# FORM A

## GENERAL FACILITY INFORMATION

REVISED 09/22/16 — NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate — **A**

**NOTE- APPLICATION WILL NOT BE PROCESSED WITHOUT THE FOLLOWING:**

- [✓] Local Zoning Consistency Determination (new or modification only)
- [✓] Appropriate Number of Copies of Application
- [✓] Responsible Official/Authorized Contact Signature
- [✓] P.E. Seal (if required)

**Application Fee** (please check one option below): [ ] Not Required [✓] ePayment [ ] Check Enclosed

**GENERAL INFORMATION**

| | |
|---|---|
| ***Legal Corporate/Owner Name:*** | Piedmont Lithium Carolinas, Inc |
| ***Site Name:*** | Carolina Lithium |
| Site Address (911 Address) Line 1: | Hephzibah Church Rd |
| Site Address Line 2: | |
| City: Bessemer City | State: NC |
| Zip Code: 28016 | County: Gaston |

**CONTACT INFORMATION**

| | |
|---|---|
| ***Responsible Official/Authorized Contact:*** Patrick Brindle | ***Invoice Contact:*** Monique Parker |
| Name/Title: Executive Vice President, Chief Operating Officer | Name/Title: Vice President - Health, Safety and Environment |
| Mailing Address Line 1: 42 E. Catawba Street | Mailing Address Line 1: 42 E. Catawba Street |
| Mailing Address Line 2: | Mailing Address Line 2: |
| City: Belmont State: NC Zip Code: 28012 | City: Belmont State: NC Zip Code: 28012 |
| Primary Phone No.: 704-461-8000 Fax No.: | Primary Phone No.: 704-461-8000 Fax No.: |
| Secondary Phone No.: | Secondary Phone No.: |
| Email Address: pbrindle@piedmontlithium.com | Email Address: mparker@piedmontlithium.com |
| ***Facility/Inspection Contact:*** Monique Parker | ***Permit/Technical Contact:*** Monique Parker |
| Name/Title: Vice President - Health, Safety and Environment | Name/Title: Vice President - Health, Safety and Environment |
| Mailing Address Line 1: 42 E. Catawba Street | Mailing Address Line 1: 42 E. Catawba Street |
| Mailing Address Line 2: | Mailing Address Line 2: |
| City: Belmont State: NC Zip Code: 28012 | City: Belmont State: NC Zip Code: 28012 |
| Primary Phone No.: 704-461-8000 Fax No.: | Primary Phone No.: 704-461-8000 Fax No.: |
| Secondary Phone No.: | Secondary Phone No.: |
| Email Address: mparker@piedmontlithium.com | Email Address: mparker@piedmontlithium.com |

**APPLICATION IS BEING MADE FOR**

- [✓] New Non-permitted Facility/Greenfield
- [ ] Modification of Facility (permitted)
- [ ] Renewal Title V
- [ ] Renewal Non-Title V
- [ ] Name Change
- [ ] Ownership Change
- [ ] Administrative Amendment
- [ ] Renewal with Modification

**FACILITY CLASSIFICATION AFTER APPLICATION (Check Only One)**

[ ] General [ ] Small [ ] Prohibitory Small [ ] Synthetic Minor [✓] Title V

**FACILITY (Plant Site) INFORMATION**

Describe nature of (plant site) operation(s):
See attached.

| | |
|---|---|
| | Facility ID No. |
| Primary SIC/NAICS Code: SIC - 2819, NAICS - 325180 | Current/Previous Air Permit No. Expiration Date: |
| Facility Coordinates: Latitude: 35.388847 | Longitude: -81.302154 |

**Does this application contain confidential data?** [ ] **YES** [✓] **NO** — *****If yes, please contact the DAQ Regional Office prior to submitting this application.***** **(See Instructions)**

**PERSON OR FIRM THAT PREPARED APPLICATION**

| | | | |
|---|---|---|---|
| Person Name: M. Kirk Dunbar | | Firm Name: HDR Engineering, Inc. | |
| Mailing Address Line 1: 1601 Utica Avenue South | | Mailing Address Line 2: Suite 600 | |
| City: Minneapolis | State: Minnesota | Zip Code: 55416 | County: Hennepin |
| Phone No.: 763-591-5476 | Fax No.: NA | Email Address: kirk.dunbar@hdrinc.com | |

**SIGNATURE OF RESPONSIBLE OFFICIAL/AUTHORIZED CONTACT**

| | |
|---|---|
| Name (typed): Patrick H. Brindle | Title: Executive Vice President, Chief Operating Officer |
| **X** Signature(Blue Ink): [signature] | Date: 8/22/2022 |

**Attach Additional Sheets As Necessary**

**Describe nature of (plant site) operation(s):**

Carolina Lithium is designed to produce battery-grade lithium hydroxide from spodumene mined and processed at the site. Lithium hydroxide is an important chemical which is used to manufacture high-nickel cathode for use in high energy density lithium ion batteries for electric vehicles. The process consists of the mining, crushing, handling of spodumene ore and waste rock, and placement of process tailings (Mine Operations), initial processing of the spodumene ore to increase its lithium concentration (Concentrate Operation) and two plants to convert the concentrate into lithium hydroxide (Lithium Hydroxide Conversion Plants).

In response to an applicability determination request the North Carolina Department of Environmental Quality/Division of Air Quality (DAQ) determined that the purpose of all operations at the integrated site is to produce lithium hydroxide. The SIC code for the production of lithium compounds is 2819, making the integrated site a chemical manufacturing plant for the purposes of the Prevention of Significant Deterioration (PSD) pre-construction permitting program. As such, the PSD major source threshold for PSD-regulated pollutants is 100 tpy. In addition, as a chemical manufacturing plant all reasonably quantifiable sources of fugitive emissions must be included to determine PSD (as well as Title V) applicability.

The main air pollutant generating activities associated with each area of the integrated site's operation are summarized in the following:

<u>Mining Operations</u>

- Drilling of holes for explosives
- Explosives Detonation
- Initial ore and waste rock breaking and crushing
- Ore and waste rock conveying and stacking
- Wind erosion of waste rock and tailings disposal

<u>Concentrate Plant</u>

- Wind erosion of piles
- Ore crushing and conveyance
- Other dry material handling
- Feldspar and quartz drying
- Emergency generators
- Storage tanks
- Truck traffic

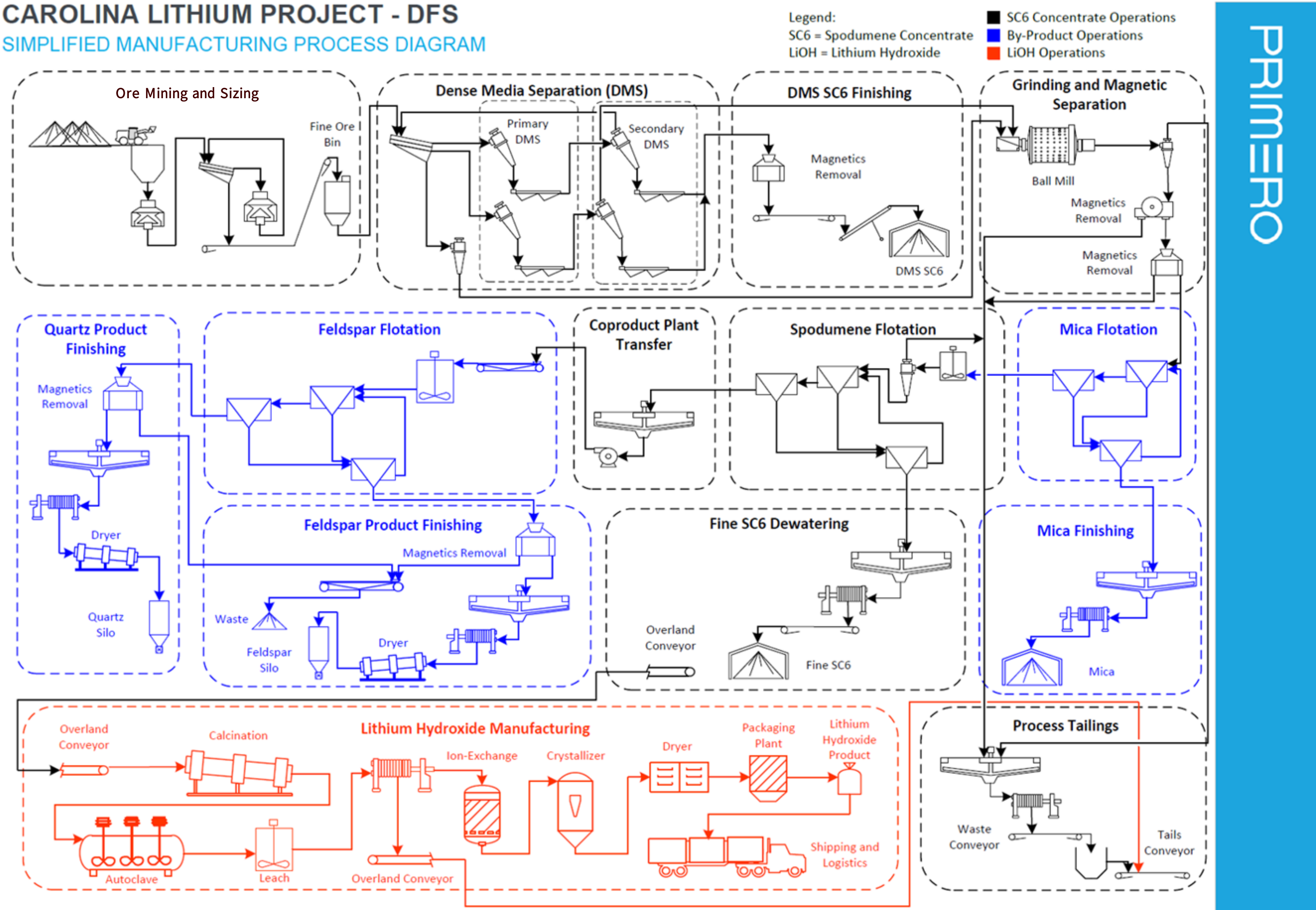
<u>Lithium Hydroxide Conversion Plant (each)</u>

- Concentrate handling and processing
- Natural gas-fired calciner
- Calcined concentrate handling and processing
- Product bagging
- Natural gas boilers
- Emergency generators
- Storage tanks
- Truck traffic

A block diagram is shown on the following page.

