000103	0.001090
	PM_4	0.000476	0.000019	0.000457
	PM_4 crystalline silica	0.000088	0.000003	0.000085

Table 4. Comparison of measured PM_{10} PM emission factors and PM_4 crystalline silica emission factors.

Source	**Plant**	**PM_{10} Emission Factors (lb/t)**	**Crystalline Silica PM_4 Factors (lb/t)**	**Ratio, Percent PM_4 Crystalline Silica to PM_{10}**
Screen	Barstow	0.000167	0.000006	3.59
	Carroll Canyon	0.000831	0.000046	5.54
	Vernalis	0.001693	0.000081	4.78
Crusher	Barstow	0.002581	0.000083	3.21
	Carroll Canyon	0.001232	0.000098	7.95
	Vernalis	0.001677	0.00011	6.56
Conveyor transfer point	Barstow	0.000575	0.000029	5.04
	Carroll Canyon	0.000525	0.000031	5.90
	Vernalis	0.00109	0.000085	7.80

on the downwind side of the facility at a location immediately adjacent to the plant fence line. A single upwind Model 2000 FRM was located on the upwind side of the facility.

These instruments were operated for 24 hr and obtained sample volumes of 16 m^3. R.J. Lee Group, Inc. (RJL) weighed the filter samples using a microbalance and analyzed for crystalline silica using NIOSH Method 7500.

RESULTS

Emission Factor Test Results

The PM_{10}, PM_4, and PM_4 crystalline silica emission factors for the equipment sources measured at the three facilities are presented in Tables 1–3. The emission factors presented in the column on the right were calculated by subtracting the measured downwind concentrations from the measured upwind (ambient) concentrations.

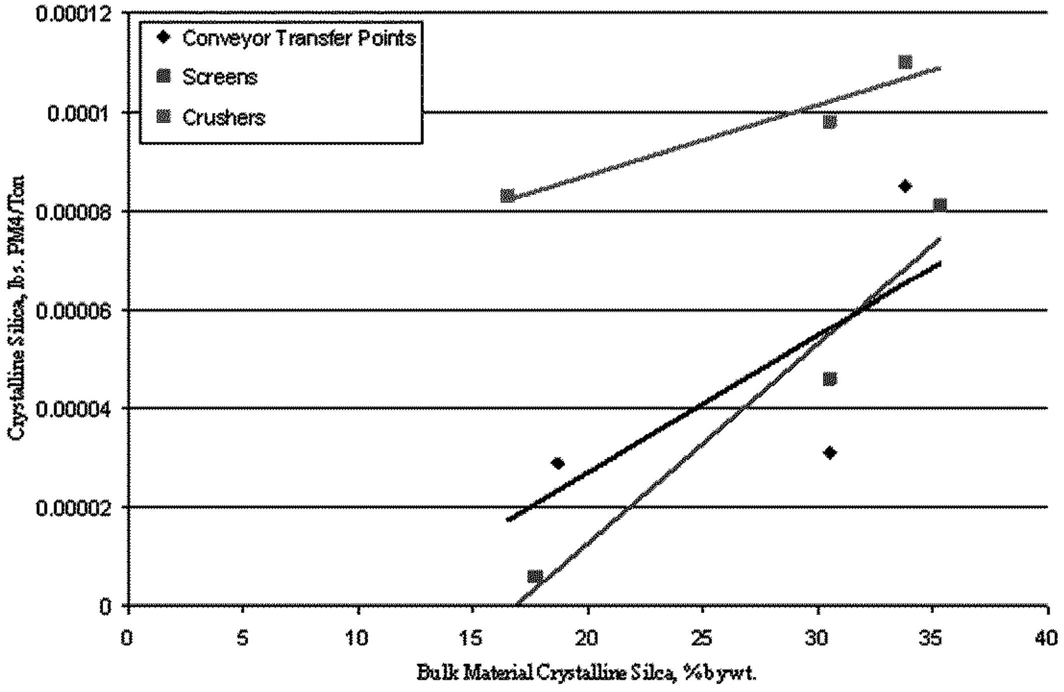

Figure 4. Relationship between bulk material crystalline silica content and the PM_4 crystalline silica emission factor.

As indicated in Table 4, the crystalline silica PM_4 emission factors range from 3.21 to 7.95% of the PM_{10} emission factors. This is a useful ratio because it compares the PM_4 crystalline silica emissions with PM_{10} emissions for which data are often available.

The plant-to-plant differences in PM_4 crystalline silica emission factors are primarily due to the crystalline silica content of the material being handled. As indicated in Figure 4, the bulk material crystalline silica content is responsible for most of the variance in the data. However, it is important to note that because of the small number of test values (three), it is not possible to demonstrate that the relationship between PM_4 crystalline silica emission factors and bulk crystalline silica content is significant at the 90% confidence level.

A less consistent relationship was observed for the conveyor transfer point tests. The reduced emission factor value for the Carroll Canyon plant (30.5% crystalline silica point) is probably due to the high aggregate throughput of this unit. It is theorized that at very high throughputs, some of the stone in the flowing material stream is shielded from attrition and, therefore, does not contribute to emissions. Despite this one test value, there appears to be a relationship between PM_4 crystalline silica emission factors and the crystalline silica content of the bulk material.

An alternative approach for summarizing the PM_4 crystalline silica concentrations is to compile average values for the datasets for the crushers, screens, and conveyor transfer points tested. Table 5 includes average values based on the data from the three plants provided in Tables 1–3.

Table 6 summarizes the crystalline silica fraction of the total PM_4. These data demonstrate that the crystalline silica content of the PM_4 material is considerably lower than the crystalline silica content measured in the bulk samples recovered from each unit tested. On the basis of an average of the tests at the three plants, the PM_4 crystalline silica content is 44% of the bulk material crystalline silica content. It is apparent that the crystalline silica content of the rock is not as prone to attrition size reduction as other constituents in the aggregate.

The process equipment PM_4 crystalline silica emission factors summarized in Tables 1–6 are consistent with previously published emission factors for $PM_{2.5}$ and PM_{10} from similar process units. The PM_4 crystalline silica emission factors are intended for use as input data to dispersion models to evaluate annual average PM_4 concentrations at plant fence lines.

Ambient PM_4 Crystalline Silica Concentrations

Ambient concentrations of PM_4 crystalline silica were measured during 3 consecutive 24-hr periods at the

Table 5. Average emission factors from Barstow, Carroll Canyon, and Vernalis: combined dataset.

Source	Analyte	Emissions (lb/t)
Vibrating screen	PM_{10}	0.00090 PM10 cs = 0.00009 lb/t
	PM_4	0.00044
	PM_4 crystalline silica	0.000044 PM4 cs = 10% of PM4
Crusher	PM_{10}	0.00183 PM10 cs = 0.0002 lb/t
	PM_4	0.00088
	PM_4 crystalline silica	0.000097 PM4 cs = 11% of PM4
Conveyor transfer point	PM_{10}	0.00073
	PM_4	0.00035
	PM_4 crystalline silica	0.000048

Table 6. Crystalline silica fraction of PM_4 PM.

Plant	Source	Crystalline Silica Content (percent weight of total PM_4)	Crystalline Silica Content (percent weight of material samples)
Barstow	Screen	7.5	17.7
	Crusher	6.5	16.5
	Conveyor transfer point	8.3	18.7
	Average	6.9	17.3
Carroll Canyon	Screen	12.5	30.5
	Crusher	15.4	30.4
	Conveyor transfer point	12.8	30.6
	Average	13.6	30.5
Vernalis	Screen	9.6	35.3
	Crusher	21.9	33.9
	Conveyor transfer point	18.4	33.8
	Average	16.6	34.3

Carroll Canyon and Vernalis plants. Two collocated TECO FRM samplers modified for PM_4 crystalline silica measurement operated at a location downwind of the quarry and processing equipment. A single TECO FRM instrument for PM_4 crystalline silica monitoring operated at a location upwind of the entire facility being tested. Meteorological monitoring stations were placed at the upwind and downwind locations. The results of the ambient monitoring tests demonstrated that the plants operated at levels well below the 3-$\mu g/m^3$ REL value. Tables 7 and 8 summarize the results for the Carroll Canyon and Vernalis plants, respectively.

The differences between the upwind and downwind ambient PM_4 crystalline silica concentrations are small. The slightly higher upwind values observed during several of the test days are due to emissions from unpaved roads near the upwind monitoring sites.

Quality Assurance/Quality Control Procedures for PM_4 and PM_{10} Sampling

All of the PM_4 crystalline silica concentration tests conducted with modified Appendix L samplers included quality assurance (QA)/quality control (QC) procedures established by EPA for IO-1.3 (TEOMs) and 40 CFR Part 50, Appendix L (TECO FRM 2000s). The QA/QC data indicated that the TECO PM_4 samplers, the TECO PM_{10} samplers, and the TECO TEOM monitor used for PM_4 and PM_{10} monitoring performed extremely well throughout the three test programs.

All of the PM_4 concentration samplers used for emission factor testing and ambient air monitoring met all of the pre- and post-test requirements concerning filter temperature, ambient temperature, barometric pressure, sample flow, and sample gas stream leak rates.

A TEOM monitor was used during the tests at Barstow for the emission factor tests of the tertiary crusher, the vibrating screen, and the conveyor transfer point. The TEOM monitor satisfied the pre- and post-test QA requirements concerning ambient temperature, barometric pressure, sample flow, and sample gas stream leak rates.

SUMMARY

PM_4 crystalline silica emission factors measured using an Appendix L-based filter sampler ranged from 0.000006 to 0.000110 lb/t of stone processed in vibrating screens, tertiary crushers, and conveyor transfer points. The measured PM_4 crystalline silica emissions ranged from 3.21 to 7.95% of the simultaneously measured PM_{10} emission factors. The PM_4 crystalline silica emissions measured in this study appeared to be related to the crystalline silica content of the mineral being handled. The concentration of crystalline silica in PM_4 PM averaged 44% of the crystalline silica content of the bulk mineral.

Ambient concentrations of PM_4 crystalline silica were measured upwind and downwind of the facilities during the emission factor test programs. The measured ambient concentrations of PM_4 crystalline silica ranged from below the detectable limit of 0.3 $\mu g/m^3$ to 2.8 $\mu g/m^3$. These concentrations are well below the California REL of 3 $\mu g/m^3$.

Table 7. Plant upwind-downwind ambient monitoring at Carroll Canyon.

	PM_4 Crystalline Silica ($\mu g/m^3$)		
Date	Upwind	Downwind (primary)	Downwind (collocated)
September 17	1.3	1.1	1.0
September 18	1.4	0.7	0.8
September 19	0.6	0.5	0.4

Table 8. Plant upwind-downwind ambient monitoring at Vernalis.

	PM_4 Crystalline Silica ($\mu g/m^3$)		
Date	Upwind	Downwind (primary)	Downwind (collocated)
September 24	0.8	0.6	0.9
September 25	2.8	0.9	0.8
September 26	2.5	0.0	1.2

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About the Authors

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MATERIAL SAFETY DATA SHEET

tion 1: Product & Company Identification

Product Name: **Brakleen® Brake Parts Cleaner - Non-Chlorinated**
Product Number (s): 05084

Manufactured By: CRC Industries, Inc. (215) 674-4300
885 Louis Drive, Warminster, PA 18974
24-Hour Emergency Information: CHEMTREC (800) 424-9300

Section 2: Composition/Information on Ingredients

Component	CAS NUMBER	ACGIH TLV	OSHA PEL	OTHER LIMITS	%
Toluene	108-88-3	100 ppm	100 ppm	NE	22-32
Methanol	67-56-1	200 ppm	200 ppm	NE	15-25
Acetone	67-64-1	750 ppm	750 ppm	NE	38-48
Carbon Dioxide	124-38-9	5000 ppm	10000 ppm	NE	< 10

Section 3: Hazards Identification

Emergency Overview

Appearance & Odor: Clear, water-white liquid.

Danger: Extremely Flammable. Vapor Harmful. Harmful or Fatal if Swallowed. May be fatal or cause blindness if swallowed Eye and skin irritant. Contents Under Pressure.

Potential Health Effects:
Inhalation: Dizziness, breathing difficulties, anesthetic effects, nausea and irritation to respiratory tract.
Eyes: Irritation
Skin: Irritation, defatting
Ingestion: NA
Carcinogenicity: OSHA: No IARC: No NTP: No
Chronic Overexposure: Contact dermatitis. Chronic overexposure may cause nervous system damage.
Medical Conditions Aggravated by Exposure: Breathing problems.

Section 4: First Aid Measures

Inhalation:	Remove to fresh air. Give artificial respiration if necessary.
Eyes:	Flush with large amounts of water for 15 minutes.
Skin:	Remove contaminated clothing and wash area with soap and water.
Ingestion:	Call a physician. Do not induce vomiting.

Section 5: Fire-Fighting Measures

shpoint: < 0°F Method: TCC LEL: 1.0 UEL: 13.0

Extinguishing Media: CO_2, foam and fog

Hazardous Combustion Products: CO_2, carbon monoxide

Fire-fighting Instructions: Remove containers from fire area if possible. Use self-contained breathing apparatus for fire fighting. Aerosol cans may explode if heated above 120°F.

NFPA:	Health:	2	Flammability:	4	Reactivity:	0		
HMIS:	Health:	2	Flammability:	4	Reactivity:	0	PPE:	B

Section 6: Accidental Release Measures

Spill/Leak Procedures: Usually not a problem with aerosols. Area should be ventilated. Absorbent should be used to pick up excess material. All used and unused product should be disposed of in accordance with federal, state and local regulations.

Section 7: Handling and Storage

Handling Procedures: Store in a cool, dry area. Aerosol cans must be maintained below 120°F to prevent cans from exploding.

Section 8: Exposure Controls/Personal Protection

Engineering Controls: Adequate to prevent accumulation of vapors. Use mechanical means if necessary to maintain levels below the exposure limits. If working in a confined space, follow applicable OSHA regulations.

Respiratory: Use NIOSH/MSHA compliant respirators or self-contained breathing apparatus above exposure limits. Follow OSHA regulations 29 CFR 1910.134.

Protective Clothing/Equipment: Wear chemically protective gloves and safety glasses. Use a splash apron and boots if splashing occurs.

Section 9: Physical & Chemical Properties

Physical State:	Liquid	Appearance & Odor:	Clear, water-white liquid
Specific Gravity:	0.815	Boiling Point:	131°F (initial)
Freezing Point:	ND	Vapor Pressure:	ND
Evaporation Rate:	fast	Vapor Density (air = 1)	ND
pH:	NA	Solubility:	Partially soluble in water. Soluble in most organic liquids.
			lbs./gal: 3.36

Volatile Organic Compounds:%: 49.7 g/L: 402

Section 10: Stability and Reactivity

Stability:	Stable
Chemical Incompatibilities:	Strong oxidizers.
Materials to Avoid:	Strong oxidizing agents and sources of ignition.
Hazardous Decomposition Products:	None

Hazardous Polymerization: No

Section 11: Toxicological Information

Long-term toxicological studies have not been conducted for this product. See Section 3 of this MSDS for acute symptoms of overexposure and carcinogenicity information.

Section 12: Ecological Information

Ecotoxicity: No data available.
Environmental Fate: No data available for biodegradation.

Section 13: Disposal Considerations

Disposal: This material if discarded may be hazardous waste under U.S. EPA RCRA regulations. All disposal activities must comply with federal, state and local regulations. Contact your local or state environmental agency for specific rules. Do not dump into sewers, on the ground or into any body of water.

Section 14: Transportation Information

Shipping Name: Consumer Commodity
Hazard Class: ORM-D
Label: NA
Special Provisions: NA
UN Number: NA
Placard: NA
Packing Group: NA

Section 15: Regulatory Information

TSCA: All components are either listed under TSCA or are exempt.
SARA Title III: Section 311/312: Acute, Pressure
Section 313*: Toluene, Methanol
CERCLA/Superfund (RQ): Mixture
Extremely Hazardous Substances: No
California Prop 65: This product contains chemicals known to the State of California to cause cancer, birth defects and other reproductive harm.

* See section 2 for percentage

Section 16: Additional Information

Prepared By: Adam M. Selisker
Date: February 18, 1999
Technical Information: (800) 521-3168
CRC #: 594J

This information is accurate to the best of CRC Industries' knowledge or obtained from sources believed by CRC to be accurate. Before using any product, read all warnings and directions on the label.

CAS:	Chemical Abstract Service	NA:	Not Applicable
ppm:	Parts per Million	ND:	Not Determined
TCC:	Tag Closed Cup	NE:	Not Established
LEL:	Lower Exposure Limit	g/L:	grams per Liter
UEL:	Upper Exposure Limit	lbs./gal:	pounds per gallon
PPE:	Personal Protection Equipment	RQ:	Reportable Quantity
COC:	Cleveland Closed Cup		

AIRx Testing Services, Inc.

Dates Tested:	June 2-3-7, 2021
Dates Tested:	July13-14-15, 2021
Date Issued:	August 19, 2021
Revision Number:	0

SOURCE EMISSION TEST REPORT
ALL AMERICAN ASPHALT
IRVINE ASPHALT PLANT
ONE (1) ROTARY DRYER BAGHOUSE

Facility No. 082207
Application No. 514969

Source Location:
ALL AMERICAN ASPHALT
10600 Jeffrey Road
Irvine, California 92602

Submitted to:
ALL AMERICAN ASPHALT
P.O. Box 2229
Corona, California 91719

Attention: John Gardner

For Submittal to:
South Coast Air Quality Management District
21854 Copley Drive
Diamond Bar, California 91765-4178

Prepared By:
AIRx Testing Services, Inc.
2472 Eastman Avenue Unit #34
Ventura, CA 93003

Job Number
1064

Laboratory Report Number
221-061

Test Team Leader
Ken Kennepohl

Tom Porter

Tom Porter, Vice President of Testing Services

Ken Kennepohl, Project Engineer

TABLE OF CONTENTS

1.0 SUMMARY

Source Tested:	All American Asphalt Rotary Dryer Baghouse - Asphalt Plant
Test Location:	All American Asphalt 10600 Jeffrey Road Irvine, California
Test Requested by:	SCAQMD
Test Objectives	Determine for reporting: Health Risk Assessment.
Test Performed by:	AIRx Testing Services, Inc.
Personnel:	Ken Kennepohl, Wesley Hart & Ferodie Torres
Test Methodology:	O2 & CO2: SCAQMD Method 100.1 Multiple Metals: CARB Method 436 Toxic Organics: EPA TO-15 PAHs: CARB Method 429 Total & Hexavalent Chromium: CARB Method 425 Formaldehyde/ Acetaldehyde: EPA 0011
Test Observed by:	--
Plant Contact:	John Gardner
Facility ID Number:	082207
SCAQMD Application Number:	514969
SCAQMD Permit Number:	N/A

2.0 INTRODUCTION

Air pollutant emissions from stationary sources in the Los Angeles Basin (Los Angeles, Orange, Riverside and the non-desert portion of San Bernardino County) are regulated by the South Coast Air Quality Management District (SCAQMD). AIRx Testing Services, Inc. was contracted by All American Asphalt to conduct source emission testing to determine emission factors for the facility Health Risk Assessment. The rotary dryer baghouse exhaust testing was conducted for Formaldehyde, Acetaldehyde, PAHs, Total chromium, Hexavalent Chromium, Multiple Metals, Toxic Organics, Exhaust Flow Rate, O2 and CO2.

Source testing was conducted by an AIRx Testing Services team on June 2-7, 2021, July 13-15, 2021 to measure gaseous emissions from one (1) baghouse attached to a natural gas fired rotary drier. Testing was conducted while operating at a normal load condition.

AIRx personnel directly involved with this test program were Ryan Yanagihara, Ferodie Torres, Ken Kennepohl and Wesley Hart. The contact for All American Asphalt for this project was John Gardner.

The baghouse is equipped with a round stack 62.5" in diameter. The two, 4-inch female sample ports are located 0.6 diameters upstream and 3.0 downstream from a flow disturbance. Two (2) female sample ports was accessed from a platform around the stack circumference. A total of 24 traverse points (12 per port) were utilized used for the flow rate and concentration sampling. A stack diagram with traverse points is included in the attachments.

The Rotary Dryer fuel usage was recorded every 30 minutes for all test runs. Plant production in tons per hour was recorded for every 30 minutes during all testing. Results for all detected pollutants will be reported in concentration (ppmv or ppbv), pounds per hour (lb/hr), pounds per ton of produced asphalt (lb/ton) and pounds per million cubic feet of natural gas burned (lb/MMcf gas).

The dryer (A/N 514969) is identified as follows:

Rotary Dryer; Astec Double Barrel Dryer with a low NOx burner; an Astec Phoenix Phantom, Model PP-125; rated at 125 MMBtu/hr, Natural gas fired.

3.0 PROCESS DESCRIPTION

The facility produces asphalt by using virgin aggregate material and RAP material. The testing was conducted. While the plant was producing mix [redacted] The plant was producing mix that includes asphalt binder which has a range of [redacted].

The particulate is controlled with a fabric baghouse attached to the Astec rotary dryer exhaust. The subject test will determine the mass emissions of the required pollutants from the existing exhaust stack.

COMMENTS:

The baghouse is equipped with a round stack 62.5" in diameter. The two, 4-inch female sample ports are located 0.6 diameters upstream and 3.0 downstream from a flow disturbance. Two (2) female sample ports was accessed from a platform around the stack circumference. A total of 24 traverse points (12 per port) were utilized used for the flow rate and concentration sampling. A stack diagram with traverse points is included in the attachments.

The Rotary Dryer fuel usage and plant production in tons per hour was recorded every 30 minutes for all test runs. Results for all detected pollutants are reported in concentration (ppmv or ppbv), pounds per hour (lb/hr), pounds per ton of produced asphalt (lb/ton) and pounds per million BTU.

4.0 TEST PROCEDURES

Formaldehyde & Acetaldehyde CARB Method 430/EPA Method 0011/SW846:

Aldehyde concentrations were determined in triplicate according to a Modified CARB Method 430/EPA Method 0011/SW846. Sampling was conducted isokinetically for 120 minutes. Three (3) test runs were sampled. The sample train consists of a glass nozzle, a glass probe attached to three (3) full sized impingers, each containing approximately 100 ml of fresh acidic DNPH solution. (NOTE: The third impinger, with the appropriate solutions, is added to avoid possible formaldehyde breakthrough). The 12" transfer Teflon line to the impingers is not heated as the entire line is rinsed into the first impinger after the end of each test run.

The acidic DNPH solution was supplied by Atmospheric Analysis and Consulting (AAC) of Ventura, California and was used within 48 hours after preparation.

Four (4) DNPH reagent blanks were analyzed for contamination prior to use in the field as per Section 3, page 4 of CARB Method 430. As per Section 4.2.2 the sample/field blank ratio shall be equal to or greater than five (5) as calculated per Section 11.9.

The samples were kept on ice and then returned to the laboratory for recovery and delivery to AAC for analysis by HPLC with a UV detection system. The recovered samples and field blanks were kept refrigerated or kept on ice prior delivery to AAC. The samples were delivered to AAC within 24-48 hours after the sampling. As per the method the samples were extracted within seven (7) days and the extract analyzed within 30 days

The appropriate field blanks were submitted for analysis along with the samples. Each impinger was weighed prior to submission for analysis. Each impinger was analyzed separately as per Section 8.4 – Analytical procedures (Warning #2) and the results are reported in ug/sample. The resulting concentrations (ug/dscm) from each analysis are added together to obtain the total weight of the aldehydes for each test run. The final results are reported in ppmv, lb/hr and lb/MMBtu.

The following procedures are to be followed for Modified Method 430 (with the addition of toluene) /EPA Method 0011/SW846:

i. Fields Blanks: Taken by AIRx. Three (3) field blanks were taken by using Teflon tubing the same length as our sample line attached to one (1) impinger. Two (2) ml of DNPH is entered in to the tubing followed by one (1) ml of DI water. The vials are capped and labeled as field blanks 1-3. A spiked field blank will be taken for Acrolein by adding a known amount of Acrolein to an empty vial in the laboratory and the DNPH will be added in the field and then recovered as a field blank.

ii: Matrix Spike: The first impinger from one (1) of the runs was spiked with a know amount of acrolein prior to delivery to the field. The DNPH and the Toluene is added in the field.. The results are reported as percent recovery with the difference being the amount in the gas stream.

TEST METHODOLOGY (cont)

Formaldehyde & Acetaldehyde CARB Method 430 EPA Method 0011/SW846/ (cont):

i: Reagent Blank: Conducted by AAC in house. An analysis is conducted on the DNPH solution returning from the field.
ii: Laboratory Spikes: Conducted by AAC in house. One (1) 10 ml portion of the DNPH solution returning from the field will be spiked with the three (3) constituents and the percent recovery reported.
iii: The QA on the stock DNPH solution: Conducted by AAC in house. Four (4) samples of the fresh DNPH solution will be analyzed prior to delivery to AIRx. The values have been reported in the final report.

NOTE: The Modified CARB 430/EPA Method 011/8315 is being utilized due to prior discussions with the SCAQMD on an identical asphalt plant process. The modification in sampling replaces the midget impingers with full sized impingers, but includes the QA/QC procedures required by CARB Method 430.

Three (3) 120 minute isokinetic samples were taken from the exhaust stack.

TEST METHODOLOGY (cont)

Total & Hexavalent Chromium CARB Method 425:

California Air Resources Board Method 425 was used to determine the emission rates of total and hexavalent chromium. The sample train consists of a glass nozzle, a glass probe and a flexible Teflon line followed by four impingers in series. The first two (2) impingers are Greenberg-Smith type and contain 100 ml of sodium bicarbonate ($NaHCO3$) solution. The third impinger is a modified type and is empty. A 47-millimeter, Teflon Coated glass fiber filter is placed between the third and fourth impingers. The fourth impinger contains approximately 200 grams of Silica Gel desiccant.

The samples were collected isokinetically for three (3) 360 minutes (6 hours) runs by using 24 traverse points. The impinger solutions was checked for sufficiently high pH (>8) upon recovery.

As directed in Section 13.3.2 of CARB Method 425 (Lower Concentrations), the sample train was recovered as follows:

The probe and nozzle rinse was placed into container #1. The contents of impinger #1 and rinses was placed into container #2. Impinger #2 solution and rinses were placed into container #3. The 47mm filter were placed into container #2. The resulting samples were refrigerated until delivery to Atmospheric Analysis and Consulting (AAC) in Ventura. AAC subbed the analyses to Chester Labnet located in Tigard Oregon.

The three (3) fractions were each analyzed for total and hexavalent Chromium. Analysis for Hexavalent Chromium was performed using ion chromatography.

A schematic of the CARB Method 425 train is provided in the attachments.

NOTE: Prior to use of the sample train, the probe was prewashed with the NaHCO3 solution. A sample of the probe prewash will be submitted to the laboratory for Hexavalent Chromium analysis to assure the absence of Hexavalent Chromium.

