NORTH CAROLINA
DIVISION OF AIR QUALITY

Air Permit Review

Issue Date: XXXXX XX, XXXX

Region: ……..Winston-Salem Regional Office
County: ……...Caswell
NC Facility ID: ……..1700017
Inspector's Name: ……...TBD
Date of Last Inspection: ……..N/A
Compliance Code: ……N/A

Facility Data

Applicant (Facility's Name): Carolina Sunrock LLC - Prospect Hill Quarry and Distribution Center
Facility Address: 1238 Wrenn Road, Prospect Hill, NC 27314

SIC: 1429 / Crushed And Broken Stone Nec
NAICS: 212319 / Other Crushed and Broken Stone Mining and Quarrying

Facility Classification Before: Permit/Registration Pending **After:** Synthetic Minor
Fee Classification: **Before:** N/A **After:** Synthetic Minor

Permit Applicability (this application only)

SIP: ……Yes
NSPS: …….Yes(Subpart I,OOO,IIII, and JJJJ)
NESHAP: ……..Subpart ZZZZ
PSD: ……No
PSD Avoidance: ……Yes
NC Toxics: ……..Yes (2D .1100 & 2Q .0711)
112(r): ……..No
Other: ……N/A

Contact Data

Facility Contact	Authorized Contact	Technical Contact
Scott Martino Compliance Manager (984) 202-4761 200 Horizon Drive, Suite 100 Raleigh, NC 27615	Gregg Bowler CFO (919) 747-6400 200 Horizon Drive, Suite 100 Raleigh, NC 27615	Scott Martino Compliance Manager (984) 202-4761 200 Horizon Drive, Suite 100 Raleigh, NC 27615

Application Data

Application Number: ……1700017.19A
Date Received: ……...11/18/2019
Application Type: …….Greenfield Facility
Application Schedule: …….State

Existing Permit Data
Existing Permit Number: ……N/A
Existing Permit Issue Date: ……N/A
Existing Permit Expiration Date: ……...N/A

Review Engineer: Dylan Wright
Review Engineer's Signature:

Date:

Comments / Recommendations:
Issue: ……..10641R00
Permit Issue Date: ……XXXX XX, XXXX
Permit Expiration Date: ……...XXXX XX, XXXX

I. PURPOSE OF APPLICATION

On November 18, 2019, WSRO-DAQ received an application package from Carolina Sunrock LLC, requesting an air permit for a new synthetic minor facility located at 1238 Wrenn Road, Prospect Hill, NC. Carolina Sunrock also operates a separate Prospect Hill site located at 57 Wrenn Road (Fac. ID # 1700015). Therefore, to differentiate between the two Prospect Hill facilities, this site will be called "Carolina Sunrock LLC - Prospect Hill Quarry and Distribution Center." Included in the submittal were the appropriate A, B, C and D forms along with supporting documentation and a check in the amount $400, the application fee required for a synthetic minor facility. The initial submittal also included a copy of a letter to the Caswell County Planning Department that stated the intent of this facility to construct an asphalt plant, concrete plant, and quarry. This letter also requested the planning department to process the included Zoning Consistency Determination (ZCD) form. It is noted that this site is located in an area without zoning; therefore, the applicant is required to publish a legal notice in accordance with 2Q .0113. The applicant was notified of this requirement via mail on November 26, 2019 stating that the application will be considered incomplete until the requirements of 02Q .0113 were fulfilled. A letter dated December 12, 2019 was received by the WSRO-DAQ that stated that a public notice was published on December 4, 2019 in the Caswell Messenger and a sign was posted on December 2, 2019. DAQ-WSRO Environmental Specialist Chris Bryant visited the site on December 18, 2019 and confirmed the sign was posted as required.

The contact information provided in the application was created in the IBEAM database. Carolina Sunrock LLC is duly registered under this name with the North Carolina Secretary of State (NCSOS) – Division of Corporations and holds a current-active status, as verified by this reviewer via online search of the NCSOS database.

Application Chronology

Date	Event	Comment
November 18, 2019	Incomplete application received	Application deemed incomplete due to the need for a legal notice that is required per 2Q .0113 because this facility is located in an area without zoning: Clock not started
December 2, 2019	Roadside sign was posted	Clock remains off
December 4, 2019	Public notice posted in newspaper	Clock remains off
January 2, 2020 January 6, 2020 January 13, 2020	Additional Information Requested	Clock remains off
January 11, 2020	Sign was posted for 40 days	Clock remains off
January 3, 2020 (partial) January 8, 2020 (partial) January 13, 2020 (partial) January 14, 2020 (partial) January 15, 2020 (complete)	Additional Information Received	Clock started
February 13, 2020	Facility notified that the draft permit will be noticed to the public and posted for a public comment period	Clock stopped
XXXXX XX, XXXX	Permit issued	-----

II. DESCRIPTION OF BUSINESS

Information contained in the application states that this facility will involve the construction of a Drum Mix Asphalt Plant (250 tons per hour maximum capacity), RAP Crushing System, a Truck Mix Concrete Batch Plant (120 cubic yards per hour) and a quarry operation (1,500 tons per hour maximum capacity). The expected operating schedule is 14 hr/day, 6 days/wk and 52 wk/yr (4,368 hr/yr). The Permitted Emission Sources and Insignificant/Exempt Activities are listed in the following tables:

Permitted Emission Sources

Emission Source ID	Emission Source Description	Control System ID	Control System Description
Drum Mix Asphalt Plant (250 tons per hour capacity) consisting of the following:			
HMA-1 (**NSPS-I**)	Propane/Natural Gas/No. 2 Fuel Oil/Recycled No. 2 Fuel Oil/Recycled No. 4 Fuel Oil-fired drum type hot mix asphalt plant (80 MMBtu/hr maximum heat input capacity)	HMA-CD1	Cyclone in series with a Bagfilter (8,968 square feet of filter area)
HMA-Silo1	Hot Mix Asphalt Storage Silo (150 tons Maximum Capacity)	N/A	N/A
HMA-Silo2	Hot Mix Asphalt Storage Silo (150 tons Maximum Capacity)		
HMA-Silo3	Hot Mix Asphalt Storage Silo (200 tons Maximum Capacity)		
HMA-Silo4	Hot Mix Asphalt Storage Silo (200 tons Maximum Capacity)		
HMA-Silo5	Hot Mix Asphalt Storage Silo (200 tons Maximum Capacity)		
HMA-LO1	Asphalt Loadout Operation Silo 1		
HMA-LO2	Asphalt Loadout Operation Silo 2		
HMA-LO3	Asphalt Loadout Operation Silo 3		
HMA-LO4	Asphalt Loadout Operation Silo 4		
HMA-LO5	Asphalt Loadout Operation Silo 5		
ES-ACH1	Natural Gas/No.2 fuel oil-fired Asphalt Cement Heater (1.2 MMBtu/hr maximum heat input capacity)		
ES-ACH2	Natural Gas/No.2 fuel oil-fired Liquid Asphalt Tank Heater (1.1 MMBtu/hr maximum heat input capacity)		

Emission Source ID	Emission Source Description	Control System ID	Control System Description
RAP Crushing System Consisting of the Following:			
RAP-BF1 (**NSPS-OOO**)	RAP Bin and Feeder	N/A	N/A
RAP-C1 (**NSPS-OOO**)	RAP 36" Conveyor (C-1) Feeder to Crusher (RAP-CR1)	N/A	N/A
RAP-C2 (**NSPS-OOO**)	RAP 36" Conveyor (C-2) Crusher to Screen (RAP-CR1)	N/A	N/A
RAP-C3 (**NSPS-OOO**)	RAP 36" Conveyor (C-3) Screen to Plant	N/A	N/A
RAP-C4 (**NSPS-OOO**)	RAP 36" Conveyor (C-4) Screen to Conveyor (C-5)	N/A	N/A
RAP-C5 (**NSPS-OOO**)	RAP 36" Conveyor (C-5) Conveyor (C-5) to Conveyor (C-6)	N/A	N/A
RAP-C6 (**NSPS-OOO**)	RAP 36" Conveyor (C-6) Conveyor (C-6) to Crusher (RAP-CR1)	N/A	N/A
RAP-SC1 (**NSPS-OOO**)	8' X 20' Double Deck Screen	N/A	N/A
Truck Mix Concrete Batch Plant (120 cubic yards per hour capacity) consisting of the following:			
RMC-LO1	Truck Loadout Point	RMC-CD2	Bagfilter (1,433 square feet of filter area)
RMC-Silo1	Cement Storage Silo (200-ton capacity)		
RMC-Silo2	Flyash Storage Silo (150-ton capacity)		
RMC-WB1	Cement/Flyash Weigh Batcher (25-ton max capacity)		
RMC-WB2	Aggregate Weigh Batcher (50-ton max capacity)	N/A	N/A
Non-Metallic Mineral Processing Plant utilizing water suppression with no other control device, including:			
ES-Conveying (**NSPS-OOO**)	Conveying Operations	N/A	N/A
ES-Crusher (**NSPS-OOO**)	Crushing Operations		
ES-Screening (**NSPS-OOO**)	Screening Operations		
Power Generators:			
ES-PGEN1 (**NSPS-JJJJ, NESHAP-ZZZZ**)	2065 hp Natural Gas/Propane Fired Generator #1	CD-PGEN1	Catalytic Oxidizer
ES-PGEN2 (**NSPS-JJJJ, NESHAP-ZZZZ**)	2065 hp Natural Gas/Propane Fired Generator #2	CD-PGEN2	Catalytic Oxidizer
ES-PGEN3 (**NSPS-JJJJ, NESHAP-ZZZZ**)	1721 hp Natural Gas/Propane Fired Generator #3	CD-PGEN3	Catalytic Oxidizer
Support Equipment:			
GEN-1 (**NSPS-IIII, NESHAP-ZZZZ**)	(J50V2) 350 hp Diesel Engine Powering Primary Crusher	N/A	N/A
GEN-1a (**NSPS-IIII, NESHAP-ZZZZ**)	(J45) 350 hp Diesel Engine Powering Primary Crusher	N/A	N/A
GEN-2 (**NSPS-IIII, NESHAP-ZZZZ**)	(s190dt) 125 hp Diesel Engine Powering Screen	N/A	N/A
GEN-3 (**NSPS-IIII, NESHAP-ZZZZ**)	(PS1300 Maxtrack) 440 hp Diesel Engine Powering Cone Crusher	N/A	N/A
GEN-4 (**NSPS-IIII, NESHAP-ZZZZ**)	(TF80) 125 hp Diesel Engine Powering Tracked Feeder	N/A	N/A
GEN-5 (**NSPS-IIII, NESHAP-ZZZZ**)	(PS1300 Maxtrack) 450 hp Diesel Engine Powering Cone Crusher	N/A	N/A
GEN-7 (**NSPS-IIII, NESHAP-ZZZZ**)	(PS100 Maxtrack) 350 hp Diesel Engine Powering Cone Crusher	N/A	N/A