# CAROLINA LITHIUM PROJECT - DFS

## SIMPLIFIED MANUFACTURING PROCESS DIAGRAM



# FORMs A2, A3

## EMISSION SOURCE LISTING FOR THIS APPLICATION - A2

## 112r APPLICABILITY INFORMATION - A3

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **A2**

| EMISSION SOURCE LISTING: New, Modified, Previously Unpermitted, Replaced, Deleted | | | |
|---|---|---|---|
| EMISSION SOURCE ID NO. | EMISSION SOURCE DESCRIPTION | CONTROL DEVICE ID NO. | CONTROL DEVICE DESCRIPTION |
| **Equipment To Be ADDED By This Application (New, Previously Unpermitted, or Replacement)** | | | |
| *Concentrator Plant* | | | |
| ES01 | Ore Sorting Operations | CD01 | Fabric Filter |
| ES02 | Secondary Crusher Feed Bin | CD02 | Fabric Filter |
| ES03 | Secondary Crusher Discharge | CD03 | Fabric Filter |
| ES04 | Fine Ore Sizing Screen Discharge | CD04 | Fabric Filter |
| ES05 | Tertiary Crusher Feed Bin 1 | CD05 | Fabric Filter |
| ES06 | Tertiary Crusher Feed Bin 2 | CD06 | Fabric Filter |
| ES07 | Tertiary Crusher No. 1 | CD07 | Fabric Filter |
| ES08 | Tertiary Crusher No. 2 | | |
| ES09 | Fine Ore Bin | CD08 | Fabric Filter |
| ES10 | Quartz Dryer | CD09, CD10 | Fabric Filter, Wet Scrubbrer |
| ES11 | Feldspar Dryer | CD11, CD12 | Fabric Filter, Wet Scrubbrer |
| ES12 | 1,000 kW Emergency Generator No 1 | | |
| ES13 | 1,000 kW Emergency Generator No 2 | | |
| ES14 | Hydrofluoric Acid Storage Tank | CD13 | Wet Scrubber |
| *Chemical Plant, CL-1* | | | |
| ES15 | Spodumene Concentrate Conveying | CD14 | Fabric Filter |
| ES16 | Spodumene Concentrate Surge Silo | CD15 | Fabric Filter |
| ES17 | Spodumene Concentrate Conveyor to Calciner | CD16 | Fabric Filter |
| ES18 | Calciner Rotary Kiln | CD17, CD18 | Cyclone, Wet Scrubber |
| ES19 | Cooler Discharge Sweep Air | CD19 | Fabric Filter |
| ES20 | Ball Mill Feed Bin | CD20 | Fabric Filter |
| ES21 | Train 1 Pressure Leaching | CD21 | Fabric Filter |
| ES22 | Train 2 Pressure Leaching | CD22 | Fabric Filter |
| ES23 | LiOH Bagging Area Surge Bin/Transporter No. 1 | CD23 | Fabric Filter |
| ES24 | LiOH Bagging Area Surge Bin/Transporter No. 2 | CD24 | Fabric Filter |
| ES25 | LiOH Bagging Area Day Tank No. 1 | CD25 | Fabric Filter |
| ES26 | LiOH Bagging Area Day Tank No. 2 | CD26 | Fabric Filter |
| ES27 | LiOH Bagging Area Day Tank No. 3 | CD27 | Fabric Filter |
| ES28 | LiOH Bagging Area Day Tank No. 4 | CD28 | Fabric Filter |
| ES29 | LiOH Bagging Operation | CD29 | Wet Scrubber |
| ES30 | LiOH Bagging Area Vacuum | CD30 | Fabric Filter |
| ES31 | Lime Receiving and Storage | CD31 | Fabric Filter |
| ES32 | Phosphate Receiving and Storage | CD32 | Fabric Filter |
| ES33 | Sodium Carbonate Receiving and Storage Silo | CD33 | Fabric Filter |
| ES34 | Sodium Carbonate Receiving and Feeder Bin | CD34 | Fabric Filter |
| ES35 | Boiler No. 1 | | |
| ES36 | Boiler No. 2 | | |
| ES37 | Boiler No. 3 | | |
| ES38 | 1,000 kW Emergency Generator No. 1 | | |
| ES39 | 1,000 kW Emergency Generator No. 2 | | |
| ES40 | Fire Pump | | |
| ES41 | Hydrochloric Acid Storage Tank | CD35 | Wet Scrubber |
| ES42 | Hydrochloric Acid Dilution Tank | | |
| ES43 | Sulfuric Acid Storage Tank | | |
| *Chemical Plant, CL-2* | | | |
| ES44 | Spodumene Concentrate Conveying | CD36 | Fabric Filter |
| ES45 | Spodumene Concentrate Surge Silo | CD37 | Fabric Filter |
| ES46 | Spodumene Concentrate Conveyor to Calciner | CD38 | Fabric Filter |
| ES47 | Calciner Rotary Kiln | CD39, CD40 | Cyclone, Wet Scrubber |
| ES48 | Cooler Discharge Sweep Air | CD41 | Fabric Filter |

| | | | |
|---|---|---|---|
| ES49 | Ball Mill Feed Bin | CD42 | Fabric Filter |
| ES50 | Train 1 Pressure Leaching | CD43 | Fabric Filter |
| ES51 | Train 2 Pressure Leaching | CD44 | Fabric Filter |
| ES52 | LiOH Bagging Area Surge Bin/Transporter No. 1 | CD45 | Fabric Filter |
| ES53 | LiOH Bagging Area Surge Bin/Transporter No. 2 | CD46 | Fabric Filter |
| ES54 | LiOH Bagging Area Day Tank No. 1 | CD47 | Fabric Filter |
| ES55 | LiOH Bagging Area Day Tank No. 2 | CD48 | Fabric Filter |
| ES56 | LiOH Bagging Area Day Tank No. 3 | CD49 | Fabric Filter |
| ES57 | LiOH Bagging Area Day Tank No. 4 | CD50 | Fabric Filter |
| ES58 | LiOH Bagging Operation | CD51 | Wet Scrubber |
| ES59 | LiOH Bagging Area Vacuum | CD52 | Fabric Filter |
| ES60 | Phosphate Receiving and Storage | CD53 | Fabric Filter |
| ES61 | Sodium Carbonate Receiving and Feeder Bin | CD54 | Fabric Filter |
| ES62 | Boiler No. 1 | | |
| ES63 | Boiler No. 2 | | |
| ES64 | Boiler No. 3 | | |
| ES65 | 1,000 kW Emergency Generator No. 1 | | |
| ES66 | 1,000 kW Emergency Generator No. 2 | | |
| ES67 | Hydrochloric Acid Storage Tank | CD55 | Wet Scrubber |
| ES68 | Hydrochloric Acid Dilution Tank | | |
| ES69 | Sulfuric Acid Storage Tank | | |

**Existing Permitted Equipment To Be MODIFIED By This Application**

| | | | |
|---|---|---|---|
| | | | |

**Equipment To Be DELETED By This Application**

| | | | |
|---|---|---|---|
| | | | |

## 112(r) APPLICABILITY INFORMATION

**A 3**

Is your facility subject to 40 CFR Part 68 "Prevention of Accidental Releases" - Section 112(r) of the Federal Clean Air Act? ☐ Yes ☑ No

If No, please specify in detail how your facility avoided applicability: Facility does not use or store any chemicals subject to 112(r).

If your facility is Subject to 112(r), please complete the following:

A. Have you already submitted a Risk Management Plan (RMP) to EPA Pursuant to 40 CFR Part 68.10 or Part 68.150?

☐ Yes ☐ No Specify required RMP submittal date: _____________ If submitted, RMP submittal date: _____________

B. Are you using administrative controls to subject your facility to a lesser 112(r) program standard?

☐ Yes ☐ No If yes, please specify: ________________________________

C. List the processes subject to 112(r) at your facility:

| PROCESS DESCRIPTION | PROCESS LEVEL (1, 2, or 3) | HAZARDOUS CHEMICAL | MAXIMUM INTENDED INVENTORY (LBS) |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 — **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** — **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Ore Sorting Operations | EMISSION SOURCE ID NO: ES01<br>CONTROL DEVICE ID NO(S): CD01 |
| OPERATING SCENARIO ___1___ OF ___1___ | EMISSION POINT (STACK) ID NO(S): EP01 |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
Ore sorting operations.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Int.combustion engine/generator (Form B2)
- ☐ Liquid storage tanks (Form B3)
- ☐ Woodworking (Form B4)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Storage silos/bins (Form B6)
- ☐ Manuf. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☑ Other (Form B9)

START CONSTRUCTION DATE: | DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: | EXPECTED OP. SCHEDULE: __24__ HR/DAY __7__ DAY/WK __52__ WK/YR

IS THIS SOURCE SUBJECT TO? ☑ NSPS (SUBPARTS?): OOO ☐ NESHAP (SUBPARTS?):

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

### *CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) | |
|---|---|---|---|---|---|---|---|
| | | lb/hr | tons/yr | lb/hr | tons/yr | lb/hr | tons/yr |
| PARTICULATE MATTER (PM) | See attached emission calculations | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

### *HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) | |
|---|---|---|---|---|---|---|---|---|
| | | | lb/hr | tons/yr | lb/hr | tons/yr | lb/hr | tons/yr |
| | | See attached emission calculations | | | | | | |
| | | | | | | | | |
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### *TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS | | |
|---|---|---|---|---|---|
| | | | lb/hr | lb/day | lb/yr |
| | | See attached emission calculations | | | |
| | | | | | |
| | | | | | |
| | | | | | |
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| | | | | | |
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Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B9