As per CARB Method 425, section 21.2 "Alternative Test Methods", NaHCO3 impinger solution may be utilized provided that at all times during sampling and transport of samples, the pH of the impinger solutions shall be maintained above a pH of 8.0 as determined by the use of a clean rod and color indicating paper for pH. This alternative is highly recommended by the analytical laboratory (AAC).

NOTE: The stack moisture was determined gravimetrically using the CARB Method 425 sample train. The four (4) impingers were pre-weighed prior to the sampling and then reweighed after completion of the sampling.

TEST METHODOLOGY (cont)

Total & Hexavalent Chromium CARB Method 425 (cont):

California Air Resources Board Method 425 requires pretest calculations to determine the minimum sample volume and sampling duration to meet the detection limits necessary to demonstrate compliance with applicable standards.

1) Section 3.4.2; Equation 425.2 – Reporting Limit (RL)

RL = LOD*220 = 0.2 ng/ml*220 ml = 44 ng

2) Section 3.5.2; Equation 425.3 – Minimum Sample Volume

MSV = RL*1/STC = 44*1/10ng/dscm = 4.4 dscm (155 cfm)

3) Section 3.5.3; Equation 425.4 – Minimum Sampling Time (MST)

MST = MSV/VSR = 4.4/45 dscf/hr or 1.27 dscm/hr = 3.5 hr

4) Section 3.5.4; Equation 425.6 – Planned Sample Volume (PSV)

PSV = PST*VSR = 8*1.0 = 8.0 dscm (282 cf)

Section 3.5.6 Equation 425-8 – Source Reporting Limit (SRL)

SRL = RL/PSV = 44/8.0 = 5.5 ng/dscm = 0.0055 mg/dscm

A blank train was prepared, transported to the site, recovered and analyzed in the same manner as the actual sample trains. All requirements established in CARB Method 425 will be adhered to.

All analyses conforms to the requirements of CARB Method 425 and all applicable QA/QC measures included in the final report.

TEST METHODOLOGY (cont)

Multiple Metals, CARB Method 436:

The Multiple Metals (Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Cobalt, Copper, Lead, Manganese, Mercury, Nickel, Phosphorous, Selenium, Silver, Thallium, Vanadium and Zinc) has been reported as pounds per hour. The sampling was conducted according to CARB Method 436, a description of which can be found in the Attachments. Three (3) 480 minute isokinetic samples were taken from the exhaust stack. The Multiple Metals samples were refrigerated until delivery to Atmospheric Analysis and Consulting (AAC) in Ventura. AAC has subbed the analyses to Chester Labnet located in Tigard Oregon.

The Multiple Metals sampling train consists of a glass nozzle, heated probe, heated filter, a series of six impingers immersed in an ice bath and a silica gel impinger.

The following system was used for the condensation and collection of gaseous metals and for determining the moisture content of the stack gas:

The impinger train consisted of six (6) impingers. Impingers are connected in series with leak-free ground glass fittings or other leak-free, non-contaminating fittings and immersed in an ice bath. The first impinger is utilized as a water knockout trap for use during test conditions where high stack gas moisture content might result in considerable dilution of the impinger solutions.

The impingers used in the metals train are described as follows:

The first impinger was used as a water knockout, it was of the Greenburg-Smith design modified to have either a short or long stem, appropriately sized for the expected moisture catch and installed empty. The second impinger was of the Greenburg-Smith design modified to have a long stem as described for the first impinger in ARB Method 5, Section 2.1.7 and contain 100 ml of 5%HNO/10% H2O2 solution. The third impinger (or the impinger used as the second HNO/H2O2 impinger) was of the Greenburg-Smith design with the standard tip as described for the second impinger in ARB Method 5, Paragraph 2.1.7 and contain 100 ml of 5%HNO/10% H2O2 solution. The fourth impinger was installed empty and was of the Greenburg-Smith design modified to have a short stem. The function of the fourth impinger was to prevent commingling of the solution in the second and third impingers with the solution in the fifth and sixth impingers. The fifth and sixth impingers was of the Greenburg-Smith design modified to have a long stem and shall each contain 100 ml of acidic potassium permanganate (4% KMnO4/10%4H2SO4) solution. A thermometer capable of measuring to within 1C (2F) was placed at the outlet of the last impinger

TEST METHODOLOGY (cont)

Toxic Organics, EPA Method TO-15:

The toxic organics were sampled in duplicate from the dryer outlet for each of the three (3) 60 minute test runs. Summa passivated canisters were utilized to sample for the toxic organics. The Summa canisters were equipped with preset calibrated mass flow controllers. The sampling was integrated over each 60 minute test run. The samples were submitted to Atmospheric Analysis and Consulting (AAC) for analyses by GC/MS (TO-15).

The analyses followed EPA Method TO-15 methodology. The reported detection limit is 0.001 ppmv or 1 ppbv. The sample is cryogenically pre-concentrated in a series of multi-bed traps, with water and CO2 management protocols, and finally cryofocused before desorption into the gas chromatograph.

Upon separation in the Gas Chromatograph, the sample is introduced into the mass spectrometer. The HAPs characteristic retention time and mass spectra qualitatively identify compounds. The results have been reported in ppbv, lb/hr and lbs/ton of asphalt.

TEST METHODOLOGY (cont)

PAH's, CARB Method 429:

PAH's concentrations were determined in triplicate according CARB Method 429. Sampling was conducted isokinetically for 480 minutes. The sample train consists of a quartz sample probe with the appropriate nozzle, an "s" type pitot tube, a Teflon filter, a spiral condenser, a spiked sorbent module, two (2) preweighed Greensburg-Smith impingers containing 100 ml of 3mM Sodium bicarbonate/2.4 mM Sodium Carbonate, a third dry preweighed impinger and a fourth preweighed impinger containing silica get

The samples were sealed and returned to the laboratory for recovery. The recovery includes rinsing the nozzle, probe and top half of the filter holder three (3) times with acetone, hexane and methylene chloride with the rinses placed into a glass container labeled as "Front half rinses'. The filter is removed from holder and placed into a petri dish. The bottom half of the filter holder, connector connection and the spiral condenser is rinsed three (3) times with acetone, hexane and methylene chloride with the rinses placed into a glass container labeled as "Back half rinses". The rinses may be combined with the "front half rinses" container. The impingers are reweighed then the solution transferred to a container labeled "Impinger contents". The impingers are then rinsed three (3) times with acetone, hexane and methylene chloride with the rinses placed into a glass container labeled as "Impinger rinses". The rinses may be combined with the container labeled as "Impinger contents". The silica get impinger is reweighed. The field blank will be recovered and submitted for analysis along with the samples.

The cleaned XAD resin and filters were supplied by VISTA Analytical located in El Dorado Hill. The samples sent to VISTA Analytical for analysis according to procedures outlined in CARB Method 429.

TEST METHODOLOGY (cont)

Stack Gas Oxygen, Carbon Dioxide, SCAQMD Method 100.1:

The CEM sampling system consists of a stainless steel probe, a heated Teflon sample line and a sample gas conditioner that cools the gas to <60°F entering a gas conditioner prior to distribution to the analyzers. The conditioner dries the gas to <37°F. The stack gas was extracted from the stack with a pump into the sample gas conditioner and transported under positive pressure to the flowpanel, which distributes the dry conditioned gas to the appropriate analyzers. A traverse was conducted on the exhaust stack to determine the presence or absence of stratification of a pollutant. A bias (probe tip) check was made at the beginning and end of each run to determine sample system integrity. EPA Protocol calibration gases was used for calibrating the analyzers. The stack was initially traversed using the sampling utilizing half the number of points dictated for a particulate traverse to determine the presence of stratification. No stratification was observed (<10% of average) thus a single representative sample point will be utilized. Data was continuously collected with a DAS and on a 10" strip chart recorder.

5.0 TEST RESULTS AND DISCUSSION

A summary of the emissions results has been provided on pages 5-2 thru 5-13

REPLACEMENT PAGES After Recalculation

POLYCYCLIC AROMATIC HYDROCARBONS (PAH) SUMMARY

CARB 429

Client : All American Asphalt
Site : Irvine, CA
Unit : Baghouse

T std: 60 °F

Date : 6/2 - 6/7
Job #: 1064
Lab #: 221-061

RESULTS in lb/hr

Compound Name	RUN # 1	RUN # 2	RUN # 3	AVERAGE
Acenaphthene	0.000065	0.00014	0.000034	**0.000079**
Acenaphthylene	0.00033	0.00049	0.00016	**0.00033**
Anthracene	0.0000059	0.000015	0.0000053	**0.0000089**
Benz(a)anthracene	0.00000013	< 0.000000099	< 0.000000091	**0.00000011**
Benzo(a)pyrene	< 0.000000102	< 0.000000099	< 0.000000091	**< 0.000000097**
Benzo(e)pyrene	< 0.000000102	< 0.000000099	< 0.000000091	**< 0.000000097**
Benzo(b)fluoranthene	0.00000011	< 0.000000099	< 0.000000091	**< 0.00000010**
Benzo(g,h,i)perylene	< 0.000000102	< 0.000000099	< 0.000000091	**< 0.000000097**
Benzo(k)fluoranthene	< 0.000000102	< 0.000000099	< 0.000000091	**< 0.000000097**
Chrysene	0.00000071	0.00000029	0.00000032	**0.00000044**
Dibenz(a,h)anthracene	< 0.000000102	< 0.000000099	< 0.000000091	**< 0.000000097**
Fluoranthene	0.0000050	0.0000049	0.0000024	**0.0000041**
Fluorene	0.000079	0.00017	0.000045	**0.000098**
Indeno(1,2,3-cd)pyrene	0.000000102	0.000000099	0.000000091	0.000000097
2-Methylnaphthalene	0.0015	0.0026	0.00092	**0.0017**
Naphthalene	0.0054	0.0062	0.0031	**0.0049**
Perylene	< 0.000000102	< 0.000000099	< 0.000000091	**< 0.000000097**
Phenanthrene	0.00010	0.00017	0.000068	**0.00011**
Pyrene	0.0000049	0.0000047	0.0000020	**0.0000039**

RESULTS in lb/ton

Compound Name	RUN # 1	RUN # 2	RUN # 3	AVERAGE
Acenaphthene	[redacted]	[redacted]	[redacted]	[redacted]
Acenaphthylene	[redacted]	[redacted]	[redacted]	[redacted]
Anthracene	[redacted]	[redacted]	[redacted]	[redacted]
Benz(a)anthracene	[redacted]	[redacted]	[redacted]	[redacted]
Benzo(a)pyrene	[redacted]	[redacted]	[redacted]	[redacted]
Benzo(e)pyrene	[redacted]	[redacted]	[redacted]	[redacted]
Benzo(b)fluoranthene	[redacted]	[redacted]	[redacted]	[redacted]
Benzo(g,h,i)perylene	[redacted]	[redacted]	[redacted]	[redacted]
Benzo(k)fluoranthene	[redacted]	[redacted]	[redacted]	[redacted]
Chrysene	[redacted]	[redacted]	[redacted]	[redacted]
Dibenz(a,h)anthracene	[redacted]	[redacted]	[redacted]	[redacted]
Fluoranthene	[redacted]	[redacted]	[redacted]	[redacted]
Fluorene	[redacted]	[redacted]	[redacted]	[redacted]
Indeno(1,2,3-cd)pyrene	[redacted]	[redacted]	[redacted]	[redacted]
2-Methylnaphthalene	[redacted]	[redacted]	[redacted]	[redacted]
Naphthalene	[redacted]	[redacted]	[redacted]	[redacted]
Perylene	[redacted]	[redacted]	[redacted]	[redacted]
Phenanthrene	[redacted]	[redacted]	[redacted]	[redacted]
Pyrene	[redacted]	[redacted]	[redacted]	[redacted]

RESULTS in lb/MMBtu

Compound Name	RUN # 1	2	3	AVERAGE
Acenaphthene	0.000013	0.0000028	0.00000068	**0.0000054**
Acenaphthylene	0.0000064	0.0000098	0.0000033	**0.0000065**
Anthracene	0.00000012	0.00000031	0.00000011	**0.00000018**
Benz(a)anthracene	0.0000000026	< 0.0000000020	< 0.0000000019	**0.0000000021**
Benzo(a)pyrene	< 0.0000000020	< 0.0000000020	< 0.0000000019	**< 0.0000000020**
Benzo(e)pyrene	< 0.0000000020	< 0.0000000020	< 0.0000000019	**< 0.0000000020**
Benzo(b)fluoranthene	0.0000000021	< 0.0000000020	< 0.0000000019	**0.0000000020**
Benzo(g,h,i)perylene	< 0.0000000020	< 0.0000000020	< 0.0000000019	**< 0.0000000020**
Benzo(k)fluoranthene	< 0.0000000020	< 0.0000000020	< 0.0000000019	**< 0.0000000020**
Chrysene	0.000000014	0.0000000058	0.0000000066	**0.0000000088**
Dibenz(a,h)anthracene	< 0.0000000020	< 0.0000000020	< 0.0000000019	**< 0.0000000020**
Fluoranthene	0.000000099	0.000000098	0.000000049	**0.000000082**
Fluorene	0.0000016	0.0000033	0.00000092	**0.0000019**
Indeno(1,2,3-cd)pyrene	< 0.0000000020	< 0.0000000020	< 0.0000000019	**< 0.0000000020**
2-Methylnaphthalene	0.000028	0.000051	0.000019	**0.000033**
Naphthalene	0.00011	0.00012	0.000062	**0.000097**
Perylene	< 0.0000000020	< 0.0000000020	< 0.0000000019	**< 0.0000000020**
Phenanthrene	0.0000021	0.0000033	0.0000014	**0.0000023**
Pyrene	0.000000096	0.000000093	0.000000042	**0.000000077**

ALL AMERICAN ASPHALT IRVINE 221-061
CALCULATED EMISSION RESULTS CARB METHOD 436

	Run 1	Run 2	Run 3	Average (3 Runs)
Aluminum Weight (g)	0.00248	0.00227	0.00142	0.00206
Aluminum Emissions (grain/Dscf)	0.000092	0.000095	0.000057	0.000081
Aluminum Flow Rate (lb/hr)	0.018	0.019	0.012	0.016
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Aluminum (lb/mmbtu)	0.000360	0.000379	0.000226	0.000322
Antimony Weight (g)	< 0.00000113	< 0.00000113	< 0.00000587	<0.00000271
Antimony Emissions (grain/Dscf)	< 0.000000042	< 0.000000047	< 0.00000024	<0.00000011
Antimony Flow Rate (lb/hr)	< 0.0000083	< 0.0000096	< 0.000049	< 0.000022
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Antimony (lb/mmbtu)	< 0.00000016	< 0.00000019	< 0.00000093	<0.00000043
Arsenic Weight (g)	< 0.00000158	< 0.00000158	< 0.00000158	<0.00000158
Arsenic Emissions (grain/Dscf)	< 0.000000058	< 0.000000066	< 0.000000063	< 0.000000063
Arsenic Flow Rate (lb/hr)	< 0.0000116	< 0.0000134	< 0.0000131	< 0.0000127
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Arsenic (lb/mmbtu)	< 0.00000023	< 0.00000026	< 0.00000025	<0.00000025
Barium Weight (g)	0.0000246	0.0000239	0.0000173	0.0000219
Barium Emissions (grain/Dscf)	0.00000091	0.00000100	0.00000070	0.00000087
Barium Flow Rate (lb/hr)	0.00018	0.00020	0.00014	0.00018
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Barium (lb/mmbtu)	0.00000358	0.00000399	0.00000275	0.00000344
Beryllium Weight (g)	< 0.000000045	< 0.000000045	< 0.000000045	< 0.000000045
Beryllium Emissions (grain/Dscf)	< 0.0000000017	< 0.0000000019	< 0.0000000018	< 0.0000000018
Beryllium Flow Rate (lb/hr)	< 0.00000033	< 0.00000038	< 0.00000037	<0.00000036
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Beryllium (lb/mmbtu)	< 0.0000000065	< 0.0000000075	< 0.0000000071	< 0.0000000071
Cadmium Weight (g)	0.00000068	0.00000126	0.00000090	0.000000946
Cadmium Emissions (grain/Dscf)	0.000000025	0.000000053	0.000000036	0.000000038
Cadmium Flow Rate (lb/hr)	0.0000050	0.0000107	0.0000075	0.0000077
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Cadmium (lb/mmbtu)	0.000000098	0.000000210	0.000000143	0.000000150
Chromium Weight (g)	0.0000125	0.0000174	0.00000479	0.00001156
Chromium Emissions (grain/Dscf)	0.00000046	0.00000073	0.00000019	0.00000046
Chromium Flow Rate (lb/hr)	0.000092	0.000148	0.000040	0.000093
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Chromium (lb/mmbtu)	0.000001817	0.000002902	0.000000761	0.00000183
Cobalt Weight (g)	0.00000119	0.00000189	0.00000035	0.00000114
Cobalt Emissions (grain/Dscf)	0.000000044	0.000000079	0.000000014	0.000000046
Cobalt Flow Rate (lb/hr)	0.0000088	0.000016	0.0000029	0.0000093
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Cobalt (lb/mmbtu)	0.000000173	0.000000315	0.0000000554	0.000000181
Copper Weight (g)	0.0000117	0.0000414	0.00000585	0.00001965
Copper Emissions (grain/Dscf)	0.00000043	0.0000017	0.00000024	0.00000080
Copper Flow Rate (lb/hr)	0.000086	0.00035	0.000049	0.00016
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Copper (lb/mmbtu)	0.00000170	0.00000690	0.000000929	0.00000318
Lead Weight (g)	<0.00000113	<0.00000113	<0.00000113	<0.00000113
Lead Emissions (grain/Dscf)	<0.000000042	<0.000000047	<0.000000045	<0.000000045
Lead Flow Rate (lb/hr)	<0.0000083	<0.0000096	<0.0000093	<0.0000091
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Lead (lb/mmbtu)	<0.00000016	<0.00000019	<0.00000018	<0.00000018
Manganese Weight (g)	0.0000405	0.0000873	0.00001980	0.00004920
Manganese Emissions (grain/Dscf)	0.0000015	0.0000037	0.00000080	0.0000020
Manganese Flow Rate (lb/hr)	0.00030	0.00074	0.00016	0.00040
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Manganese (lb/mmbtu)	0.00000589	0.0000146	0.00000315	0.00000786

CALCULATED EMISSION RESULTS CARB METHOD 436 (Continued)

	Run 1	Run 2	Run 3	Average (3 Runs)
Mercury Weight (g)	< 0.0000074	< 0.0000062	< 0.0000054	<0.00000631
Mercury Emissions (grain/Dscf)	< 0.00000027	< 0.00000026	< 0.00000022	<0.00000025
Mercury Flow Rate (lb/hr)	< 0.000054	< 0.000053	< 0.000045	< 0.000051
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Mercury (lb/mmbtu)	< 0.0000011	< 0.0000010	< 0.00000086	<0.00000099
Nickel Weight (g)	0.0000296	0.0000404	0.0000085	0.0000262
Nickel Emissions (grain/Dscf)	0.0000011	0.0000017	0.00000034	0.0000010
Nickel Flow Rate (lb/hr)	0.00022	0.00034	0.000070	0.00021
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Nickel (lb/mmbtu)	0.00000430	0.00000674	0.00000134	0.00000413
Phosphorous Weight (g)	0.000113	0.000126	0.0000927	0.0001106
Phosphorous Emissions (grain/Dsc	0.0000042	0.0000053	0.0000037	0.0000044
Phosphorous Flow Rate (lb/hr)	0.00083	0.0011	0.00077	0.00089
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Phosphorous (lb/mmbtu)	0.0000164	0.0000210	0.0000147	0.0000174
Selenium Weight (g)	<0.0000034	< 0.0000034	< 0.0000034	<0.00000338
Selenium Emissions (grain/Dscf)	<0.00000013	<0.00000014	<0.00000014	<0.00000013
Selenium Flow Rate (lb/hr)	<0.000025	<0.000029	<0.000028	<0.000027
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Selenium (lb/mmbtu)	<0.00000049	<0.00000056	<0.00000054	<0.00000053
Silver Weight (g)	< 0.00000045	< 0.00000045	< 0.00000045	<0.00000045
Silver Emissions (grain/Dscf)	< 0.000000017	< 0.000000019	< 0.000000018	< 0.000000018
Silver Flow Rate (lb/hr)	< 0.000003322	< 0.000003835	< 0.000003732	< 0.000003629
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Silver (lb/mmbtu)	< 0.000000065	< 0.000000075	< 0.000000071	< 0.000000071
Thallium Weight (g)	< 0.00000225	< 0.0000023	<0.00000225	<0.00000225
Thallium Emissions (grain/Dscf)	< 0.000000083	< 0.000000094	< 0.000000091	<0.000000090
Thallium Flow Rate (lb/hr)	< 0.000017	< 0.000019	< 0.000019	< 0.000018
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Thallium (lb/mmbtu)	<0.00000033	<0.00000038	<0.00000036	<0.00000035
Vanadium Weight (g)	<0.0000061	< 0.0000069	<0.0000025	<0.00000516
Vanadium missions (grain/Dscf)	<0.00000023	<0.00000029	<0.000000099	<0.00000021
Vanadium Flow Rate (lb/hr)	<0.000045	<0.000059	<0.000020	<0.000041
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Vanadium (lb/mmbtu)	<0.00000088	<0.0000012	<0.00000039	<0.00000081
Zinc Weight (g)	0.000155	0.000169	0.0000701	0.0001314
Zinc Emissions (grain/Dscf)	0.0000058	0.0000071	0.0000028	0.0000052
Zinc Flow Rate (lb/hr)	0.0011	0.0014	0.00058	0.0011
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Zinc Flow (lb/mmbtu)	0.0000225	0.0000282	0.0000111	0.0000206

EPA TO-15 Average Results

Client : All American Asphalt
Site : Irvine, CA
Unit : Rotary Dryer Baghouse

T std: 60 °F
Run No.: 1 - 3

Test Date : 6/3/2021
Job #: 1064
Lab #: 221-061

Q std: [redacted] dscfm (Average)
Production Rate: TPH (Average)

Compound Name	lb/hr	lb/Ton	lb/Mmbtu	MW
Propene	**0.44**	[redacted]	**0.00874**	42.08
Chlorodifluoromethane	< 0.010	[redacted]	< 0.00020	86.47
Dichlorodifluoromethane	< 0.012	[redacted]	< 0.00024	102.92
Chloromethane	< 0.0061	[redacted]	< 0.00012	50.50
1,2 Dichloro-1,1,2,2-Tetrafluoroethane	< 0.021	[redacted]	< 0.00040	170.92
Vinyl Chloride	< 0.0075	[redacted]	< 0.00015	62.50
1,3-Butadiene	**0.080**	[redacted]	**0.00159**	54.09
Bromomethane	< 0.011	[redacted]	< 0.00022	94.94
Methanol	**0.085**	[redacted]	**0.00168**	32.04
Chloroethane	< 0.0077	[redacted]	< 0.00015	64.50
Dichlorofluoromethane	< 0.012	[redacted]	< 0.00024	102.92
Ethanol	**0.027**	[redacted]	**0.000542**	46.07
Vinyl Bromide	< 0.013	[redacted]	< 0.00025	106.96
Trichlorofluoromethane	< 0.015	[redacted]	< 0.00030	127.50
Acetone	**0.155**	[redacted]	**0.00305**	58.08
Isopropyl Alcohol	< 0.029	[redacted]	< 0.00057	60.10
Allyl Chloride	< 0.014	[redacted]	< 0.00028	76.53
1,1-Dichloroethene	< 0.014	[redacted]	< 0.00027	96.00
Acrylonitrile	< 0.025	[redacted]	< 0.00050	53.06
Methylene Chloride	< 0.024	[redacted]	< 0.00046	98.00
Carbon Disulfide	**0.038**	[redacted]	**0.000740**	76.14
1,1,2-Trichloro-1,2,2-Trifluoroethane	< 0.022	[redacted]	< 0.00044	187.40
trans-1,2- Dichloroethene	< 0.012	[redacted]	< 0.00023	96.94
1,1- Dichloroethane	< 0.012	[redacted]	< 0.00023	98.00
MTBE	< 0.011	[redacted]	< 0.00021	88.15
Vinyl Acetate	< 0.021	[redacted]	< 0.00041	86.09
MEK	**0.024**	[redacted]	**0.000476**	72.11
cis-1,2- Dichloroethene	< 0.012	[redacted]	< 0.00023	96.00
Hexane	< 0.010	[redacted]	< 0.00020	86.18
Chloroform	< 0.014	[redacted]	< 0.00028	119.50
Ethyl Acetate	< 0.011	[redacted]	< 0.00021	88.11
Tetrahydrofuran	< 0.0087	[redacted]	< 0.00017	72.11
1,2-Dichloroethane	< 0.012	[redacted]	< 0.00023	98.00
Benzene	**0.19**	[redacted]	**0.00369**	78.11
Cyclohexane	< 0.010	[redacted]	< 0.00020	84.16
Heptane	< 0.012	[redacted]	< 0.00024	100.21
Toluene	**0.079**	[redacted]	**0.00155**	92.14
Carbon Tetrachloride	< 0.018	[redacted]	< 0.00036	153.24
1,2-Dichloropropane	< 0.014	[redacted]	< 0.00027	112.99
Bromodichloromethane	< 0.020	[redacted]	< 0.00039	163.83
1,4-Dioxane	< 0.042	[redacted]	< 0.00083	88.11
Trichloroethene	< 0.016	[redacted]	< 0.00031	131.40
2,2,4-Trimethylpentane	< 0.014	[redacted]	< 0.00027	114.23
cis-1,3-Dichloropropene	< 0.013	[redacted]	< 0.00026	110.97
4-Methyl-2-Pentanone (MiBK)	< 0.024	[redacted]	< 0.00048	100.16
t-1,3-Dichloropropene	< 0.013	[redacted]	< 0.00026	110.97
1,1,2-Trichloroethane	< 0.016	[redacted]	< 0.00032	133.40
2-Hexanone	< 0.065	[redacted]	< 0.0013	134.60
Dibromochloromethane	< 0.025	[redacted]	< 0.00049	208.28
1,2-Dibromomethane	< 0.023	[redacted]	< 0.00044	187.88
Tetrachloroethylene	< 0.020	[redacted]	< 0.00039	165.83
Chlorobenzene	< 0.014	[redacted]	< 0.00027	112.56
Ethylbenzene	< 0.013	[redacted]	< 0.00025	106.16
m & p-Xylenes	**0.032**	[redacted]	**0.000634**	106.16
Bromoform	< 0.030	[redacted]	< 0.00060	252.72
Styrene	**0.015**	[redacted]	**0.000297**	104.14
1,1,2,2-Tetrachloroethane	< 0.020	[redacted]	< 0.00040	167.85
o-Xylene	< 0.013	[redacted]	< 0.00025	106.16
4-Ethyltoluene	< 0.014	[redacted]	< 0.00028	120.19
1,3,5-Trimethylbenzene	< 0.014	[redacted]	< 0.00027	112.99
1,2,4-Trimethylbenzene	**0.029**	[redacted]	**0.000575**	120.19
Benzyl Chloride	< 0.15	[redacted]	< 0.0030	126.59
1,3-Dichlorobenzene	< 0.018	[redacted]	< 0.00035	147.00
1,4-Dichlorobenzene	< 0.018	[redacted]	< 0.00035	147.01
1,2-Dichlorobenzene	< 0.018	[redacted]	< 0.00035	147.01
1,2,4-Trichlorobenzene	< 0.087	[redacted]	< 0.0017	181.45
Hexachlorobutadiene	< 0.13	[redacted]	< 0.00247	260.76
1,1,1-Trichloroethene	< 0.016	[redacted]	< 0.00031	131.40