Insignificant/Exempt Sources

Source	Exemption Regulation	Source of TAPs?	Source of Title V Pollutants?
IES-1 - Used Oil Storage Tank associated with Asphalt Plant (20,000 gallon capacity)	2Q .0102 (g)(4)	Yes	No
IES-2 - Used Oil Storage Tank associated with Asphalt Plant (20,000 gallon capacity)	2Q .0102 (g)(4)		
IES-3 - Liquid Asphalt Tank (30,000 gallon capacity)	2Q .0102 (g)(14)(B)		
IES-4 - Liquid Asphalt Tank (30,000 gallon capacity)	2Q .0102 (g)(14)(B)		
IES-5 - Diesel Fuel Storage Tank associated with Asphalt Plant (20,000 gallon capacity)	2Q .0102 (g)(4)		
IES-6 - Diesel Fuel Storage Tank associated with Asphalt Plant (20,000 gallon capacity)	2Q .0102 (g)(4)		
IES-13 - Diesel Fuel Storage Tank associated with Quarry (20,000 gallon capacity)	2Q .0102 (g)(4)		
IES-14 - Diesel Fuel Storage Tank associated with Quarry (20,000 gallon capacity)	2Q .0102 (g)(4)		
IES-15 - Propane Storage Tank (100,000 gallon capacity)	2Q .0102 (g)(4)		

III. REVIEW OF REGULATIONS

The following North Carolina Administrative Code Title 15A regulations were evaluated under this review:

2D .0202 – Registration of Air Pollution Sources
2D .0503 – Particulates from Fuel Burning Indirect Heat Exchangers
2D .0506 – Particulates from Hot Mix Asphalt (HMA) Plants
2D .0510 – Particulates from Sand, Gravel, or Crushed Stone Operations
2D .0515 – Particulates from Miscellaneous Industrial Processes
2D .0516 – Sulfur Dioxide (SO_2) Emissions from Combustion Sources
2D .0521 – Control of Visible Emissions (VE)
2D .0524 – New Source Performance Standards (NSPS)
2D .0535 – Excess Emissions Reporting and Malfunctions
2D .0540 – Particulates from Fugitive Dust Emission Sources
2D .0605 – Quarry Equipment Reporting
2D .0605 – General Recordkeeping and Reporting Requirements
2D .0611 – Monitoring Emissions from Other Sources
2D .1100 – Control of Toxic Air Pollutants (TAPs)
2D .1111 – Maximum Achievable Control Technology
2D .1806 – Control and Prohibition of Odorous Emissions
2Q .0304 – Zoning Specific Condition
2Q .0315 – Synthetic Minor Facilities
2Q .0317 – Avoidance Condition (Toxics)
2Q .0317 – Avoidance Condition (PSD)
2Q .0700 – Avoidance Condition (Recycled Asphalt Shingles)
2Q .0711 – Emission Rates Requiring a Permit

CONTROL DEVICE EVALUATION

Bagfilter HMA-CD1

The proposed Bagfilter, associated with the Hot Mix Asphalt Plant (HMA-1), was evaluated using the NCDENR Bagfilter Evaluation Spreadsheet - Version 3.3, September 23, 1999 (see Attachment). The following table lists the characteristics based on the data provided on Form C1.

Material Controlled	Abrasive Dust
No. of Compartments	3
No. of Bags	640
Bag Length/Bag Diameter	120.5 in./ 4 5/8 in.
Filter Surface Area	8,868 ft^2
Inlet Air Flow Rate:	45,000 ACFM
Air to Cloth Ratio	5.78:1
Filter Material	Aramid (Nomex)
Max. Operation Temperature	350 °F
Cleaning Procedure	Pulse Jet
Claimed Capture Efficiency	93%/90% for PM/PM_{10}

According to the spreadsheet, the filtering velocity of 5.8 fpm does not exceed the typical filtering velocity of 10.0 fpm and the filter fabric is appropriate for both the maximum operating temperature and chemical resistance to acids, alkalis and organics. Also, the control efficiency as stated in the application seems reasonable, so the Bagfilter was assessed as an adequate control device. It is noted that, because the air flow rate exceeds 10,000 ACFM, a P.E. certification is required. This certification was provided on Application Form D5, bearing the seal and signature of Aimee L. Andrews, P.E., NC Professional Engineer No. 029987.

Bagfilter RMC-CD2

The proposed Bagfilter, associated with the Concrete Batch Plant, was evaluated using the NCDENR Bagfilter Evaluation Spreadsheet - Version 3.3, September 23, 1999 (see Attachment B2). The following table lists the characteristics based on the data provided on Form C1.

Material Controlled	Cement/Fly Ash
No. of Compartments	2
No. of Bags per Compartment	36
Bag Length/Bag Diameter	114 in./ 8 in.
Filter Surface Area	1,433 ft^2
Inlet Air Flow Rate:	6,500 ACFM
Air to Cloth Ratio	4.54:1
Filter Material	Dacron (Polyester)
Max. Operation Temperature	Ambient
Cleaning Procedure	Reverse Flow
Claimed Capture Efficiency	99.9% for PM

According to the spreadsheet, the filtering velocity of 4.5 fpm does not exceed the typical filtering velocity of 8.0 fpm and the filter fabric is appropriate for both the maximum operating temperature and chemical resistance to acids, alkalis and organics. Also, the control efficiency as stated in the application seems reasonable, so the Bagfilter was assessed as an adequate control device. It is noted that, because the air flow rate does not exceed 10,000 ACFM, a P.E. certification is not required.

Catalytic Oxidizers CD-PGEN1, CD-PGEN2, and CD-PGEN3

This application proposes to install three Catalytic Oxidizers associated with the three Natural Gas/Propane Fired Generators. The following table lists the characteristics based on the data provided on Form C1.

Material Controlled	Carbon Monoxide
Type of Device	Catalytic Oxidizer
Type of Catalyst	Platinum/Rhodium
Expected Life of Catalyst	3 Years
Method of Detecting Spent Catalyst	Monitor
Inlet Temp Min	550 °F
Inlet Temp Max	1250 °F
Outlet Temp Max	1350 °F
Max. Operation Temperature	880 °F
Inlet Air Flow Rate	4162
Claimed Destruction Efficiency	66.7%

According to the document titled "Air Pollution Control Technology Fact Sheet" (EPA-452/F-03-021) for Regenerative Incinerators, "RCO systems using precious metal-based catalyst can destroy more that 98 percent of the CO in the VOC-laden air stream." It should be noted that "Regenerative" in Regenerative Catalytic Oxidizers (RTOs) refers to the means of heat transfer and does not change the ability of this device to oxidize CO. The facility is claiming a control efficiency of 66.7% (from Miratech document in attachments). The EPA document states that control efficiencies for CO can reach 98%, therefore these catalytic oxidizers appear to be adequate control devices. It is noted that, because the air flow rate through each device does not exceed 10,000 ACFM, a P.E. certification is not required.

2D .0202 – Registration of Air Pollution Sources

This regulation allows the Director to require a facility to report, as in this case, total weights and kinds of air pollution released as well as any other information considered essential in evaluating the potential of the source to cause air pollution. In accordance with this regulation, the facility will be required to submit a CY 2026 Emissions Inventory at least ninety (90) days prior to XXXXX XX, XXXX, which is the expiration date of this Air Permit. It is reasonable to anticipate compliance.

2D .0503 – Particulates from Fuel Burning Indirect Heat Exchangers

This regulation applies to the two (2) Natural Gas/No. 2 Fuel Oil-fired Asphalt Cement Heaters (ES-ACH1 and ES-ACH2), and it limits particulate emissions according to the following equation:

$$\mathbf{E = 1.09 \times Q^{-0.2594}}$$

where: **E** = allowable emission limit for particulate matter in lb/MMBtu
Q = maximum total heat input of all fuel burning indirect heat exchangers in MMBtu/hr,
except where the maximum total heat input is ≤ 10 MMBtu/hr, as in this case, then **E** = 0.60 lb/MMBtu

Using the AP-42 emission factor for Fuel Oil – Tables 1.3-1 and 1.3-2, rev 5/10, and Natural Gas – Table 1.4-2, rev 7/98, the actual emissions rates are calculated as follows:

$$E_{actual\ -\ Natural\ Gas} = 7.6\ lb\ PM_{total}/10^6\ scf \div 1{,}020\ MMBtu/10^6\ scf = 0.007\ lb\ PM/MMBtu$$

$$E_{actual\ -\ No.\ 2\ Fuel\ Oil} = (2\ lb\ PM_{filterable} + 1.3\ lb\ PM_{condensable})/10^3\ gallons \div 140\ MMBtu/10^3\ gallons = 0.024\ lb\ PM/MMBtu$$

0.007; 0.024 lb PM/MMBtu < 0.60 lb PM/MMBtu → O.K.

Based on the foregoing, actual emissions for combustion of No. 2 Fuel Oil and Natural Gas are less than the allowable emissions limit; therefore, compliance is demonstrated.