## EMISSION SOURCE (OTHER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B9**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Ore Sorting Operations | EMISSION SOURCE ID NO: ES01 |
| | CONTROL DEVICE ID NO(S): CD01 |
| OPERATING SCENARIO: 1 OF 1 | EMISSION POINT (STACK) ID NO(S): EP01 |

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Ore sorting operations with dust pickups.
See process flow diagram included as Attachment 1.

| MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS | | MAX. DESIGN | REQUESTED CAPACITY |
|---|---|---|---|
| TYPE | UNITS | CAPACITY (UNIT/HR) | LIMITATION(UNIT/HR) |
| Coarse ore | ton/hr | 416 | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| MATERIALS ENTERING PROCESS - BATCH OPERATION | | MAX. DESIGN | REQUESTED CAPACITY |
|---|---|---|---|
| TYPE | UNITS | CAPACITY (UNIT/BATCH) | LIMITATION (UNIT/BATCH) |
| | | | |
| | | | |
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| | |
|---|---|
| MAXIMUM DESIGN (BATCHES / HOUR): | |
| REQUESTED LIMITATION (BATCHES / HOUR): | (BATCHES/YR): |
| FUEL USED: | TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR): |
| MAX. CAPACITY HOURLY FUEL USE: | REQUESTED CAPACITY ANNUAL FUEL USE: |

COMMENTS:

**Attach Additional Sheets as Necessary**

# FORM C1

## CONTROL DEVICE (FABRIC FILTER)

**NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C1**

| | |
|---|---|
| CONTROL DEVICE ID NO: CD01 | CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES01 |
| EMISSION POINT (STACK) ID NO(S): EP01 | POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS |
| **OPERATING SCENARIO:** | |
| 1 OF 1 | P.E. SEAL REQUIRED (PER 2q .0112)? ☐ YES ☑ NO |

DESCRIBE CONTROL SYSTEM:

The bag cleaning is controlled by a timer card is used to energize the pulse valve solenoids for specified time and wait a specified time before energizing the next pulse valve solenoid.

The timer card has the ability to measure the differential pressure of the baghouse. Once the differential pressure is above the setpoint, the cleaning will start. Once the differential pressure drops below the cleaning set point, the cleaning stops.

| | | | | |
|---|---|---|---|---|
| POLLUTANTS COLLECTED: | $PM/PM_{10}/PM_{2.5}$ | | | |
| BEFORE CONTROL EMISSION RATE (LB/HR): | 2,535 | | | |
| CAPTURE EFFICIENCY: | 100 % | % | % | % |
| CONTROL DEVICE EFFICIENCY: | 99.995 % | % | % | % |
| CORRESPONDING OVERALL EFFICIENCY: | 99.995 % | % | % | % |
| EFFICIENCY DETERMINATION CODE: | 4 | | | |
| TOTAL AFTER CONTROL EMISSION RATE (LB/HR): | 0.12 | | | |

PRESSURE DROP (IN $H_20$): MIN: 4 MAX: 6.5 GAUGE? ☑ YES ☐ NO

| | | |
|---|---|---|
| BULK PARTICLE DENSITY (LB/$FT^3$): 112 | INLET TEMPERATURE ($^oF$): MIN 5 MAX 120 | |
| POLLUTANT LOADING RATE: 2,535 ☑ LB/HR ☐ GR/$FT^3$ | OUTLET TEMPERATURE ($^oF$) MIN 5 MAX 120 | |
| INLET AIR FLOW RATE (ACFM): 6,787 | FILTER OPERATING TEMP ($^oF$): 5-120 | |
| NO. OF COMPARTMENTS: 1 | NO. OF BAGS PER COMPARTMENT: 110 | LENGTH OF BAG (IN.): 120 |
| NO. OF CARTRIDGES: | FILTER SURFACE AREA PER CARTRIDGE ($FT^2$): | DIAMETER OF BAG (IN.): 6 |
| TOTAL FILTER SURFACE AREA ($FT^2$): 1,787 | AIR TO CLOTH RATIO: 3.78 | |

DRAFT TYPE: ☑ INDUCED/NEGATIVE ☐ FORCED/POSITIVE FILTER MATERIAL: ☐ WOVEN ☑ FELTED

DESCRIBE CLEANING PROCEDURES:

- ☑ AIR PULSE
- ☐ REVERSE FLOW
- ☐ MECHANICAL/SHAKER
- ☐ OTHER:
- ☐ SONIC
- ☐ SIMPLE BAG COLLAPSE
- ☐ RING BAG COLLAPSE

DESCRIBE INCOMING AIR STREAM:
Fan draws air stream from transfer points and open areas into the unit which then intermittently purges to return material back onto the conveyor.

Vendor states unit removes > 0.5μm particles

**PARTICLE SIZE DISTRIBUTION**

| SIZE (MICRONS) | WEIGHT % OF TOTAL | CUMULATIVE % |
|---|---|---|
| 0-1 | 0 | 0 |
| 1-10 | 1.25 | 1.25 |
| 10-25 | 1.49 | 2.74 |
| 25-50 | 44.2 | 46.9 |
| 50-100 | 20.9 | 67.8 |
| >100 | 32.2 | 100 |
| | TOTAL = 100 | |

ON A SEPARATE PAGE, ATTACH A DIAGRAM SHOWING THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S): See Attachment 1

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Secondary Crusher Feed Bin | EMISSION SOURCE ID NO: ES02<br>CONTROL DEVICE ID NO(S): CD02 |
| OPERATING SCENARIO 1 OF 1 | EMISSION POINT (STACK) ID NO(S): EP02 |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
Secondary crusher feed bin dust pickup.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Int.combustion engine/generator (Form B2)
- ☐ Liquid storage tanks (Form B3)
- ☐ Woodworking (Form B4)
- ☐ Coating/finishing/printing (Form B5)
- ☑ Storage silos/bins (Form B6)
- ☐ Manuf. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☐ Other (Form B9)

START CONSTRUCTION DATE: DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR

IS THIS SOURCE SUBJECT TO? ☑ NSPS (SUBPARTS?): OOO ☐ NESHAP (SUBPARTS?):

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

### *CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) | |
|---|---|---|---|---|---|---|---|
| | | lb/hr | tons/yr | lb/hr | tons/yr | lb/hr | tons/yr |
| PARTICULATE MATTER (PM) | See attached emission calculations | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

### *HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) | |
|---|---|---|---|---|---|---|---|---|
| | | | lb/hr | tons/yr | lb/hr | tons/yr | lb/hr | tons/yr |
| | | See attached emission calculations | | | | | | |
| | | | | | | | | |
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| | | | | | | | | |

### *TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS | | |
|---|---|---|---|---|---|
| | | | lb/hr | lb/day | lb/yr |
| | | See attached emission calculations | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B6

## EMISSION SOURCE (STORAGE SILO/BINS)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B6**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION: | EMISSION SOURCE ID NO: ES02 |
| Secondary Crusher Feed Bin | CONTROL DEVICE ID NO(S): CD02 |
| OPERATING SCENARIO: _____1____ OF _____1____ | EMISSION POINT(STACK) ID NO(S): EP02 |

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Secondary crusher feed bin with dust pickup.
See process flow diagram included as Attachment 1.

| | | | | |
|---|---|---|---|---|
| MATERIAL STORED: Sorted ore | | | | DENSITY OF MATERIAL (LB/FT3): 112 |
| ***CAPACITY*** | CUBIC FEET: | | | TONS: |
| ***DIMENSIONS (FEET)*** | HEIGHT: | DIAMETER: | ***(OR)*** | LENGTH: WIDTH: HEIGHT: |
| ***ANNUAL PRODUCT THROUGHPUT (TONS)*** | | ACTUAL: | | MAXIMUM DESIGN CAPACITY: |

| **PNEUMATICALLY FILLED** | **MECHANICALLY FILLED** | **FILLED FROM** |
|---|---|---|
| ☐ BLOWER | ☑ SCREW CONVEYOR | ☐ RAILCAR |
| ☐ COMPRESSOR | ☐ BELT CONVEYOR | ☐ TRUCK |
| ☐ OTHER: | ☐ BUCKET ELEVATOR | ☐ STORAGE PILE |
| | ☐ OTHER: | ☑ OTHER: Conveyor from ore sorting operation |

NO. FILL TUBES:

MAXIMUM ACFM:

MATERIAL IS UNLOADED TO:
Secondary crusher

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?
Airlock to enclosed conveyor.

MAXIMUM DESIGN FILLING RATE OF MATERIAL (TONS/HR): 416

MAXIMUM DESIGN UNLOADING RATE OF MATERIAL (TONS/HR): 416

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM C1

## CONTROL DEVICE (FABRIC FILTER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C1**

| | |
|---|---|
| CONTROL DEVICE ID NO: CD02 | CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES02 |
| EMISSION POINT (STACK) ID NO(S): EP02 | POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS |
| **OPERATING SCENARIO:** | |
| 1 OF 1 | P.E. SEAL REQUIRED (PER 2q .0112)? ☐ YES ☑ NO |

DESCRIBE CONTROL SYSTEM:

Baghouse to control dust emissions generated by material entering the bin. Unit is a mechanical device with a 5 HP motor to generate negative pressure as the bin is filled. Unit installed has a capacity of up to 3,000 scfm.

| | | | | |
|---|---|---|---|---|
| POLLUTANTS COLLECTED: | $PM/PM_{10}/PM_{2.5}$ | | | |
| BEFORE CONTROL EMISSION RATE (LB/HR): | 311 | | | |
| CAPTURE EFFICIENCY: | 100 % | % | % | % |
| CONTROL DEVICE EFFICIENCY: | 99.98 % | % | % | % |
| CORRESPONDING OVERALL EFFICIENCY: | 99.98 % | % | % | % |
| EFFICIENCY DETERMINATION CODE: | 4 | | | |
| TOTAL AFTER CONTROL EMISSION RATE (LB/HR): | 0.05 | | | |