EPA TO-15
Tank 1352

Client : All American Asphalt
Site : Irvine, CA
Unit : Rotary Dryer Baghouse

T std: 60 °F
Run No.: 1

Test Date : 6/3/2021
Job #: 1064
Lab #: 221-061

Q std: [redacted] dscfm (Method 429)
Production Rate: TPH

Compound Name	Lab Results ppb	lb/hr	lb/Ton	lb/Mmbtu	MW
Propene	**1010**	**0.16**	[redacted]	**0.00318**	42.08
Chlorodifluoromethane	< 14.8	<0.0049	[redacted]	< 0.000096	86.47
Dichlorodifluoromethane	< 14.8	<0.0058	[redacted]	< 0.00011	102.92
Chloromethane	< 14.8	<0.0028	[redacted]	< 0.000056	50.50
1,2 Dichloro-1,1,2,2-Tetrafluoroethane	< 14.8	<0.010	[redacted]	< 0.00019	170.92
Vinyl Chloride	< 14.8	<0.0035	[redacted]	< 0.000069	62.50
1,3-Butadiene	**81.1**	**0.017**	[redacted]	**0.000328**	54.09
Bromomethane	< 14.8	<0.0054	[redacted]	< 0.00010	94.94
Methanol	**186**	**0.023**	[redacted]	**0.000445**	32.04
Chloroethane	< 14.8	<0.0036	[redacted]	< 0.000071	64.50
Dichlorofluoromethane	< 14.8	<0.0058	[redacted]	< 0.00011	102.92
Ethanol	< 59.2	**0.010**	[redacted]	**0.000204**	46.07
Vinyl Bromide	< 14.8	<0.006	[redacted]	< 0.00012	106.96
Trichlorofluoromethane	< 14.8	<0.007	[redacted]	< 0.00014	127.50
Acetone	**363**	**0.080**	[redacted]	**0.00158**	58.08
Isopropyl Alcohol	< 59.2	<0.014	[redacted]	< 0.00027	60.10
Allyl Chloride	< 29.6	<0.0086	[redacted]	< 0.00017	76.53
1,1-Dichloroethene	< 14.8	<0.0054	[redacted]	< 0.00011	96.00
Acrylonitrile	< 59.2	<0.012	[redacted]	< 0.00023	53.06
Methylene Chloride	< 29.6	<0.011	[redacted]	< 0.00022	98.00
Carbon Disulfide	< 59.2	<0.017	[redacted]	< 0.00034	76.14
1,1,2-Trichloro-1,2,2-Trifluoroethane	< 14.8	<0.011	[redacted]	< 0.00021	187.40
trans-1,2- Dichloroethene	< 14.8	<0.0055	[redacted]	< 0.00011	96.94
1,1- Dichloroethane	< 14.8	<0.0055	[redacted]	< 0.00011	98.00
MTBE	< 14.8	<0.0050	[redacted]	< 0.00010	88.15
Vinyl Acetate	< 29.6	<0.010	[redacted]	< 0.00019	86.09
MEK	**45.0**	**0.012**	[redacted]	**0.000242**	72.11
cis-1,2- Dichloroethene	< 14.8	<0.0054	[redacted]	< 0.00011	96.00
Hexane	< 14.8	<0.0049	[redacted]	< 0.000095	86.18
Chloroform	< 14.8	<0.0067	[redacted]	< 0.00013	119.50
Ethyl Acetate	< 14.8	<0.0050	[redacted]	< 0.000097	88.11
Tetrahydrofuran	< 14.8	<0.0041	[redacted]	< 0.000080	72.11
1,2-Dichloroethane	< 14.8	<0.0055	[redacted]	< 0.00011	98.00
Benzene	**302**	**0.090**	[redacted]	**0.00176**	78.11
Cyclohexane	< 14.8	<0.0047	[redacted]	< 0.000093	84.16
Heptane	< 14.8	<0.0057	[redacted]	< 0.00011	100.21
Toluene	**99.7**	**0.035**	[redacted]	**0.000686**	92.14
Carbon Tetrachloride	< 14.8	<0.0086	[redacted]	< 0.00017	153.24
1,2-Dichloropropane	< 14.8	<0.0064	[redacted]	< 0.00012	112.99
Bromodichloromethane	< 14.8	<0.0092	[redacted]	< 0.00018	163.83
1,4-Dioxane	< 59.2	<0.0199	[redacted]	< 0.00039	88.11
Trichloroethene	< 14.8	<0.0074	[redacted]	< 0.00015	131.40
2,2,4-Trimethylpentane	< 14.8	<0.0064	[redacted]	< 0.00013	114.23
cis-1,3-Dichloropropene	< 14.8	<0.0063	[redacted]	< 0.00012	110.97
4-Methyl-2-Pentanone (MiBK)	< 29.6	<0.011	[redacted]	< 0.00022	100.16
t-1,3-Dichloropropene	< 14.8	<0.0063	[redacted]	< 0.00012	110.97
1,1,2-Trichloroethane	< 14.8	<0.0075	[redacted]	< 0.00015	133.40
2-Hexanone	< 59.2	<0.030	[redacted]	< 0.00060	134.60
Dibromochloromethane	< 14.8	<0.012	[redacted]	< 0.00023	208.28
1,2-Dibromomethane	< 14.8	<0.011	[redacted]	< 0.00021	187.88
Tetrachloroethylene	< 14.8	<0.0094	[redacted]	< 0.00018	165.83
Chlorobenzene	< 14.8	<0.0063	[redacted]	< 0.00012	112.56
Ethylbenzene	< 14.8	<0.0060	[redacted]	< 0.00012	106.16
m & p-Xylenes	**44.1**	**0.018**	[redacted]	**0.000350**	106.16
Bromoform	< 14.8	<0.014	[redacted]	< 0.00028	252.72
Styrene	**16.9**	**0.0067**	[redacted]	**0.000131**	104.14
1,1,2,2-Tetrachloroethane	< 14.8	<0.0095	[redacted]	< 0.00019	167.85
o-Xylene	< 14.8	<0.0060	[redacted]	< 0.00012	106.16
4-Ethyltoluene	< 14.8	<0.0068	[redacted]	< 0.00013	120.19
1,3,5-Trimethylbenzene	< 14.8	<0.0064	[redacted]	< 0.00012	112.99
1,2,4-Trimethylbenzene	< 29.6	<0.014	[redacted]	< 0.00027	120.19
Benzyl Chloride	< 148	<0.071	[redacted]	< 0.0014	126.59
1,3-Dichlorobenzene	< 14.8	<0.0083	[redacted]	< 0.00016	147.00
1,4-Dichlorobenzene	< 14.8	<0.0083	[redacted]	< 0.00016	147.01
1,2-Dichlorobenzene	< 14.8	<0.0083	[redacted]	< 0.00016	147.01
1,2,4-Trichlorobenzene	< 59.2	<0.041	[redacted]	< 0.00080	181.45
Hexachlorobutadiene	< 59.2	<0.059	[redacted]	< 0.0012	260.76
1,1,1-Trichloroethene	< 14.8	<0.0074	[redacted]	< 0.00015	131.40

lb/hr = (ppb/1000) * Qstd * MW * 0.0000001581
lb/MMBtu = F-Factor (8710)*lb/hr/(60*Qstd)*20.9/(20.9-O2)
lb/ton = lb/hr/tons/hr

EPA TO-15
Tank 1192

Client : All American Asphalt
Site : Irvine, CA
Unit : Rotary Dryer Baghouse

T std: 60 °F
Run No.: 1A

Date : 6/3/2021
Job #: 1064
Lab #: 221-061

Q std: [redacted] dscfm (Method 429)
Production Rate: TPH

Compound Name	Lab Results ppb	lb/hr	lb/Ton	lb/Mmbtu	MW
Propene	**1080**	**0.17**	[redacted]	**0.00340**	42.08
Chlorodifluoromethane	< 13	< 0.0043	[redacted]	< 0.000085	86.47
Dichlorodifluoromethane	< 13	< 0.0051	[redacted]	< 0.00010	102.92
Chloromethane	< 13	< 0.0025	[redacted]	< 0.000049	50.50
1.2 Dichloro-1.1.2.2-Tetrafluoroethane	< 13	< 0.0085	[redacted]	< 0.00017	170.92
Vinyl Chloride	< 13	< 0.0031	[redacted]	< 0.000061	62.50
1.3-Butadiene	**152**	**0.031**	[redacted]	**0.00061**	54.09
Bromomethane	< 13	< 0.0047	[redacted]	< 0.000093	94.94
Methanol	**790**	**0.096**	[redacted]	**0.0019**	32.04
Chloroethane	< 13	< 0.0032	[redacted]	< 0.000063	64.50
Dichlorofluoromethane	< 13	< 0.0051	[redacted]	< 0.00010	102.92
Ethanol	**168**	**0.029**	[redacted]	**0.00058**	46.07
Vinyl Bromide	< 13	< 0.0053	[redacted]	< 0.00010	106.96
Trichlorofluoromethane	< 13	< 0.0064	[redacted]	< 0.00012	127.50
Acetone	**389**	**0.086**	[redacted]	**0.00169**	58.08
Isopropyl Alcohol	< 52	< 0.012	[redacted]	< 0.00024	60.10
Allyl Chloride	< 26	< 0.0076	[redacted]	< 0.00015	76.53
1.1-Dichloroethene	< 52	< 0.019	[redacted]	< 0.00038	96.00
Acrylonitrile	< 52	< 0.011	[redacted]	< 0.00021	53.06
Methylene Chloride	< 26	< 0.0098	[redacted]	< 0.00019	98.00
Carbon Disulfide	< 52	< 0.015	[redacted]	< 0.00030	76.14
1.1.2-Trichloro-1.2.2-Trifluoroethane	< 13	< 0.0094	[redacted]	< 0.00018	187.40
trans-1.2- Dichloroethene	< 13	< 0.0048	[redacted]	< 0.000095	96.94
1.1- Dichloroethane	< 13	< 0.0049	[redacted]	< 0.000096	98.00
MTBE	< 13	< 0.0044	[redacted]	< 0.000086	88.15
Vinyl Acetate	< 26	< 0.0086	[redacted]	< 0.00017	86.09
MEK	**34.1**	**0.0094**	[redacted]	**0.000184**	72.11
cis-1.2- Dichloroethene	< 13	< 0.0048	[redacted]	< 0.000094	96.00
Hexane	< 13	< 0.0043	[redacted]	< 0.000084	86.18
Chloroform	< 13	< 0.0060	[redacted]	< 0.00012	119.50
Ethyl Acetate	< 13	< 0.0044	[redacted]	< 0.000086	88.11
Tetrahydrofuran	< 13	< 0.0036	[redacted]	< 0.000071	72.11
1.2-Dichloroethane	< 13	< 0.0049	[redacted]	< 0.000096	98.00
Benzene	**310**	**0.092**	[redacted]	**0.00181**	78.11
Cyclohexane	< 13	<0.0042	[redacted]	< 0.000082	84.16
Heptane	< 13	<0.0050	[redacted]	< 0.000098	100.21
Toluene	**104**	**0.037**	[redacted]	**0.000716**	92.14
Carbon Tetrachloride	< 13	<0.0076	[redacted]	< 0.00015	153.24
1.2-Dichloropropane	< 13	<0.0056	[redacted]	< 0.00011	112.99
Bromodichloromethane	< 13	<0.0082	[redacted]	< 0.00016	163.83
1.4-Dioxane	< 52	<0.018	[redacted]	< 0.00034	88.11
Trichloroethene	< 13	<0.0066	[redacted]	< 0.00013	131.40
2.2.4-Trimethylpentane	< 13	<0.0057	[redacted]	< 0.00011	114.23
cis-1.3-Dichloropropene	< 13	<0.0055	[redacted]	< 0.00011	110.97
4-Methyl-2-Pentanone (MiBK)	< 26	<0.010	[redacted]	< 0.00020	100.16
t-1.3-Dichloropropene	< 13	<0.0055	[redacted]	< 0.00011	110.97
1.1.2-Trichloroethane	< 13	<0.0067	[redacted]	< 0.00013	133.40
2-Hexanone	< 52	<0.027	[redacted]	< 0.00053	134.60
Dibromochloromethane	< 13	<0.010	[redacted]	< 0.00020	208.28
1.2-Dibromomethane	< 13	<0.0094	[redacted]	< 0.00018	187.88
Tetrachloroethylene	< 13	<0.0083	[redacted]	< 0.00016	165.83
Chlorobenzene	< 13	<0.0056	[redacted]	< 0.00011	112.56
Ethylbenzene	< 13	<0.0053	[redacted]	< 0.00010	106.16
m & p-Xylenes	**43.5**	**0.018**	[redacted]	**0.000345**	106.16
Bromoform	< 13	<0.013	[redacted]	< 0.00025	252.72
Styrene	**19.9**	**0.0079**	[redacted]	**0.000155**	104.14
1.1.2.2-Tetrachloroethane	< 13	<0.0084	[redacted]	< 0.00016	167.85
o-Xylene	< 13	<0.0053	[redacted]	< 0.00010	106.16
4-Ethyltoluene	< 13	<0.0060	[redacted]	< 0.00012	120.19
1.3.5-Trimethylbenzene	< 13	<0.0056	[redacted]	< 0.00011	112.99
1.2.4-Trimethylbenzene	**29.6**	**0.014**	[redacted]	**0.000266**	120.19
Benzyl Chloride	< 131	<0.063	[redacted]	< 0.0012	126.59
1.3-Dichlorobenzene	< 13	<0.0073	[redacted]	< 0.00014	147.00
1.4-Dichlorobenzene	< 13	<0.0073	[redacted]	< 0.00014	147.01
1.2-Dichlorobenzene	< 13	<0.0073	[redacted]	< 0.00014	147.01
1.2.4-Trichlorobenzene	< 52	<0.036	[redacted]	< 0.00071	181.45
Hexachlorobutadiene	< 52	<0.052	[redacted]	< 0.0010	260.76
1.1.1-Trichloroethene	< 13	<0.0066	[redacted]	< 0.00013	131.40

lb/hr = (ppb/1000) * Ostd * MW * 0.0000001581
lb/MMBtu = F-Factor (8710)*lb/hr/(60*Ostd)*20.9/(20.9-O2)
lb/ton = lb/hr/tons/hr

EPA TO-15
Tank 1172

Client : All American Asphalt
Site : Irvine, CA
Unit : Rotary Dryer Baghouse

T std: 60 °F
Run No.: 2

Date : 6/3/2021
Job #: 1064
Lab #: 221-061

Q std: [redacted] dscfm (Method 429)
Production Rate: TPH

Compound Name	Lab Results ppb	lb/hr	lb/Ton	lb/Mmbtu	MW
Propene	**890**	**0.14**	[redacted]	**0.00280**	42.08
Chlorodifluoromethane	< 12.0	< 0.0040	[redacted]	< 0.000078	86.47
Dichlorodifluoromethane	< 12.0	< 0.0047	[redacted]	< 0.000092	102.92
Chloromethane	< 12.0	< 0.0023	[redacted]	< 0.000045	50.50
1,2 Dichloro-1,1,2,2-Tetrafluoroethane	< 12.0	< 0.0078	[redacted]	< 0.00015	170.92
Vinyl Chloride	< 12.0	< 0.0029	[redacted]	< 0.000056	62.50
1,3-Butadiene	**66.8**	**0.014**	[redacted]	**0.000270**	54.09
Bromomethane	< 12.0	< 0.0043	[redacted]	< 0.000085	94.94
Methanol	**421**	**0.051**	[redacted]	**0.00101**	32.04
Chloroethane	< 12.0	< 0.0029	[redacted]	< 0.000058	64.50
Dichlorofluoromethane	< 12.0	< 0.0047	[redacted]	< 0.000092	102.92
Ethanol	**80.3**	**0.014**	[redacted]	**0.000276**	46.07
Vinyl Bromide	< 12.0	< 0.0049	[redacted]	< 0.000096	106.96
Trichlorofluoromethane	< 12.0	< 0.0058	[redacted]	< 0.00011	127.50
Acetone	**298**	**0.0659**	[redacted]	**0.00129**	58.08
Isopropyl Alcohol	< 47.9	< 0.011	[redacted]	< 0.00022	60.10
Allyl Chloride	< 24.0	< 0.0070	[redacted]	< 0.00014	76.53
1,1-Dichloroethene	< 12.0	< 0.0044	[redacted]	< 0.000086	96.00
Acrylonitrile	< 47.9	< 0.0097	[redacted]	< 0.00019	53.06
Methylene Chloride	< 24.0	< 0.0090	[redacted]	< 0.00018	98.00
Carbon Disulfide	**68.5**	**0.020**	[redacted]	**0.000390**	76.14
1,1,2-Trichloro-1,2,2-Trifluoroethane	< 12.0	< 0.0086	[redacted]	< 0.00017	187.40
trans-1,2- Dichloroethene	< 12.0	< 0.0044	[redacted]	< 0.000087	96.94
1,1- Dichloroethane	< 12.0	< 0.0045	[redacted]	< 0.000088	98.00
MTBE	< 12.0	< 0.0040	[redacted]	< 0.000079	88.15
Vinyl Acetate	< 24.0	< 0.0079	[redacted]	< 0.00015	86.09
MEK	**54.6**	**0.015**	[redacted]	**0.000294**	72.11
cis-1,2- Dichloroethene	< 12.0	< 0.0044	[redacted]	< 0.000086	96.00
Hexane	< 12.0	< 0.0039	[redacted]	< 0.000077	86.18
Chloroform	< 12.0	< 0.0055	[redacted]	< 0.00011	119.50
Ethyl Acetate	< 12.0	< 0.0040	[redacted]	< 0.000079	88.11
Tetrahydrofuran	< 12.0	< 0.0033	[redacted]	< 0.000065	72.11
1,2-Dichloroethane	< 12.0	< 0.0045	[redacted]	< 0.000088	98.00
Benzene	**262**	**0.078**	[redacted]	**0.00153**	78.11
Cyclohexane	< 12.0	<0.0038	[redacted]	< 0.000075	84.16
Heptane	< 12.0	<0.0046	[redacted]	< 0.000090	100.21
Toluene	**85.8**	**0.030**	[redacted]	**0.000591**	92.14
Carbon Tetrachloride	< 12.0	<0.0070	[redacted]	< 0.00014	153.24
1,2-Dichloropropane	< 12.0	<0.0052	[redacted]	< 0.00010	112.99
Bromodichloromethane	< 12.0	<0.0075	[redacted]	< 0.00015	163.83
1,4-Dioxane	< 47.9	<0.0161	[redacted]	< 0.00032	88.11
Trichloroethene	< 12.0	<0.0060	[redacted]	< 0.00012	131.40
2,2,4-Trimethylpentane	< 12.0	<0.0052	[redacted]	< 0.00010	114.23
cis-1,3-Dichloropropene	< 12.0	<0.0051	[redacted]	< 0.000099	110.97
4-Methyl-2-Pentanone (MiBK)	< 24.0	<0.0092	[redacted]	< 0.00018	100.16
t-1,3-Dichloropropene	< 12.0	<0.0051	[redacted]	< 0.000099	110.97
1,1,2-Trichloroethane	< 12.0	<0.0061	[redacted]	< 0.00012	133.40
2-Hexanone	< 47.9	<0.025	[redacted]	< 0.00048	134.60
Dibromochloromethane	< 12.0	<0.0095	[redacted]	< 0.00019	208.28
1,2-Dibromomethane	< 12.0	<0.0086	[redacted]	< 0.00017	187.88
Tetrachloroethylene	< 12.0	<0.0076	[redacted]	< 0.00015	165.83
Chlorobenzene	< 12.0	<0.0051	[redacted]	< 0.00010	112.56
Ethylbenzene	< 12.0	<0.0049	[redacted]	< 0.000095	106.16
m & p-Xylenes	**44.3**	**0.018**	[redacted]	**0.000351**	106.16
Bromoform	< 12.0	<0.012	[redacted]	< 0.00023	252.72
Styrene	**13.4**	**0.0053**	[redacted]	**0.000104**	104.14
1,1,2,2-Tetrachloroethane	< 12.0	<0.0077	[redacted]	< 0.00015	167.85
o-Xylene	< 12.0	<0.0049	[redacted]	< 0.00010	106.16
4-Ethyltoluene	< 12.0	<0.0055	[redacted]	< 0.00011	120.19
1,3,5-Trimethylbenzene	< 12.0	<0.0052	[redacted]	< 0.00010	112.99
1,2,4-Trimethylbenzene	< 24.0	<0.011	[redacted]	< 0.00022	120.19
Benzyl Chloride	< 120.0	<0.058	[redacted]	< 0.0011	126.59
1,3-Dichlorobenzene	< 12.0	<0.0067	[redacted]	< 0.00013	147.00
1,4-Dichlorobenzene	< 12.0	<0.0067	[redacted]	< 0.00013	147.01
1,2-Dichlorobenzene	< 12.0	<0.0067	[redacted]	< 0.00013	147.01
1,2,4-Trichlorobenzene	< 47.9	<0.033	[redacted]	< 0.00065	181.45
Hexachlorobutadiene	< 47.9	<0.048	[redacted]	< 0.00093	260.76
1,1,1-Trichloroethene	< 12.0	<0.0060	[redacted]	< 0.00012	131.40

lb/hr = (ppb/1000) * Qstd * MW * 0.0000001581
lb/MMBtu = F-Factor (8710)*lb/hr/(60*Qstd)*20.9/(20.9-O2)
lb/ton = lb/hr/tons/hr

EPA TO-15
Tank 1266

Client : All American Asphalt
Site : Irvine, CA
Unit : Rotary Dryer Baghouse

T std: 60 °F
Run No.: 2A

Date : 6/3/2021
Job #: 1064
Lab #: 221-061

Q std: [redacted] dscfm (Method 429)
Production Rate: TPH

Compound Name	Lab Results ppb	lb/hr	lb/Ton	lb/MMbtu	MW
Propene	997	**0.16**	[redacted]	**0.00313**	42.08
Chlorodifluoromethane	< 15.6	< 0.0051	[redacted]	< 0.00010	86.47
Dichlorodifluoromethane	< 15.6	< 0.0061	[redacted]	< 0.00012	102.92
Chloromethane	< 15.6	< 0.0030	[redacted]	< 0.000059	50.50
1,2 Dichloro-1,1,2,2-Tetrafluoroethane	< 15.6	< 0.010	[redacted]	< 0.00020	170.92
Vinyl Chloride	< 15.6	< 0.0037	[redacted]	< 0.000073	62.50
1,3-Butadiene	138	**0.028**	[redacted]	**0.000558**	54.09
Bromomethane	< 15.6	< 0.0056	[redacted]	< 0.00011	94.94
Methanol	309	**0.038**	[redacted]	**0.000740**	32.04
Chloroethane	< 15.6	< 0.0038	[redacted]	< 0.000075	64.50
Dichlorofluoromethane	< 15.6	< 0.0061	[redacted]	< 0.00012	102.92
Ethanol	98.7	**0.017**	[redacted]	**0.000340**	46.07
Vinyl Bromide	< 15.6	< 0.0064	[redacted]	< 0.00012	106.96
Trichlorofluoromethane	< 15.6	< 0.0076	[redacted]	< 0.00015	127.50
Acetone	355	**0.079**	[redacted]	**0.00154**	58.08
Isopropyl Alcohol	< 62.3	< 0.014	[redacted]	< 0.00028	60.10
Allyl Chloride	< 31.1	< 0.0091	[redacted]	< 0.00018	76.53
1,1-Dichloroethene	< 15.6	< 0.0057	[redacted]	< 0.00011	96.00
Acrylonitrile	< 62.3	< 0.013	[redacted]	< 0.00025	53.06
Methylene Chloride	< 31.1	< 0.012	[redacted]	< 0.00023	98.00
Carbon Disulfide	< 62.3	< 0.018	[redacted]	< 0.00035	76.14
1,1,2-Trichloro-1,2,2-Trifluoroethane	< 15.6	< 0.011	[redacted]	< 0.00022	187.40
trans-1,2- Dichloroethene	< 15.6	< 0.0058	[redacted]	< 0.00011	96.94
1,1- Dichloroethane	< 15.6	< 0.0058	[redacted]	< 0.00011	98.00
MTBE	< 15.6	< 0.0052	[redacted]	< 0.00010	88.15
Vinyl Acetate	< 31.1	< 0.010	[redacted]	< 0.00020	86.09
MEK	39.2	**0.011**	[redacted]	**0.000211**	72.11
cis-1,2- Dichloroethene	< 15.6	< 0.0057	[redacted]	< 0.00011	96.00
Hexane	< 15.6	< 0.0051	[redacted]	< 0.00010	86.18
Chloroform	< 15.6	< 0.0071	[redacted]	< 0.00014	119.50
Ethyl Acetate	< 15.6	< 0.0052	[redacted]	< 0.00010	88.11
Tetrahydrofuran	< 15.6	< 0.0043	[redacted]	< 0.000084	72.11
1,2-Dichloroethane	< 15.6	< 0.0058	[redacted]	< 0.00011	98.00
Benzene	288	**0.086**	[redacted]	**0.00168**	78.11
Cyclohexane	< 15.6	< 0.0050	[redacted]	< 0.000098	84.16
Heptane	< 15.6	< 0.0060	[redacted]	< 0.00012	100.21
Toluene	101	**0.035**	[redacted]	**0.000695**	92.14
Carbon Tetrachloride	< 15.6	<0.0091	[redacted]	< 0.00018	153.24
1.2-Dichloropropane	< 15.6	<0.0067	[redacted]	< 0.00013	112.99
Bromodichloromethane	< 15.6	<0.0097	[redacted]	< 0.00019	163.83
1.4-Dioxane	< 62.3	<0.0209	[redacted]	< 0.00041	88.11
Trichloroethene	< 15.6	<0.0078	[redacted]	< 0.00015	131.40
2.2.4-Trimethylpentane	< 15.6	<0.0068	[redacted]	< 0.00013	114.23
cis-1.3-Dichloropropene	< 15.6	<0.0066	[redacted]	< 0.00013	110.97
4-Methyl-2-Pentanone (MiBK)	< 31.1	<0.012	[redacted]	< 0.00023	100.16
t-1.3-Dichloropropene	< 15.6	<0.0066	[redacted]	< 0.00013	110.97
1.1.2-Trichloroethane	< 15.6	<0.0079	[redacted]	< 0.00016	133.40
2-Hexanone	< 62.3	<0.032	[redacted]	< 0.00063	134.60
Dibromochloromethane	< 15.6	<0.012	[redacted]	< 0.00024	208.28
1.2-Dibromomethane	< 15.6	<0.011	[redacted]	< 0.00022	187.88
Tetrachloroethylene	< 15.6	<0.0099	[redacted]	< 0.00019	165.83
Chlorobenzene	< 15.6	<0.0067	[redacted]	< 0.00013	112.56
Ethylbenzene	< 15.6	<0.0063	[redacted]	< 0.00012	106.16
m & p-Xylenes	42.7	**0.017**	[redacted]	**0.000339**	106.16
Bromoform	< 15.6	<0.015	[redacted]	< 0.00029	252.72
Styrene	17.1	**0.0068**	[redacted]	**0.000133**	104.14
1.1.2.2-Tetrachloroethane	< 15.6	<0.010	[redacted]	< 0.00020	167.85
o-Xylene	< 15.6	<0.0063	[redacted]	< 0.00012	106.16
4-Ethyltoluene	< 15.6	<0.0071	[redacted]	< 0.00014	120.19
1.3.5-Trimethylbenzene	< 15.6	<0.0067	[redacted]	< 0.00013	112.99
1.2.4-Trimethylbenzene	< 31.1	<0.014	[redacted]	< 0.00028	120.19
Benzyl Chloride	< 156	<0.075	[redacted]	< 0.00148	126.59
1.3-Dichlorobenzene	< 15.6	<0.0087	[redacted]	< 0.00017	147.00
1.4-Dichlorobenzene	< 15.6	<0.0087	[redacted]	< 0.00017	147.01
1.2-Dichlorobenzene	< 15.6	<0.0087	[redacted]	< 0.00017	147.01
1.2.4-Trichlorobenzene	< 62.3	<0.043	[redacted]	< 0.00084	181.45
Hexachlorobutadiene	< 62.3	<0.062	[redacted]	< 0.0012	260.76
1.1.1-Trichloroethene	< 15.6	<0.0078	[redacted]	< 0.00015	131.40

lb/hr = (ppb/1000) * Qstd * MW * 0.0000001581
lb/MMBtu = F-Factor (8710)*lb/hr/(60*Qstd)*20.9/(20.9-O2)
lb/ton = lb/hr/tons/hr

AIR TESTING SERVICES, INC.