2D .0506 – "Particulates from Hot Mix Asphalt Plants"

This regulation is applicable to both filterable and condensable particulate emissions from the plant. It limits the allowable particulate matter emissions from Hot Mix Asphalt Plants as calculated by the following equations:

$$\mathbf{E = 4.9445(P)^{0.4376}} \quad \text{if } \mathbf{P} < 300 \text{ tons/hr}$$
$$\mathbf{E = 60\ lbs/hr} \quad \text{if } \mathbf{P} \geq 300 \text{ tons/hr}$$

where: **P** = the process rate in tons/hr
E = the maximum allowable emission rate for PM in lb/hr

Since the permitted process rate is 250 tons per hour, this plant's allowable PM emission rate is calculated as follows:

$$E = 4.9445(250)^{0.4376} = \underline{55.4 \text{ lb PM/hr}}$$

Using AP-42 emission factors for Drum Mix Asphalt Plants (Table 11.1-3, 3/04), the emission factor for total PM for a Drum Mix HMA plant controlled by a fabric filter is 0.033 lb PM/ton of asphalt; therefore, the actual expected PM emission rate is calculated as follows:

$$PM = 0.033 \text{ lb PM/ton} \times 250 \text{ ton/hr} = \underline{8.25 \text{ lb PM/hr}}$$

$$\underline{8.25 \text{ lb PM/hr} < 55.4 \text{ lb PM/hr}} \rightarrow \text{O.K.}$$

Also, this regulation requires that visible emissions from stacks or vents at an HMA plant shall be less than 20% opacity when averaged over a six-minute period and that fugitive dust shall be controlled as required by 2D .0540 (discussed below). A source test on the Hot Mix Asphalt Drum-type Hot Asphalt Plant (HMA-1) controlled by a Bagfilter (HMA-CD1) will need to be conducted to determine the HMA plant's particulate matter emission rate. See 2D .0605 of this review for more details regarding testing. Per the Memorandum "Hot Mix Asphalt Plant Performance Testing/Emission Testing Frequency" issued August 13, 2013, by Sheila Holman, former DAQ Director, the facility must test for compliance at least once every ten (10) years. If the emission source operates according to manufacturer specifications and with the permitted bagfilter, the source should be in compliance with this regulation.

2D .0510 – Particulates from Sand, Gravel, or Crushed Stone Operations

This facility, engaging in sand, gravel, recycled asphalt pavement (RAP), or crushed stone operations, must not cause, allow, or permit any material to be produced, handled, transported, or stockpiled without taking measures to reduce to a minimum any particulate matter from becoming airborne. This is in order to prevent exceeding the ambient air quality standards beyond the property line for particulate matter. Fugitive dust shall be controlled as required by 2D .0540 as discussed below. Process generated emissions from crushers, conveyors, screens, and transfer points shall be controlled so that opacity standards required by 2D .0521 and 2D. 0524, as applicable, are not exceeded. Specifically, crushers are to be controlled using wet suppression. Compliance is anticipated.

2D .0515 – Particulates from Miscellaneous Industrial Processes

This regulation is applicable to particulate matter (PM) emissions from any stack, vent, or outlet, resulting from any industrial process for which no other emission control standards are applicable. All concrete batch plant sources at this facility are subject to this rule. All remaining sources have other emission control standards. This rule limits the allowable PM emissions as derived by the following equations:

$$\mathbf{E = 4.10\ (P)^{0.67}} \qquad \textbf{if P} \leq \textbf{30 tons per hour}$$
$$\mathbf{E = 55.0\ (P)^{0.11} - 40} \qquad \textbf{if P} > \textbf{30 tons per hour}$$

where: **P** = the process rate in tons per hour, and
E = maximum allowable emission rate of PM in pounds per hour

Emissions factors from the NCDENR Concrete Batch Plant Emissions Calculator Spreadsheet were used to calculate the uncontrolled and controlled emissions rates and the following table indicates that the facility can comply with this regulation when the Bagfilter (RMC-CD2) is installed and properly operated and maintained on the respective emission sources. Note that the process weight rates for the Truck Loadout Point, Cement Storage Silo, Flyash Storage Silo, and Aggregate Weigh Batcher were taken from information provided with the application and presented on the aforementioned NCDENR Spreadsheet. Process weight rate for the Cement/Fly Ash Weigh Batcher was calculated by this reviewer as indicated in the table footnotes.

Emission Source	Process Weight Rate (P) [tons/hr]	Allowable Emissions Rate (E) 2D .0515 Limit [lb PM/hr]	Uncontrolled Expected Actual Emissions Rate [lb PM/hr]	Controlled Expected Actual Emissions Rate [lb PM/hr]
Truck Loadout Point (RMC-LO1)	240.96[1]	60.5	52.210	1.001[3]
Cement Storage Silo (RMC-Silo1)	25.00[1]	35.4	18.250	0.025
Flyash Storage Silo (RMC-Silo2)	25.00[1]	35.4	78.500	0.223
Cement/Flyash Weigh Batcher (RMC-WB1)	35.76[2]	41.51	52.210	1.001[3]
Aggregate Weigh Batcher (RMC-WB2)	205.20[1]	58.8	0.985	N/A

[1] Taken from information provided with the application as shown on the NCDENR Spreadsheet.
[2] 120 yd^3/hr × (448 lb Cement/yd^3 + 148 lb Fly Ash/yd^3) ÷ 2,000 lb/ton = 35.76 ton/hr.
[3] As noted in the spreadsheet *"Truck/Central Mix emission factors include emissions from cement and supplement weigh hoppers,"* and so, to be conservative, the Cement/Fly Ash Weigh Batcher emission rates are shown as the same as the Truck Loadout Point emission rate.

2D .0516 – Sulfur Dioxide Emissions from Combustion Sources

This regulation applies to the Propane/Natural Gas/No. 2 Fuel Oil/Recycled No. 2 Fuel Oil/Recycled No. 4 Fuel Oil-fired drum type Hot Mix Asphalt Plant (HMA-1) and the two (2) Natural Gas/No. 2 Fuel Oil-fired Asphalt Heaters (ES-ACH1 and ES-ACH2), and it limits the emissions of sulfur dioxide (SO_2) from any source of combustion that is discharged from any vent, stack, or chimney to 2.3 lb SO_2 /MMBtu input.

For the drum dryer/mixer associated with the Asphalt Plant (HMA-1), the SO_2 emission rate is equal to 0.003 lb/MMBtu when combusting Natural Gas, 0.253 lb/MMBtu when combusting No. 2 Fuel Oil, 0.262 lb/MMBtu when combusting No. 4 Fuel Oil (0.5% Sulfur) and 1.886 lb/MMBtu when combusting No. 4 Fuel Oil (2.1% Sulfur), as demonstrated below. It is assumed that No. 4 Fuel Oil has the same emission factors as Recycled No. 4 Fuel Oil and that emission factors for Propane are similar to those for Natural Gas.

Natural Gas (NCDENR Asphalt Emissions Calculator Spreadsheet Revision G, 08/30/2019)
SO_2 = 0.0001 lb/ton of asphalt × 250 ton/hr ÷ 80 MMBtu/hr = 0.003 lb/MMBtu < 2.3 lb/MMBtu → O.K.

No. 2 Fuel Oil (0.5% Sulfur) (NCDENR Asphalt Emissions Calculator Spreadsheet Revision G, 08/30/2019)
SO_2 = 0.0811 lb/ton of asphalt × 250 ton/hr ÷ 80 MMBtu/hr = 0.253 lb/MMBtu < 2.3 lb/MMBtu → O.K.

No. 4 Fuel Oil (0.5% Sulfur) (NCDENR Asphalt Emissions Calculator Spreadsheet Revision G, 08/30/2019)
SO_2 = 0.0837 lb/ton of asphalt × 250 ton/hr ÷ 80 MMBtu/hr = 0.262 lb/MMBtu < 2.3 lb/MMBtu → O.K.

No. 4 Fuel Oil (2.1% Sulfur) (NCDENR Asphalt Emissions Calculator Spreadsheet Revision G, 08/30/2019)
SO_2 = 0.6034 lb/ton of asphalt × 250 ton/hr ÷ 80 MMBtu/hr = 1.886 lb/MMBtu < 2.3 lb/MMBtu → O.K.

For the two (2) Natural Gas/No. 2 Fuel Oil-fired Asphalt Heaters (ES-ACH1 and ES-ACH2), the SO_2 emission rate is equal to 0.00059 lb/MMBtu when combusting Natural Gas and 0.51 lb/MMBtu when combusting No. 2 fuel oil as demonstrated below. The first equation assumes the sulfur content of Natural Gas is 2,000 grains/10^6 scf, and the average heating value of Natural Gas is 1,020 Btu/scf. The second equation assumes a Fuel Oil sulfur content (*S*) of 0.5% by weight, and the average heating value of No. 2 Fuel Oil is 140,000 Btu/gal. Compliance is demonstrated.

Natural Gas (AP-42, Table 1.4-2)
SO_2 = 0.6 lb/10^6 scf × (10^6 scf/1,020 MMBtu) = 0.00059 lb/MMBtu < 2.3 lb/MMBtu → O.K.

No. 2 Fuel Oil (AP-42, Table 1.3-1)
SO_2 = 142×S (*S* = 0.5) lb/10^3 gal × (10^3 gal/140 MMBtu) = 0.51 lb/MMBtu < 2.3 lb/MMBtu → O.K.

For the diesel-fired internal combustion engines associated with the support equipment (<600 HP), the sulfur dioxide emission rate is equal to 0.29 lbs/MMBtu (< 2.3 lbs/MMBtu) when combusting diesel fuel in an engine rated less than 600 hp output (AP-42, Table 3.3-1).

For the natural gas/propane-fired internal combustion engines used as power generators, the sulfur dioxide emission rate is equal to 0.000588 lbs/MMBtu (< 2.3 lbs/MMBtu) when combusting natural gas in a four-stroke lean burn engine (AP-42, Table 3.2-2). It is assumed that SO_2 emissions would be comparable when combusting propane.

2D .0521 - Control of Visible Emissions

This regulation applies, and it will be included on the permit. According to section (d) of this rule, visible emissions from the emission sources manufactured after July 1, 1971, shall not be more than 20% opacity when averaged over a six-minute period, except that six-minute periods averaging not more than 87% opacity may occur not more than once in any hour nor more than four times in any 24-hour period. For sources manufactured before July 1, 1971, a 40% opacity limit applies. However, sources subject to a visible emission standard in 2D .0506 or 2D .0524 shall meet that standard instead of the standard contained in this rule. The HMA plant is subject to both 2D .0506 and 2D .0524. Since all sources are considered new, it is assumed they were manufactured after July 1, 1971. If the subject emission sources operate according to manufacturer specifications and with the listed particulate control device, they will likely comply with the opacity limit. Future compliance is anticipated.