PRESSURE DROP (IN $H_20$): MIN: 0.6 MAX: 8 GAUGE? ☑ YES ☐ NO

| | |
|---|---|
| BULK PARTICLE DENSITY ($LB/FT^3$): 112 | INLET TEMPERATURE (°F): MIN 20 MAX 120 |
| POLLUTANT LOADING RATE: 311 ☑ LB/HR ☐ $GR/FT^3$ | OUTLET TEMPERATURE (°F) MIN 20 MAX 120 |
| INLET AIR FLOW RATE (ACFM): 3,000 | FILTER OPERATING TEMP (°F): 20-120 |

| | | |
|---|---|---|
| NO. OF COMPARTMENTS: 1 | NO. OF BAGS PER COMPARTMENT: | LENGTH OF BAG (IN.): |
| NO. OF CARTRIDGES: 6 | FILTER SURFACE AREA PER CARTRIDGE ($FT^2$): 48 | DIAMETER OF BAG (IN.): |

TOTAL FILTER SURFACE AREA ($FT^2$): 288 AIR TO CLOTH RATIO: 10.5

DRAFT TYPE: ☑ INDUCED/NEGATIVE ☐ FORCED/POSITIVE FILTER MATERIAL: ☑ WOVEN ☐ FELTED

DESCRIBE CLEANING PROCEDURES:

☑ AIR PULSE ☐ SONIC
☐ REVERSE FLOW ☐ SIMPLE BAG COLLAPSE
☐ MECHANICAL/SHAKER ☐ RING BAG COLLAPSE
☐ OTHER:

DESCRIBE INCOMING AIR STREAM:

Stream comes from transfer point into the bin and maintains a negative pressure in the system. Fan draws air stream from bin chamber into the unit which then intermittently purges to return material back into the bin.

**PARTICLE SIZE DISTRIBUTION**

| SIZE (MICRONS) | WEIGHT % OF TOTAL | CUMULATIVE % |
|---|---|---|
| 0-1 | 0.3 | 0.3 |
| 1-10 | 6.6 | 6.9 |
| 10-25 | 12.7 | 19.6 |
| 25-50 | 33.6 | 53.2 |
| 50-100 | 39.3 | 92.5 |
| >100 | 7.5 | 100 |
| | TOTAL = 100 | |

ON A SEPARATE PAGE, ATTACH A DIAGRAM SHOWING THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S): See Attachment 1

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 — **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** — **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Secondary Crusher Discharge | EMISSION SOURCE ID NO: ES03<br>CONTROL DEVICE ID NO(S): CD03 |
| OPERATING SCENARIO ___1___ OF ___1___ | EMISSION POINT (STACK) ID NO(S): EP03 |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
Secondary crusher discharge.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Int.combustion engine/generator (Form B2)
- ☐ Liquid storage tanks (Form B3)
- ☐ Woodworking (Form B4)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Storage silos/bins (Form B6)
- ☐ Manuf. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☑ Other (Form B9)

START CONSTRUCTION DATE: — DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: — EXPECTED OP. SCHEDULE: __24__ HR/DAY __7__ DAY/WK __52__ WK/YR

IS THIS SOURCE SUBJECT TO? ☑ NSPS (SUBPARTS?):_OOO_______ ☐ NESHAP (SUBPARTS?):__________

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

### *CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) | |
|---|---|---|---|---|---|---|---|
| | | lb/hr | tons/yr | lb/hr | tons/yr | lb/hr | tons/yr |
| PARTICULATE MATTER (PM) | See attached emission calculations | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

### *HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) | |
|---|---|---|---|---|---|---|---|---|
| | | | lb/hr | tons/yr | lb/hr | tons/yr | lb/hr | tons/yr |
| | | See attached emission calculations | | | | | | |

### *TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS | | |
|---|---|---|---|---|---|
| | | | lb/hr | lb/day | lb/yr |
| | | See attached emission calculations | | | |

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B9

## EMISSION SOURCE (OTHER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B9**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Secondary Crusher Discharge | EMISSION SOURCE ID NO: ES03 |
| | CONTROL DEVICE ID NO(S): CD03 |
| OPERATING SCENARIO: 1 OF 1 | EMISSION POINT (STACK) ID NO(S): EP03 |

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Secondary crusher discarge with dust pickups.
See process flow diagram included as Attachment 1.

| **MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS** | | MAX. DESIGN | REQUESTED CAPACITY |
|---|---|---|---|
| TYPE | UNITS | CAPACITY (UNIT/HR) | LIMITATION(UNIT/HR) |
| Crushed ore | ton/hr | 416 | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| **MATERIALS ENTERING PROCESS - BATCH OPERATION** | | MAX. DESIGN | REQUESTED CAPACITY |
|---|---|---|---|
| TYPE | UNITS | CAPACITY (UNIT/BATCH) | LIMITATION (UNIT/BATCH) |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

MAXIMUM DESIGN (BATCHES / HOUR):

| | |
|---|---|
| REQUESTED LIMITATION (BATCHES / HOUR): | (BATCHES/YR): |
| FUEL USED: | TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR): |
| MAX. CAPACITY HOURLY FUEL USE: | REQUESTED CAPACITY ANNUAL FUEL USE: |

COMMENTS:

**Attach Additional Sheets as Necessary**

# FORM C1

## CONTROL DEVICE (FABRIC FILTER)

**NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C1**

| | |
|---|---|
| CONTROL DEVICE ID NO: CD03 | CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES03 |
| EMISSION POINT (STACK) ID NO(S): EP03 | POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS |
| **OPERATING SCENARIO:** | |
| 1 OF 1 | P.E. SEAL REQUIRED (PER 2q .0112)? ☐ YES ☑ NO |

DESCRIBE CONTROL SYSTEM:

Located at the secondary crusher discharge chute transfer. Unit is a non-mechanical device which relies on material movement to generate the operating pressure at the transfer point to the conveyor.

| | | | | |
|---|---|---|---|---|
| POLLUTANTS COLLECTED: | $PM/PM_{10}/PM_{2.5}$ | | | |
| BEFORE CONTROL EMISSION RATE (LB/HR): | 92 | | | |
| CAPTURE EFFICIENCY: | 100 % | % | % | % |
| CONTROL DEVICE EFFICIENCY: | 99.996 % | % | % | % |
| CORRESPONDING OVERALL EFFICIENCY: | 99.996 % | % | % | % |
| EFFICIENCY DETERMINATION CODE: | 4 | | | |
| TOTAL AFTER CONTROL EMISSION RATE (LB/HR): | 0.004 | | | |

PRESSURE DROP (IN $H_20$): MIN: 2 MAX: 6 GAUGE? ☑ YES ☐ NO

| | | |
|---|---|---|
| BULK PARTICLE DENSITY ($LB/FT^3$): 112 | INLET TEMPERATURE ($^oF$): MIN 20 MAX 120 | |
| POLLUTANT LOADING RATE: 92 ☑ LB/HR ☐ $GR/FT^3$ | OUTLET TEMPERATURE ($^oF$) MIN 20 MAX 120 | |
| INLET AIR FLOW RATE (ACFM): 205 | FILTER OPERATING TEMP ($^oF$): 20-120 | |
| NO. OF COMPARTMENTS: 1 | NO. OF BAGS PER COMPARTMENT: 1 | LENGTH OF BAG (IN.): 72 |
| NO. OF CARTRIDGES: 1 | FILTER SURFACE AREA PER CARTRIDGE ($FT^2$): 18 | DIAMETER OF BAG (IN.): 24 |
| TOTAL FILTER SURFACE AREA ($FT^2$): 18 | AIR TO CLOTH RATIO: 11.4 | |

DRAFT TYPE: ☐ INDUCED/NEGATIVE ☑ FORCED/POSITIVE FILTER MATERIAL: ☑ WOVEN ☐ FELTED

DESCRIBE CLEANING PROCEDURES:

- ☑ AIR PULSE
- ☐ REVERSE FLOW
- ☐ MECHANICAL/SHAKER
- ☐ OTHER:
- ☐ SONIC
- ☐ SIMPLE BAG COLLAPSE
- ☐ RING BAG COLLAPSE

DESCRIBE INCOMING AIR STREAM:
Dust is lifted during transfer from the crusher discharge to the discharge to the conveyor, the pressure variation caused by this is adsorbed by this unit which is built into chute work, and allows the air to flow through thus reducing air flow to end of the chute work.

**PARTICLE SIZE DISTRIBUTION**

| SIZE (MICRONS) | WEIGHT % OF TOTAL | CUMULATIVE % |
|---|---|---|
| 0-1 | 0.4 | 0.4 |
| 1-10 | 5 | 5.40 |
| 10-25 | 7.2 | 12.60 |
| 25-50 | 35.6 | 48.2 |
| 50-100 | 45.5 | 93.7 |
| >100 | 6.3 | 100 |
| | TOTAL = 100 | |

ON A SEPARATE PAGE, ATTACH A DIAGRAM SHOWING THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S): See Attachment 1

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION: Fine Ore Sizing Screen Discharge | EMISSION SOURCE ID NO: ES04 |
| | CONTROL DEVICE ID NO(S): CD04 |
| OPERATING SCENARIO 1 OF 1 | EMISSION POINT (STACK) ID NO(S): EP04 |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
Fine ore sizing screen discharge.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Woodworking (Form B4)
- ☐ Manuf. of chemicals/coatings/inks (Form B7)
- ☐ Int.combustion engine/generator (Form B2)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Incineration (Form B8)
- ☐ Liquid storage tanks (Form B3)
- ☐ Storage silos/bins (Form B6)
- ☑ Other (Form B9)

START CONSTRUCTION DATE: DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR

IS THIS SOURCE SUBJECT TO? ☑ NSPS (SUBPARTS?): OOO ☐ NESHAP (SUBPARTS?):

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

### *CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr |
|---|---|---|---|---|---|---|---|
| PARTICULATE MATTER (PM) | See attached emission calculations | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

### *HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr |
|---|---|---|---|---|---|---|---|---|
| | | See attached emission calculations | | | | | | |

### *TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr | lb/day | lb/yr |
|---|---|---|---|---|---|
| | | See attached emission calculations | | | |