EPA TO-15
Tank 1191

Client : All American Asphalt
Site : Irvine, CA
Unit : Rotary Dryer Baghouse

T std: 60 °F
Run No.: 3

Date : 6/3/2021
Job #: 1064
Lab #: 221-061

O std: [redacted] dscfm (Method 429)
Production Rate: TPH

Compound Name	Lab Results ppb	lb/hr	lb/Ton	lb/Mmbtu	MW
Propene	**7520**	**1.20**	[redacted]	**0.0236**	42.08
Chlorodifluoromethane	< 61.4	<0.020	[redacted]	<0.00040	86.47
Dichlorodifluoromethane	< 61.4	<0.024	[redacted]	<0.00047	102.92
Chloromethane	< 61.4	<0.012	[redacted]	<0.00023	50.50
1.2 Dichloro-1.1.2.2-Tetrafluoroethane	< 61.4	<0.040	[redacted]	<0.00078	170.92
Vinyl Chloride	< 61.4	<0.014	[redacted]	<0.00029	62.50
1.3-Butadiene	**501**	**0.10**	[redacted]	**0.00202**	54.09
Bromomethane	< 61.4	<0.022	[redacted]	<0.00044	94.94
Methanol	**1770**	**0.21**	[redacted]	**0.00424**	32.04
Chloroethane	< 61.4	<0.015	[redacted]	<0.00030	64.50
Dichlorofluoromethane	< 61.4	<0.024	[redacted]	<0.00047	102.92
Ethanol	< 245	<0.043	[redacted]	<0.00084	46.07
Vinyl Bromide	< 61.4	<0.025	[redacted]	<0.00049	106.96
Trichlorofluoromethane	< 61.4	<0.030	[redacted]	<0.00058	127.50
Acetone	**1700**	**0.37**	[redacted]	**0.00738**	58.08
Isopropyl Alcohol	< 245	<0.056	[redacted]	<0.0011	60.10
Allyl Chloride	< 31.6	<0.009	[redacted]	<0.00018	76.53
1.1-Dichloroethene	< 61.4	<0.022	[redacted]	<0.00044	96.00
Acrylonitrile	< 245	<0.049	[redacted]	<0.00097	53.06
Methylene Chloride	< 123	<0.046	[redacted]	<0.00090	98.00
Carbon Disulfide	< 245	<0.070	[redacted]	<0.0014	76.14
1.1.2-Trichloro-1.2.2-Trifluoroethane	< 61.4	<0.043	[redacted]	<0.00086	187.40
trans-1.2- Dichloroethene	< 61.4	<0.022	[redacted]	<0.00044	96.94
1.1- Dichloroethane	< 61.4	<0.023	[redacted]	<0.00045	98.00
MTBE	< 61.4	<0.020	[redacted]	<0.00040	88.15
Vinyl Acetate	< 123.0	<0.040	[redacted]	<0.00079	86.09
MEK	**210**	**0.057**	[redacted]	**0.0011**	72.11
cis-1.2- Dichloroethene	< 61.4	<0.022	[redacted]	<0.00044	96.00
Hexane	< 61.4	<0.020	[redacted]	<0.00040	86.18
Chloroform	< 61.4	<0.028	[redacted]	<0.00055	119.50
Ethyl Acetate	< 61.4	<0.020	[redacted]	<0.00040	88.11
Tetrahydrofuran	< 61.4	<0.017	[redacted]	<0.00033	72.11
1.2-Dichloroethane	< 61.4	<0.023	[redacted]	<0.00045	98.00
Benzene	**1640**	**0.48**	[redacted]	**0.0096**	78.11
Cyclohexane	< 61.4	<0.020	[redacted]	<0.00039	84.16
Heptane	< 61.4	<0.023	[redacted]	<0.00046	100.21
Toluene	**609**	**0.21**	[redacted]	**0.00419**	92.14
Carbon Tetrachloride	< 61.4	<0.036	[redacted]	<0.00070	153.24
1.2-Dichloropropane	< 61.4	<0.026	[redacted]	<0.00052	112.99
Bromodichloromethane	< 61.4	<0.038	[redacted]	<0.00075	163.83
1.4-Dioxane	< 245	<0.082	[redacted]	<0.0016	88.11
Trichloroethene	< 61.4	<0.030	[redacted]	<0.00060	131.40
2.2.4-Trimethylpentane	< 61.4	<0.026	[redacted]	<0.00052	114.23
cis-1.3-Dichloropropene	< 61.4	<0.026	[redacted]	<0.00051	110.97
4-Methyl-2-Pentanone (MiBK)	< 123	<0.047	[redacted]	<0.00092	100.16
t-1.3-Dichloropropene	< 61.4	<0.026	[redacted]	<0.00051	110.97
1.1.2-Trichloroethane	< 61.4	<0.031	[redacted]	<0.00061	133.40
2-Hexanone	< 245	<0.12	[redacted]	<0.0025	134.60
Dibromochloromethane	< 61.4	<0.048	[redacted]	<0.00096	208.28
1.2-Dibromomethane	< 61.4	<0.044	[redacted]	<0.00086	187.88
Tetrachloroethylene	< 61.4	<0.038	[redacted]	<0.00076	165.83
Chlorobenzene	< 61.4	<0.026	[redacted]	<0.00052	112.56
Ethylbenzene	< 61.4	<0.025	[redacted]	<0.00049	106.16
m & p-Xylenes	**158**	**0.063**	[redacted]	**0.00125**	106.16
Bromoform	< 61.4	<0.059	[redacted]	<0.0012	252.72
Styrene	**72.4**	**0.028**	[redacted]	**0.000563**	104.14
1.1.2.2-Tetrachloroethane	< 61.4	<0.039	[redacted]	<0.00077	167.85
o-Xylene	< 61.4	<0.025	[redacted]	<0.00049	106.16
4-Ethyltoluene	< 61.4	<0.028	[redacted]	<0.00055	120.19
1.3.5-Trimethylbenzene	< 61.4	<0.026	[redacted]	<0.00052	112.99
1.2.4-Trimethylbenzene	< 123	<0.056	[redacted]	<0.0011	120.19
Benzyl Chloride	< 614	<0.29	[redacted]	<0.0058	126.59
1.3-Dichlorobenzene	< 61.4	<0.034	[redacted]	<0.00067	147.00
1.4-Dichlorobenzene	< 61.4	<0.034	[redacted]	<0.00067	147.01
1.2-Dichlorobenzene	< 61.4	<0.034	[redacted]	<0.00067	147.01
1.2.4-Trichlorobenzene	< 245	<0.17	[redacted]	<0.0033	181.45
Hexachlorobutadiene	< 245	<0.24	[redacted]	<0.0048	260.76
1.1.1-Trichloroethene	< 61.4	<0.030	[redacted]	<0.00060	131.40

lb/hr = (ppb/1000) * Ostd * MW * 0.0000001581
lb/MMBtu = F-Factor (8710)*lb/hr/(60*Ostd)*20.9/(20.9-O2)
lb/ton = lb/hr/tons/hr

AIR TESTING SERVICES, INC.

EPA TO-15
Tank 1345

Client : All American Asphalt
Site : Irvine, CA
Unit : Rotary Dryer Baghouse

T std: 60 °F
Run No.: 3A

Date : 6/3/2021
Job #: 1064
Lab #: 221-061

O std: [redacted] dscfm (Method 429)
Production Rate: TPH

Compound Name	Lab Results ppb	lb/hr	lb/Ton	lb/Mmbtu	MW
Propene	**5180**	**0.82**	[redacted]	**0.0163**	42.08
Chlorodifluoromethane	< 73.3	< 0.024	[redacted]	<0.00047	86.47
Dichlorodifluoromethane	< 73.3	< 0.028	[redacted]	<0.00056	102.92
Chloromethane	< 73.3	< 0.014	[redacted]	<0.00028	50.50
1.2 Dichloro-1.1.2.2-Tetrafluoroethane	< 73.3	< 0.047	[redacted]	<0.00094	170.92
Vinyl Chloride	< 73.3	< 0.017	[redacted]	<0.00034	62.50
1.3-Butadiene	**1420**	**0.29**	[redacted]	**0.00574**	54.09
Bromomethane	< 73.3	< 0.026	[redacted]	<0.00052	94.94
Methanol	< 733	< 0.089	[redacted]	<0.0018	32.04
Chloroethane	< 73.3	< 0.018	[redacted]	<0.00035	64.50
Dichlorofluoromethane	< 73.3	< 0.028	[redacted]	<0.00056	102.92
Ethanol	< 293	< 0.051	[redacted]	<0.0010	46.07
Vinyl Bromide	< 73.3	< 0.030	[redacted]	<0.00059	106.96
Trichlorofluoromethane	< 73.3	< 0.035	[redacted]	<0.0007	127.50
Acetone	**1110**	**0.24**	[redacted]	**0.00482**	58.08
Isopropyl Alcohol	< 293	< 0.067	[redacted]	<0.0013	60.10
Allyl Chloride	< 147	< 0.042	[redacted]	<0.00084	76.53
1.1-Dichloroethene	< 73.3	< 0.027	[redacted]	<0.00053	96.00
Acrylonitrile	< 293	< 0.059	[redacted]	<0.0012	53.06
Methylene Chloride	< 147	< 0.054	[redacted]	<0.0011	98.00
Carbon Disulfide	< 293	< 0.084	[redacted]	<0.0017	76.14
1.1.2-Trichloro-1.2.2-Trifluoroethane	< 73.3	< 0.052	[redacted]	<0.0010	187.40
trans-1.2- Dichloroethene	< 73.3	< 0.027	[redacted]	<0.00053	96.94
1.1- Dichloroethane	< 73.3	< 0.027	[redacted]	<0.00054	98.00
MTBE	< 73.3	< 0.024	[redacted]	<0.00048	88.15
Vinyl Acetate	< 147	< 0.048	[redacted]	<0.00095	86.09
MEK	< 147	< 0.040	[redacted]	<0.00079	72.11
cis-1.2- Dichloroethene	< 73.3	< 0.027	[redacted]	<0.00053	96.00
Hexane	< 73.3	< 0.024	[redacted]	<0.00047	86.18
Chloroform	< 73.3	< 0.033	[redacted]	<0.00065	119.50
Ethyl Acetate	< 73.3	< 0.024	[redacted]	<0.00048	88.11
Tetrahydrofuran	< 73.3	< 0.020	[redacted]	<0.00039	72.11
1.2-Dichloroethane	< 73.3	< 0.027	[redacted]	<0.00054	98.00
Benzene	**987**	**0.29**	[redacted]	**0.00576**	78.11
Cyclohexane	< 73.3	<0.023	[redacted]	<0.00046	84.16
Heptane	< 73.3	<0.028	[redacted]	<0.00055	100.21
Toluene	**353**	**0.12**	[redacted]	**0.00243**	92.14
Carbon Tetrachloride	< 73.3	<0.042	[redacted]	<0.00084	153.24
1.2-Dichloropropane	< 73.3	<0.031	[redacted]	<0.00062	112.99
Bromodichloromethane	< 73.3	<0.045	[redacted]	<0.00090	163.83
1.4-Dioxane	< 293	<0.097	[redacted]	<0.0019	88.11
Trichloroethene	< 73.3	<0.036	[redacted]	<0.00072	131.40
2.2.4-Trimethylpentane	< 73.3	<0.032	[redacted]	<0.00063	114.23
cis-1.3-Dichloropropene	< 73.3	<0.031	[redacted]	<0.00061	110.97
4-Methyl-2-Pentanone (MiBK)	< 147	<0.056	[redacted]	<0.0011	100.16
t-1.3-Dichloropropene	< 73.3	<0.031	[redacted]	<0.00061	110.97
1.1.2-Trichloroethane	< 73.3	<0.037	[redacted]	<0.00073	133.40
2-Hexanone	< 293	<0.149	[redacted]	<0.0029	134.60
Dibromochloromethane	< 73.3	<0.058	[redacted]	<0.0011	208.28
1.2-Dibromomethane	< 73.3	<0.052	[redacted]	<0.0010	187.88
Tetrachloroethylene	< 73.3	<0.046	[redacted]	<0.00091	165.83
Chlorobenzene	< 73.3	<0.031	[redacted]	<0.00062	112.56
Ethylbenzene	< 73.3	<0.029	[redacted]	<0.00058	106.16
m & p-Xylenes	< 147	<0.059	[redacted]	<0.0012	106.16
Bromoform	< 73.3	<0.070	[redacted]	<0.0014	252.72
Styrene	**89.4**	**<0.035**	[redacted]	**0.00070**	104.14
1.1.2.2-Tetrachloroethane	< 73.3	<0.046	[redacted]	<0.00092	167.85
o-Xylene	< 73.3	<0.029	[redacted]	<0.00058	106.16
4-Ethyltoluene	< 73.3	<0.033	[redacted]	<0.00066	120.19
1.3.5-Trimethylbenzene	< 73.3	<0.031	[redacted]	<0.00062	112.99
1.2.4-Trimethylbenzene	< 147	<0.067	[redacted]	<0.0013	120.19
Benzyl Chloride	< 733	<0.35	[redacted]	<0.0069	126.59
1.3-Dichlorobenzene	< 73.3	<0.041	[redacted]	<0.00081	147.00
1.4-Dichlorobenzene	< 73.3	<0.041	[redacted]	<0.00081	147.01
1.2-Dichlorobenzene	< 73.3	<0.041	[redacted]	<0.00081	147.01
1.2.4-Trichlorobenzene	< 293	<0.201	[redacted]	<0.0040	181.45
Hexachlorobutadiene	< 293	<0.29	[redacted]	<0.0057	260.76
1.1.1-Trichloroethene	< 73.3	<0.036	[redacted]	<0.00072	131.40

lb/hr = (ppb/1000) * Ostd * MW * 0.0000001581
lb/MMBtu = F-Factor (8710)*lb/hr/(60*Ostd)*20.9/(20.9-O2)
lb/ton = lb/hr/tons/hr

ALL AMERICAN ASPHALT IRVINE 221-061

CALCULATED EMISSION RESULTS EPA METHOD 0011

	Run 1	Run 2	Run 3	Average (3 Runs)
Formaldehyde (HCHO)				
HCHO Weight (ug/sample)	5220	7630	7950	6933
HCHO Flow Rate (lb/hr)	0.17	0.24	0.26	0.22
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
HCHO Flow Rate (lb/MMbtu)	0.00355	0.00469	0.00528	0.00451
Acetaldehyde (CH3CHO)				
CH3CHO Weight (ug/sample)	1560	1180	2160	1633
CH3CHO Flow Rate (lb/hr)	0.050	0.037	0.070	0.052
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
CH3CHO Flow Rate (lb/MMbtu)	0.00104	0.000723	0.00142	0.00106

ALL AMERICAN ASPHALT IRVINE 221-061
CALCULATED EMISSION RESULTS CARB METHOD 425

	Run 1	**Run 2**	**Run 3**	**Average (3 Runs)**
Probe Rinse CR+6 Weight (g)	0.000000022	0.000000009	0.000000051	0.000000028
Impinger #1 CR+6 Weight (g)	0.000000038	0.000000035	0.000000047	0.000000040
Impinger #2 CR+6 Weight (g)	0.000000024	0.000000065	0.000000031	0.000000040
Total CR+6 Weight (g)	0.000000085	0.000000072	0.000000104	0.000000087
Cr+6 Emissions (grain/Dscf)	0.0000000056	0.0000000047	0.0000000068	0.0000000057
Cr+6 Flow Rate (lb/hr)	0.0000011	0.00000098	0.0000014	0.0000012
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Cr+6 Flow Rate (lb/MMBtu)	0.0000000234	0.000000191	0.000000286	0.000000167

6.0 QUALITY ASSURANCE

Quality control procedures used in the test program follow SCAQMD, EPA & CARB procedures. Calibration methods and frequency follow the text of SCAQMD Source Test Manual.

Quality control procedures used in continuous emissions monitoring follow SCAQMD Method 100.1 procedures. All method performance checks conducted during the subject test program were within allowable tolerances.

The analyzers used for the continuous emissions monitoring of CO2 and O2 have been approved by the California Air Resources Board for such use.

Acquired data is reduced using computer spreadsheets and validated using sound criteria by an individual familiar with the field procedures used. Results are reviewed by a second individual to prevent data reduction and reporting errors.

EPA Method TO-15 and 0011/SW846
CARB Methods 425-436 and 429 followed each agencies procedures.

AIRx TESTING SERVICES, INC.

CONFLICT OF INTEREST NEGATIVE DECLARATION

AIRx Testing is an independent emissions testing contractor.

AIRx Testing maintains that no conflict of interest exists between the partners and employees of AIRx Testing, and the partners, employees or interests involved in the facility detailed in this report.

INDEPENDENT CONTRACTOR

Tom Porter

Signature

Tom Porter – Vice President

08/ 9/2021

Date of Signature

Source Test Report

All American Asphalt
10671 Jeffrey Road
Irvine, CA 92602

Source Tested: One (1) Carbon Absorption Unit
Test Dates: March 17-19, 2021

AST Project No. 2021-0883

Prepared By
Alliance Source Testing, LLC
3683 W 2270 S, Suite E
West Valley City, UT 84120

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SOURCE TESTING
stacktest.com

EMISSIONS MONITORING
alliance-em.com

ANALYTICAL SERVICES
allianceanalyticalservices.com

Regulatory Information

Facility No.	082207
SCAQMD Application No.	623921

Source Information

Source Name	*Source ID*	*Target Parameters*
One (1) Carbon Adsorption Unit Inlet and Outlet	CAU	Metals, Toxic Organics, PAH, VOC, Total Sulfur

Contact Information

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Alliance Source Testing, LLC (AST) has completed the source testing as described in this report. Results apply only to the source(s) tested and operating condition(s) for the specific test date(s) and time(s) identified within this report. All results are intended to be considered in their entirety, and AST is not responsible for use of less than the complete test report without written consent. This report shall not be reproduced in full or in part without written approval from the customer.

To the best of my knowledge and abilities, all information, facts and test data are correct. Data presented in this report has been checked for completeness and is accurate, error-free and legible. Onsite testing was conducted in accordance with approved internal Standard Operating Procedures. Any deviations or problems are detailed in the relevant sections on the test report.

This report is only considered valid once an authorized representative of AST has signed in the space provided below; any other version is considered draft. This document was prepared in portable document format (.pdf) and contains pages as identified in the bottom footer of this document.

Austin Keough, QSTI
Alliance Source Testing, LLC

April 16, 2021
Date

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Introduction

1.0 Introduction

Alliance Source Testing, LLC (AST) was retained by All American Asphalt, Corona (All American Asphalt) to conduct compliance testing at the Crumb Rubber Asphalt plant in Irvine, California. Testing was completed using the combined efforts of the Cypress, California and Salt Lake City, Utah facilities. The facility operates under South Coast Air Quality Management District Rule 441 and the SCAQMD Application No. 623921. Testing was conducted to determine the concentration and emission rates of multiple metals, toxic organics, polycyclic aromatic hydrocarbons (PAH), volatile organic compounds (VOC) and total sulfur compounds from the inlet and the outlet of the Carbon Adsorption Unit (CAU).

1.1 Source and Control System Descriptions

The CAU (A/N 623921) is identified as follows: 1) Carbon Adsorber, ENVENT Corporation, Model EC-2000, with Two Canisters in series (Primary and Secondary), each 3'-9.5" x 7'-10" and each with 2,000 pounds of activated carbon. 2) Venting Two Electrostatic Precipitators.

1.2 Project Team

Personnel involved in this project are identified in the following table.

Table 1-1
Project Team

SCAQMD Personnel	Bill Welch
AST Personnel	Austin Keough Charles Figueroa Tobias Hubbard Robert Lewis George Huner Michael Benini

1.3 Test Program Notes

Testing was conducted in compliance with the test protocol submitted by Airx Testing Services and accepted by the District (Ref: P21000) with the following deviations agreed to by the District:

Since the emissions expect to have no products of combustion, the Gas Density was agreed to be assumed as ambient and the continuous emission monitoring using SCAQMD Method 100.1 was removed from the test program

After additional review of the proposed test locations, SCAQMD 1.2 and 2.3 were agreed to be utilized at both test locations.

A total of three sets of sampling ports, each meeting the minimum straight run criteria were installed at both the 6" diameter inlet duct and outlet stack. The two upstream sets of ports were used for the isokinetic sampling for the PAH and Metals test program (1 set for each). The downstream set of ports was used to measure simultaneous flows for isokinetic calculations and mass emissions.

The inlet duct was a fixed section of PVC pipe that replaced a section of flexible ducting between the ESP and the first carbon cannister. his section of ducting was placed horizontally approximately 30 inches above ground level.

The exhaust duct was placed directly over the auxiliary blower exiting the second carbon cannister and extended vertically approximately 14-feet above ground level. The sample ports were accessible using a 6-foot temporary scaffold.

Summary of Results

2.0 Summary of Results

AST conducted compliance testing at the All American Asphalt Crumb Rubber Asphalt plant in Irvine, California on March 17-19, 2021. The test team setup on March 16, 2021 and collected preliminary flows and respective field blanks. Testing coincided with the normal production schedule from approximately 4am to noon each test day. Testing consisted of determining the emission rates of multiple metals, toxic organics, PAH, VOC and total sulfur compounds from the inlet and the outlet of the CAU.

The Crumb Rubber process is a batch process where the crumb rubber is added to the hopper approximately every two hours. During each of the AST 8-hour test runs crumb rubber hopper additions occurred at the beginning of our testing and then two additional times in 2-hr increments. The last two hours of the test program did not include a hopper addition (due to production demands) and the emission were primarily derived from the blending tank.

Although each the Metals and PAH sampling test were conducted over the entire 8-hr period, each of the other collected samples were collected in 1-hr increments. Each of these were sampled during the first 6 hours of process that would include the emissions from both the active hopper and the blending tank.

Tables 2-1 through 2-8 provide summaries of the emission testing results. Any difference between the summary results listed in the following tables and the detailed results contained in appendices is due to rounding for presentation.