2D .0524 – New Source Performance Standards (NSPS)

This regulation applies, and it will be included on the permit. The Propane/Natural Gas/No. 2 Fuel Oil/Recycled No. 2 Fuel Oil/Recycled No. 4 Fuel Oil-fired drum type hot mix asphalt plant (HMA-1) is subject to **40 CFR Part 60 Subpart I for "Hot Mix Asphalt Facilities."** The facility will be required to comply with the requirements of this rule. The facility is required to notify the DAQ of the start-up date in writing, within 15 days after start-up of the HMA plant. Under §60.92, this rule states that this facility shall not discharge into the atmosphere

from the affected source any gases which contain particulate matter in excess of 90 mg/dscm (0.04 gr/dscf) or exhibit 20% opacity or greater. The asphalt plant (HMA-1) controlled by a bagfilter (CD-1) will require a source test as described in 2D .0605 below, to show compliance with this rule. Future compliance is anticipated.

The facility is also subject to **40 CFR 60, Subpart OOO for "Nonmetallic Mineral Processing Plants."** This rule applies to each crusher, grinding mill, screening operation, bucket elevator, belt conveyor, bagging operation, storage bin, enclosed truck, or railcar loading station at fixed or portable nonmetallic mineral processing plants that commenced construction, reconstruction, or modification after August 31, 1983, except, in part, to fixed plants with capacities of 25 tons per hour or less or portable plants with capacities of 150 tons per hour or less. Also, crushers and grinding mills at hot mix asphalt facilities that reduce the size of nonmetallic minerals embedded in recycled asphalt pavement and subsequent affected facilities up to, but not including, the first storage silo or bin are subject to the provisions of this Subpart. Therefore, the Crushing, Conveying, and Screening Operations (ES-Crusher, ES-Conveying, and ES-Screening) associated with the quarry, the six RAP conveyors (RAP-C1 through RAP-C6), the RAP Bin and Feeder (RAP-BF1), and the 8' X 20' Double Deck Screen (RAP-SC1) are subject to this rule. When the facility wishes to use the RAP crushing system, they will utilize a crusher from the quarry crushing operations. Within 15 days after start-up of each source, the facility is required to notify the DAQ of the start-up date in writing.

For affected sources that commenced construction, modification, or reconstruction after August 31, 1983, but before April 22, 2008, visible emissions are limited to 15% opacity for crushers and 10% opacity for fugitive emissions from conveyor belts, screening operations, and other affected sources. For sources constructed, modified, or reconstructed on or after April 22, 2008, visible emissions are limited to 12% opacity for crushers and 7% opacity for fugitive emissions from conveyor belts, screening operations, and other affected sources. Monthly inspection requirements apply for affected sources that were constructed on or after April 22, 2008, and that use wet suppression to control emissions. A source test using EPA Method 9 on the crushers, screens, and conveyors will need to be conducted to determine their compliance with the respective opacity limits if one has not previously been conducted. The facility must perform these tests within 60 days of achieving the maximum rate, but no later than 180 days of the initial start-up of the facility. A stack test protocol must be submitted the WSRO-DAQ. To ensure that the stack test protocol is reviewed prior to the test, it must be submitted 45 days prior to the test date. If the protocol is submitted after this date, it is not required to be pre-approved by the DAQ prior to testing. In order to give DAQ the opportunity to have an observer present, the facility should provide a written notice to the WSRO at least 7 days prior to any required performance tests that involve only Method 9. The duration of the Method 9 tests must be 30 minutes (five 6-minute averages). Compliance with the fugitive visible emissions limits must be based on the average of the five 6-minute averages. If the facility does not use wet suppression to control emissions, the source must be retested every 5 years. Sources that rely on water carryover from upstream wet suppression are exempt from the 5-year retesting requirements. Future compliance is anticipated.

The facility is also subject to **40 CFR 60, Subpart IIII for "Stationary Compression Ignition Internal Combustion Engines."** This rule applies to owners and operators of any stationary CI ICE that commence construction after July 11, 2005. All of the diesel-fired engines will be 2019 or later model depending on the date that construction commences. Therefore, the seven (7) engines that are associated with the quarry (GEN-1, GEN-1a, GEN-2, GEN-3, GEN-4, GEN-5, and GEN-7) are subject to this rule. These engines will be used for non-emergency purposes therefore they will be subject to the emission standards of §60.4201. This rule states that, "*Stationary CI internal combustion engine manufacturers must certify their 2007 model year and later non-emergency stationary CI ICE with a maximum engine power less than or equal to 2,237 kilowatt (KW) (3,000 horsepower (HP)) and a displacement of less than 10 liters per cylinder to the certification emission standards for new nonroad CI engines in 40 CFR 89.112, 40 CFR 89.113, 40 CFR 1039.101, 40 CFR 1039.102, 40 CFR 1039.104, 40 CFR 1039.105, 40 CFR 1039.107, and 40 CFR 1039.115, as applicable, for all pollutants, for the same model year and maximum engine power.*" These engines will also be subject to the fuel requirements of §60.4207. This rule states that, "*Beginning October 1, 2010, owners and operators of stationary CI ICE subject to this subpart with a displacement of less than 30 liters per cylinder that use diesel fuel must use diesel fuel that meets the requirements of 40 CFR 80.510(b) for nonroad diesel fuel, except that any existing diesel fuel purchased (or otherwise obtained) prior to October 1, 2010, may be used until depleted.*" 40 CFR 80.510(b) says that the sulfur content must be less than 15 ppm for nonroad diesel fuel. It also says that the cetane index must be greater than 40 or the aromatic content must be less than 35 volume percent.

The facility plans to purchase new Tier 4 certified engines and will only burn fuel oil that meets the fuel requirements listed above. No performance testing will be required if the facility purchases certified engines. If the facility installs, configures, and operates the engines according to the manufacturer's specifications, then it will be reasonable to anticipate compliance with 40 CFR 60, Subpart IIII.

The facility is also subject to **40 CFR 60, Subpart JJJJ for "Stationary Spark Ignition Internal Combustion Engines."** This rule applies to owners and operators of stationary SI ICE that commence construction after June 12, 2006, where the stationary SI ICE are manufactured on or after July 1, 2008. The three Natural Gas/Propane-Fired Generators (ES-PGEN1, ES-PGEN2, and ES-PGEN3) are subject to this rule. These engines will be a 2019 model or later, depending on the date of construction, and will be constructed after the issuance of this permit. Similar to Subpart IIII above, a certified engine under this rule does not have any additional requirements other than maintaining the engine according to the manufacturer's emission-related written instructions. If the facility operates these engines while combusting natural gas according to the manufacturer's emission-related written instructions they will not have to keep a maintenance plan, conduct a performance test, or submit an initial notification. This engine must comply with the following emissions standards taken from Table 1 of

this rule for Non-Emergency SI Natural Gas and Non-Emergency SI Lean Burn LPG (except lean burn 500≤HP<1,350) for maximum HP >500HP manufactured after 7/1/2010:

- 1.0 g/hp-hr of NOx
- 2.0 g/hp-hr of CO
- 0.7 g/hp-hr of VOC

If the facility chooses to combust propane in these engines, the application states that they will treat the unit as a non-certified engine. If the facility combusts propane in the engines, they must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, the facility must conduct an initial performance test and conduct subsequent performance testing every 8,760 hours or 3 years, whichever comes first, thereafter to demonstrate compliance. A copy of the performance test must be submitted within 60 days of the test. The facility must submit an initial notification according to §60.4245(c). It is reasonable to anticipate compliance with 40 CFR 60, Subpart JJJJ.

2D. 0535 – Excess Emissions Reporting and Malfunctions

This facility is subject to this regulation. In accordance with section (f) of this rule, the Permittee must notify DAQ in the event of a source of excess emissions that last for more than four (4) hours and that result from a malfunction, a breakdown of process or control equipment, or any other abnormal conditions. It is reasonable to anticipate compliance.

2D .0540 – Particulates from Fugitive Dust Emission Sources

This facility is subject to this regulation. It applies to particulate emissions that do not pass through a process stack or vent and are generated within plant property boundaries. If fugitive dust emissions cause excessive visible emissions beyond property boundaries, or cause substantive complaints, the Director may require the facility to develop, implement, and comply with a fugitive dust control plan. It is reasonable to anticipate compliance.

2D .0605 – Quarry Equipment Reporting

This facility is subject to this regulation. This rule allows DAQ to require recordkeeping and reporting in order to demonstrate compliance with state and federal regulations. This condition will allow the quarry to maintain their flexible permit by not listing each piece of equipment related to the crushing, screening and conveying operation on the permitted equipment list as long as the facility tracks the equipment through an equipment list and plant flow diagram and submit any changes to the equipment list to DAQ. The equipment list must include the following for each piece of equipment:

- A description of equipment, including NSPS applicability.
- Width of belt conveyors.
- Dimensions and configurations of screens.
- Rated capacity of each crusher.
- Rated capacity of all non-metallic mineral processing equipment.
- A unique ID number.
- The date the equipment was manufactured.
- The dates any required performance testing was conducted and submitted to DAQ.

This condition allows the facility to install or relocate equipment used for nonmetallic mineral processing equipment. Whenever the facility adds or relocates equipment at this facility, they must send a written notification to DAQ-WSRO which must include a revised equipment list and plant flow diagram. The notification must be submitted 15 days before new equipment is installed or within 15 days of any relocation of existing equipment. The equipment list and plant (or flow) diagram should bear the date when the current list and diagrams were revised. It is reasonable to anticipate compliance.

2D .0605 – General Recordkeeping and Reporting Requirements

This regulation allows the DAQ to require any monitoring, recordkeeping, reporting, or testing it deems necessary for the facility to demonstrate compliance with an emission standard or permit condition. As mentioned previously, a memorandum titled "Hot Mix Asphalt Plant Performance Testing/Emission Testing Frequency" was issued August 13, 2013, by Sheila Holman, former DAQ Director. This requires all hot mix asphalt plants to test for compliance with 2D .0506 at least once every 10 years. The results also happen to reinforce compliance with 2D .0524 (NSPS Subpart I). The stack testing is for filterable and condensable particulate matter using EPA Methods 5 and 202, respectively. Additionally, EPA Method 9 is required for visible emissions from the HMA plant, as this is the initial test. The tests must be conducted within 60 days after achieving the maximum production rate at which the affected source will be operated, but not later than 180 days after initial startup of the source. The results of the test for this facility must be submitted to the DAQ-WSRO 60 days after the testing. In accordance with 2D .2602, a testing protocol must be provided to DAQ prior to testing. Protocols are not required to be

approved before the test date, but those that are received at least 45 days prior to the test date will be reviewed. The facility must provide at least 15 days' notice (or 7 days' notice, if Method 9 only) in written form of any required performance testing, to provide DAQ the opportunity to have an observer present. It is reasonable to anticipate compliance.