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B9

## EMISSION SOURCE (OTHER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B9**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Fine Ore Sizing Screen Discharge | EMISSION SOURCE ID NO: ES04 |
| | CONTROL DEVICE ID NO(S): CD04 |
| OPERATING SCENARIO: 1 OF 1 | EMISSION POINT (STACK) ID NO(S): EP04 |

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Fine ore sizing screen discharge with dust pickups.
See process flow diagram included as Attachment 1.

| **MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS** | | MAX. DESIGN | REQUESTED CAPACITY |
|---|---|---|---|
| TYPE | UNITS | CAPACITY (UNIT/HR) | LIMITATION(UNIT/HR) |
| Screened crushed ore | ton/hr | 1,061 | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| **MATERIALS ENTERING PROCESS - BATCH OPERATION** | | MAX. DESIGN | REQUESTED CAPACITY |
|---|---|---|---|
| TYPE | UNITS | CAPACITY (UNIT/BATCH) | LIMITATION (UNIT/BATCH) |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| | |
|---|---|
| MAXIMUM DESIGN (BATCHES / HOUR): | |
| REQUESTED LIMITATION (BATCHES / HOUR): | (BATCHES/YR): |
| FUEL USED: | TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR): |
| MAX. CAPACITY HOURLY FUEL USE: | REQUESTED CAPACITY ANNUAL FUEL USE: |

COMMENTS:

**Attach Additional Sheets as Necessary**

# FORM C1

## CONTROL DEVICE (FABRIC FILTER)

**NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C1**

| | |
|---|---|
| CONTROL DEVICE ID NO: CD04 | CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES04 |
| EMISSION POINT (STACK) ID NO(S): EP04 | POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS |
| **OPERATING SCENARIO:** | |
| 1 OF 1 | P.E. SEAL REQUIRED (PER 2q .0112)? ☐ YES ☑ NO |

DESCRIBE CONTROL SYSTEM:

Located in the fine ore screen undersized discharge chute. Unit is a mechanical device with a 3 HP motor to generate a negative pressure at the discharge. Unit installed has a capacity of up to 1,000 scfm.

| | | | | |
|---|---|---|---|---|
| POLLUTANTS COLLECTED: | $PM/PM_{10}/PM_{2.5}$ | | | |
| BEFORE CONTROL EMISSION RATE (LB/HR): | 183 | | | |
| CAPTURE EFFICIENCY: | 100 % | % | % | % |
| CONTROL DEVICE EFFICIENCY: | 99.996 % | % | % | % |
| CORRESPONDING OVERALL EFFICIENCY: | 99.996 % | % | % | % |
| EFFICIENCY DETERMINATION CODE: | 4 | | | |
| TOTAL AFTER CONTROL EMISSION RATE (LB/HR): | 0.007 | | | |

PRESSURE DROP (IN $H_20$): MIN: 06 MAX: 8 GAUGE? ☑ YES ☐ NO

| | |
|---|---|
| BULK PARTICLE DENSITY ($LB/FT^3$): 112 | INLET TEMPERATURE (°F): MIN 20 MAX 120 |
| POLLUTANT LOADING RATE: 183 ☑ LB/HR ☐ $GR/FT^3$ | OUTLET TEMPERATURE (°F) MIN 20 MAX 120 |
| INLET AIR FLOW RATE (ACFM): 410 | FILTER OPERATING TEMP (°F): 20-120 |

| | | |
|---|---|---|
| NO. OF COMPARTMENTS: 1 | NO. OF BAGS PER COMPARTMENT: | LENGTH OF BAG (IN.): |
| NO. OF CARTRIDGES: 2 | FILTER SURFACE AREA PER CARTRIDGE ($FT^2$): 48 | DIAMETER OF BAG (IN.): |

TOTAL FILTER SURFACE AREA ($FT^2$): 96 AIR TO CLOTH RATIO: 4.27

DRAFT TYPE: ☑ INDUCED/NEGATIVE ☐ FORCED/POSITIVE FILTER MATERIAL: ☑ WOVEN ☐ FELTED

DESCRIBE CLEANING PROCEDURES:

- ☑ AIR PULSE
- ☐ REVERSE FLOW
- ☐ MECHANICAL/SHAKER
- ☐ OTHER:
- ☐ SONIC
- ☐ SIMPLE BAG COLLAPSE
- ☐ RING BAG COLLAPSE

**PARTICLE SIZE DISTRIBUTION**

| SIZE (MICRONS) | WEIGHT % OF TOTAL | CUMULATIVE % |
|---|---|---|
| 0-1 | 0.6 | 0.6 |
| 1-10 | 6 | 6.6 |
| 10-25 | 13.1 | 19.7 |
| 25-50 | 44.7 | 64.4 |
| 50-100 | 32.2 | 96.6 |
| >100 | 3.4 | 100 |
| | TOTAL = 100 | |

DESCRIBE INCOMING AIR STREAM:
Fan draws air stream from discharge chute into the unit which then intermittently purges to return filter dust as agglomerated material back to the transfer point.

ON A SEPARATE PAGE, ATTACH A DIAGRAM SHOWING THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S): See Attachment 1

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Tertiary Crusher Feed Bin | EMISSION SOURCE ID NO: ES05 (Bin No. 1)<br>ES06 (Bin No. 2) |
| | CONTROL DEVICE ID NO(S): CD05 (Bin No. 1)<br>CD06 (Bin No. 2) |
| OPERATING SCENARIO ___1___ OF ___1___ | EMISSION POINT (STACK) ID NO(S): EP05 (Bin No. 1)<br>EP06 (Bin No. 2) |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
Tertiary crusher feed bin dust pickup.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

| | | |
|---|---|---|
| ☐ Coal,wood,oil, gas, other burner (Form B1) | ☐ Woodworking (Form B4) | ☐ Manuf. of chemicals/coatings/inks (Form B7) |
| ☐ Int.combustion engine/generator (Form B2) | ☐ Coating/finishing/printing (Form B5) | ☐ Incineration (Form B8) |
| ☐ Liquid storage tanks (Form B3) | ☑ Storage silos/bins (Form B6) | ☐ Other (Form B9) |

START CONSTRUCTION DATE: DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: EXPECTED OP. SCHEDULE: __24__ HR/DAY __7__ DAY/WK __52__ WK/YR

IS THIS SOURCE SUBJECT TO? ☑ NSPS (SUBPARTS?): OOO ☐ NESHAP (SUBPARTS?):

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

***CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE***

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr |
|---|---|---|---|---|---|---|---|
| PARTICULATE MATTER (PM) | See attached emission calculations | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

***HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE***

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr |
|---|---|---|---|---|---|---|---|---|
| | | See attached emission calculations | | | | | | |

***TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE***

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr | lb/day | lb/yr |
|---|---|---|---|---|---|
| | | See attached emission calculations | | | |

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B6

## EMISSION SOURCE (STORAGE SILO/BINS)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B6**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION: | EMISSION SOURCE ID NO: ES05 (Bin No. 1)<br>ES06 (Bin No. 2) |
| Tertiary Crusher Feed Bin | CONTROL DEVICE ID NO(S): CD05 (Bin No. 1)<br>CD06 (Bin No. 2) |
| OPERATING SCENARIO: ___1___ OF ___1___ | EMISSION POINT (STACK) ID NO(S): EP05 (Bin No. 1)<br>EP06 (Bin No. 2) |

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Tertiary crusher feed bin with dust pickup.
See process flow diagram included as Attachment 1.

| | | | | |
|---|---|---|---|---|
| MATERIAL STORED: Screened crushed ore | | | | DENSITY OF MATERIAL (LB/FT3): 112 |
| ***CAPACITY*** | CUBIC FEET: | | | TONS: |
| ***DIMENSIONS (FEET)*** | HEIGHT: | DIAMETER: | ***(OR)*** | LENGTH: WIDTH: HEIGHT: |
| ***ANNUAL PRODUCT THROUGHPUT (TONS)*** | | ACTUAL: | | MAXIMUM DESIGN CAPACITY: |

| **PNEUMATICALLY FILLED** | **MECHANICALLY FILLED** | **FILLED FROM** |
|---|---|---|
| ☐ BLOWER | ☑ SCREW CONVEYOR | ☐ RAILCAR |
| ☐ COMPRESSOR | ☐ BELT CONVEYOR | ☐ TRUCK |
| ☐ OTHER: | ☐ BUCKET ELEVATOR | ☐ STORAGE PILE |
| | ☐ OTHER: | ☑ OTHER: Conveyor from fine ore screen unders discharge |
| NO. FILL TUBES: | | |
| MAXIMUM ACFM: | | |

MATERIAL IS UNLOADED TO:

Tertiary crusher

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?
Airlock to enclosed conveyor.