Table 2-1
Summary of Results – TRS

Run Number	Run 1	Run 2	Run 3	Average
Date	**3/17/21**	**3/18/21**	**3/19/21**	**--**
Total Sulfur Data				
Inlet Concentration, ppmvd	2.9	4.8	4.1	3.9
Inlet Emission Rate, lb/hr	1.1E-02	1.7E-02	1.4E-02	1.4E-02
Outlet Concentration, ppmvd	<0.050	<0.050	<0.050	<0.050
Outlet Emission Rate, lb/hr	<1.9E-04	<1.9E-04	<1.9E-04	<1.9E-04

Table 2-2
Summary of Results – TGNMEO

Run Number	Run 1	Run 2	Run 3	Average
Date	**3/17/21**	**3/18/21**	**3/19/21**	**--**
Total Gaseous Non-Methane/Ethane Organics Data				
Inlet Concentration, ppmvd	363.0	844.5	565.5	591.0
Inlet Emission Rate, lb/hr (as methane)	0.62	1.4	0.91	0.97
Outlet Concentration, ppmvd	13.6	6.8	13.3	11.2
Outlet Emission Rate, lb/hr (as methane)	0.024	0.012	0.023	0.020

Table 2-3
Summary of Results – TO-15 Inlet

Run Number Date	Run 1 3/17/21	Run 2 3/18/21	Run 3 3/19/21	Average --
1,3-Butadiene Concentration, ppbvd	<308.1	<151.7	<282.5	<247.4
1,3-Butadiene Emission Rate, lb/hr	<1.8E-03	<8.4E-04	<1.5E-03	<1.4E-03
2,2,4-Trimethylpentane Concentration, ppbvd	146.5	202.2	121.1	156.6
2,2,4-Trimethylpentane Emission Rate, lb/hr	1.8E-03	2.4E-03	1.4E-03	1.8E-03
2-Butanone (MEK) Concentration, ppbvd	580.8	773.5	570.1	641.5
2-Butanone (MEK) Emission Rate, lb/hr	4.5E-03	5.7E-03	4.1E-03	4.8E-03
4-Methyl-2-pentanone (MIBK) Concentration, ppbvd	1,161.6	3,083.9	2,472.3	2,239.3
4-Methyl-2-pentanone (MIBK) Emission Rate, lb/hr	1.2E-02	3.1E-02	2.5E-02	2.3E-02
Acetone Concentration, ppbvd	2,929.3	4,701.7	3,834.5	3,821.8
Acetone Emission Rate, lb/hr	1.8E-02	2.8E-02	2.2E-02	2.3E-02
Benzene Concentration, ppbvd	287.9	814.0	580.2	560.7
Benzene Emission Rate, lb/hr	2.4E-03	6.5E-03	4.6E-03	4.5E-03
Cyclohexane Concentration, ppbvd	545.5	1,006.1	615.5	722.4
Cyclohexane Emission Rate, lb/hr	4.9E-03	8.6E-03	5.2E-03	6.3E-03
Ethanol Concentration, ppbvd	4,646.5	8,695.7	6,054.5	6,465.5
Ethanol Emission Rate, lb/hr	2.3E-02	4.1E-02	2.8E-02	3.1E-02
Ethylbenzene Concentration, ppbvd	68.7	121.3	82.2	90.8
Ethylbenzene Emission Rate, lb/hr	7.8E-04	1.3E-03	8.8E-04	9.9E-04
Heptane Concentration, ppbvd	722.2	1,087.0	600.4	803.2
Heptane Emission Rate, lb/hr	7.7E-03	1.1E-02	6.1E-03	8.3E-03
Hexane Concentration, ppbvd	1,464.6	1,921.1	1,311.8	1,565.9
Hexane Emission Rate, lb/hr	1.4E-02	1.7E-02	1.1E-02	1.4E-02
m-Xylene & p-Xylene Concentration, ppbvd	580.8	1,668.4	1,311.8	1,187.0
m-Xylene & p-Xylene Emission Rate, lb/hr	6.6E-03	1.8E-02	1.4E-02	1.3E-02
Methanol Concentration, ppbvd	13,636.4	21,739.1	13,622.6	16,332.7
Methanol Emission Rate, lb/hr	4.7E-02	7.1E-02	4.4E-02	5.4E-02
Propene Concentration, ppbvd	2,878.8	3,488.4	2,775.0	3,047.4
Propene Emission Rate, lb/hr	1.3E-02	1.5E-02	1.2E-02	1.3E-02
Toluene Concentration, ppbvd	323.2	657.2	499.5	493.3
Toluene Emission Rate, lb/hr	3.2E-03	6.2E-03	4.6E-03	4.7E-03
o-Xylene Concentration, ppbvd	<50.5	75.8	51.0	59.1
o-Xylene Emission Rate, lb/hr	<5.7E-04	8.2E-04	5.5E-04	6.5E-04
Carbon disulfide Concentration, ppbvd	237.4	353.9	201.8	264.4
Carbon disulfide Emission Rate, lb/hr	1.9E-03	2.7E-03	1.5E-03	2.1E-03
Chlorodifluoromethane (TIC *) Concentration, ppbvd	<474.7	<121.3	<272.5	<289.5
Chlorodifluoromethane (TIC) Emission Rate, lb/hr	<4.4E-03	<1.1E-03	<2.4E-03	<2.6E-03
Dichlorofluoromethane (TIC) Concentration, ppbvd	NA	NA	<131.2	<131.2
Dichlorofluoromethane (TIC) Emission Rate, lb/hr	NA	NA	<1.4E-03	<1.4E-03

* TIC = tentatively identified compounds

Table 2-4
Summary of Results – TO-15 Outlet

Run Number	**Run 1**	**Run 2**	**Run 3**	**Average**
Date	**3/17/21**	**3/18/21**	**3/19/21**	**--**
1,3-Butadiene Concentration, ppbvd	<2.1	<6.0	<22.6	<10.3
1,3-Butadiene Emission Rate, lb/hr	<1.2E-05	<3.6E-05	<1.3E-04	<6.1E-05
2,2,4-Trimethylpentane Concentration, ppbvd	<0.68	<2.0	<7.5	<3.4
2,2,4-Trimethylpentane Emission Rate, lb/hr	<8.5E-06	<2.5E-05	<9.4E-05	<4.3E-05
2-Butanone (MEK) Concentration, ppbvd	<2.1	<6.0	<22.6	<10.3
2-Butanone (MEK) Emission Rate, lb/hr	<1.6E-05	<4.7E-05	<1.8E-04	<8.1E-05
4-Methyl-2-pentanone (MIBK) Concentration, ppbvd	<2.1	<6.0	<22.6	<10.3
4-Methyl-2-pentanone (MIBK) Emission Rate, lb/hr	<2.3E-05	<6.6E-05	<2.5E-04	<1.1E-04
Acetone Concentration, ppbvd	126.6	<21.7	<30.2	<59.5
Acetone Emission Rate, lb/hr	8.1E-04	<1.4E-04	<1.9E-04	<3.8E-04
Benzene Concentration, ppbvd	<0.68	<2.0	<7.5	<3.4
Benzene Emission Rate, lb/hr	<5.8E-06	<1.7E-05	<6.4E-05	<2.9E-05
Cyclohexane Concentration, ppbvd	<0.68	<2.0	<7.5	<3.4
Cyclohexane Emission Rate, lb/hr	<6.2E-06	<1.8E-05	<6.9E-05	<3.1E-05
Ethanol Concentration, ppbvd	11.5	<20.2	<75.5	<35.7
Ethanol Emission Rate, lb/hr	5.8E-05	<1.0E-04	<3.8E-04	<1.8E-04
Ethylbenzene Concentration, ppbvd	<0.68	<2.0	<7.5	<3.4
Ethylbenzene Emission Rate, lb/hr	<7.9E-06	<2.3E-05	<8.8E-05	<4.0E-05
Heptane Concentration, ppbvd	<2.7	<8.1	<30.2	<13.7
Heptane Emission Rate, lb/hr	<3.0E-05	<8.8E-05	<3.3E-04	<1.5E-04
Hexane Concentration, ppbvd	<2.9	<8.1	<30.2	<13.7
Hexane Emission Rate, lb/hr	<2.8E-05	<7.5E-05	<2.8E-04	<1.3E-04
m-Xylene & p-Xylene Concentration, ppbvd	<2.7	<8.1	<30.2	<13.7
m-Xylene & p-Xylene Emission Rate, lb/hr	<3.2E-05	<9.3E-05	<3.5E-04	<1.6E-04
Methanol Concentration, ppbvd	156.4	630.0	3,068.4	1,285.0
Methanol Emission Rate, lb/hr	5.5E-04	2.2E-03	1.1E-02	4.5E-03
Propene Concentration, ppbvd	<13.6	<40.3	<150.9	<68.3
Propene Emission Rate, lb/hr	<6.3E-05	<1.8E-04	<6.9E-04	<3.1E-04
Toluene Concentration, ppbvd	<0.68	<2.0	<7.5	<3.4
Toluene Emission Rate, lb/hr	<6.8E-06	<2.0E-05	<7.6E-05	<3.4E-05
o-Xylene Concentration, ppbvd	<0.68	<2.0	<7.5	<3.4
o-Xylene Emission Rate, lb/hr	<7.9E-06	<2.3E-05	<8.8E-05	<4.0E-05
Chloromethane Concentration, ppbvd	<0.68	15.6	12.6	9.6
Chloromethane Emission Rate, lb/hr	<3.7E-06	8.6E-05	6.9E-05	5.3E-05
Carbon disulfide Concentration, ppbvd	<2.7	<8.1	<30.2	<13.7
Carbon disulfide Emission Rate, lb/hr	<2.3E-05	<6.7E-05	<2.5E-04	<1.1E-04
Chlorodifluoromethane (TIC*) Concentration, ppbvd	NA	19.2	68.9	44.0
Chlorodifluoromethane (TIC) Emission Rate, lb/hr	NA	1.8E-04	6.5E-04	4.2E-04
Dichlorofluoromethane (TIC) Concentration, ppbvd	NA	NA	NA	NA
Dichlorofluoromethane (TIC) Emission Rate, lb/hr	NA	NA	NA	NA

* TIC = tentatively identified compounds

Table 2-5
Summary of Results – PAH Inlet

Run Number	**Run 1**	**Run 2**	**Run 3**	**Average**
Date	**3/17/21**	**3/18/21**	**3/19/21**	**–**
Naphthalene Concentration, ng/dscm	355,008	421,597	414,599	397,068
Naphthalene Emission Rate, lb/hr	9.0E-04	1.0E-03	1.0E-03	9.7E-04
2-Methylnaphthalene Concentration, ng/dscm	109,075	142,949	160,060	137,361
2-Methylnaphthalene Emission Rate, lb/hr	2.8E-04	3.5E-04	3.8E-04	3.4E-04
Acenaphthylene Concentration, ng/dscm	<514.5	<517.9	641.3	557.9
Acenaphthylene Emission Rate, lb/hr	<1.3E-06	<1.3E-06	1.5E-06	1.4E-06
Acenaphthene Concentration, ng/dscm	889.1	1,212.0	1,333.8	1,145.0
Acenaphthene Emission Rate, lb/hr	2.3E-06	2.9E-06	3.2E-06	2.8E-06
Fluorene Concentration, ng/dscm	770.7	811.1	967.0	849.6
Fluorene Emission Rate, lb/hr	2.0E-06	2.0E-06	2.3E-06	2.1E-06
Phenanthrene Concentration, ng/dscm	726.5	1,429.5	1,344.9	1,167.0
Phenanthrene Emission Rate, lb/hr	1.8E-06	3.5E-06	3.2E-06	2.8E-06
Anthracene Concentration, ng/dscm	882.9	695.1	875.9	817.9
Anthracene Emission Rate, lb/hr	2.2E-06	1.7E-06	2.1E-06	2.0E-06
Fluoranthene Concentration, ng/dscm	36.1	25.2	68.0	43.1
Fluoranthene Emission Rate, lb/hr	9.2E-08	6.1E-08	1.6E-07	1.1E-07
Pyrene Concentration, ng/dscm	80.9	56.4	147.8	95.0
Pyrene Emission Rate, lb/hr	2.1E-07	1.4E-07	3.6E-07	2.3E-07
Benz(a)anthracene Concentration, ng/dscm	1.1	1.2	1.7	1.3
Benz(a)anthracene Emission Rate, lb/hr	2.9E-09	2.9E-09	4.0E-09	3.3E-09
Chrysene Concentration, ng/dscm	8.5	9.1	11.7	9.8
Chrysene Emission Rate, lb/hr	2.2E-08	2.2E-08	2.8E-08	2.4E-08
Benzo(b)fluoranthene Concentration, ng/dscm	2.1	1.5	7.1	3.6
Benzo(b)fluoranthene Emission Rate, lb/hr	5.4E-09	3.7E-09	1.7E-08	8.7E-09
Benzo(k)fluoranthene Concentration, ng/dscm	<1.0	<1.0	1.7	1.3
Benzo(k)fluoranthene Emission Rate, lb/hr	<2.6E-09	<2.5E-09	4.2E-09	3.1E-09
Benzo(e)pyrene Concentration, ng/dscm	9.9	7.1	51.2	22.7
Benzo(e)pyrene Emission Rate, lb/hr	2.5E-08	1.7E-08	1.2E-07	5.5E-08
Benzo(a)pyrene Concentration, ng/dscm	2.5	1.7	5.6	3.2
Benzo(a)pyrene Emission Rate, lb/hr	6.3E-09	4.0E-09	1.3E-08	7.9E-09
Perylene Concentration, ng/dscm	1.0	1.2	1.2	1.1
Perylene Emission Rate, lb/hr	2.6E-09	2.9E-09	2.9E-09	2.8E-09
Indeno(1,2,3-c,d)pyrene Concentration, ng/dscm	3.2	1.6	10.3	5.0
Indeno(1,2,3-c,d)pyrene Emission Rate, lb/hr	8.2E-09	3.8E-09	2.5E-08	1.2E-08
Dibenz(a,h)anthracene Concentration, ng/dscm	<1.0	<1.0	<1.1	<1.1
Dibenz(a,h)anthracene Emission Rate, lb/hr	<2.6E-09	<2.5E-09	<2.7E-09	<2.6E-09
Benzo(g,h,i)perylene Concentration, ng/dscm	25.8	12.4	70.0	36.1
Benzo(g,h,i)perylene Emission Rate, lb/hr	6.6E-08	3.0E-08	1.7E-07	8.8E-08

Table 2-6
Summary of Results – PAH Outlet

Run Number Date	Run 1 3/17/21	Run 2 3/18/21	Run 3 3/19/21	Average –
Naphthalene Concentration, ng/dscm	52.1	31.3	22.5	35.3
Naphthalene Emission Rate, lb/hr	1.4E-07	8.0E-08	5.8E-08	9.1E-08
2-Methylnaphthalene Concentration, ng/dscm	68.2	41.2	33.1	47.5
2-Methylnaphthalene Emission Rate, lb/hr	1.8E-07	1.1E-07	8.5E-08	1.2E-07
Acenaphthylene Concentration, ng/dscm	2.4	1.4	1.5	1.8
Acenaphthylene Emission Rate, lb/hr	6.3E-09	3.7E-09	3.9E-09	4.6E-09
Acenaphthene Concentration, ng/dscm	96.8	63.4	60.3	73.5
Acenaphthene Emission Rate, lb/hr	2.5E-07	1.6E-07	1.6E-07	1.9E-07
Fluorene Concentration, ng/dscm	256.4	169.1	150.9	192.1
Fluorene Emission Rate, lb/hr	6.7E-07	4.3E-07	3.9E-07	5.0E-07
Phenanthrene Concentration, ng/dscm	256.4	255.0	216.6	242.6
Phenanthrene Emission Rate, lb/hr	6.7E-07	6.5E-07	5.6E-07	6.3E-07
Anthracene Concentration, ng/dscm	6.7	5.8	5.2	5.9
Anthracene Emission Rate, lb/hr	1.7E-08	1.5E-08	1.3E-08	1.5E-08
Fluoranthene Concentration, ng/dscm	10.8	10.2	8.0	9.7
Fluoranthene Emission Rate, lb/hr	2.8E-08	2.6E-08	2.1E-08	2.5E-08
Pyrene Concentration, ng/dscm	15.0	17.2	14.9	15.7
Pyrene Emission Rate, lb/hr	3.9E-08	4.4E-08	3.8E-08	4.0E-08
Benz(a)anthracene Concentration, ng/dscm	<0.90	<0.89	<0.89	<0.89
Benz(a)anthracene Emission Rate, lb/hr	<2.3E-09	<2.3E-09	<2.3E-09	<2.3E-09
Chrysene Concentration, ng/dscm	2.1	1.5	1.2	1.6
Chrysene Emission Rate, lb/hr	5.4E-09	3.9E-09	3.2E-09	4.1E-09
Benzo(b)fluoranthene Concentration, ng/dscm	<0.90	<0.89	<0.89	<0.89
Benzo(b)fluoranthene Emission Rate, lb/hr	<2.3E-09	<2.3E-09	<2.3E-09	<2.3E-09
Benzo(k)fluoranthene Concentration, ng/dscm	<0.90	<0.89	<0.89	<0.89
Benzo(k)fluoranthene Emission Rate, lb/hr	<2.3E-09	<2.3E-09	<2.3E-09	<2.3E-09
Benzo(e)pyrene Concentration, ng/dscm	2.2	2.2	2.8	2.4
Benzo(e)pyrene Emission Rate, lb/hr	5.8E-09	5.5E-09	7.3E-09	6.2E-09
Benzo(a)pyrene Concentration, ng/dscm	<0.90	<0.89	<0.89	<0.89
Benzo(a)pyrene Emission Rate, lb/hr	<2.3E-09	<2.3E-09	<2.3E-09	<2.3E-09
Perylene Concentration, ng/dscm	<0.90	<0.89	<0.89	<0.89
Perylene Emission Rate, lb/hr	<2.3E-09	<2.3E-09	<2.3E-09	<2.3E-09
Indeno(1,2,3-c,d)pyrene Concentration, ng/dscm	0.98	1.1	1.1	1.1
Indeno(1,2,3-c,d)pyrene Emission Rate, lb/hr	2.5E-09	2.8E-09	2.9E-09	2.7E-09
Dibenz(a,h)anthracene Concentration, ng/dscm	<0.90	<0.89	<0.89	<0.89
Dibenz(a,h)anthracene Emission Rate, lb/hr	<2.3E-09	<2.3E-09	<2.3E-09	<2.3E-09
Benzo(g,h,i)perylene Concentration, ng/dscm	7.4	9.0	9.1	8.5
Benzo(g,h,i)perylene Emission Rate, lb/hr	1.9E-08	2.3E-08	2.3E-08	2.2E-08

Table 2-7
Summary of Results – Metals Inlet

Run Number **Date**	**Run 1** **3/17/21**	**Run 2** **3/18/21**	**Run 3** **3/19/21**	**Average** **--**
Aluminum Concentration, ug/dscm	9.4	9.1	9.7	9.4
Aluminum Emission Rate, lb/hr	2.4E-05	2.2E-05	2.3E-05	2.3E-05
Antimony Concentration, ug/dscm	<0.064	<0.066	<0.069	<0.066
Antimony Emission Rate, lb/hr	<1.6E-07	<1.6E-07	<1.6E-07	<1.6E-07
Arsenic Concentration, ug/dscm	0.083	0.039	0.027	0.050
Arsenic Emission Rate, lb/hr	2.1E-07	9.4E-08	6.5E-08	1.2E-07
Barium Concentration, ug/dscm	0.50	0.64	0.74	0.63
Barium Emission Rate, lb/hr	1.3E-06	1.5E-06	1.8E-06	1.5E-06
Beryllium Concentration, ug/dscm	<0.22	<0.22	<0.23	<0.22
Beryllium Emission Rate, lb/hr	<5.5E-07	<5.4E-07	<5.6E-07	<5.5E-07
Cadmium Concentration, ug/dscm	0.016	0.016	<0.014	0.015
Cadmium Emission Rate, lb/hr	4.1E-08	3.7E-08	<3.4E-08	3.7E-08
Chromium Concentration, ug/dscm	0.35	0.24	0.20	0.26
Chromium Emission Rate, lb/hr	8.9E-07	5.8E-07	4.8E-07	6.5E-07
Cobalt Concentration, ug/dscm	0.0094	0.0057	0.0005	0.0052
Cobalt Emission Rate, lb/hr	2.4E-08	1.4E-08	1.3E-09	1.3E-08
Copper Concentration, ug/dscm	0.43	0.24	0.93	0.53
Copper Emission Rate, lb/hr	1.1E-06	5.8E-07	2.2E-06	1.3E-06
Lead Concentration, ug/dscm	0.16	0.05	0.05	0.09
Lead Emission Rate, lb/hr	4.1E-07	1.2E-07	1.1E-07	2.1E-07
Manganese Concentration, ug/dscm	0.77	0.47	0.28	0.51
Manganese Emission Rate, lb/hr	2.0E-06	1.1E-06	6.8E-07	1.3E-06
Nickel Concentration, ug/dscm	0.42	0.32	0.25	0.33
Nickel Emission Rate, lb/hr	1.1E-06	7.7E-07	6.1E-07	8.1E-07
Phosphorus Concentration, ug/dscm	3.0	3.1	2.6	2.9
Phosphorus Emission Rate, lb/hr	7.7E-06	7.5E-06	6.3E-06	7.2E-06
Selenium Concentration, ug/dscm	<0.026	<0.026	0.028	0.027
Selenium Emission Rate, lb/hr	<6.5E-08	<6.3E-08	6.8E-08	6.5E-08
Silver Concentration, ug/dscm	0.083	0.035	0.019	0.046
Silver Emission Rate, lb/hr	2.1E-07	8.4E-08	4.6E-08	1.1E-07
Thallium Concentration, ug/dscm	<0.0051	<0.0052	<0.0055	<0.0053
Thallium Emission Rate, lb/hr	<1.3E-08	<1.3E-08	<1.3E-08	<1.3E-08
Vanadium Concentration, ug/dscm	<0.017	<0.017	<0.018	<0.018
Vanadium Emission Rate, lb/hr	<4.3E-08	<4.2E-08	<4.4E-08	<4.3E-08
Zinc Concentration, ug/dscm	0.93	0.80	0.97	0.90
Zinc Emission Rate, lb/hr	2.3E-06	1.9E-06	2.3E-06	2.2E-06
Mercury Concentration, ug/dscm	0.18	<0.084	<0.18	0.15
Mercury Emission Rate, lb/hr	4.7E-07	<2.0E-07	<4.2E-07	3.6E-07

Table 2-8
Summary of Results – Metals Outlet

Run Number Date	Run 1 3/17/21	Run 2 3/18/21	Run 3 3/19/21	Average --
Aluminum Concentration, ug/dscm	10.2	9.9	10.7	10.3
Aluminum Emission Rate, lb/hr	2.6E-05	2.5E-05	2.8E-05	2.6E-05
Antimony Concentration, ug/dscm	<0.063	<0.061	<0.061	<0.062
Antimony Emission Rate, lb/hr	<1.6E-07	<1.6E-07	<1.6E-07	<1.6E-07
Arsenic Concentration, ug/dscm	<0.025	<0.024	<0.024	<0.024
Arsenic Emission Rate, lb/hr	<6.5E-08	<6.2E-08	<6.2E-08	<6.3E-08
Barium Concentration, ug/dscm	0.78	0.60	0.73	0.70
Barium Emission Rate, lb/hr	2.0E-06	1.5E-06	1.9E-06	1.8E-06
Beryllium Concentration, ug/dscm	<0.21	<0.21	<0.21	<0.21
Beryllium Emission Rate, lb/hr	<5.5E-07	<5.3E-07	<5.3E-07	<5.4E-07
Cadmium Concentration, ug/dscm	0.028	0.018	0.013	0.020
Cadmium Emission Rate, lb/hr	7.2E-08	4.6E-08	3.5E-08	5.1E-08
Chromium Concentration, ug/dscm	0.41	0.17	0.21	0.26
Chromium Emission Rate, lb/hr	1.1E-06	4.4E-07	5.5E-07	6.8E-07
Cobalt Concentration, ug/dscm	0.030	0.014	0.030	0.025
Cobalt Emission Rate, lb/hr	7.7E-08	3.7E-08	7.8E-08	6.4E-08
Copper Concentration, ug/dscm	0.24	0.31	0.86	0.47
Copper Emission Rate, lb/hr	6.2E-07	8.0E-07	2.2E-06	1.2E-06
Lead Concentration, ug/dscm	0.057	0.049	0.12	0.074
Lead Emission Rate, lb/hr	1.5E-07	1.3E-07	3.0E-07	1.9E-07
Manganese Concentration, ug/dscm	1.5	1.9	1.3	1.6
Manganese Emission Rate, lb/hr	3.8E-06	4.8E-06	3.5E-06	4.0E-06
Nickel Concentration, ug/dscm	0.33	0.23	0.32	0.30
Nickel Emission Rate, lb/hr	8.6E-07	6.0E-07	8.3E-07	7.6E-07
Phosphorus Concentration, ug/dscm	2.2	2.3	2.9	2.5
Phosphorus Emission Rate, lb/hr	5.7E-06	6.0E-06	7.4E-06	6.4E-06
Selenium Concentration, ug/dscm	<0.025	<0.024	<0.024	<0.024
Selenium Emission Rate, lb/hr	<6.5E-08	<6.2E-08	<6.2E-08	<6.3E-08
Silver Concentration, ug/dscm	0.015	0.016	0.0065	0.013
Silver Emission Rate, lb/hr	3.8E-08	4.1E-08	1.7E-08	3.2E-08
Thallium Concentration, ug/dscm	<0.0050	<0.0048	<0.0048	<0.0049
Thallium Emission Rate, lb/hr	<1.3E-08	<1.2E-08	<1.2E-08	<1.3E-08
Vanadium Concentration, ug/dscm	<0.017	<0.016	<0.016	<0.016
Vanadium Emission Rate, lb/hr	<4.3E-08	<4.1E-08	<4.2E-08	<4.2E-08
Zinc Concentration, ug/dscm	0.65	0.90	1.3	0.96
Zinc Emission Rate, lb/hr	1.7E-06	2.3E-06	3.5E-06	2.5E-06
Mercury Concentration, ug/dscm	<0.18	<0.063	<0.094	<0.11
Mercury Emission Rate, lb/hr	<4.6E-07	<1.6E-07	<2.4E-07	<2.9E-07

Testing Methodology

3.0 Testing Methodology

The emission testing program was conducted in accordance with the test methods listed in Table 3-1. Method descriptions are provided below while quality assurance/quality control data is provided in Appendix D.

Table 3-1
Source Testing Methodology

Parameter	Reference Test Methods	Notes/Remarks
Volumetric Flow Rate	SCAQMD Methods 1.2 and 2.3	Full Velocity Traverses
Moisture Content	SCAQMD Method 4.1	Gravimetric Analysis
Multiple Metals	CARB Method 436	Isokinetic Sampling
Toxic Organics	U.S. EPA TO-15	Canister Sampling
Polycyclic Aromatic Hydrocarbons	CARB Method 429	Isokinetic Sampling
Volatile Organic Compounds	SCAQMD Methods 25.1 & 25.3	Canister Sampling
Total Sulfur Compounds	SCAQMD Method 307.91	Tedlar Bag Sampling

3.1 SCAQMD Reference Methods 1.2 and 2.3 – Volumetric Flow Rate of Small Ducts (4" – 12")

The sampling location and number of traverse (sampling) points were selected in accordance with SCAQMD Reference Test Method 1.2. The duct diameter was less than 12 inches; therefore, the velocity measurement location was located downstream of the sampling location, and the pitot tube and thermocouple were removed from the sampling probe assembly.

Full velocity traverses were conducted in accordance with SCAQMD Reference Test Method 2.3 to determine the average stack gas velocity pressure, static pressure and temperature. The velocity and static pressure measurement system consisted of a pitot tube and inclined manometer. The stack gas temperature was measured with a K-type thermocouple and pyrometer.

The O_2 and CO_2 concentration were assumed to be ambient for molecular weight and volumetric flow rate calculations.

3.2 SCAQMD Method 4.1 – Moisture Content

The stack gas moisture content was determined in accordance with SCAQMD Method 4.1. The gas conditioning train consisted of a series of chilled impingers. Prior to testing, each impinger was filled with a known quantity of water or silica gel. Each impinger was analyzed gravimetrically before and after each test run on the same balance to determine the amount of moisture condensed.