2D .0611 – Monitoring Emissions from Other Sources

This regulation applies to the Cyclone in series with Bagfilter (HMA-CD1) associated with the Drum Mix Asphalt Plant and Bagfilter (RMC-CD2) associated with the Truck Mix Concrete Batch Plant. It allows the Director to require the facility to conduct monitoring in order to demonstrate compliance with rules in Subchapters 2D and 2Q and is the basis for requiring control device inspections in the Air Permit. This facility will be required to perform periodic inspections and maintenance (I&M) as recommended by the manufacturer. At a minimum, this facility will be required to perform an annual internal inspection of each bagfilter. Records of all inspections and maintenance with dates and descriptions should be kept in a logbook (written or electronic format) located on-site. This logbook should be made available to DAQ personnel upon request. It is reasonable to anticipate compliance.

2D .1100 – Control of Toxic Air Pollutants (TAPs)

A toxics review has been triggered due to the addition of the HMA plant and associated sources that emit toxic air pollutants (TAPs). The facility modeled for Arsenic, Benzene, Cadmium, Formaldehyde, Mercury and Nickel due to expected actual emissions of these TAPs being above their respective toxic permit emission rates (TPERs) listed at 2Q .0711. The sources of these TAP emissions are the HMA Plant (HMA-1), the five (5) HMA storage silos (HMA-Silo 1 through HMA-Silo 5), the five (5) Asphalt Loadout Operations (HMA-LO1 through HMA-LO5), the two (2) Asphalt Cement Heaters (ES-ACH1 and ES-ACH2), and the Concrete Batch Plant. Note that the heaters cannot be exempt from toxics per 2Q .0702 (a)(18), because they are combustion sources permitted after July 10, 2010. TAPs are also expected to be emitted from the exempt storage tanks containing No. 4, Used Oil, and Diesel Fuel[1] (IES-1 through IES-6) and Liquid Asphalt[2] (IES-13 and IES-14), but these sources currently qualify for exemption from toxics rules per 2Q .0702 (a)(19)(B) for *"fuel oils […] or petroleum products with a true vapor pressure (TVP) less than 1.5 pounds per square inch absolute."* Also note that the three (3) Natural Gas/Propane fired generators (ES-PGEN1 through ES-PGEN3) along with the seven (7) diesel fired engines associated with the quarry equipment (GEN-1, GEN-1a, GEN-2, GEN-3, GEN-4, GEN-5, and GEN-7) were also modeled although they currently qualify for exemption from toxics rules per 2Q .0702 (a)(27)(B), "*an affected source pursuant to 40 CFR Part 63*". They were modeled to demonstrate that there was no unacceptable risk to human health in accordance with General Statute 143-215.107(a)(5)b. Since no AALs were exceeded in the modeling, the engines were not required to have an emissions limit placed in this condition.

On February 6, 2020, Matthew Porter, Meteorologist, Air Quality Analysis Branch (AQAB) issued a Memorandum regarding the analysis stating that "*the modeling analysis of maximum-allowable facility-wide TAPs emissions adequately demonstrated compliance with Acceptable Ambient Levels (AALs) outlined in 02D .1104, on a source-by-source basis, for all TAPs.*" The total formaldehyde and benzene emission rates from the HMA Silos are 0.021 and 9.75×10^{-4} lb/hour, respectively, according to the HMA plant emissions calculation spreadsheet. The facility originally modeled the 5 silos to each have 20% of the maximum silo emission rate. However, this situation is not representative of normal operations. Asphalt plants can only fill one silo at a time, and it is uncommon for more than two or three silos to be loaded in any given hour. Mr. Porter ran the model with every silo having to total emissions rate of 0.021 and 9.75×10^{-4} lb/hour. This resulted in an exceedance of the AAL for benzene. This operating scenario is overly conservative and physically impossible for the facility to emit this rate. Mr. Porter ran the model with each individual silo having an emissions rate of 0.021 and 9.75×10^{-4} lb/hour with the remaining solos having no emissions. Mr. Porter discovered that the scenario with the highest impact was when the model was run with all of the emissions coming from Silo 5. This model showed the maximum annual benzene concentration to only be 93.9% of the AAL. Since this impact was smaller than the original model (94.8%), there seems to be no need for the model to be revised. The allowable emissions rate for the silos will be listed as 0.021 and 9.75×10^{-4} lb/hour with the caveat that only one silo can be filled at any given time. The same logic applies to the asphalt loadout operation. The allowable formaldehyde and benzene emissions rates from the loadout operation will be five times higher than that which was modeled, but no more than one truck loadout operation is allowed to be operated at any given time.

It should also be noted that the facility erroneously modeled mercury emissions from the concrete plant bagfilter (CD-2). This type of source is not expected to emit mercury. Therefore, the facility has not requested a permit limit for this emission source for mercury.

The following table illustrates the maximum impacts from the modeling:

[1] Distillate Fuel Oil has a TVP of 0.062 kPa (0.0090 psi) at 700 F (AP-42 7.1, Organic Liquid Storage Tanks, rev. 11/06, Table 7.1-2).

[2] Liquid asphalt has a TVP less than 0.12 kPa (0.017 psi) at 325º F (AP-42 11.1 HMA plants, background document, 2/2004, p. 4-82).

Maximum Modeled TAP Impacts

TAP	Averaging Period	AAL [µg/m^3]	AAL [%]
Arsenic	Annual	0.0021	5.71
Benzene		0.12	94.8
Cadmium		0.0055	1.09
Formaldehyde	1-hr	150	63.0
Mercury	24-hr	0.060	0.41
Nickel		0.60	0.65

Every emission point was modeled at 8760 hours/year of the 5-year meteorological modeling period. Therefore, there will be no operational restrictions in this permit condition. The facility must operate in a manner to maintain emission rates below the rates listed in the table below. To ensure compliance, the heights and geodetic positions of the stacks and release points, as specified in the modeling and contained in this permit condition, shall remain unchanged. No recordkeeping or reporting requirements are required for this condition. It is reasonable to anticipate compliance.

Affected Source(s)	Toxic Air Pollutant	Emission Limit
Propane/Natural Gas/No. 2 Fuel Oil/Recycled No. 2 Fuel Oil/Recycled No. 4 Fuel Oil-fired drum type hot mix asphalt plant (80 MMBtu/hr maximum heat input capacity) (HMA-1)	Formaldehyde (50-00-0)	7.75E-01 lb/hr
	Mercury, vapor (Component of HGC) (7439-97-6)	1.56E-02 lb/day
	Nickel metal (Component of NIC) (7440-02-0)	3.79E-01 lb/day
	Arsenic & Compounds (total mass of elemental AS, arsine and all inorganic compounds) (ASC (7778394))	1.23E+00 lb/yr
	Benzene (71-43-2)	8.54E+02 lb/yr
	Cadmium Metal, elemental, unreacted (Component of CDC) (7440-43-9)	9.02E-01 lb/yr
Natural Gas/No.2 fuel oil-fired Asphalt Cement Heater (1.2 MMBtu/hr maximum heat input capacity) (ES-ACH1)	Formaldehyde (50-00-0)	2.83E-04 lb/hr
	Mercury, vapor (Component of HGC) (7439-97-6)	8.64E-05 lb/day
	Nickel metal (Component of NIC) (7440-02-0)	8.64E-05 lb/day
	Arsenic & Compounds (total mass of elemental AS, arsine and all inorganic compounds) (ASC (7778394))	4.20E-02 lb/yr
	Benzene (71-43-2)	2.15E-02 lb/yr
	Cadmium Metal, elemental, unreacted (Component of CDC) (7440-43-9)	3.15E-02 lb/yr
Natural Gas/No.2 fuel oil-fired Asphalt Cement Heater (1.1 MMBtu/hr maximum heat input capacity) (ES-ACH2)	Formaldehyde (50-00-0)	2.59E-04 lb/hr
	Mercury, vapor (Component of HGC) (7439-97-6)	7.92E-05 lb/day
	Nickel metal (Component of NIC) (7440-02-0)	7.92E-05 lb/day
	Arsenic & Compounds (total mass of elemental AS, arsine and all inorganic compounds) (ASC (7778394))	3.85E-02 lb/yr
	Benzene (71-43-2)	1.97E-02 lb/yr
	Cadmium Metal, elemental, unreacted (Component of CDC) (7440-43-9)	2.89E-02 lb/yr
Five Hot Mix Asphalt Storage Silos (150-200 tons Maximum Capacity, each) (HMA-Silo1 through HMA-Silo5)[1]	Formaldehyde (50-00-0)	2.10E-02 lb/hr, each
	Benzene (71-43-2)	8.54E+00 lb/yr, each
Truck Loadout Point (RMC-LO1)	Formaldehyde (50-00-0)	0.00E+00 lb/hr
	Nickel metal (Component of NIC) (7440-02-0)	4.62E-03 lb/day
	Arsenic & Compounds (total mass of elemental AS, arsine and all inorganic compounds) (ASC (7778394))	5.77E-01 lb/yr
	Benzene (71-43-2)	0.00E+00 lb/yr
	Cadmium Metal, elemental, unreacted (Component of CDC) (7440-43-9)	4.38E-03 lb/yr

Affected Source(s)	Toxic Air Pollutant	Emission Limit
Asphalt Loadout Operation for Silos 1 through 5 (HMA-LO1 through HMA-LO5)[2]	Formaldehyde (50-00-0)	9.15E-04 lb/hr, each
	Benzene (71-43-2)	4.74E+00 lb/yr, each

[1] Asphalt Silos shall not be loaded concurrently
[2] Asphalt Loadouts shall not be operated concurrently

2D .1111 – Maximum Achievable Control Technology

This facility has seven (7) diesel-fired engines (GEN-1, GEN-1a, GEN-2, GEN-3, GEN-4, GEN-5, and GEN-7) and three (3) natural gas/propane-fired engines (PGEN-1, PGEN-2, and PGEN-3) that are subject to 40 CFR 63 Subpart ZZZZ. In accordance with 40 CFR §63.6590(c)(1), these sources shall meet the requirements of 40 CFR 63 Subpart ZZZZ and Subpart A by meeting the requirements of 40 CFR 60 Subpart IIII for compression ignition engines or 40 CFR 60 Subpart JJJJ for spark ignition engines. No further requirements apply for such engines under 40 CFR 63 Subpart ZZZZ or Subpart A. It is reasonable to anticipate compliance.