MAXIMUM DESIGN FILLING RATE OF MATERIAL (TONS/HR): 646

MAXIMUM DESIGN UNLOADING RATE OF MATERIAL (TONS/HR): 646

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM C1
## CONTROL DEVICE (FABRIC FILTER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C1**

| | |
|---|---|
| CONTROL DEVICE ID NO: CD05 (Bin No. 1)<br>CD06 (Bin No. 2) | CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES05 (Bin No. 1)<br>ES06 (Bin No. 2) |
| EMISSION POINT (STACK) ID NO(S): EP05 (Bin No. 1)<br>EP06 (Bin No. 2) | POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS |
| **OPERATING SCENARIO:** | |
| 1 OF 1 | P.E. SEAL REQUIRED (PER 2q .0112)? ☐ YES ☑ NO |

DESCRIBE CONTROL SYSTEM:

Baghouse located at the top of the tertiary crusher feed bin to control dust emissions generated by material entering the bin. Unit is a mechanical device with a 5 HP motor to generate negative pressure as the bin is filled. Unit installed has a capacity of up to 3,000 scfm.

| | | | | |
|---|---|---|---|---|
| POLLUTANTS COLLECTED: | $PM/PM_{10}/PM_{2.5}$ | | | |
| BEFORE CONTROL EMISSION RATE (LB/HR): | 311 | | | |
| CAPTURE EFFICIENCY: | 100 % | % | % | % |
| CONTROL DEVICE EFFICIENCY: | 99.98 % | % | % | % |
| CORRESPONDING OVERALL EFFICIENCY: | 99.98 % | % | % | % |
| EFFICIENCY DETERMINATION CODE: | 4 | | | |
| TOTAL AFTER CONTROL EMISSION RATE (LB/HR): | 0.05 | | | |

PRESSURE DROP (IN $H_2O$): MIN: 0.6 MAX: 8 GAUGE? ☑ YES ☐ NO

| | | |
|---|---|---|
| BULK PARTICLE DENSITY ($LB/FT^3$): 112 | INLET TEMPERATURE (°F): MIN 20 MAX 120 | |
| POLLUTANT LOADING RATE: 311 ☑ LB/HR ☐ $GR/FT^3$ | OUTLET TEMPERATURE (°F) MIN 20 MAX 120 | |
| INLET AIR FLOW RATE (ACFM): 3,000 | FILTER OPERATING TEMP (°F): 20-120 | |
| NO. OF COMPARTMENTS: 1 | NO. OF BAGS PER COMPARTMENT: | LENGTH OF BAG (IN.): |
| NO. OF CARTRIDGES: 6 | FILTER SURFACE AREA PER CARTRIDGE ($FT^2$): 48 | DIAMETER OF BAG (IN.): |
| TOTAL FILTER SURFACE AREA ($FT^2$): 288 | AIR TO CLOTH RATIO: 10.5 | |

DRAFT TYPE: ☑ INDUCED/NEGATIVE ☐ FORCED/POSITIVE FILTER MATERIAL: ☑ WOVEN ☐ FELTED

DESCRIBE CLEANING PROCEDURES:

- ☑ AIR PULSE
- ☐ REVERSE FLOW
- ☐ MECHANICAL/SHAKER
- ☐ OTHER:
- ☐ SONIC
- ☐ SIMPLE BAG COLLAPSE
- ☐ RING BAG COLLAPSE

**PARTICLE SIZE DISTRIBUTION**

| SIZE (MICRONS) | WEIGHT % OF TOTAL | CUMULATIVE % |
|---|---|---|
| 0-1 | 0.2 | 0.2 |
| 1-10 | 2.2 | 2.4 |
| 10-25 | 4.7 | 7.1 |
| 25-50 | 36.6 | 43.7 |
| 50-100 | 49.9 | 93.6 |
| >100 | 6.4 | 100 |
| | TOTAL = 100 | |

DESCRIBE INCOMING AIR STREAM:

Stream comes from transfer point into the bin and maintains a negative pressure in the system. Fan draws air stream from bin chamber into the unit which then intermittently purges to return material back into the bin.

ON A SEPARATE PAGE, ATTACH A DIAGRAM SHOWING THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S): See Attachment 1

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Tertiary Crusher Discharge | EMISSION SOURCE ID NO: ES07 (Crusher No. 1)<br>ES08 (Crusher No. 2) |
| | CONTROL DEVICE ID NO(S): CD07 |
| OPERATING SCENARIO ___1___ OF ___1___ | EMISSION POINT (STACK) ID NO(S): EP07 |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
Tertiary crusher.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Woodworking (Form B4)
- ☐ Manuf. of chemicals/coatings/inks (Form B7)
- ☐ Int.combustion engine/generator (Form B2)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Incineration (Form B8)
- ☐ Liquid storage tanks (Form B3)
- ☐ Storage silos/bins (Form B6)
- ☑ Other (Form B9)

START CONSTRUCTION DATE: DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: EXPECTED OP. SCHEDULE: __24__ HR/DAY __7__ DAY/WK __52__ WK/YR

IS THIS SOURCE SUBJECT TO? ☑ NSPS (SUBPARTS?): OOO ☐ NESHAP (SUBPARTS?):

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

### *CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) | |
|---|---|---|---|---|---|---|---|
| | | lb/hr | tons/yr | lb/hr | tons/yr | lb/hr | tons/yr |
| PARTICULATE MATTER (PM) | See attached emission calculations | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

### *HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) | |
|---|---|---|---|---|---|---|---|---|
| | | | lb/hr | tons/yr | lb/hr | tons/yr | lb/hr | tons/yr |
| | | See attached emission calculations | | | | | | |

### *TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS | | |
|---|---|---|---|---|---|
| | | | lb/hr | lb/day | lb/yr |
| | | See attached emission calculations | | | |

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B9

## EMISSION SOURCE (OTHER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B9**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Tertiary Crusher Discharge | EMISSION SOURCE ID NO: ES07 (Crusher No. 1)<br>ES08 (Crusher No. 2) |
| | CONTROL DEVICE ID NO(S): CD07 |
| OPERATING SCENARIO: ______1________ OF ________1_______ | EMISSION POINT (STACK) ID NO(S): EP07 |

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Tertiary crusher with dust pickups.
See process flow diagram included as Attachment 1.

| **MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS** | | MAX. DESIGN | REQUESTED CAPACITY |
|---|---|---|---|
| TYPE | UNITS | CAPACITY (UNIT/HR) | LIMITATION(UNIT/HR) |
| Screened crushed ore | ton/hr | 646 | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| **MATERIALS ENTERING PROCESS - BATCH OPERATION** | | MAX. DESIGN | REQUESTED CAPACITY |
|---|---|---|---|
| TYPE | UNITS | CAPACITY (UNIT/BATCH) | LIMITATION (UNIT/BATCH) |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| | |
|---|---|
| MAXIMUM DESIGN (BATCHES / HOUR): | |
| REQUESTED LIMITATION (BATCHES / HOUR): | (BATCHES/YR): |
| FUEL USED: | TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR): |
| MAX. CAPACITY HOURLY FUEL USE: | REQUESTED CAPACITY ANNUAL FUEL USE: |

COMMENTS:

**Attach Additional Sheets as Necessary**

# FORM C1

## CONTROL DEVICE (FABRIC FILTER)

**NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C1**

| | |
|---|---|
| CONTROL DEVICE ID NO: CD07 | CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES07 (Crusher No. 1)<br>ES08 (Crusher No. 2) |
| EMISSION POINT (STACK) ID NO(S): EP07 | POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS |
| **OPERATING SCENARIO:** | |
| 1 OF 1 | P.E. SEAL REQUIRED (PER 2q .0112)? ☐ YES ☑ NO |

DESCRIBE CONTROL SYSTEM:

Located at the tertiary crusher discharge chute transfer. Unit is a non-mechanical device which relies on material movement to generate the operating pressure at the transfer point to the conveyor.

| | | | | |
|---|---|---|---|---|
| POLLUTANTS COLLECTED: | $PM/PM_{10}/PM_{2.5}$ | | | |
| BEFORE CONTROL EMISSION RATE (LB/HR): | 132 | | | |
| CAPTURE EFFICIENCY: | 100 % | % | % | % |
| CONTROL DEVICE EFFICIENCY: | 99.996 % | % | % | % |
| CORRESPONDING OVERALL EFFICIENCY: | 99.996 % | % | % | % |
| EFFICIENCY DETERMINATION CODE: | 4 | | | |
| TOTAL AFTER CONTROL EMISSION RATE (LB/HR): | 0.005 | | | |

PRESSURE DROP (IN $H_20$): MIN: 2 MAX: 6 GAUGE? ☑ YES ☐ NO

| | | |
|---|---|---|
| BULK PARTICLE DENSITY ($LB/FT^3$): 112 | INLET TEMPERATURE (°F): MIN 20 MAX 120 | |
| POLLUTANT LOADING RATE: 132 ☑ LB/HR ☐ $GR/FT^3$ | OUTLET TEMPERATURE (°F) MIN 20 MAX 120 | |
| INLET AIR FLOW RATE (ACFM): 295 | FILTER OPERATING TEMP (°F): 20-120 | |
| NO. OF COMPARTMENTS: 1 | NO. OF BAGS PER COMPARTMENT: 2 | LENGTH OF BAG (IN.): 72 |
| NO. OF CARTRIDGES: 1 | FILTER SURFACE AREA PER CARTRIDGE ($FT^2$): 18 | DIAMETER OF BAG (IN.): 24 |
| TOTAL FILTER SURFACE AREA ($FT^2$): 36 | AIR TO CLOTH RATIO: 8.19 | |

DRAFT TYPE: ☐ INDUCED/NEGATIVE ☑ FORCED/POSITIVE FILTER MATERIAL: ☑ WOVEN ☐ FELTED

DESCRIBE CLEANING PROCEDURES:

- ☐ AIR PULSE
- ☐ SONIC
- ☐ REVERSE FLOW
- ☑ SIMPLE BAG COLLAPSE
- ☐ MECHANICAL/SHAKER
- ☐ RING BAG COLLAPSE
- ☐ OTHER:

DESCRIBE INCOMING AIR STREAM:
Dust is lifted during transfer from the crusher discharge to the discharge to the conveyor, the pressure variation caused by this is adsorbed by this unit which is built into chute work, and allows the air to flow through thus reducing air flow to end of the chute work.