3.3 CARB Reference Test Method 436 – Multi-Metals

The metals testing was conducted in accordance with CARB Reference Test Method 436. The complete sampling system consisted of a glass nozzle, glass-lined probe, pre-cleaned heated quartz filter, gas conditioning system, pump and calibrated dry gas meter. The gas conditioning train consisted of six (6) chilled impingers. The first and second contained 100 mL of HNO_3/H_2O_2, the third was empty, the fourth and fifth contained 100 mL of acidic $KMnO_4$, and the sixth contained 200-300 grams of silica gel. The probe liner and filter heating systems were maintained at a temperature of 120 ± 14°C (248 ±25°F), and the impinger temperature was maintained at 20°C (68°F) or less throughout testing. Prior to testing, all glassware was cleaned and sealed in a controlled environment as outlined in the test method.

Following the completion of each test run, the sample train was leak checked at a vacuum pressure equal to or greater than the highest vacuum pressure observed during the run and the contents of the impingers were measured for moisture gain. The quartz filter was carefully removed and placed into container 1. The probe and nozzle were rinsed and brushed three (3) times with 0.1 N HNO_3 using a non-metallic brush and these rinses were placed in container 3. The front half of the filter holder was rinsed three (3) times with 0.1 N HNO_3 and these rinses were added to container 3. The contents of impingers 1, 2, and 3 were placed in container 4. Impingers 1, 2, and 3 along with the filter support, back half of the filter holder and all connecting glassware were triple-rinsed with 0.1 N HNO_3 and these rinses were added to container 4. The contents of impinger 4 were placed in container 5A. The impinger and connecting glassware were triple-rinsed with HNO_3 and these rinses added to container 5A. The contents of impingers 5 and 6 were placed in container 5B. The impingers and all connecting glassware were triple-rinsed with acidified $KMNO_4$ and then with de-ionized (DI) water and these rinses were added to container 5B. Impingers 5 and 6 were rinsed again with 25 mL of 8N HCl and this rinse was collected into container 5C, which contained 200 mL of DI water. All containers were sealed, labeled and liquid levels marked for transport to the identified laboratory for analysis.

3.4 U.S. EPA Reference Test Method TO-15– Toxic Organics

The toxic organics were sample simultaneously in duplicate from the CAU inlet and outlet for each of the three (3) 60-minute test runs. Summa passivated canisters were utilized to sample for the toxic organics. The Summa canisters were equipped with preset calibrated mass flow controllers. The sampling was integrated over each 60 minute test run. The sample were submitted for analyses by GC/MS (TO-15). The samples were analyzed within 72 hours of collection. The analysis followed EPA Method TO-15 methodology. The reported detection limit is 0.001ppmv or 1 ppb. The sample is cryogenically pre-concentration in a series of multi-bed traps, with water and CO2 management protocols, and finally cryofocused before desorption into the gas chromatograph.

Upon separation in the Gas Chromatograph, the sample is introduced into the mass spectrometer. The HAPs characteristic retention time and mass spectra qualitatively identify compounds.

3.5 CARB Reference Test Method 429 – Polycyclic Aromatic Hydrocarbons

The PAH testing was conducted in accordance with CARB Method 429. The complete sampling system consisted of a glass nozzle, glass-lined sample probe, gas conditioning system, pump, and calibrated gas meter. The gas conditioning train consisted of a spiral condenser, a spike sorbent module, and five (5) chilled impingers. The first impinger was initially empty, the second and third impingers contained 100ml of DI water, the third impinger was initially empty, and the fourth contained 200-300 grams of silica gel. The probe liner and filter heater system were maintained at a temperature of 120 ± 14°C (248 ±25°F), and the impinger temperature was maintained at 20°C (68°F) or less throughout testing. Prior to testing, all glassware was cleaned and sealed in a controlled environment as outlined in the test method.

Following the completion of each test run, the sample train was leak checked at a vacuum pressure equal to or greater than the highest vacuum pressure observed during the run and the contents of the impingers were measured for moisture gain. The recovery included rinsing the nozzle, probe, and top half of the filter holder three (3) times with acetone, hexane and methylene chloride with the rinses placed into a glass container labeled as "Front half rinses". The filter was removed and placed in a petri dish. The bottom half of the filter holder, connector connection, and the spiral condenser were rinses three (3) times with acetone, hexane and methylene chloride with the rinses placed into a glass container labeled as "Back half rinses". The front and back half rinses were combined for analysis. The impinger contents were transferred to a container labeled "Impinger contents" and then the impingers were rinses three (3) times with acetone, hexane and methylene chloride with the rinses placed into a glass container labeled as "Impinger rinses". The rinses were combined with the impinger contents for analysis. The spiked sorbent module was capped, and all containers were sealed, labeled and liquid levels marked for transport to the identified laboratory for analysis.

Add this for the Method 25.1 and 25.3 – our standard write ups – please format as needed

3.6 SCAQMD Method 25.3 – VOC, as TGNMO (Low- Level)

This method applies to the measurement of low-concentration (</= 50 ppmv) Volatile Organic Compounds (VOC) or total gaseous non-methane organics (TGNMO) as carbon in source emissions. In this method, gaseous samples were withdrawn from the gas stream at a constant rate through duplicate chilled condensate traps and collected in evacuated sample tanks. The sampling system is depicted in Figure 5-2. Each sampling train consisted of a in-stack filter (optional), sample probe, water-chilled mini-impinger, a flow control system, and an evacuated sample tank. The flow controller incorporated a combination vacuum/pressure gauge, which was connected directly to the canister. The TGNMO was determined by combining the analytical results obtained from independent analyses of the condensate traps (condensable fraction) and the sample tanks (gaseous fraction).

Prior to testing, the sampling system was pre-cleaned and evacuated in preparation for sample collection. On-site, the sampling system was leak-checked and the impingers were placed in an ice-slurry (the impingers were chilled for at least 30 minutes prior to sampling). Then the sample probe was placed in the stack, facing downstream to prevent collection of particulate matter. Pretest data was recorded and the sample valve was opened. The flow controller was based on a critical orifice that was preset to flow at a rate of 80-cc/min +/- 15%. Periodically, sampling train readings (i.e. tank vacuum) were recorded on the field data sheet. Sampling was stopped when one hour had elapsed. Then, the sampling train was removed from the stack and a leak check is performed. Samples are logged in and delivered to the laboratory for analysis.

The analytical system consists of two major sub-systems: a total organic carbon (TOC) analyzer capable of differentiating between total carbon (TC) and inorganic carbon (IC) and a non-methane organics (NMO) analyzer. The NMO analyzer is a gas chromatograph (GC) with backflush capability for NMO analysis and is equipped with an oxidation catalyst, reduction catalyst, and flame ionization detector (FID). The system for the recovery and conditioning of the organics captured in the condensate trap consists of a heat source, oxidation catalyst, non-dispersive infrared (NDIR) CO2 analyzer and an intermediate collection vessel (ICV). Analyses were performed as follows.

NMO collected in the water impinger were analyzed in the TOC analyzer. The TOC analyzer determined both TC and IC. The TOC was calculated as the difference between TC and IC.

The organic content of the sample fraction collected in the sampling tank is measured by injecting a gas sample into the GC to separate the NMO from carbon monoxide (CO), CO_2 and methane (CH_4). The NMO were oxidized to CO_2, reduced to CH_4, and measured by the FID. In this manner, the variable response of the FID (associated with different type of organic compounds) was eliminated. The sampling apparatus and sample analysis services were provided by Almega, which is an SCAQMD-approved laboratory.

3.7 SCAQMD Method 25.1 – VOC, as TGNMO (High-Level)

This method applies to the measurement of Volatile Organic Compounds (VOC) or total gaseous non-methane organics (TGNMO) as carbon in source emissions. In this Method, gaseous samples were withdrawn from the gas stream at a constant rate through duplicate chilled condensate traps and collected in evacuated sample tanks. Each sampling train consisted of an in-stack filter (optional), sample probe, condensate trap, a flow control system, and an evacuated sample tank. The flow controller incorporated a combination vacuum/pressure gauge, which was connected directly to the canister. The TGNMO was determined by combining the analytical results obtained from independent analyses of the condensate traps (condensable fraction) and the sample tanks (gaseous fraction). The sampling system is depicted in Figure 5-3.

Prior to testing, the sampling system was pre-cleaned and evacuated in preparation for sample collection. On-site, the sampling system was leak-checked and crushed dry ice was placed around each condensate trap. Then the sample probe was placed in the stack, facing downstream to prevent collection of particulate matter. Pretest data was recorded and the sample valve was opened. The flow controller was based on a critical orifice that was preset to flow at a rate of 80-cc/min +/- 15%. Periodically, sampling train readings (i.e. tank vacuum) were recorded on the field data sheet. Sampling was stopped when one hour had elapsed. Then, the sampling train was removed from the stack and a leak check was performed. Samples were logged in and delivered to the laboratory for analysis.

The analytical system consisted of two major sub-systems: an oxidation system for the recovery and the conditioning of the condensate trap contents, and a non-methane organics (NMO) analyzer. The NMO analyzer was a gas chromatograph (GC) with backflush capability for NMO analysis and was equipped with an oxidation catalyst, reduction catalyst, and flame ionization detector (FID). The system for the recovery and conditioning of the organics captured in the condensate trap consisted of a heat source, oxidation catalyst, non-dispersive infrared (NDIR) CO2 analyzer and an intermediate collection vessel (ICV).

The organic content of each condensate trap was oxidized to carbon dioxide (CO2), which is quantitatively collected in an evacuated vessel (the ICV); then a portion of the CO2 was reduced to methane (CH4) and measured by GC/NDIR or GC/FID. The organic content of the sample fraction collected in the sampling tank was measured by injecting a gas sample into the GC to separate the NMO from CO, CO2 and CH4. The NMO were oxidized to CO2, reduced to CH4, and measured by the FID. In this manner, the variable response of the FID (associated with different type of organic compounds) was eliminated. The sampling apparatus and sample analysis services were provided by Almega, which is a SCAQMD-approved laboratory.

3.8 SCAQMD Method 307-91 – Total Reduced Sulfur

The reduced sulfur compounds of the fuel content were measured according to SCAQMD Method 307-91. Field samples were collected from the sampling location into Tedlar bags using an air-tight sampling box. After a sample is collected, it is labeled and entered into a Chain of Custody. Within four hours after collection, samples are delivered to the Laboratory for analysis.

Samples are analyzed by GC/SCD within 24 hours after collection if collected in a Tedlar bag. Reduced sulfur compounds and SO_2 are separated by fuel. These compounds are then combusted in a hydrogen-rich flame to yield sulfur monoxide and other products. The sulfur monoxide is reacted with ozone to yield sulfur dioxide, oxygen and light. The light is detected with a photomultiplier and the response is calibrated against previously run standards. Analytical QC includes pre-test and continuing calibration of equipment, analysis of reference standards, and blanks, and replicate analysis of at least three samples.

Appendix B - Default Emission Factors for Fuel Combustion

Default Toxic Emission Factors for Form TAC Associated with Combustion Equipment are listed below and on the following pages. **If any of your combustion sources has district-approved source tests, use the emission factors developed from the source tests to calculate emissions.**

Table B-1: DEFAULT EF FOR NATURAL GAS COMBUSTION (LB / MMSCF)

SOURCE: External Combustion Equipment (Boiler, Oven, Dryer, Furnace, Heater, Afterburner)

TAC Code	POLLUTANT	CAS NO.	<10 MMBTU/HR	10-100 MMBTU/HR	>100 MMBTU/HR
2	Benzene	71432	0.0080	0.0058	0.0017
12	Formaldehyde	50000	0.0170	0.0123	0.0036
19	Total PAHs (excluding Naphthalene)	1151	0.0001	0.0001	0.0001
19	Naphthalene	91203	0.0003	0.0003	0.0003
29	Acetaldehyde	75070	0.0043	0.0031	0.0009
30	Acrolein	107028	0.0027	0.0027	0.0008
32	Ammonia*	7664417	18.000	18.000	18.000
40	Ethyl benzene	100414	0.0095	0.0069	0.0020
44	Hexane	110543	0.0063	0.0046	0.0013
68	Toluene	108883	0.0366	0.0265	0.0078
70	Xylene	1330207	0.0272	0.0197	0.0058

SOURCE: Flare, Non-Refinery

TAC Code	POLLUTANT	CAS NO.	ALL SIZES
2	Benzene	71432	0.159
12	Formaldehyde	50000	1.169
19	Total PAHs (excluding Naphthalene)	1151	0.003
19	Naphthalene	91203	0.011
29	Acetaldehyde	75070	0.043
30	Acrolein	107028	0.010
40	Ethyl benzene	100414	1.444
44	Hexane	110543	0.029
68	Toluene	108883	0.058
70	Xylene	1330207	0.029

SOURCE: Turbine

TAC Code	POLLUTANT	CAS NO.	TURBINE
2	Benzene	71432	0.0122
4	1,3-Butadiene	106990	0.000439
12	Formaldehyde	50000	0.724
19	Naphthalene	91203	0.00133
29	Acetaldehyde	75070	0.0408
30	Acrolein	107028	0.00653
32	Ammonia*	7664417	18.000
40	Ethylbenzene	100414	0.0326
62	Propylene oxide	75569	0.0296
68	Toluene	108883	0.133
70	Xylene	1330207	0.0653

***This value corresponds to equipment with SNCR, for equipment with SCR substitute listed value by 9.1 lbs/mmscf, and for equipment without SNCR or SCR by 3.2 lbs/mmscf.**

(continued)

Estimates of Air Emissions from Asphalt Storage Tanks and Truck Loading

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Title V of the 1990 Clean Air Act requires the accurate estimation of emissions rom all U.S. manufacturing processes, and places the burden of proof for that estimate on the process owner. This paper is published as a tool to assist in the estimation of air emissions from hot asphalt storage tanks and asphalt truck Loading operations. Data are presented on asphalt vapor pressure, vapor molecular weight, and the emission split between volatile organic compounds and particulate emissions that can be used with AP-42 calculation techniques to estimate air emissions from asphalt storage tanks and truck loading operations. Since current AP-42 techniques are not valid in asphalt tanks with active fume removal, a different technique for estimation of air emissions in those tanks, based on direct measurement of vapor space combustible gas content, is proposed. Likewise, since AP-42 does not address carbon monoxide or hydrogen sulfide emissions that are known to be present in asphalt operations, this paper proposes techniques for estimation of those emissions. Finally, data are presented on the effectiveness of fiber bed filters in reducing air emissions in asphalt operations.

INTRODUCTION

The use of asphalt is prevalent throughout recorded history. It is produced in refinery distillation towers and solvent extraction units. Asphalt is modified by several means: reacting with oxygen in blowing operations to produce roofing asphalts, emulsifying to produce an aqueous liquid at ambient temperature, blending with solvents to make asphalt cutback, or blending or even reacting with polymers to make polymer modified asphalt. In all these cases the asphalt is stored in tanks, usually fixed roof tanks, and is loaded into trucks to ship to customers.

Title V of the 1990 Clean Air Act required the accurate estimation of emissions from all U.S. manufacturing processes, and placed the burden of proof for that estimate on the process owner. In response to Title V, Owens Corning analyzed options for estimating emissions from asphalt tanks and loading operations and this paper is the result of that study. In particular, attempts have been made to develop data to be used with existing calculation methods to estimate air emissions in asphalt operations, to develop calculation schemes that work when existing methods cannot be used, and to expand the number of pollutants estimated. The techniques described in this paper have been used by Owens Corning to estimate asphalt emissions from their asphalt plants for many Title V permit applications.

Owens Corning also evaluated appropriate emission factors for the asphalt blowing process and that analysis has been published [I].

The Emission Factor and Inventory Group in the U. S. Environmental Protection Agency's (EPA) Office of Air Quality Planning and Standards develops and maintains a database of emission factors and a series of calculation methods for estimating air emissions from manufacturing processes. These emission factors are published in a series known as AP-42 [2]. One technique published in AP-42 calculates hydrocarbon emissions from a fixed roof tank storing petroleum products [3], and another calculates emissions for loading trucks with petroleum products [4]. These techniques require data on asphalt vapor pressure and the molecular weight of the -asphalt vapor. The calculations result in an estimate of the amount of hydrocarbons emitted from the process. To complete the emission estimate, these hydrocarbons need to be split into particulate emissions (PM) and volatile organic compounds (VOC), and any control device collection or destruction efficiencies need to be applied.

In the AP-42 calculation of emissions from fixed roof tanks it is assumed that the motive force pushing vapor out of the tank comes from either the pumping of liquid into the tank or the expansion of tank contents due to temperature changes. For tanks with an active ventilation system this assumption is invalid and a different method of emission estimation is required. This is especially true if an air sweep is used to control the vapor space composition to prevent explosive conditions [5,6]. A technique to estimate emissions from these actively controlled tanks is described in the section of this paper on non AP-42 estimates.

AP-42 EMISSION ESTIMATING TECHNIQUES FOR ASPHALT EQUIPMENT

Passive vented hot asphalt tanks: AP-42 for fixed roof petroleum tanks can be used to calculate total hydrocarbon emissions from asphalt and oil tanks that are passively vented to the atmosphere. This AP-42 calculation, simply stated, determines the amount of hydrocarbon in the tank vapor space from the vapor pressure of the material in the tank at the liquid surface temperature, and then calculates the amount of vapor forced out of the tank due to liquid being actively pumped into the tank (working losses), or due to thermal expansion or contraction of tank contents driven by ambient temperature changes (breathing losses). The result is an actual weight of hydrocarbon emissions in a specified time period. A detailed description of the tank calculations is available from the EPA web site [3]. The AP-42 calculation requires a vapor pressure versus temperature curve for the asphalt, and also estimates of the vapor phase molecular weight and partition of hydrocarbons into VOC and particulate, in addition to process data like asphalt throughput. temperature. and tank level. If the tank passively breathes through a control device, then the appropriate control efficiency is applied to the VOC and particulate emissions calculated from AP-42.

Hot Asphalt Loading: The AP-42 calculation for hydrocarbon emissions from truck or rail tank car loading of asphalt is done by estimating the amount of evaporation during the loading process. The estimate takes into account the turbulence and vapor liquid contact induced by the method of loading, ie. submerged versus splash loading. The calculation result is an emission related to the number of tons of material loaded into the truck. Vapor pressure versus temperature curves, temperature of loading, and throughputs are key variables in this calculation. Again, the hydrocarbon emission resulting from this calculation needs to be split into particulates and VOCs and control device collection and destruction efficiencies need to be applied. A detailed description of the loading calculations is available from the EPA web site [4].

DATA NEEDED FOR APPLICATION OF AP-42 TO ASPHALT EQUIPMENT

Vapor Pressure: Information on asphalt vapor pressure as a function of temperature is not readily available in the literature and its measurement is not common. However, these data are essential to use AP-42 calculations for estimating asphalt tank and loading emissions. Asphalts from different crude oil sources and from different processes will differ in composition and vapor pressure. In the extreme, every residual material used in asphalt processing would need to be measured for vapor pressure at multiple temperatures. This would entail a prohibitive amount of testing for minimal gain in accuracy of emission estimates. To provide a cost effective solution to this problem for its emission calculations, Owens Corning has characterized the vapor pressure of three basic classes of asphalt materials. chosen by their processing history. An estimate of the vapor pressure of each asphalt class was made by measuring asphalts from multiple crude oil sources in each class and using the average vapor pressure at each temperature in a regression to generate one vapor pressure equation for that class. The three classes of asphalt chosen for this analysis follow.

- Flux asphalts. or vacuum tower bottoms that can be used in the asphalt blowing process to make specification roofing asphalts. These materials generally have a higher vapor pressure than paving asphalts.
- Paving asphalts, or vacuum tower bottoms that meet paving specifications.
- Oxidized asphalt, or vacuum tower bottoms that have been reacted with oxygen in the asphalt blowing process to increase their softening point and viscosity. Typical softening points are greater than 190°F (88°C) These materials are also called air blown asphalts and are used extensively in the roofing industry. They generally have lower vapor pressure than the other two classes.

Vapor pressure measurements described in this paper were done by the Phoenix Chemical Lab in Chicago using the Isoteniscope (ASTM D2879).

To facilitate computer calculations it is desirable to develop an equation that accurately describes the relationship of vapor pressure and temperature. Thermodynamic treatment of the dependence of vapor pressure on temperature has led to the Clausius modification of the Clapeyron equation [7].

Clausius Clapeyron Treatment of Vapor Pressure Data

$$\ln P = a + b/T$$

Where: P is the equilibrium vapor pressure
of the liquid in question,
a & b are constants. and
T is the absolute temperature of the liquid
in question.
Values of a & b depend on the choice of
pressure and temperature units.

Table 1 and Figure 1 give an example of the agreement of this equation with vapor pressure data for oxidized asphalts from 13 sources around the country. In Figure 1, vapor pressure of each asphalt is plotted versus temperature to show the differences between asphalt's data to the Clausius Clapeyron each individual asphalt's data to the Clausius Clapeyron relationship. The correlation coefficients in Table 1 indicate that the agreement of this equation to all individual asphalt vapor pressure versus temperature data is excellent, with correlation coefficients for the individual asphalts greater than 0.9999. The agreement is also excellent for the individual asphalts making up the other two asphalt classes. Table 1 also presents the methodology to choose constants to use with the

Table I. Vapor Pressure Data for Oxidized Asphalts

	Temperature (°F[1])		All Data in mm Hg2								
Asphalt	200	250	300	350	400	450	500	550	575	600	r value[3]
Plant A			0.39	2	7.9	26	77	225		550	-0.999922929
Plant C		0.42	2	7.9	26		180	400	670		-0.999934558
Plant H		0.43	2	7.7	25		165	410	590		-0.999939281
Plant I		0.44	1.9	7.2	22	59	140	340		680	-0.999945804
PlantK	0.43	1.7	6.1	18.5	50	115	205	510	680		-0.999660554
PlantM	0.28	1.2	4.6	15	41	97	210	460	640		-0.999948167
PlantN	0.19	0.88	3.5	12	34	85	190	430	590		-0.999965421
PlantP	0.46	1.8	6	17.5	44	96	195	410		710	-0.999948079
Plant0		0.11	0.47	1.7	5.2	13.2	34	74		142	-0.999916578
Plant J		0.16	0.64	2.2	6.2	14.8	36	72		135	-0.999838114
PlantS	0.28	1.05	3.3	9.4	23	50	105	200		350	-0.999986213
PlantS				0.28	1	3.2	10	25		58	-0.999875798
PlantX		0.1	0.4	1.5	4.7	12.5	33	75		152	-0.999930649
Class Standard	0.22	0.91	3.2	9.5	24.9	58.8	127	254	351	477	
Average Vp	0.33	0.75	2.6	7.9	22.3	54.7	122	284	634	347	-0.994026635

13459 b in Clausius Clapeyron curve for average vapor pressure data
18.86 a in Clausius Clapeyron curve for average vapor pressure data ·

1. 1 °C= (°F - 32) * 5/9
2. 1 Pa = 0.0075 mm Hg
the r value is for the fit of the vapor pressure data to the Clausius Clapeyron Equation

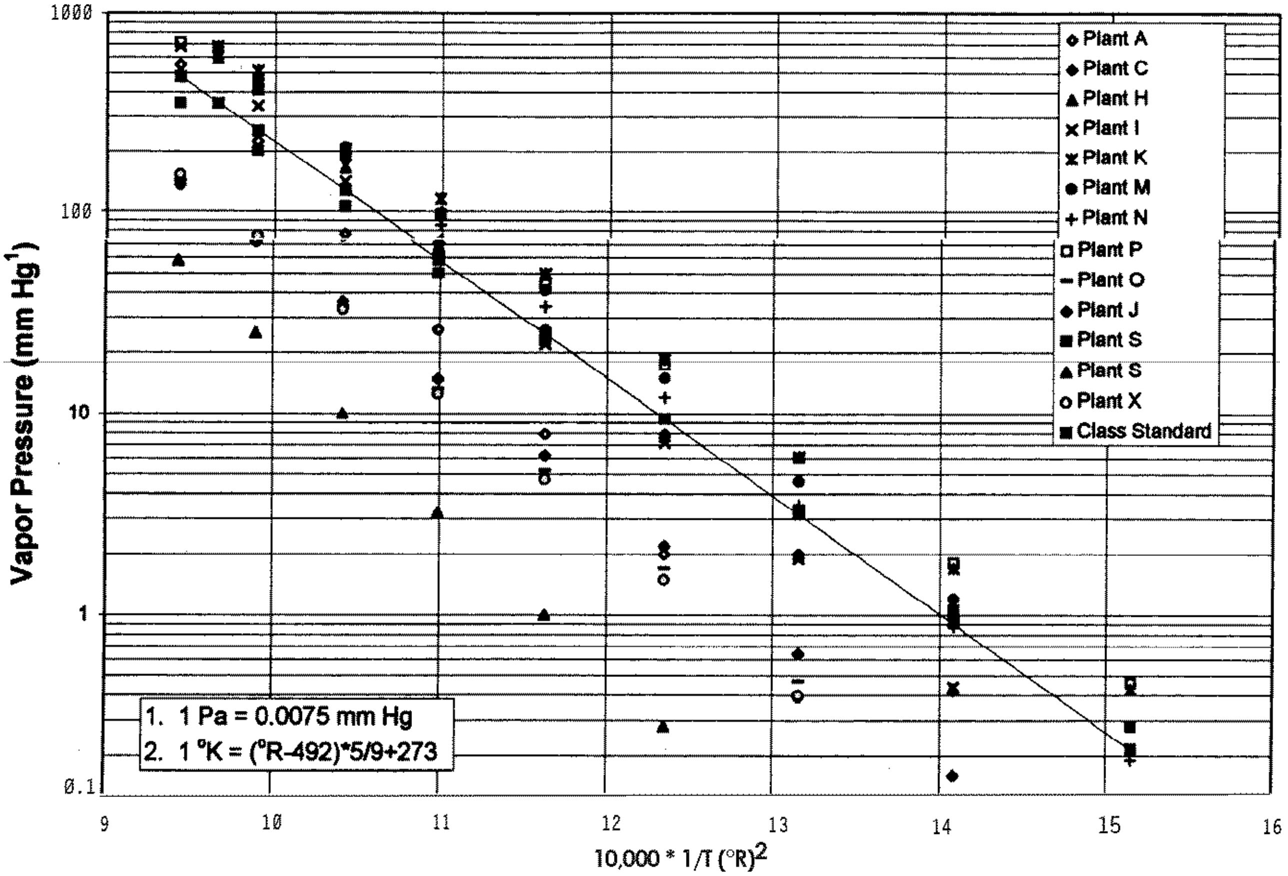

FIGURE 1. Oxidized Asphalt Vapor Pressure Data in Clausius Clapeyron Format

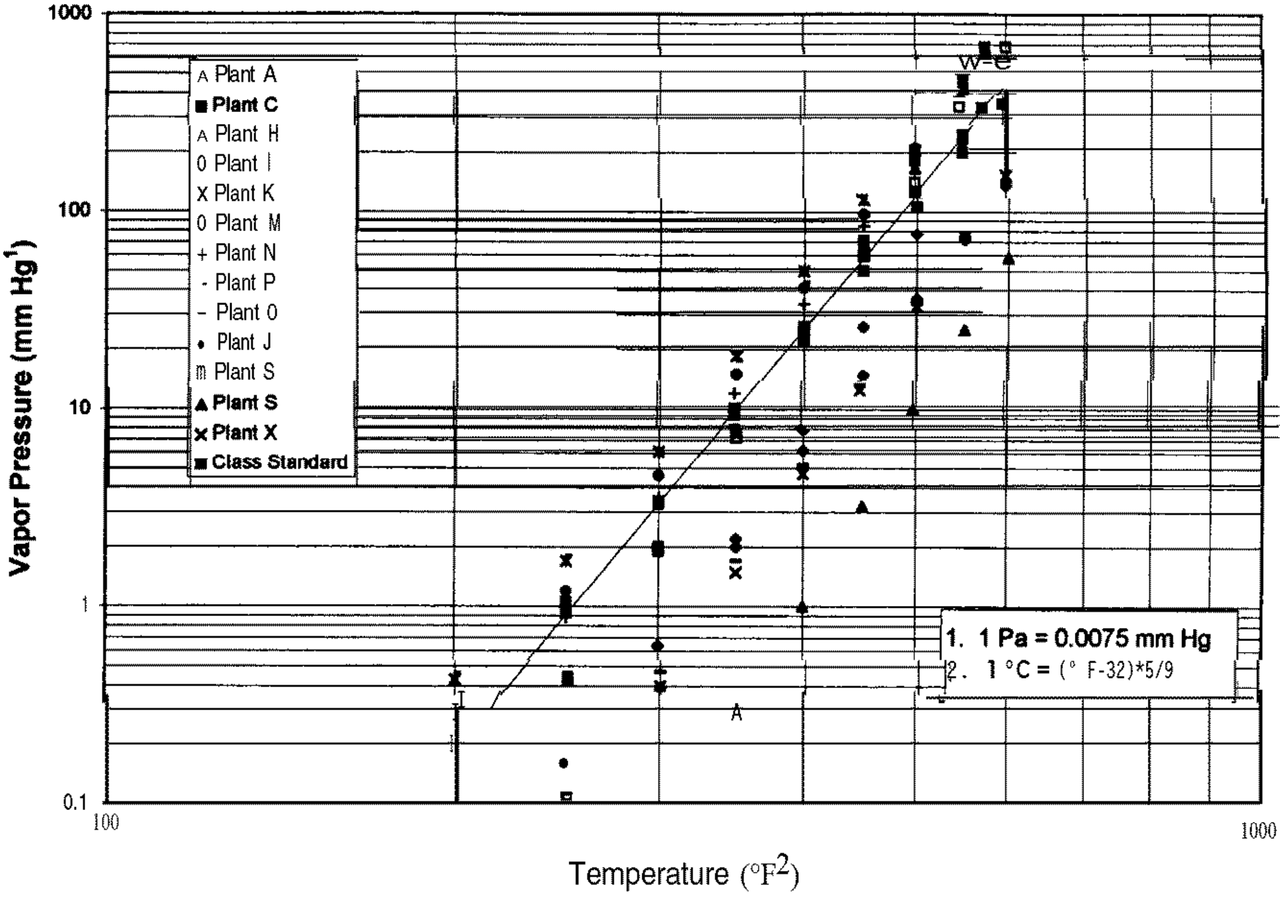

FIGURE 2. Oxidized Asphalt Vapor Pressure Data in Double Log Format

Clausius Clapeyron equation to calculate 3 representative vapor pressure at any temperature for the class of oxidized asphalts. Essentially the technique consists of averaging the vapor pressures of the 13 asphalts at each temperature and then using those averages to curve fit the data to the desired equation. This gives higher values and is more conservative than averaging the vapor pressures after the log transformation is made. The standard curve is developed by using this regression equation to calculate vapor pressures at different temperatures. and for the oxidized class that data is indicated in Table 1 and also by the straight line in Figure 1.