2D .1806 – Control and Prohibition of Odorous Emissions

This regulation requires the facility to utilize management practices or odor control equipment sufficient to prevent odorous emissions from causing or contributing to objectionable emissions beyond the facility's boundaries. It is reasonable to anticipate compliance.

2Q .0304 – Zoning Specific Condition

This regulation is the basis for requesting that, prior to construction or operation of the facility under this permit, as prescribed by NCGS 143-215.108(f), *"An applicant for a permit under this section for a new facility or for the expansion of a facility permitted under this section shall request each local government having jurisdiction over any part of the land on which the facility and its appurtenances are to be located to issue a determination as to whether the local government has in effect a zoning or subdivision ordinance applicable to the facility and whether the proposed facility or expansion would be consistent with the ordinance."* As mentioned under Section I. of this review, this site is located in an area without zoning and the Applicant was required to publish a legal notice pursuant to 15A NCAC 02Q .0113. On December 4, 2019, the required legal notice was published in The Caswell Messenger, a local publication that services the area of the proposed facility. In addition, a sign was posted on the property on December 2, 2019. It is DAQ policy to include a permit condition in permits for facilities located in areas without zoning requiring compliance with all lawfully adopted local ordinances that apply to the facility at the time of construction or operation of the facility.

2Q .0315 - Synthetic Minor Facilities

The facility is subject to this regulation. This regulation allows the facility to choose to have terms and conditions placed in their permit to restrict operation to limit the potential for the facility to emit in order to avoid Title V applicability and thus be classified as a Synthetic Minor facility. The facility has the potential without controls and limits to emit more than 100 tons of SO_2, NOx, and CO, each, per year. To ensure that the facility emits less than 100 tons of SO_2, NOx, and CO per year, the Permittee has requested that production be limited to 600,000 tons of asphalt per consecutive 12 month period, that the sulfur content of any grade of fuel oil combusted by the facility be limited to no more than 0.5% sulfur by weight, the production of the quarry operations shall be less than 7,117,500 tons per consecutive 12-month period, and the total hours of operation of the three Natural Gas/Propane Fired Generators (ES-PGEN1, ES-PGEN2, and ES-PGEN3) shall be less than 17,520 hours per consecutive 12-month period. The facility is required to record monthly and total annually the amount of asphalt produced, the amount of non-metallic mineral product produced by the quarry, the total hours of operation of the three Natural Gas/Propane Fired Generators, and keep fuel supplier certifications on-site and made available to DAQ personnel upon request. Within 30 days after each calendar quarter, regardless of actual emissions, the following data, including monthly and 12 month totals for the previous 14 months, should be provided: SO_2, NOx, and CO emissions, monthly asphalt production, monthly non-metallic mineral product production, monthly hours of operation of the three Natural Gas/Propane Fired Generators, and a summary of the sulfur content of the fuel oils from the fuel certification records for the previous 3 months. Also, the catalytic oxidizers associated with the three power generators (CD-PGEN1, CD-PGEN2, and CD-PGEN3) must be annually inspected per the manufacturer's specifications. It is reasonable to anticipate compliance.

2Q .0317 – Avoidance Conditions (2D .0530 PSD – Sulfur Dioxide)

This facility has the potential to emit more than 250 tons per year of Sulfur Dioxide (SO_2) emissions before controls. This facility is not on the list of 28 source categories with 100 tons per year major source thresholds. A limit of 250 tons per year of SO_2 emissions will be placed in the permit and so the facility is considered minor for PSD purposes.

Compliance with this regulation is achieved by meeting the 100 tons per year SO_2 emissions limit as set forth under 2Q .0315 above. It is reasonable to anticipate compliance.

2Q .0317 – Avoidance Conditions (2Q .0700 – Recycled Fuel Oil)

This facility is subject to this rule for the avoidance of 2D .0530 "Prevention of Significant Deterioration" as previously mentioned above. It is also subject to this rule for the avoidance of 2Q .0700 "Toxic Air Pollutant Procedures" due to the use of recycled No. 2 and No. 4 fuel oils. The recycled fuel oil must be equivalent to its virgin counterpart. This can be met by following the allowable levels for arsenic, cadmium, chromium, lead, total halogens, flash point, sulfur, and ash as listed in the permit condition. The facility must record and maintain for a minimum of three (3) years the actual amount of recycled fuel oil delivered to and combusted on an annual basis. Each load received shall include a delivery manifest, a batch specific analytical report, batch signature information, and a certification indicating there were no detectable PCBs (<2ppm). It is reasonable to anticipate continued compliance.

2Q .0700 – Toxic Air Pollutant Procedures (Avoidance – Recycled Asphalt Shingles)

This regulation applies, and it will be included in this permit. The facility has requested the ability to process Recycled Asphalt Shingles (RAS). The processing of RAS has the potential to emit asbestos, a toxic air pollutant with a toxic permit emission rate of 5.7×10^{-3} pound per year (obstructed or non-vertically oriented). Therefore, an avoidance condition for toxics applicability was added to the permit. The avoidance condition helps the facility to avoid NC toxics as well as NESHAP 40 CFR 61, Subpart M "National Emission Standard for Asbestos." The facility must use recycled shingles that are considered equivalent to their virgin or unadulterated counterparts by meeting the following criteria:

The recycled shingles and roofing materials are certified to be free of asbestos containing material (ACM). ACM is defined as materials containing more than one percent (1 %) by weight of asbestos. This certification shall be provided by demonstration that the materials sampled are representative of the recycled asphalt roofing materials and contain less than 1 percent asbestos or are certified to be asbestos free as measured by the method specified in Appendix E, 40 CFR 763, Section 1, polarized light microscopy (PLM). Certification shall be provided by NC-accredited Asbestos Inspectors or Roofing Supervisors to sample the PRAS to meet the above criteria. Accreditation shall be obtained through the Health Hazards Control Unit of the Division of Public Health.

The facility is responsible for ensuring that the RAS meet the criteria. The facility shall perform visual inspections of each received load for suspect ACM and take a sample from every 100 tons received to be tested. Any load received by an outside vendor must have a certification of no ACM and that it was tested in accordance with the best practices. If a received load was not tested by the outside vendor, the facility is responsible for testing and certifying the RAS. The facility is responsible for any discrepancies found by the DAQ. The facility shall maintain records for a minimum of three years of the amount of RAS delivered to and used at the facility. The facility shall also maintain the delivery manifest document, the batch specific analytical report, the batch signature information, and the certification statement of no ACM for each load or batch of RAS received by the facility. The facility is also responsible for complying with any additional regulations or obtaining any additional permits associated with the receipt and/or storage of RAS. The DAQ also reserves the right to require any additional testing and/or monitoring of the RAS in accordance with this rule, 2Q .0317. Carolina Sunrock has multiple facilities that have air permits with this requirement, therefore the company is aware of the requirements of this condition. The DAQ anticipates future compliance with this regulation from the facility.

2Q .0711 – Emission Rates Requiring a Permit (Toxics)

As previously discussed under 2D .1100, a toxics review has been triggered for this facility for certain TAPs (i.e., Arsenic, Benzene, Cadmium, Formaldehyde, Mercury and Nickel) because they are expected to be emitted above their respective toxic permit emission rates (TPER). In addition, this facility will emit additional TAP as shown in the table below that are not expected to be emitted above their respective TPER.

This facility must be operated and maintained so that any toxic air pollutant (TAP) emitted does not exceed its respective toxic permit emission rate (TPER). Prior to exceeding any TPER, the facility must modify their air quality permit. The Permittee shall maintain records of operational information demonstrating that the TAP emissions do not exceed the TPERs. A toxics review has been triggered for this initial review for the emissions of TAPs listed in the table below due to the new quarry, HMA, and Concrete Batch plants. The Hot Mix Asphalt Plant (HMA-1), the five HMA storage silos (HMA-Silo1 through HMA-Silo5), the Asphalt and Truck Loadout Operations (HMA-LO1 and HMA-LO2), the two (2) Asphalt Cement Heaters (HMA-ACH1 and HMA-ACH2), the Concrete Batch Plant, the three natural gas/propane-fired engines (ES-PGEN1 through ES-PGEN3), and the seven diesel fired engines associated with the quarry will be sources of these TAPs. The controlled potential emission rates of these TAPs were calculated using the NCDEQ Concrete Batch Plant, Asphalt, and permittee created spreadsheets. The emissions factors that were used in the permittee created spreadsheets were verified by this permit writer. These emission rates will not exceed the TPERs as demonstrated below. It is reasonable to anticipate compliance.

Pollutant	TPER (lb/yr)	TPER (lb/day)	TPER (lb/hr)	Controlled Potential Emissions
Acetaldehyde (75-07-0)			6.8	3.25E-01 lb/hr
Acrolein (107-02-8)			0.02	6.50E-03 lb/hr

Pollutant	TPER (lb/yr)	TPER (lb/day)	TPER (lb/hr)	Controlled Potential Emissions
Ammonia (as NH3) (7664-41-7)			0.68	7.17E-03 lb/hr
Benzo(a)pyrene (Component of 83329/POMTV & 56553/7PAH) (50-32-8)	2.2			2.36E-05 lb/yr
Beryllium Metal (unreacted) (Component of BEC) (7440-41-7)	0.28			1.00E-01 lb/yr
Carbon disulfide (75-15-0)		3.9		1.49E-02 lb/day
Chromium (VI) Soluble Chromate Compounds (Component of CRC)		0.013		6.66E-03 lb/day
Dichlorobenzene(p), 1,4- (106-46-7)			16.8	2.69E-06 lb/hr
Hexachlorodibenzo-p-dioxin 1,2,3,6,7,8 (57653-85-7)	0.0051			7.80E-07 lb/yr
Hexane, n- (110-54-3)		23		5.84E+00 lb/day
Hydrogen chloride (hydrochloric acid) (7647-01-0)			0.18	5.25E-02 lb/hr
Hydrogen sulfide (7783-06-4)		1.7		3.28E-01 lb/day
MEK (methyl ethyl ketone, 2-butanone) (78-93-3)		78	22.4	1.61E-01 lb/day, 6.70E-03 lb/hr
Manganese & compounds (MNC)		0.63		6.45E-02 lb/day
Methyl chloroform (71-55-6)		250	64	2.88E-01 lb/day, 1.20E-02 lb/hr
Methylene chloride (75-09-2)	1600		0.39	1.97E-02 lb/yr, 8.23E-06 lb/hr
Perchloroethylene (tetrachloroethylene) (127-18-4)	13000			1.92E-01 lb/yr
Phenol (108-95-2)			0.24	1.01E-03 lb/hr
Styrene (100-42-5)			2.7	2.40E-04 lb/hr
Tetrachlorodibenzo-p-dioxin, 2,3,7,8- (Component of CLDC & 83329/POMTV) (1746-01-6)	0.0002			1.26E-07 lb/yr
Toluene (108-88-3)		98	14.4	1.75E+01 lb/day, 7.29E-01 lb/hr
Xylene (mixed isomers) (1330-20-7)		57	16.4	1.45E+00 lb/day, 6.04E-02 lb/hr

IV. NEW SOURCE PERFORMANCE STANDARDS (NSPS) / NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAP) / PREVENTION OF SIGNIFICANT DETERIORATION (PSD) / EPA SECTION 112r / ATTAINMENT/NON-ATTAINMENT STATUS

- **NSPS APPLICABILITY** - As discussed in Section III. under 2D .0524, the facility **is** subject to 40 CFR 60 Subpart I – "Standards of Performance for Hot Mix Asphalt Facilities" and Subpart OOO for "Nonmetallic Mineral Processing Plants."