**PARTICLE SIZE DISTRIBUTION**

| SIZE (MICRONS) | WEIGHT % OF TOTAL | CUMULATIVE % |
|---|---|---|
| 0-1 | 0.5 | 0.5 |
| 1-10 | 8.8 | 9.3 |
| 10-25 | 15.5 | 24.8 |
| 25-50 | 39.2 | 64.0 |
| 50-100 | 32 | 96.0 |
| >100 | 4 | 100 |
| | TOTAL = 100 | |

ON A SEPARATE PAGE, ATTACH A DIAGRAM SHOWING THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S): See Attachment 1

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION: Fine Ore Bin | EMISSION SOURCE ID NO: ES09 |
| | CONTROL DEVICE ID NO(S): CD08 |
| OPERATING SCENARIO 1 OF 1 | EMISSION POINT (STACK) ID NO(S): EP08 |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
Fine ore bin dust pickup.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Woodworking (Form B4)
- ☐ Manuf. of chemicals/coatings/inks (Form B7)
- ☐ Int.combustion engine/generator (Form B2)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Incineration (Form B8)
- ☐ Liquid storage tanks (Form B3)
- ☑ Storage silos/bins (Form B6)
- ☐ Other (Form B9)

START CONSTRUCTION DATE: DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR

IS THIS SOURCE SUBJECT TO? ☑ NSPS (SUBPARTS?): OOO ☐ NESHAP (SUBPARTS?):

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

### *CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | tons/yr |
|---|---|---|---|---|---|---|---|
| PARTICULATE MATTER (PM) | See attached emission calculations | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

### *HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | tons/yr |
|---|---|---|---|---|---|---|---|---|
| | | See attached emission calculations | | | | | | |

### *TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr | lb/day | lb/yr |
|---|---|---|---|---|---|
| | | See attached emission calculations | | | |

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B6

## EMISSION SOURCE (STORAGE SILO/BINS)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B6**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION: | EMISSION SOURCE ID NO: ES09 |
| Fine Ore Bin | CONTROL DEVICE ID NO(S): CD08 |
| OPERATING SCENARIO: 1 OF 1 | EMISSION POINT(STACK) ID NO(S): EP08 |

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Fine ore bin with dust pickup.
See process flow diagram included as Attachment 1.

| | | | | |
|---|---|---|---|---|
| MATERIAL STORED: Fine ore | | | | DENSITY OF MATERIAL (LB/FT3): 112 |
| ***CAPACITY*** | CUBIC FEET: | | | TONS: |
| ***DIMENSIONS (FEET)*** | HEIGHT: | DIAMETER: | ***(OR)*** | LENGTH: WIDTH: HEIGHT: |
| ***ANNUAL PRODUCT THROUGHPUT (TONS)*** | ACTUAL: | | | MAXIMUM DESIGN CAPACITY: |

| **PNEUMATICALLY FILLED** | **MECHANICALLY FILLED** | **FILLED FROM** |
|---|---|---|
| ☐ BLOWER | ☑ SCREW CONVEYOR | ☐ RAILCAR |
| ☐ COMPRESSOR | ☐ BELT CONVEYOR | ☐ TRUCK |
| ☐ OTHER: | ☐ BUCKET ELEVATOR | ☐ STORAGE PILE |
| | ☐ OTHER: | ☑ OTHER: Conveyor from tertiary crushers discharge |

NO. FILL TUBES:

MAXIMUM ACFM:

MATERIAL IS UNLOADED TO:

DMS sizing screen feed box where the ore is slurried with water.

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?
Airlock to enclosed conveyor.

MAXIMUM DESIGN FILLING RATE OF MATERIAL (TONS/HR): 357

MAXIMUM DESIGN UNLOADING RATE OF MATERIAL (TONS/HR): 399

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM C1

## CONTROL DEVICE (FABRIC FILTER)

REVISED 09/22/16 — **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** — **C1**

| | |
|---|---|
| CONTROL DEVICE ID NO: CD08 | CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES09 |
| EMISSION POINT (STACK) ID NO(S): EP08 | POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS |
| **OPERATING SCENARIO:** 1 OF 1 | P.E. SEAL REQUIRED (PER 2q .0112)? ☐ YES ☑ NO |

DESCRIBE CONTROL SYSTEM:

Baghouse to control dust emissions generated by material entering the bin. Unit is a mechanical device with a 5 HP motor to generate negative pressure as the bin is filled. Unit installed has a capacity of up to 2,000 scfm.

| | | | | |
|---|---|---|---|---|
| POLLUTANTS COLLECTED: | $PM/PM_{10}/PM_{2.5}$ | | | |
| BEFORE CONTROL EMISSION RATE (LB/HR): | 622 | | | |
| CAPTURE EFFICIENCY: | 100 % | % | % | % |
| CONTROL DEVICE EFFICIENCY: | 99.994 % | % | % | % |
| CORRESPONDING OVERALL EFFICIENCY: | 99.994 % | % | % | % |
| EFFICIENCY DETERMINATION CODE: | 4 | | | |
| TOTAL AFTER CONTROL EMISSION RATE (LB/HR): | 0.03 | | | |

PRESSURE DROP (IN $H_20$): MIN: 2 MAX: 6 GAUGE? ☑ YES ☐ NO

| | | |
|---|---|---|
| BULK PARTICLE DENSITY ($LB/FT^3$): 112 | INLET TEMPERATURE (°F): MIN 20 MAX 120 | |
| POLLUTANT LOADING RATE: 622 ☑ LB/HR ☐ $GR/FT^3$ | OUTLET TEMPERATURE (°F) MIN 20 MAX 120 | |
| INLET AIR FLOW RATE (ACFM): 2,000 | FILTER OPERATING TEMP (°F): 20-120 | |
| NO. OF COMPARTMENTS: 1 | NO. OF BAGS PER COMPARTMENT: | LENGTH OF BAG (IN.): |
| NO. OF CARTRIDGES: 2 | FILTER SURFACE AREA PER CARTRIDGE ($FT^2$): 212 | DIAMETER OF BAG (IN.): |
| TOTAL FILTER SURFACE AREA ($FT^2$): 424 | AIR TO CLOTH RATIO: 4.72 | |

DRAFT TYPE: ☑ INDUCED/NEGATIVE ☐ FORCED/POSITIVE FILTER MATERIAL: ☑ WOVEN ☐ FELTED

DESCRIBE CLEANING PROCEDURES:

- ☑ AIR PULSE
- ☐ REVERSE FLOW
- ☐ MECHANICAL/SHAKER
- ☐ OTHER:
- ☐ SONIC
- ☐ SIMPLE BAG COLLAPSE
- ☐ RING BAG COLLAPSE

DESCRIBE INCOMING AIR STREAM:

Stream comes from transfer point into the bin and maintains a negative pressure in the system. Fan draws air stream from bin chamber into the unit which then intermittently purges to return material back into the bin.

**PARTICLE SIZE DISTRIBUTION**

| SIZE (MICRONS) | WEIGHT % OF TOTAL | CUMULATIVE % |
|---|---|---|
| 0-1 | 0.6 | 0.6 |
| 1-10 | 6.0 | 6.6 |
| 10-25 | 13.1 | 19.7 |
| 25-50 | 44.7 | 64.4 |
| 50-100 | 32.2 | 96.6 |
| >100 | 3.4 | 100 |
| | TOTAL = 100 | |

ON A SEPARATE PAGE, ATTACH A DIAGRAM SHOWING THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S): See Attachment 1

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION: Quartz Dryer | EMISSION SOURCE ID NO: ES10 |
| | CONTROL DEVICE ID NO(S): CD09 and CD10 |
| OPERATING SCENARIO 1 OF 1 | EMISSION POINT (STACK) ID NO(S): EP09 |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
Quarz dryer - 19.1 MMBtu/hr.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

- ☑ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Woodworking (Form B4)
- ☐ Manuf. of chemicals/coatings/inks (Form B7)
- ☐ Int.combustion engine/generator (Form B2)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Incineration (Form B8)
- ☐ Liquid storage tanks (Form B3)
- ☐ Storage silos/bins (Form B6)
- ☐ Other (Form B9)

START CONSTRUCTION DATE: DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR

IS THIS SOURCE SUBJECT TO? ☐ NSPS (SUBPARTS?): Dc ☐ NESHAP (SUBPARTS?):

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

### *CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr |
|---|---|---|---|---|---|---|---|
| PARTICULATE MATTER (PM) | See attached emission calculations | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

### *HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr |
|---|---|---|---|---|---|---|---|---|
| | | See attached emission calculations | | | | | | |

### *TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr | lb/day | lb/yr |
|---|---|---|---|---|---|
| | | See attached emission calculations | | | |

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B1

## EMISSION SOURCE (WOOD, COAL, OIL, GAS, OTHER FUEL-FIRED BURNER)

REVISED 09/22/16 — **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** — **B1**

EMISSION SOURCE DESCRIPTION: Quartz Dryer

EMISSION SOURCE ID NO: ES10

CONTROL DEVICE ID NO(S): CD09 and CD10

OPERATING SCENARIO: ___1___ OF ___1___

EMISSION POINT (STACK) ID NO(S): EP09

*DESCRIBE USE:* ☐ PROCESS HEAT ☐ SPACE HEAT ☐ ELECTRICAL GENERATION
☐ CONTINUOUS USE ☐ STAND BY/EMERGENCY ☑ OTHER (DESCRIBE): Direct Fired Material Drying

HEATING MECHANISM: ☐ INDIRECT ☑ DIRECT

MAX. FIRING RATE (MMBTU/HOUR): 19.1

### WOOD-FIRED BURNER

*WOOD TYPE:* ☐ BARK ☐ WOOD/BARK ☐ WET WOOD ☐ DRY WOOD ☐ OTHER (DESCRIBE): ____________

PERCENT MOISTURE OF FUEL:________________

☐ UNCONTROLLED ☐ CONTROLLED WITH FLYASH REINJECTION ☐ CONTROLLED W/O REINJECTION

FUEL FEED METHOD: HEAT TRANSFER MEDIA: ☐ STEAM ☐ AIR ☐ OTHER (DESCRIBE) ________________

### COAL-FIRED BURNER

*TYPE OF BOILER* IF OTHER DESCRIBE:

| PULVERIZED | OVERFEED STOKER | UNDERFEED STOKER | SPREADER STOKER | FLUIDIZED BED |
|---|---|---|---|---|
| ☐ WET BED | ☐ UNCONTROLLED | ☐ UNCONTROLLED | ☐ UNCONTROLLED | ☐ CIRCULATING |
| ☐ DRY BED | ☐ CONTROLLED | ☐ CONTROLLED | ☐ FLYASH REINJECTION | ☑ RECIRCULATING |
| | | | ☐ NO FLYASH REINJECTION | |