The form of the Clausius Clapeyron equation is somewhat cumbersome to use, especially in graphical form, and so an alternative equation was developed which used a log/log relationship to characterize the data.

Log Log Treatment of Vapor Pressure Data

$$\log Vp = A * \log(T) + B$$

where Vp is the vapor pressure.
T is the temperature (not absolute
A &B are constants

Analyses of oxidized asphalts using this equation to establish the standard curve are presented in Figure 2. The agreement is also very good. with correlation coefficients for the individual asphalts greater than 0.999. Again all three

Table 2. Vapor Pressure Correlations for Asphalts

For the Clausius Clapeyron Equation
In Vp (mm Hg^1) = a - b/T(R^2

Class of Asphalt	a	b	n	Average correlation coefficient
Flux	18.2891	12725.60	10	-0.99976
Paving	20.7962	15032.54	8	-0.99985
Oxidized	18.8642	13458.56	13	-0.99991

For a log log Equation
log Vp (mm Hg) = A *log T (°F^3) + B

Class of Asphalt	a	b	n	Average correlation coefficient
Flux	7.0850	-16.8999	10	0.99736
Paving	7.8871	-19.0600	8	0.99965
	7.0607	-16.9570	13	0.99981

1. 1 Pa = 0.0075 mm Hg
2. 1 °K = (°R - 492) * 5/9 + 273
3. 1 °C = (°F - 32) * 5/9

Table 3. Analysis of the Molecular Weight of Asphalt Tank Vapor Spaces

		Milligrams of Component in Ctube Sample of Vapor																						
Asphalt	Weighted Ave MW	<C5*	n-C5*	5-6	n-C6	6-7	n-C7	7-8	n-C8	8-9	n-C9	9-10	n-C10	10-11	n-C11	11-12	n-C12	12-13	n-C13	13-14	n-C14	14-15	n-C15	>C15*
Coating -- Plant J	83	3.70	2.10	1.80	2.10	0.82	1.70	1.70	0.82	0.21	0.26	0.23	0.05	0.02	0.04	0.01	0.02	0.04	0.01	0.01	0.15	0.07	0.14	0.13
Coating - Plant J	83	7.20	0.29	2.30	3.70	1.90	3.40	3.60	2.00	0.49	0.56	0.50	0.12	0.05	0.20	0.01	0.02	0.00	0.05	0.00	0.23	0.04	0.15	0.07
Satch - Plant J	91	3.00	1.90	2.10	2.90	1.70	3.00	3.70	1.80	0.66	0.73	0.67	0.17	0.11	0.03	0.01	0.01	0.01	0.03	0.01	0.04	0.02	0.05	0.05
Coating - Plant J	97	1.80	1.20	1.10	1.20	0.48	1.00	1.20	0.59	0.16	0.27	0.27	0.09	0.04	0.03	0.02	0.03	0.03	0.10	0.01	0.37	0.10	0.31	0.25
Flux - Plant P	76	2.00	0.70	0.40	0.49	0.34	0.39	0.48	0.15	0.10	0.05	0.03	0.01	0.00	0.01	0.00	0.02	0.00	0.01	0.02	0.02	0.00	0.09	0.14
Flux - Plant P	91	3.60	1.50	1.20	1.70	1.10	1.60	2.40	0.95	0.66	0.37	0.29	0.13	0.09	0.09	0.05	0.06	0.04	0.10	0.01	0.15	0.10	0.21	0.32
Steep - Plant P	93	3.00	3.00	1.50	2.40	1.00	2.00	1.80	0.84	0.41	2.00	1.80	0.07	0.02	0.02	0.01	0.05	0.00	0.01	0.03	0.00	0.00	0.08	0.38
PBS* - Plant S	68	3.60	0.75	0.62	0.41	0.32	0.32	0.28	0.24	0.22	0.15	0.15	0.09	0.05	0.04	0.02	0.02	0.02	0.04	0.00	0.04	0.01	0.02	0.09
Steep - Plant P	85	3.70	5.40	2.70	5.10	1.60	2.30	1.10	0.41	0.12	0.06	0.04	0.01	0.02	0.00	0.01	0.01	0.00	0.10	0.00	0.14	0.00	0.13	1.00
Steep - Plant P	85	5.80	6.40	4.50	6.50	3.90	6.40	4.60	2.40	0.79	0.64	0.23	0.22	0.09	0.12	0.04	0.05	0.02	0.06	0.00	0.05	0.02	0.05	0.06
Steep - Plant P	72	3.20	1.70	0.79	1.30	0.40	0.81	0.49	0.27	0.10	0.09	0.04	0.02	0.04	0.01	0.00	0.01	0.00	0.05	0.00	0.10	0.02	0.08	0.03
PBS* - Plant S	87	3.80	1.00	1.40	1.10	0.75	0.90	1.30	0.64	0.95	0.35	0.39	0.26	0.15	0.10	0.05	0.05	0.45	0.06	0.01	0.07	0.04	0.06	0.07
MW used for Fraction		30	72	79	86	93	100	107	114	121	128	135	142	149	156	163	170	177	184	191	198	205	212	240

*Notes:
used 30 (ethane) for MW of fraction less than pentane since when this is large it is heavily weighted to methane.
used the average MW of the two bordering n-alkanes for the intermediate peaks.
used 240 (C17 alkane) for MW of fraction > C15 since concentration decreasing as C15 approached
PBS refers to hard paving blend stock

classes of asphalts show similar agreement,

Vapor Pressure Summary: Table 2 gives a summary of the regression constants to be used in either of the equations discussed above to calculate the vapor pressure for the three classes of asphalt at any temperature. Also indicated are the number of asphalts that were used to develop the equation for each class. and the average correlation coefficient characterizing the agreement of the data to the form of the equation for each individual asphalt in the class.

In AP-42 for tanks, the correct temperature to use in the Table 2 equations is the asphalt surface temperature in the tank. Since the surface temperature is rarely. if ever, known with certainty, the bulk temperature should be used to estimate emissions. In a well mixed tank the bulk temperature will be a good approximation of the surface temperature. Where mixing is not effective the surface will be lower in temperature than the bulk and the use of the bulk temperature will give a conservative estimate of emissions. In AP-42 for loading trucks, the bulk temperature of the tank from which material is being loaded provides a good estimate of the actual loading temperature.

Asphalt Vapor Molecular Weight: Asphalt vapor molecular weight was determined by separation and analysis of the organic species in the vapor spaces of 12 tanks storing different types of asphalt. These profiles were obtained by drawing known volumes of the tank vapor space through a charcoal tube, sealing and freezing the tube to limit loss of the sample, and then desorbing the organic material from the charcoal with carbon disulfide and analyzing with gas chromatography using packed columns and flameionization detectors. Analyses were performed by CHEMIR Laboratory in St. Louis. Quantitative standards were used to identify the amount of individual normal alkanes from n-pentane to n-pentadecane. Peaks eluting between the normal alkanes were assumed to be isomers of the bordering alkanes, especially cyclic isomers of the lower carbon number alkane, and branched or unsaturated isomers of the higher carbon number alkane. The molecular weights for the n-alkane species and molecular weight estimates for the intermediate species were used with the amount of that material measured to calculate a weighted average vapor molecular weight for each tank, and then the twelve tanks were averaged together to get the molecular weight used for hot asphalt vapors in the AP-42 calculations. The result was a molecular weight of 84, which is used with all three classes of asphalts. This analysis is detailed in Table 3. Not enough data were available to assign different values to the three asphalt classes, however, from the table the unblown flux material in two tanks gave molecular weights which bracketed the average. as did the two paving blend stocks.

This analysis gave a lower molecular weight for the vapor space of asphalt tanks than for several petroleum solvents and fuel oils. This seems like a contradiction considering the nature of asphalt as the residuum material collected upon distillation. This contradiction is resolved by considering that asphalt is not a uniform material chemically and that the lower molecular weight materials

Table 4. PM/VOC Partition Data from Owens Corning Testing

Asphalt Plant 0	Tank A	Tank B	Tank c	
VOC Test	0.73	1.16	0.98	lb/hr[1]
PM Test	0.21	0.38	0.30	lb/hr
VOC Fraction	0.78	0.75	0.77	

Koofing Plant S Coater Results:
Measured at different points. Data indicated 22% of total emission (VOC + PM) was PM and 78% was VOC

1. 1 kg/sec = 0.0076 * lb/hr

are preferentially evaporated More importantly. it has also been established that thermal cracking of asphalt in hot storage tanks creates low molecular weight materials which accumulate in the tank vapor spaces [5,6].

Asphalt Liquid Molecular Weight: The actual bulk asphalt molecular weight is not needed for AP-42 calculations of emissions from tanks or loading racks. but is useful in some calculations that are beyond the scope of this paper, for example using Raoult's law for crude estimates of emissions from mixtures of asphalt and other materials. Molecular weight of bulk asphalt is not a well defined material property, both because asphalt is such a complex mixture and because intermolecular interactions in the asphalt create the appearance of high molecular weight in many measurement techniques. The measured molecular weight is usually not truly representative of the covalently bonded molecules, The difficulty in getting accurate asphalt molecular weight measurements is extensively discussed in the literature [8, 9, 10]. The use of Gel Permeation Chromatography[8], Field-Ionization Mass Spectrometry [8]. Vapor Pressure Osmometry [8,9,10], and Freezing Point Depression [10] have all been evaluated as methods for measuring the molecular weight of asphalt or its components. The topic is further complicated for emission calculations by the fact that many of the measurements have been made on fractions of the asphalt and not on the neat asphalt. In general. for very rough estimates, a value of 1000 [8] can be used for the molecular weight of bulk asphalt. This value should be used with the understanding that there is much variation in the true molecular weight and in the tendency for intermolecular interaction due to petroleum crude source and processing conditions.

Partition of hydrocarbon emissions that are particulate and VOC: Because of its heterogeneous nature, asphalt fumes are varied and may have components that are classified as condensed particulates (PM) or as volatile organic compounds (VOCs). It m-as evident in analyzing asphalt fume results that the difference between these two classes of criteria pollutants is really defined by the method used to test for the pollutants. Estimation schemes described in this paper calculate the sum of both (AP-42) or just the VOC component (non-AP-42 technique described below), and the partition needs to be understood to provide the best estimated values of the two pollutants. To that end. tests have been done on both asphalt tank exhausts in an Owens Corning asphalt plant and on the asphalt shingle coater exhausts in an Owens Corning roofing plant using EPA Methods 5 & 25A sampling protocols which define VOC and PM emissions in hydrocarbon fumes. Under conditions specified by the test method some fraction of the fume is captured on a filter and this is defined as a particulate emission, while a fraction of the hydrocarbon emission passes through the filter and this is defined as a VOC emission. The results of the split in the total hydrocarbon fume between VOC and particulate were approximately 78% VOC and 22% particulate in the asphalt equipment. in spite of the basic difference between a shingle coater and a storage tank. Data from these tests are given in Table 4.

NON AP-42 CALCULATIONS TECHNIQUES:

Estimation of VOC and particulate emissions from tanks with fume control: Many asphalt tanks have their fumes actively collected and treated in a control device, either a fiber bed filter or an incinerator. In these tanks it is common at Owens Corning to allow some air to pass through the tank vapor spaces to create an air sweep that controls combustible fumes well below the lower explosion limit (LEL) in order to prevent explosions. Because of the active removal of fumes in these systems, and the bleeding of air into the vapor space. the assumptions underlying the AP-42 tank calculations no longer apply. Specifically the driving force for the flow of fumes out of the tank is no longer just the working and breathing losses. and an alternative method of emission calculation is needed.

Several years ago safety concerns with asphalt tanks prompted Owens Corning to institute the periodic measurement of the combustible gas concentration in all asphalt tank vapor spaces [5]. With the advent of Title V it was recognized that these measurements could be used to estimate VOC emissions. As part of the safety program. techniques were developed to make this routine measurement simple and easy. and the result was the use of Mine Safety Appliance (MSA) combustion meters to quantify the hydrocarbon concentration in terms of the fraction (or %) of the LEL. This technique and the validation of its accuracy has been described in detail in a separate publication [6]. In addition to the combustible gas measurement, a slightly more complicated technique is also described and validated that gives the concentration of ethane, methane. and other light combustible gases separate from propane and larger hydrocarbons. This technique involves using a charcoal tube in the line between the tank and the MSA meter. The charcoal tube adsorbs all propane and higher hydrocarbons [6], with the resultant reading at the MSA meter due only to the lighter

Table 5. Fraction of Measured Combustible Gas that is not VOC or Particulate

	Asphalt Type	
	Oxidized	Unoxidized
Number tanks measured	109	47
Fraction combustible gas that is non-VOC/PM		
Average	0.52	0.23
Standard Deviation	0.12	0.23

materials. The charcoal tube technique was developed to troubleshoot excessive thermal cracking in asphalt tanks as a cause of high combustible gas levels in tank vapor spaces, and it is not routinely performed. It is important for emission calculations since the smaller combustibles found in the tank vapor spaces and measured with the charcoal tube in place (ethane, methane. hydrogen sulfide. and carbon monoxide) are not classified as VOCs because they do not react with ozone in the atmosphere. Nor are they particulate. The other hydrocarbons trapped by the tube and only measured when the charcoal tube is not present. are VOCs or particulate. Table 5 gives the results of testing of vapor spaces of oxidized and unoxidized asphalts for these two types of combustible gas measurements. This analysis was done to see if the routine combustible gas numbers should be adjusted for significant and predictable non-VOC/PM components. For the average tank storing oxidized asphalt. 52% of the combustible gas is non-VOC/PM anti this value n-as used for this class of asphalt. For unoxidized asphalts, both paving and flux, the non-VOC/PM %LEL varied widely and was not nearly as large a fraction of the total. For these asphalts, all of the combustible gas measurement was considered to be either VOC or particulate.

Calculation of VOC & PM from combustible gas readings: Given this background the actual calculation of VOC emissions from combustion meter measurements is as follows:

1 Combustion meter measurements from tank vapor spaces read in %LEL are adjusted for the fraction of that reading that is non-VOC/PM. This value depends on the type of asphalt in the tank.

2 The adjusted %LEL is then turned into a weight per volume concentration. Hydrocarbons have a relatively constant actual LEL concentration. 45 mg/liter, when expressed on 3 weight per volume basis [11], and this constant is used to make this calculation.

3 The weight per volume concentration from step 2 is multiplied by the fume removal flow (in volume/time) in the tank to get the VOC emission (n-eight/time) going to

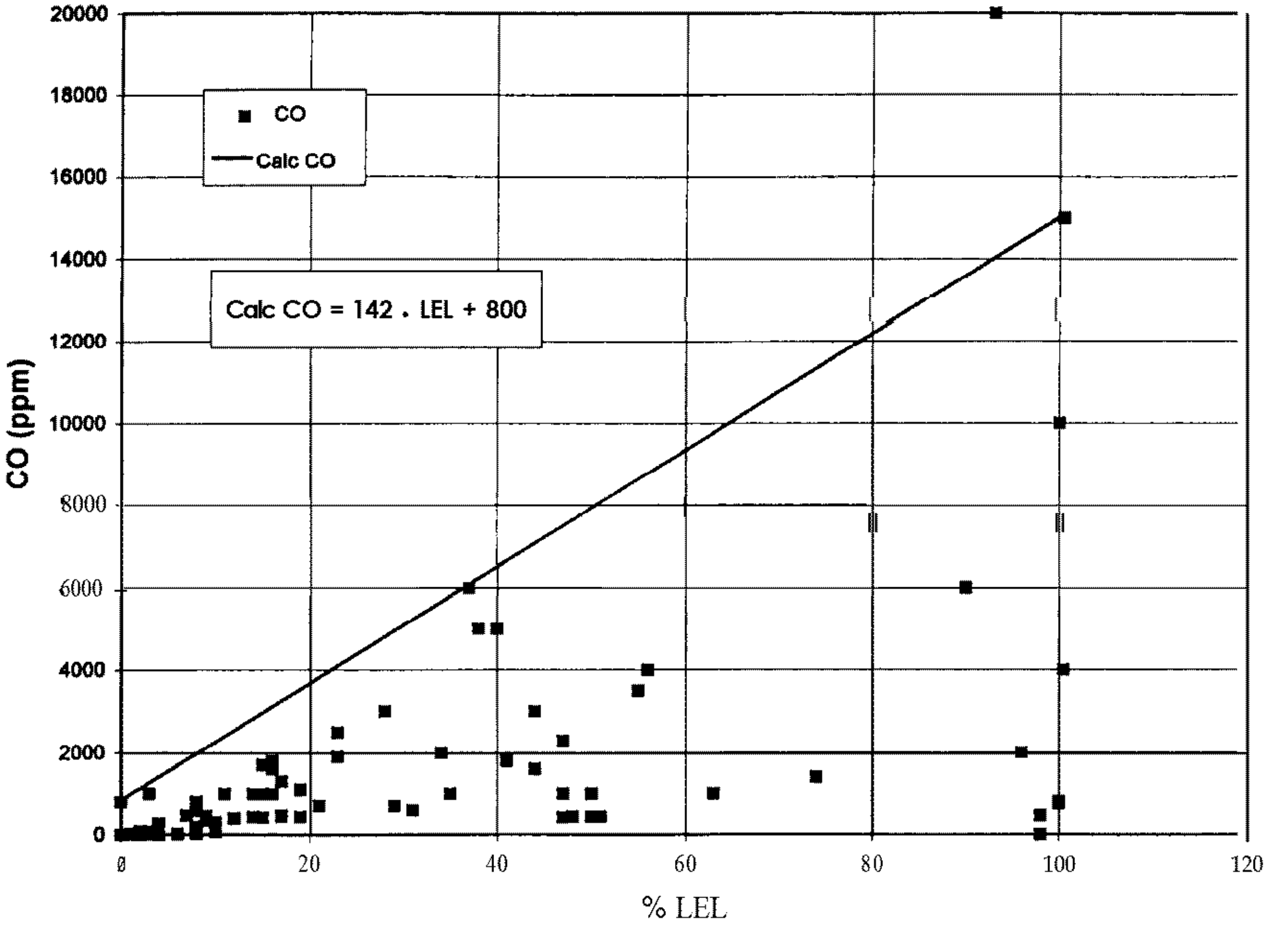

FIGURE 3. Relation of CO with % LEL Data for Oxidized Asphalts

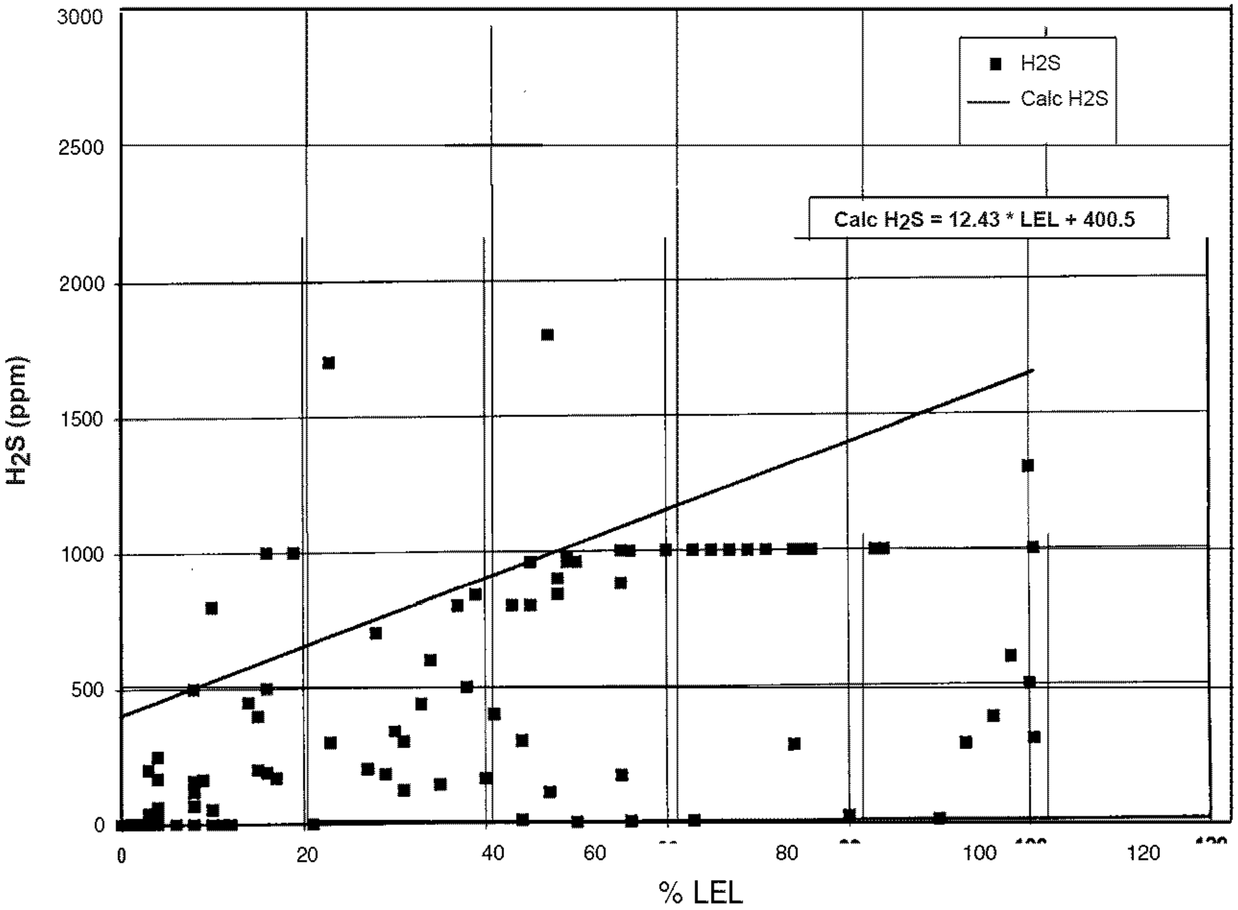

FIGURE 4. Relation of H_2S with % LEL Data for Oxidized Asphalts

a control device. It is consistent that the %LEL method measures VOC and not total hydrocarbon since the fume is drawn through a cotton filter prior to entering the combustion meter, and particulate will be filtered out.

4. The particulate emission going to the control device is estimated from the constant ratio of 22%PM/78%VOC outlined in Table 4.
5. The control device destruction efficiency is applied to both VOC and particulate emissions separately to get the final hydrocarbon based emissions from the tank. This is done after the calculation of PM emissions since the control efficiency for particulate and VOCs can be different depending on the control device.

This methodology's accuracy has been confirmed by tests in an Owens Corning asphalt plant on several passively vented tanks while material was pumped into the tank and vapors forced out by the known pumping rate. Emissions calculated with the method outlined above were compared to tank emissions calculated using AP-42 (valid in theory in this case due to the lack of a ventilation system), and to emissions measured using EPA Method 25A. As can be seen in Table 6 the method based on actual combustion meter tests is similar to the measured VOCs while AP-42 estimates are 3 to 5 times higher.