  The two Asphalt Cement Heaters (ES-ACH1 and ES-ACH2) **are not** subject to 40 CFR Part 60, Subpart Dc because the maximum heat input of each is less than 10 million Btu per hour.

  The insignificant aboveground storage tanks containing fuel oil and liquid asphalt (IES-1 through IES-6, IES-13, and IES-14) are not subject to 40 CFR Part 60, Subpart Kb, because fuel oil has a true vapor pressure (TVP) less than 0.062 kilopascals (kPa), or 0.0090 psi, at 70^0 F. (AP-42 7.1, Organic Liquid Storage Tanks, rev. 11/06, Table 7.1-2), and liquid asphalt has a TVP of 0.12 kPa (0.017 psi) at 325 ºF (AP-42 11.1 HMA plants, background document, 2/2004, p. 4-82). The 100,000-gallon propane storage tank (IES-15) does not emit to the atmosphere. According to section 60.110b(d)(2) of the rule, pressure vessels designed to operate in excess of 204.9 kPa (29.72 psi) and without emissions to the atmosphere are exempt from the Subpart's requirements.

  This facility has seven (7) diesel-fired engines (GEN-1, GEN-1a, GEN-2, GEN-3, GEN-4, GEN-5, and GEN-7) that are subject to 40 CFR 60 Subpart IIII. See Section III. under 2D .0524 for more details.

  This facility has three (3) natural gas/propane-fired engines (PGEN-1, PGEN-2, and PGEN-3) that are subject to 40 CFR 60 Subpart JJJJ. See Section III. under 2D .0524 for more details.

- **NESHAP APPLICABILITY** - This facility **is** subject to a NESHAP regulation.

This facility has seven (7) diesel-fired engines (GEN-1, GEN-1a, GEN-2, GEN-3, GEN-4, GEN-5, and GEN-7) and three (3) natural gas/propane-fired engines (PGEN-1, PGEN-2, and PGEN-3) that are subject to 40 CFR 63 Subpart ZZZZ. See Section III. under 2D .1111 for more details.

The two Asphalt Cement Heaters (ES-ACH1 and ES-ACH2) **are not** subject to 40 CFR 63 Subpart JJJJJJ for Industrial, Commercial, and Institutional Boilers at Area Sources. This rule defines boilers as "an enclosed device using controlled flame combustion in which water is heated to recover thermal energy in the form of steam or hot water." These heaters are not considered boilers as defined by this rule, i.e., it is not used to create steam, and so this rule **does not** apply.

The facility **is not** subject to 40 CFR 63 Subpart LLLLL - National Emission Standards for Hazardous Air Pollutants: Asphalt Processing and Asphalt Roofing Manufacturing. This facility is not defined as an asphalt processing plant or asphalt roofing manufacturer in this Subpart, and is classified as minor for HAP emissions, and so this rule **does not** apply.

The facility **is avoiding subjectivity** to 40 CFR 61, Subpart M "National Emission Standard for Asbestos" by inserting an avoidance condition in the permit. The avoidance condition helps the facility to avoid NC toxics as well as this NESHAP. The facility must use recycled shingles that are considered equivalent to their virgin or unadulterated counterparts by meeting a set of criteria. See Section III. under 2Q .0700 for more details.

- **PSD APPLICABILITY** - As discussed in Section III. under 2Q .0317, this facility has the potential to emit greater than 250 tons per year (after controls) of a criteria pollutant (SO2) but has a permit condition under rule 2Q .0317 so that it can be considered minor for PSD purposes. This facility is not one of the twenty-eight named PSD source categories limited to 100 tons per year (after controls) of any criteria pollutant. Caswell County has not yet triggered a PSD baseline date. Therefore, increment tracking is not required.
- **TOXICS APPLICABILITY -** The facility does emit toxics and **is** subject to 2D .1100 and 2Q .0711. See Section III. for further discussion.
- **EPA SECTION 112(r) –** This facility will have a 100,000 gallon propane storage tank (IES-15) for fuel for the three natural gas/propane-fired generators (ES-PGEN 1 through ES-*PGEN3*). §68.126 of this rule states that *"a flammable substance listed in Tables 3 and 4 of §68.130 is nevertheless excluded from all provisions of this part when the substance is used as a fuel or held for sale as a fuel at a retail facility."* This facility **is** subject to the "General Duty Clause" of EPA Section 112(r) regulations; however, it **is not** subject to the Risk Management Plan (RMP) requirement due to §68.126.
- **ATTAINMENT/NON-ATTAINMENT STATUS -** Caswell County is considered in attainment or unclassifiable for all regulated pollutants.

V. FACILITY – WIDE EMISSIONS

This facility has a verity of emission sources. The emissions of these sources were calculated using the following methods:

- Emissions from the HMA plant and one of the asphalt cement heaters were calculated using the NCDENR Asphalt Emissions Calculator spreadsheet (Revision G).
- Emissions from the second Asphalt Cement Heater were calculated using a spreadsheet that the facility's consultant (Trinity Consultants) created using emissions factors from AP-42.
- Emissions from the concrete batch plant were calculated using the NCDENR Concrete Batch Plant Emissions Calculator spreadsheet (Revision D).
- Emissions from the quarry equipment was calculated using the NCDENR Stone Quarry Emissions Calculator spreadsheet (Revision C).
- Emissions from the three natural gas/propane-fired power generating engines were calculated using a spreadsheet that the facility's consultant created using emissions factors from AP-42, vendor specifications, and 40 CFR 60 Subpart JJJJ emissions limits.
- Emissions from the seven diesel-fired power generating engines were calculated using a spreadsheet that the facility's consultant created using emissions factors from AP-42, the NCDENR Gas & Diesel Internal Combustion Engines Emissions Calculator spreadsheet (Revision S), and 40 CFR 60 Subpart IIII emissions limits.

Potential Emissions before controls were calculated assuming 8760 hours/year production and no production or operating restrictions. Compliance with all federally enforceable emission limits (e.g. NSPS limits for the asphalt plant and generators) was also assumed. The controlled potential emissions for the HMA plant were calculated assuming that the emissions were controlled with a baghouse, the fuel used was 0.5% Sulfur, and 600,000 tons/year production.

The Potential Emissions with Synthetic Minor Limits for the quarry equipment and associated engines were calculated assuming a maximum quarry throughput of 7,117,500 tons/year. The Potential Emissions with Synthetic Minor Limits for the power generating engines

were calculated assuming maximum hours of operation to be 17,520. The Potential Emissions with Synthetic Minor Limits for the remaining sources will be the same as the controlled potential emissions.

The following table summarizes the facility-wide emissions from this facility:

Pollutant	Potential Emissions with Synthetic Minor Limits [tons/year]	Potential Emissions [tons/year]	
		Before Controls/Limits	After Controls
PM	94.43	629.10	140.81
PM_{10}	46.26	82.57	66.32
$PM_{2.5}$	34.05	60.03	43.78
SO_2	30.37	666.01	30.45
NO_x	45.26	103.50	59.77
CO	99.56	243.06	137.70
VOC	43.95	95.19	56.95
HAP_{Total}	9.78	24.2	20.45
$HAP_{Highest}$ (Formaldehyde)	7.21	13.0	12.36

VI. COMPLIANCE HISTORY

There is no compliance history as this is a Greenfield facility. This facility will be targeted for a compliance inspection upon issuance of this permit.

VII. APPLICATION FEE

An application fee of $400, the required fee for a new permit for a Greenfield facility, was submitted along with the application.

VIII. ZONING CONSISTENCY DETERMINATION (ZCD)

As mentioned previously, this site is located in an area without zoning; therefore, a legal notice is required per 2Q .0113. A sign was posted on the property on December 2, 2019 and the required legal notice was published in The Caswell Messenger on December 4, 2019. Chris Bryant of the WSRO verified that the sign was posted, via site visit on December 18, 2019 and compliance with legal notice requirements was fulfilled on January 11, 2020.

IX. RECOMMENDATION

It is recommended that Air Quality Permit No. 10641R00 be issued to Carolina Sunrock LLC - Prospect Hill Quarry and Distribution Center.

DIVISION OF AIR QUALITY
February 6, 2020

MEMORANDUM

TO: Dylan Wright, Environmental Engineer, WSRO
Davis Murphy, Permit Coordinator, WSRO

FROM: Matthew Porter, Meteorologist, AQAB

THROUGH: Tom Anderson, AQAB Supervisor, AQAB

SUBJECT: Review of Dispersion Modeling Analysis for Carolina Sunrock, LLC – Prospect Hill Quarry
Facility ID: 1700017
Application ID: 1700017.19A – Green – 300
Prospect Hill, NC Caswell County

I have reviewed the dispersion modeling analysis, received December 4, 2019, for the new proposed Carolina Sunrock, LLC – Prospect Hill facility located in Prospect Hill, Caswell County, NC. The new facility will include a quarry, asphalt plant, and truck mix concrete batch plant. Additional modeling for mercury emissions impacts was received via email January 6, 2020 to include in the final review. The dispersion modeling analysis was conducted to evaluate toxics air quality impacts from the combination of all proposed manufacturing operations at the new facility. The facility-wide total emissions of arsenic, benzene, cadmium, formaldehyde, mercury, and nickel were estimated to exceed toxic air pollutant (TAP) emissions rates (TPERs) outlined in 15A NCAC 02Q .0700. Accordingly, and based on my final review, the modeling analysis of maximum-allowable facility-wide TAPs emissions adequately demonstrated compliance with Acceptable Ambient Levels (AALs) outlined in 15A NCAC 02D.1104, on a source-by-source basis, for all TAPs.

Modeled source release parameters for point and volume sources are provided in attached Tables A1 and A2. Modeled TAPs emissions are provided in attached Table A3. TAP emissions modeled at the facility included 19 point sources and 5 volume source. The emissions shown in Table A3 were modeled 8760 hours/year for each year of the 5-year meteorological modeling period.

AERMOD (version 18081) using five years (2014-2018) of Danville Regional Airport meteorological data (surface) and Greensboro vertical profile data (upper air) were used to evaluate impacts in both simple and complex terrain. AERMET (version 18081) was used to process the airport surface and upper air data to generate vertical meteorological and atmospheric turbulence profiles for hourly AERMOD dispersion modeling calculations. The AERMET processing was conducted by NC DAQ and downloaded by the applicant via the NC DAQ website. Direction-specific building downwash parameters, calculated using EPA's BPIP-PRIME program (04274), were used as input to AERMOD to determine building downwash effects on plume rise and effects on entrainment of stack emissions into the cavity and turbulent wake zones downwind of existing buildings. The building downwash analysis included 11 buildings and 19 stacks. Receptors were modeled around the facility's property line at 25-meter intervals. Discrete gridded receptors were modeled approximately 2 km from the facility using

100-meter spacing. In all, a total of 1,404 receptors were modeled. Building, source, and receptor elevations and receptor dividing streamline heights were calculated from 1-arc-second resolution USGS NED terrain data using the AERMOD terrain pre-processor AERMAP (version 11103). All model buildings, sources, and receptors were geo-located within the modeling domain based on the horizontal North American Datum of 1983 (NAD83) and Zone 17 of the Universal Transverse Mercator (UTM) coordinate system.

Modeled emissions impacts for each TAP and associated averaging period are shown in Table 1 below as a percentage of the applicable AAL.

Table 1.
Maximum Modeled Toxics Impacts
Carolina Sunrock, LLC, Prospect Hill, NC

Pollutant	Averaging Period	AAL ($\mu g/m^3$)	Maximum Modeled Impacts % of AAL
Arsenic	Annual	0.0021	5.71 %
Benzene	Annual	0.12	94.8 %
Cadmium	Annual	0.0055	1.09 %
Formaldehyde	1-hour	150	63.0 %
Mercury	24-hour	0.6	0.41 %
Nickel Metal	24-hour	6	0.65 %

This compliance demonstration assumes the source parameters and pollutant emission rates used in the dispersion modeling analysis are correct.

cc: Tom Anderson
Matthew Porter

Table A1. Modeled Release Parameters for Point Sources

Source Description	Model ID	X-utm (m)	Y-utm (m)	Elev. (m)	Release Ht. (m)	Exit Temp. (K)	Exit Vel. (m/s)	Stack Diam. (m)	Release Configuration
Power Engine 1	PGEN1	664047.9	4018679.7	205.0	5.18	788.71	22.02	0.15	NO
Power Engine 2	PGEN2	664050.7	4018673.3	205.2	5.18	788.71	22.02	0.15	NO
Power Engine 3	PGEN3	664053.4	4018667.0	205.4	5.18	788.71	22.02	0.15	NO
Asphalt Plant Baghouse	CD1	664069.6	4018718.7	204.6	9.22	388.71	29.41	0.96	NO
Aspalt Heater	IES4	664066.8	4018732.0	204.7	2.74	435.93	0.01	0.30	NO
Liquid Asphalt Heater	IES5	664071.1	4018735.0	204.8	4.57	435.93	0.01	0.05	NO
Aspalt Silo 1 Vent	HMASILO1	664109.1	4018719.0	205.1	19.81	298.15	0.01	0.30	NO
Aspalt Silo 2 Vent	HMASILO2	664112.0	4018721.4	205.1	19.81	298.15	0.01	0.30	NO
Aspalt Silo 3 Vent	HMASILO3	664115.0	4018723.7	205.0	18.29	298.15	0.01	0.30	NO
Aspalt Silo 4 Vent	HMASILO4	664117.9	4018726.2	204.9	18.29	298.15	0.01	0.30	NO
Aspalt Silo 5 Vent	HMASILO5	664106.1	4018716.5	205.2	18.29	298.15	0.01	0.30	NO
Concrete Plant Baghouse	CD2	664155.2	4018786.6	202.2	10.67	298.15	24.38	0.46	NO
Quarry Generator	GEN1	664799.0	4018997.2	191.0	3.66	797.04	29.11	0.15	NO
Quarry Generator	GEN1A	665048.1	4018924.3	186.6	3.66	797.04	29.11	0.15	NO
Quarry Generator	GEN2	664815.4	4019139.4	190.8	3.66	797.04	29.11	0.15	NO
Quarry Generator	GEN3	664617.9	4018936.2	199.0	3.66	797.04	29.11	0.15	NO
Quarry Generator	GEN4	665031.3	4019118.9	188.2	1.83	778.71	15.07	0.15	HOR
Quarry Generator	GEN5	664627.5	4018930.4	198.4	3.66	797.04	29.11	0.15	NO
Quarry Generator	GEN7	664636.8	4018891.0	197.4	3.66	797.04	29.11	0.15	NO

Table A2. Modeled Release Parameters for Volume Sources

Source Description	Model ID	X-utm (m)	Y-utm (m)	Elev. (m)	Release Ht. (m)	Init. Sigma-y (m)	Init. Sigma-z (m)
Asphalt Loadout 1	HMALO1	664109.1	4018719.0	205.1	3.66	0.15	1.70
Asphalt Loadout 2	HMALO2	664112.0	4018721.4	205.1	3.66	0.15	1.70
Asphalt Loadout 3	HMALO3	664115.0	4018723.7	205.0	3.66	0.15	1.70
Asphalt Loadout 4	HMALO4	664117.9	4018726.2	204.9	3.66	0.15	1.70
Asphalt Loadout 5	HMALO5	664106.1	4018716.5	205.2	3.66	0.15	1.70

Table A3. Modeled Emission Rates for Point and Volume Sources

Source Description	Model ID	Source Type	Arsenic (lb/hr)	Benzene (lb/hr)	Cadmium (lb/hr)	Formaldehyde (lb/hr)	Mercury (lb/hr)	Nickel (lb/hr)
Power Engine 1	PGEN1	Point	0.000E+00	2.515E-02	0.000E+00	7.976E-01	0.000E+00	0.000E+00
Power Engine 2	PGEN2	Point	0.000E+00	2.515E-02	0.000E+00	7.976E-01	0.000E+00	0.000E+00
Power Engine 3	PGEN3	Point	0.000E+00	2.096E-02	0.000E+00	6.650E-01	0.000E+00	0.000E+00
Asphalt Plant Baghouse	CD1	Point	1.400E-04	9.754E-02	1.030E-04	7.750E-01	6.500E-04	1.580E-02
Aspalt Heater	IES4	Point	4.800E-06	2.456E-06	3.600E-06	2.829E-04	3.600E-06	3.600E-06
Liquid Asphalt Heater	IES5	Point	4.400E-06	2.252E-06	3.300E-06	2.593E-04	3.300E-06	3.300E-06
Aspalt Silo 1 Vent	HMASILO1	Point	0.000E+00	1.950E-04	0.000E+00	4.200E-03	0.000E+00	0.000E+00
Aspalt Silo 2 Vent	HMASILO2	Point	0.000E+00	1.950E-04	0.000E+00	4.200E-03	0.000E+00	0.000E+00
Aspalt Silo 3 Vent	HMASILO3	Point	0.000E+00	1.950E-04	0.000E+00	4.200E-03	0.000E+00	0.000E+00
Aspalt Silo 4 Vent	HMASILO4	Point	0.000E+00	1.950E-04	0.000E+00	4.200E-03	0.000E+00	0.000E+00
Aspalt Silo 5 Vent	HMASILO5	Point	0.000E+00	1.950E-04	0.000E+00	4.200E-03	0.000E+00	0.000E+00
Concrete Plant Baghouse	CD2	Point	6.585E-05	0.000E+00	4.998E-07	0.000E+00	1.923E-04	1.923E-04
Quarry Generator	GEN1	Point	9.802E-06	2.286E-03	7.350E-06	2.891E-03	7.350E-06	7.350E-06
Quarry Generator	GEN1A	Point	9.802E-06	2.286E-03	7.350E-06	2.891E-03	7.350E-06	7.350E-06
Quarry Generator	GEN2	Point	3.500E-06	8.167E-04	2.625E-06	1.033E-03	2.625E-06	2.625E-06
Quarry Generator	GEN3	Point	1.232E-05	2.874E-03	9.238E-06	3.634E-03	9.238E-06	9.238E-06
Quarry Generator	GEN4	Point	3.500E-06	8.167E-04	2.625E-06	1.033E-03	2.625E-06	2.625E-06
Quarry Generator	GEN5	Point	1.260E-05	2.939E-03	9.452E-06	3.717E-03	9.452E-06	9.452E-06
Quarry Generator	GEN7	Point	9.802E-06	2.286E-03	7.350E-06	2.891E-03	7.350E-06	7.350E-06
Asphalt Loadout 1	HMALO1	Volume	0.000E+00	1.082E-04	0.000E+00	1.830E-04	0.000E+00	0.000E+00
Asphalt Loadout 2	HMALO2	Volume	0.000E+00	1.082E-04	0.000E+00	1.830E-04	0.000E+00	0.000E+00
Asphalt Loadout 3	HMALO3	Volume	0.000E+00	1.082E-04	0.000E+00	1.830E-04	0.000E+00	0.000E+00
Asphalt Loadout 4	HMALO4	Volume	0.000E+00	1.082E-04	0.000E+00	1.830E-04	0.000E+00	0.000E+00
Asphalt Loadout 5	HMALO5	Volume	0.000E+00	1.082E-04	0.000E+00	1.830E-04	0.000E+00	0.000E+00