Table 6. Owens Corning Tank Fume Sampling Results - VOC Emissions

	Tank A	Tank B	Tank C
VOC Method 2jA Test	0.73	1.16	0.98
% LEL Based Estimate	0.72	0.91	0.83
AP-42 Based Estimate	3.17	4.5	3.39

1. 1 kg/sec = 0.0076 *lb/hr

Estimation of CO and H_2S emissions from asphalt tanks: As part of the safety monitoring program mentioned above. Owens Corning has also used detector tubes in asphalt tanks to measure the vapor space concentration of carbon monoxide and hydrogen sulfide [6]. These emissions are usually ignored in asphalt tanks, however. the data Owens Corning has taken clearly indicates their presence in tank vapor spaces and therefore their emission [il. These gases are not routinely measured in Owens Corning asphalt tanks. unlike combustible gas measurements, and thus fresh data are not available for current calculation. nor are data available for every one of our tanks. To apply these data to all tanks. a surrogate measurement is necessary. Since the same mechanism, thermal cracking, that produces light hydrocarbons in asphalt tank vapor spaces also produces carbon monoxide and hydrogen sulfide, the periodic combustion meter measurement of tank vapor spaces was

Table 7. Asphalt Plant 0: Tank Emissions of H_2S and CO

	Tank A	Tank B	Tank C	
H_2S Data				
Actual Test	0.06	0.12	0.15	lb/hr[1]
%LEL based estimate	0.19	0.18	0.20	lb/hr
CO Data				
Actual Test	0.20	0.17	0.23	□ lb/hr
%LEL based estimate	0.74	0.85	0.83	lb/br

1. 1 kg/sec = 0.0076' lb/hr

investigated as a surrogate for CO and H_2S Data for CO and H_2S are plotted in Figures 3 and 4. Because of the scatter of data in the correlations a representative line was chosen for each material that was more conservative than nearly all of the data, in other words a line that defined a maximum concentration of CO and H_2S that could be expected in an asphalt tank from the combustion meter measurement. The equations used in the calculation of CO and H_2S concentrations from combustion meter results

$$\text{CO (ppm)} = 142 * \%\text{LEL} + 800 \text{ for oxidized asphalt}$$

$$H_2S\text{(ppm)} = 12.43 * \%\text{LEL} + 400.5 \text{ for oxidized asphalt}$$

In unoxidized asphalt no such correlation was seen and conservative values of 500 ppm are used for both species.

To estimate an emission from this correlation the CO and H_2S concentrations are multiplied by the flow out of the tank to get emissions. and conversion factors are used to transform this into a weight per time emission. Any control device destruction efficiency is then applied. The emissions using these techniques can be significant. Limited direct measurement in an Owens Corning asphalt plant was consistent with this approach. at least in so far as that the %LEL approach was conservative. H_2S was the closer of the two estimates. Data are presented in Table 7.

One consequence of fume incineration is that one mole of H_2S in the fumes is oxidized to one mole of SO_2 The amount of H_2S oxidized to SO, is the amount of H_2S generated minus both the amount that escapes at the source and the amount that is not incinerated at the control device. or in effect the total uncontrolled H_2S emissions minus the emissions remaining after control. Because of the reaction with oxygen and the molecular weight differences between H_2S and SO_2, every pound (2.2 kg) of H_2S emission is oxidized to 1.88 pounds (4.14 kg) of SO_2 emission.

LoadingRack emissions of CO and H_2S: As in the tanks. %LEL versus CO and H_2S correlations are used to estimate these components in loading rack emissions. Again, with incineration, the H_2S is oxidized to SO_2. Flow out of the tank truck during loading is needed for CO and H_2S calculations. When fumes are collected, that flow can be either the more conservative flow induced by the fume fan, or the lower and more realistic displacement of air by the asphalt being loaded. When no collection takes place that flow is the displacement of air by asphalt being loaded. Combustion meter measurements of %LELs from the tanks used for loading are used for these calculations.

EFFECTIVENESS OF FIBER BED FILTERS FOR ASPHALT FUME EMISSION CONTROL

One device used extensively to control asphalt fumes is a fiber bed filter. Fumes are actively pulled through these filters or passively hreathe through these filters. Their first use at Owens Corning was to control opacity to comply with NSPS regulations, and for this application they have proven to he quite effective.

Testing was done on both asphalt tanks and on a roofing line center to determine the control efficiency of fiber bed filters for both VOC and particulate emissions. Data from the testing are summarized in Table 8. In all cases. the particulate collection in the filter exceeded 90% of the emissions in the input stream. This value agrees well with manufacturer's estimate of 95% and with the observation that these devices can eliminate opacity. However, VOC removal varied widely in the tests. With the average removal near zero, and a very large variation, it was decided that no removal of VOC by these filters could be assumed. Although organic oil is collected. this oil is considered part of the particulate fraction of the hydrocarbons in the fumes and not the VOC fraction. Indeed the lack of removal of VOCs by these filters is consistent with the method of partitioning hydrocarbons into VOC and particulate described above -- namely VOCs pass through a testing filter and particulate do not. Based on the effectiveness of these control devices to eliminate opacity it is assumed that particulate greater than 10 micron is captured by the fiber bed filter so that the total particulate emissions from the fiber bed filter are considered to be PM10 emissions.

Fiber bed filters are not considered to he a control device for CO and H_2S in tank or loading rack fume streams.

Table 8. Effectiveness of Fiber Bed Filters for Emission Control from Asphalt Tanks

Plant	Equipment	Pollutant	Control Efficiency
Asphalt 0	Tank 1	VOC	-35.7%
Asphalt 0	Tank 1	VOC	5.7%
Asphalt 0	Tank 1	VOC	43.4%
Asphalt 0	Tank 57	VOC	5.3%
Roofing I	Coater	VOC	0.0%
Asphalt 0	Tank 1	Total Particulate □	95.7%
Asphalt 0	Tank 57	Total Particulate	90.7%
Asphalt 0	Tank 1	Filterable Particulate	100.0%
Asphalt 0	Tank 57	Filterable	100.0%

Table 9. Summary of Data for Calculating Asphalt Tank Emissions

Data Type	Flux Asphalt	Paving Asphalt	Oxidized Asphalt
Clausius Clapeyron constant a for vapor pressure 1	18.2891	20.7962	18.8642
Clausius Clapeyron constant b for vapor pressure 1	12725.6	15032.54	13458.56
Log Log constant A for vapor pressure 2	7.085	7.8871	7.0607
Log Log constant B for vapor pressure 2	-16.8999	-19.06	-16.957
Asphalt vapor molecular weight	use 84 for all types of asphalt		
Asphalt liquid molecular weight	very rough estimate - 1000		
Partition of hydrocarbon fumes into particulate and VOC	use 22% particulate, 78% VOC for all types		
% fumes that are VOC or particulate, versus non VOC/PM	100%	100%	48%
Vapor space carbon monoxide (conservative estimate)ppm	500	500	142* % LEL + 800
Vapor space hydrogen sulfide (conservative estimate) ppm	500	500	12.43*%LEL + 400.5
Fiber bed filter control of VOC	use 0% for all asphalt types		
Fibe4r bed filter control of particulate	use 90% for all asphalt types		

1.In Vp(mm Hg) = a + b/T(°R) 1 Pa = 0.0075mm Hg, 1 °K = (°R-492)*5/9 +273
2.log Vp (mm Hg) = A*log T(°F) + B 1 °C = (°F - 32)* 5/9

CONCLUSIONS

Estimation of air emissions for asphalt tanks and loading racks can be done using AP-42 calculation methods given appropriate data on asphalt properties. More precise estimates of emissions, or estimates for tanks using ventilation schemes that compromise the AP-42 assumptions, can be done using a simple measurement of the combustible gas in the vapor space. Methods to do this are outlined in the paper. Data that is useful with all these methods are summarized in Table 9. These data are given for three major classes of asphalt: paving, flux and oxidized

LITERATURE CITED

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2. **U.S.Environmental Protection Agency,** "Introduction to 5th edition of AP-42 Emission Factors," U. S. EPA, January,1995,from the Internet at http://www.epa.gov/ttn/chief/ap42.html (accessed May 14, 1998).
3. **U.S Environmental Protection Agency,** Chapter 7.1 of the 5th edition of AP-42 Emission Factors, U.S.EPA, "Organic Liquid Storage Tanks," September, 1997, from the Internet at http://www.epa.gov/ttn/chief/ap42.html (accessed May 14, 1998).
4. **U.S.Envoironmental Protection Agency,** Chapter 5.2 of the 5th edition of AP-42 Emission Factors, U.S. EPA, "Transportation and Marketing of Petroleum Liquids," January, 1995, from the Internet at http://www.epa.gov/ttn/chief/ap42.html (accessed May 14, 1998).
5. **Trumbore, D.C. and C.R.Wilkinson,** "Better understanding needed for asphalt tank-explosion hazards," Oil Gas J., 87, pp.38-41 (September 18, 1989).
6. **Trumbore, D.C., C.R.Wilkinson, and S.Wolfersberger,** "Evaluation of techniques for in situ determination of explosion hazards in asphalt tanks," J.Loss Prev. Process Ind., 4, pp. 230-235 (July,1991).
7. **Schmidt, A.X. and H.L. List,** "Material and Energy Balance," Prentice Hall, Inc., Englewood Cliffs, New Jersey, pp. 40-41 (1962).
8. **Boduszynski, M.M.,** "Asphaltenes in petroleum Asphalt: Composition and Formation," Chapter 7, in "The Chemistry of Asphaltenes," American Chemical Society, Washington, D.C., pp. 119-135 (1981).
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10. **Speight, J.G., and S.E.Moschopedis,** "Asphaltene molecular weights by a cryoscopic method," Fuel, 56, pp 344-345 (July, 1977).
11. **Bodurtha, F.T.,** "Industrial Explosion Prevention and Protection," McGraw Hill, Inc, New york, New York, page 11 (1980).

ATTACHMENT “D”

HARP TOXIC EMISSION SUMMARY

HARP Facility Prioritization Report

```
                         HARP EIM Version: 2.1.6

Reporting Year: 2016
Project Path: H:\My Drive\Project Folder\All American Asphalt\2018\ALARM-18-2445 2016 AB2588 Revision\New 2016 HRA letter Different Engineer\J-HARP
Project Database: H:\My Drive\Project Folder\All American Asphalt\2018\ALARM-18-2445 2016 AB2588 Revision\New 2016 HRA letter Different Engineer\J-HARP
\AllAmerican2016-127.mdb
CEIDARS Utility Database: C:\HARP2 Inv\Tables\CEIDARSTables022021.mdb
HARP Health Talbe: HEALTH202108
Sorting Order: DIS, AB, CO, TS, FACID
Date Created: 12/6/2021 11:30:13 PM
Operator: SWT
********************************************************************************************************************************************


POLLUTANT HEALTH VALUES FROM HARP HEALTH DATABASE:
------------------------------------------------------

POLLUTANT ID    POLLUTANT       CANCERURF(INH)  ACUTEREL        CHRONICREL(INH)
                                (ug/m^3)^-1     ug/m^3          ug/m^3

71556           1,1,1-TCA       N/A             6.80E+04        1.00E+03
95636           1,2,4TriMeBenze N/A             N/A             N/A
106990          1,3-Butadiene   1.70E-04        6.60E+02        2.00E+00
540841          2,2,4TriMePentn N/A             N/A             N/A
91576           2MeNaphthalene  N/A             N/A             N/A
83329           Acenaphthene    N/A             N/A             N/A
208968          Acenaphthylene  N/A             N/A             N/A
75070           Acetaldehyde    2.70E-06        4.70E+02        1.40E+02
107028          Acrolein        N/A             2.50E+00        3.50E-01
7429905         Aluminum        N/A             N/A             N/A
120127          Anthracene      N/A             N/A             N/A
7440360         Antimony        N/A             N/A             N/A
7440382         Arsenic         3.30E-03        2.00E-01        1.50E-02
56553           B[a]anthracene  1.10E-04        N/A             N/A
50328           B[a]P           1.10E-03        N/A             N/A
205992          B[b]fluoranthen 1.10E-04        N/A             N/A
192972          B[e]pyrene      N/A             N/A             N/A
191242          B[g,h,i]perylen N/A             N/A             N/A
207089          B[k]fluoranthen 1.10E-04        N/A             N/A
7440393         Barium          N/A             N/A             N/A
71432           Benzene         2.90E-05        2.70E+01        3.00E+00
7440417         Beryllium       2.40E-03        N/A             7.00E-03
7726956         Bromine         N/A             N/A             N/A
7440439         Cadmium         4.20E-03        N/A             2.00E-02
7782505         Chlorine        N/A             2.10E+02        2.00E-01
7440473         Chromium        N/A             N/A             N/A
218019          Chrysene        1.10E-05        N/A             N/A
75456           ClDiFluorMethan N/A             N/A             N/A
7440484         Cobalt          7.70E-03        N/A             N/A
7440508         Copper          N/A             1.00E+02        N/A
18540299        Cr(VI)          1.50E-01        N/A             2.00E-01
75150           CS2             N/A             6.20E+03        8.00E+02
98828           Cumene          N/A             N/A             N/A
110827          Cyclohexane     N/A             N/A             N/A
53703           D[a,h]anthracen 1.20E-03        N/A             N/A
75434           DiClFluorMethan N/A             N/A             N/A
```

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100414        Ethyl Benzene   2.50E-06        N/A             2.00E+03
75003         Ethyl Chloride  N/A             N/A             3.00E+04
206440        Fluoranthene    N/A             N/A             N/A
86737         Fluorene        N/A             N/A             N/A
50000         Formaldehyde    6.00E-06        5.50E+01        9.00E+00
7783064       H2S             N/A             4.20E+01        1.00E+01
110543        Hexane          N/A             N/A             7.00E+03
193395        In[1,2,3-cd]pyr 1.10E-04        N/A             N/A
7439921       Lead            1.20E-05        N/A             N/A
1128          Lead cmp(inorg) 1.20E-05        N/A             N/A
7439965       Manganese       N/A             N/A             9.00E-02
78933         MEK             N/A             1.30E+04        N/A
7439976       Mercury         N/A             6.00E-01        3.00E-02
67561         Methanol        N/A             2.80E+04        4.00E+03
74839         Methyl Bromide  N/A             3.90E+03        5.00E+00
75092         Methylene Chlor 1.00E-06        1.40E+04        4.00E+02
108101        MIBK            N/A             N/A             N/A
108383        m-Xylene        N/A             2.20E+04        7.00E+02
91203         Naphthalene     3.40E-05        N/A             9.00E+00
7664417       NH3             N/A             3.20E+03        2.00E+02
7440020       Nickel          2.60E-04        2.00E-01        1.40E-02
95476         o-Xylene        N/A             2.20E+04        7.00E+02
1151          PAHs-w/o        1.10E-03        N/A             N/A
127184        Perc            6.10E-06        2.00E+04        3.50E+01
198550        Perylene        N/A             N/A             N/A
85018         Phenanthrene    N/A             N/A             N/A
7723140       Phosphorus      N/A             N/A             N/A
115071        Propylene       N/A             N/A             3.00E+03
106423        p-Xylene        N/A             2.20E+04        7.00E+02
129000        Pyrene          N/A             N/A             N/A
7782492       Selenium        N/A             N/A             2.00E+01
1175          Silica, Crystln N/A             N/A             3.00E+00
7440224       Silver          N/A             N/A             N/A
100425        Styrene         N/A             2.10E+04        9.00E+02
79016         TCE             2.00E-06        N/A             6.00E+02
7440280       Thallium        N/A             N/A             N/A
108883        Toluene         N/A             5.00E+03        4.20E+02
75694         TriClFluorMetha N/A             N/A             N/A
7440622       Vanadium        N/A             3.00E+01        N/A
1330207       Xylenes         N/A             2.20E+04        7.00E+02
7440666       Zinc            N/A             N/A             N/A
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PRIORITIZATION SCORE SUMMARY:
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Facility Name
Proximity Method
                         Emission and Potency Procedure           Dispersion Adjustment Procedure            Highest
FACID      CO AB  DIS     Cancer      Acute    Chronic  NonCancer    Cancer      Acute    Chronic  NonCancer    Score


ALL AMERICAN ASPHALT
Proximity Method: Proximity manually edited by user as 822.96
     Annual Operating Hours  [redacted]
        1 30 SC  SC        8.14        0.39       0.52       0.80       8.12       0.39       0.52       0.80       8.14
```

HARP Facility Prioritization Report

HARP EIM Version: 2.1.6

Reporting Year: 2016
Project Path: H:\My Drive\Project Folder\All American Asphalt\2018\ALARM-18-2445 2016 AB2588 Revision\New 2016 HRA letter Different Engineer\J-HARP
Project Database: H:\My Drive\Project Folder\All American Asphalt\2018\ALARM-18-2445 2016 AB2588 Revision\New 2016 HRA letter Different Engineer\J-HARP
\AllAmerican2016-127.mdb
CEIDARS Utility Database: C:\HARP2 Inv\Tables\CEIDARSTables022021.mdb
HARP Health Talbe: HEALTH202108
Sorting Order: DIS, AB, CO, TS, FACID
Date Created: 12/7/2021 4:33:08 PM
Operator: SWT
****

POLLUTANT HEALTH VALUES FROM HARP HEALTH DATABASE:

POLLUTANT ID	POLLUTANT	CANCERURF(INH) (ug/m^3)^-1	ACUTEREL ug/m^3	CHRONICREL(INH) ug/m^3
71556	1,1,1-TCA	N/A	6.80E+04	1.00E+03
95636	1,2,4TriMeBenze	N/A	N/A	N/A
106990	1,3-Butadiene	1.70E-04	6.60E+02	2.00E+00
540841	2,2,4TriMePentn	N/A	N/A	N/A
91576	2MeNaphthalene	N/A	N/A	N/A
83329	Acenaphthene	N/A	N/A	N/A
208968	Acenaphthylene	N/A	N/A	N/A
75070	Acetaldehyde	2.70E-06	4.70E+02	1.40E+02
107028	Acrolein	N/A	2.50E+00	3.50E-01
7429905	Aluminum	N/A	N/A	N/A
120127	Anthracene	N/A	N/A	N/A
7440360	Antimony	N/A	N/A	N/A
7440382	Arsenic	3.30E-03	2.00E-01	1.50E-02
56553	B[a]anthracene	1.10E-04	N/A	N/A
50328	B[a]P	1.10E-03	N/A	N/A
205992	B[b]fluoranthen	1.10E-04	N/A	N/A
192972	B[e]pyrene	N/A	N/A	N/A
191242	B[g,h,i]perylen	N/A	N/A	N/A
207089	B[k]fluoranthen	1.10E-04	N/A	N/A
7440393	Barium	N/A	N/A	N/A
71432	Benzene	2.90E-05	2.70E+01	3.00E+00
7440417	Beryllium	2.40E-03	N/A	7.00E-03
7726956	Bromine	N/A	N/A	N/A
7440439	Cadmium	4.20E-03	N/A	2.00E-02
7782505	Chlorine	N/A	2.10E+02	2.00E-01
7440473	Chromium	N/A	N/A	N/A
218019	Chrysene	1.10E-05	N/A	N/A
75456	ClDiFluorMethan	N/A	N/A	N/A
7440484	Cobalt	7.70E-03	N/A	N/A
7440508	Copper	N/A	1.00E+02	N/A
18540299	Cr(VI)	1.50E-01	N/A	2.00E-01
75150	CS2	N/A	6.20E+03	8.00E+02
98828	Cumene	N/A	N/A	N/A
110827	Cyclohexane	N/A	N/A	N/A
53703	D[a,h]anthracen	1.20E-03	N/A	N/A
75434	DiClFluorMethan	N/A	N/A	N/A

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100414          Ethyl Benzene   2.50E-06        N/A             2.00E+03
75003           Ethyl Chloride  N/A             N/A             3.00E+04
206440          Fluoranthene    N/A             N/A             N/A
86737           Fluorene        N/A             N/A             N/A
50000           Formaldehyde    6.00E-06        5.50E+01        9.00E+00
7783064         H2S             N/A             4.20E+01        1.00E+01
110543          Hexane          N/A             N/A             7.00E+03
193395          In[1,2,3-cd]pyr 1.10E-04        N/A             N/A
7439921         Lead            1.20E-05        N/A             N/A
1128            Lead cmp(inorg) 1.20E-05        N/A             N/A
7439965         Manganese       N/A             N/A             9.00E-02
78933           MEK             N/A             1.30E+04        N/A
7439976         Mercury         N/A             6.00E-01        3.00E-02
67561           Methanol        N/A             2.80E+04        4.00E+03
74839           Methyl Bromide  N/A             3.90E+03        5.00E+00
75092           Methylene Chlor 1.00E-06        1.40E+04        4.00E+02
108101          MIBK            N/A             N/A             N/A
108383          m-Xylene        N/A             2.20E+04        7.00E+02
91203           Naphthalene     3.40E-05        N/A             9.00E+00
7664417         NH3             N/A             3.20E+03        2.00E+02
7440020         Nickel          2.60E-04        2.00E-01        1.40E-02
95476           o-Xylene        N/A             2.20E+04        7.00E+02
1151            PAHs-w/o        1.10E-03        N/A             N/A
127184          Perc            6.10E-06        2.00E+04        3.50E+01
198550          Perylene        N/A             N/A             N/A
85018           Phenanthrene    N/A             N/A             N/A
7723140         Phosphorus      N/A             N/A             N/A
115071          Propylene       N/A             N/A             3.00E+03
106423          p-Xylene        N/A             2.20E+04        7.00E+02
129000          Pyrene          N/A             N/A             N/A
7782492         Selenium        N/A             N/A             2.00E+01
1175            Silica, Crystln N/A             N/A             3.00E+00
7440224         Silver          N/A             N/A             N/A
100425          Styrene         N/A             2.10E+04        9.00E+02
79016           TCE             2.00E-06        N/A             6.00E+02
7440280         Thallium        N/A             N/A             N/A
108883          Toluene         N/A             5.00E+03        4.20E+02
75694           TriClFluorMetha N/A             N/A             N/A
7440622         Vanadium        N/A             3.00E+01        N/A
1330207         Xylenes         N/A             2.20E+04        7.00E+02
7440666         Zinc            N/A             N/A             N/A
********************************************************************************************************************************************


PRIORITIZATION SCORE SUMMARY:
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Facility Name
Proximity Method
Optional Factors
                         Emission and Potency Procedure                Dispersion Adjustment Procedure            Highest
FACID     CO AB  DIS     Cancer      Acute    Chronic  NonCancer     Cancer      Acute    Chronic  NonCancer       Score


ALL AMERICAN ASPHALT
Proximity Method: Proximity manually edited by user as 2700
     Annual Operating Hours [redacted]
        1 30 SC  SC        0.74   3.55E-02   4.75E-02   7.29E-02       0.74   3.55E-02   4.75E-02   7.29E-02       0.74
```

ATTACHMENT “E”

MATERIAL HANDLING - DETAILED CALCULATIONS

ES19P1

Description		Throughput (TPH)	×	Controlled PM Emission Factors (lbs/ton)	=	Estimated PM Emissions (lbs/hour)
Truck to Hopper-1	*Transfer Point*	[redacted]		[redacted]		0.070
Hopper-1 to BC-1	*Transfer Point*	[redacted]		[redacted]		0.070
BC-1 to BC-2	*Transfer Point*	[redacted]		[redacted]		0.070
BC-2 to BC-3	*Transfer Point*	[redacted]		[redacted]		0.070
BC-3 to Silo AB 1-8	*Transfer Point*	[redacted]		[redacted]		0.070
Silo AB 1-8 to BC	*Transfer Point*	[redacted]		[redacted]		0.070
				[redacted]		0.420
					÷	500
				lb/ton		0.00084
				lb/kton		0.840

ES11P5

Description		Throughput (TPH)	×	Controlled PM Emission Factors (lbs/ton)	=	Estimated PM Emissions (lbs/hour)
BC 8-15 to BC-16	*Transfer Point*	[redacted]		[redacted]		0.070
BC-16 to Screen S-2	*Transfer Point*	[redacted]		[redacted]		0.070
Screen S-2	*Screening*	[redacted]		[redacted]		1.800
Screen S-2 to BC-17	*Transfer Point*	[redacted]		[redacted]		0.070
BC-17 to Dryer D-1	*Transfer Point*	[redacted]		[redacted]		0.070
				[redacted]		2.080
					÷	500
				lb/ton		0.00416
				lb/kton		4.160

*Control efficiency of 99.9% with baghouse
0.001

ES14P1

Description		Throughput (TPH)	×	Controlled PM Emission Factors (lbs/ton)	=	Estimated PM Emissions (lbs/hour)
Loader to Hopper H-4	*Transfer Point*	[redacted]		[redacted]		0.028
Hopper to BC-18	*Transfer Point*	[redacted]		[redacted]		0.028
Hopper to Horizontal Shafter Impactor	*Transfer Point*	[redacted]		[redacted]	*	0.000
Horizontal Shaft Impactor	*Transfer Point*	[redacted]		[redacted]	*	0.000
Horizontal Shaft Impactor to Belt BC-18	*Transfer Point*	[redacted]		[redacted]		0.028
BC-18 to BC-1	*Transfer Point*	[redacted]		[redacted]		0.028
BC-1 to BC-2	*Transfer Point*	[redacted]		[redacted]		0.028
BC-2 to BC-3	*Transfer Point*	[redacted]		[redacted]		0.028
BC-3 to BC-4	*Transfer Point*	[redacted]		[redacted]		0.028
BC-4 to Silo 1	*Transfer Point*	[redacted]		[redacted]		0.028
Silo 1 to BC-5	*Transfer Point*	[redacted]		[redacted]		0.028
BC-5 to BC-6	*Transfer Point*	[redacted]		[redacted]		0.028
BC-6 to Screen 1	*Transfer Point*	[redacted]		[redacted]	*	0.000028
Screen 1	*Transfer Point*	[redacted]		[redacted]	*	0.000440
Screen 1 to BC-7	*Transfer Point*	[redacted]		[redacted]	*	0.001
BC-7 to Dryer	*Transfer Point*	[redacted]		[redacted]		0.028
Screen 1 to BC-20	*Transfer Point*	[redacted]		[redacted]		0.008
BC-20 to Impactor	*Transfer Point*	[redacted]		[redacted]		0.008
Impactor	*Transfer Point*	[redacted]		[redacted]	*	0.0000720
Impactor to BC-21	*Transfer Point*	[redacted]		[redacted]	*	0.0000084
BC-21 to BC-25	*Transfer Point*	[redacted]		[redacted]		0.008
BC-25 to BC26	*Transfer Point*	[redacted]		[redacted]		0.008
BC-26 to BC-6	*Transfer Point*	[redacted]		[redacted]		0.008
				[redacted]		0.334
					÷	200
*Control efficiency of 99.9% with baghouse				lb/ton		0.001670222
0.001				lb/kton		1.670222