### OIL/GAS-FIRED BURNER

TYPE OF ~~BOILER~~ DRYER: ☐ UTILITY ☑ INDUSTRIAL ☐ COMMERCIAL ☐ INSTITUTIONAL

TYPE OF FIRING: ☐ NORMAL ☐ TANGENTIAL ☑ LOW NOX BURNERS ☐ NO LOW NOX BURNER

### OTHER FUEL-FIRED BURNER

TYPE(S) OF FUEL: __________________________ PE

TYPE OF BOILER: ☐ UTILITY ☐ INDUSTRIAL ☐ COMMERCIAL ☐ INSTITUTIONAL

TYPE OF FIRING: _______________ TYPE(S) OF CONTROL(S) (IF ANY): ________________________________________

### FUEL USAGE (INCLUDE STARTUP/BACKUP FUELS)

| FUEL TYPE | UNITS | MAXIMUM DESIGN CAPACITY (UNIT/HR) | REQUESTED CAPACITY LIMITATION (UNIT/HR) |
|---|---|---|---|
| Natural gas | MMBtu/hr, heat input | 19.1 | |
| | | | |
| | | | |

### FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

| FUEL TYPE | SPECIFIC BTU CONTENT | SULFUR CONTENT (% BY WEIGHT) | ASH CONTENT (% BY WEIGHT) |
|---|---|---|---|
| Natural gas | 1,020 Btu/cubic foot (default value) | | |
| | | | |
| | | | |

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM C1

## CONTROL DEVICE (FABRIC FILTER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C1**

| | |
|---|---|
| CONTROL DEVICE ID NO: CD09 | CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES10 |
| EMISSION POINT (STACK) ID NO(S): EP09 | POSITION IN SERIES OF CONTROLS NO. 1 OF 2 UNITS |
| **OPERATING SCENARIO:** | |
| 1 OF 1 | P.E. SEAL REQUIRED (PER 2q .0112)? ☑ YES ☐ NO |

DESCRIBE CONTROL SYSTEM:

Baghouse to recover product from quartz dryer exhaust stream.

| | | | | |
|---|---|---|---|---|
| POLLUTANTS COLLECTED: | $PM/PM_{10}/PM_{2.5}$ | | | |
| BEFORE CONTROL EMISSION RATE (LB/HR): | 4,801 | | | |
| CAPTURE EFFICIENCY: | 100 % | % | % | % |
| CONTROL DEVICE EFFICIENCY: | 99.72 % | % | % | % |
| CORRESPONDING OVERALL EFFICIENCY: | 99.72 % | % | % | % |
| EFFICIENCY DETERMINATION CODE: | 4 | | | |
| TOTAL AFTER CONTROL EMISSION RATE (LB/HR): | 13.4 | | | |

PRESSURE DROP (IN $H_2O$): MIN: 2 MAX: 6 GAUGE? ☑ YES ☐ NO

| | | |
|---|---|---|
| BULK PARTICLE DENSITY ($LB/FT^3$): 90 | INLET TEMPERATURE (°F): MIN 36 MAX 200 | |
| POLLUTANT LOADING RATE: 4,801 ☑ LB/HR ☐ $GR/FT^3$ | OUTLET TEMPERATURE (°F) MIN 36 MAX 200 | |
| INLET AIR FLOW RATE (ACFM): 10,704 | FILTER OPERATING TEMP (°F): 36 - 199 | |
| NO. OF COMPARTMENTS: 1 | NO. OF BAGS PER COMPARTMENT: 121 | LENGTH OF BAG (IN.): 144 |
| NO. OF CARTRIDGES: 121 | FILTER SURFACE AREA PER CARTRIDGE ($FT^2$): 18 | DIAMETER OF BAG (IN.): 6 |
| TOTAL FILTER SURFACE AREA ($FT^2$): 2,178 | AIR TO CLOTH RATIO: 4.9:1 | |

DRAFT TYPE: ☑ INDUCED/NEGATIVE ☐ FORCED/POSITIVE FILTER MATERIAL: ☐ WOVEN ☑ FELTED

DESCRIBE CLEANING PROCEDURES:

- ☑ AIR PULSE
- ☐ REVERSE FLOW
- ☐ MECHANICAL/SHAKER
- ☐ OTHER:
- ☐ SONIC
- ☐ SIMPLE BAG COLLAPSE
- ☐ RING BAG COLLAPSE

**PARTICLE SIZE DISTRIBUTION**

| SIZE (MICRONS) | WEIGHT % OF TOTAL | CUMULATIVE % |
|---|---|---|
| 0-1 | 0.25 | 0.25 |
| 1-10 | 45.55 | 45.8 |
| 10-25 | 54.2 | 100 |
| 25-50 | 0 | 100 |
| 50-100 | 0 | 100 |
| >100 | 0 | 100 |
| | TOTAL = 100 | |

DESCRIBE INCOMING AIR STREAM:

Exhaust from a natural gas, direct fired material dryer.

Dust particle size distribution has been set based on a modeled feed distribution using Gates-Gaudin-Schuhmann method, and sufficient velocity to lift a 25 μm particle, as there is no data available for this application.

The discharge from this stream reports to the wet scrubber (CD10).

ON A SEPARATE PAGE, ATTACH A DIAGRAM SHOWING THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S): See Attachment 1

COMMENTS:

The control device efficiency is based on engineering experience with similar emissions units and control devices.

**Attach Additional Sheets As Necessary**

# FORM C8

## CONTROL DEVICE (WET PARTICULATE SCRUBBER)

REVISED 09/22/16 | **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** | **C8**

| | |
|---|---|
| CONTROL DEVICE ID NO: CD10 | CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES10 |
| EMISSION POINT ID NO(S): EP09 | POSITION IN SERIES OF CONTROLS: NO. 2 OF 2 UNITS |
| **OPERATING SCENARIO:** | |
| 1 OF 1 | P.E. SEAL NEEDED (PER 2Q .0112)? ☑ YES ☐ NO |

DESCRIBE CONTROL SYSTEM:

Quartz dryer dust and HF emissions management. Wet scrubber is post dryer baghouse (CD09)

| | | | |
|---|---|---|---|
| POLLUTANT(S) COLLECTED: | $PM/PM_{10}/PM_{2.5}$ | HF | |
| BEFORE CONTROL EMISSION RATE (LB/HR): | 13.4 | 44.2 | |
| CAPTURE EFFICIENCY: | 100 % | 100 % | % |
| CONTROL DEVICE EFFICIENCY: | 99 % | 98.5 % | % |
| CORRESPONDING OVERALL EFFICIENCY: | 99 % | 98.5 % | % |
| EFFICIENCY DETERMINATION CODE: | 4 | 4 | |
| TOTAL AFTER CONTROL EMISSION RATE (LB/HR): | 0.13 | 0.66 | |

| | |
|---|---|
| PRESSURE DROP (IN. $H_20$): 26 MIN 54 MAX | |
| INLET TEMPERATURE ($^oF$): 36 MIN 200 MAX | OUTLET TEMPERATURE ($^oF$): 36 MIN 200 MAX |
| INLET AIR FLOW RATE (ACFM): 10,704 | MOISTURE CONTENT : INLET 1 % OUTLET 1.05 % |
| THROAT VELOCITY (FT/SEC): 56.8 | THROAT TYPE: ☑ FIXED ☐ VARIABLE |
| TYPE OF SYSTEM: Venturi scrubber with packed bed | TYPE OF PACKING USED IF ANY: Polyprolyene fibrous pads |
| ADDITIVE LIQUID SCRUBBING MEDIUM: Water with NaOH/CaCO3 | PERCENT RECIRCULATED: 90-99% |
| MINIMUM LIQUID INJECTION (RECIRCULATION RATE (GAL/MIN): 20 | |
| MAKE UP RATE (GAL/MIN): 20 FOR ADDITIVE (GAL/MIN): 0.2 | |

DESCRIBE MAINTENANCE PROCEDURES:

- Daily checks on mechanical components
- Monthly performance checks / preventative maintenance program

DESCRIBE ANY MONITORING DEVICES, GAUGES, TEST PORTS, ETC:

- Manual pH checks
- Pressure Gauge/ DP transducer
- Flow monitor
- Sample ports for reservoir, between venturi and packed bed/demister, and emission stack (post demister)

**PARTICLE SIZE DISTRIBUTION**

| SIZE (MICRONS) | WEIGHT % OF TOTAL | CUMULATIVE % |
|---|---|---|
| 0-1 | 1.1 | 1.1 |
| 1-10 | 95.1 | 96.2 |
| 10-25 | 3.8 | 100 |
| 25-50 | 0 | 100 |
| 50-100 | 0 | 100 |
| >100 | 0 | 100 |
| | TOTAL = 100 | |

ATTACH A DIAGRAM OF THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S): See Attachment 1

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Feldspar Dryer | EMISSION SOURCE ID NO: ES11<br>CONTROL DEVICE ID NO(S): CD11 and CD12 |
| OPERATING SCENARIO _______1_________ OF _______1_________ | EMISSION POINT (STACK) ID NO(S): EP10 |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
Feldspar dryer - 29.6 MMBtu/hr.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

| | | |
|---|---|---|
| ☑ Coal,wood,oil, gas, other burner (Form B1) | ☐ Woodworking (Form B4) | ☐ Manuf. of chemicals/coatings/inks (Form B7) |
| ☐ Int.combustion engine/generator (Form B2) | ☐ Coating/finishing/printing (Form B5) | ☐ Incineration (Form B8) |
| ☐ Liquid storage tanks (Form B3) | ☐ Storage silos/bins (Form B6) | ☐ Other (Form B9) |

START CONSTRUCTION DATE: DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: EXPECTED OP. SCHEDULE: __24__ HR/DAY __7__ DAY/WK __52__ WK/YR

IS THIS SOURCE SUBJECT TO? ☐ NSPS (SUBPARTS?):_Dc__________ ☐ NESHAP (SUBPARTS?):____________

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

### CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

| | SOURCE OF | EXPECTED ACTUAL | | POTENTIAL EMISSIONS | | | |
|---|---|---|---|---|---|---|---|
| | EMISSION | (AFTER CONTROLS / LIMITS) | | (BEFORE CONTROLS / LIMITS) | | (AFTER CONTROLS / LIMITS) | |
| **AIR POLLUTANT EMITTED** | FACTOR | lb/hr | tons/yr | lb/hr | tons/yr | lb/hr | tons/yr |
| PARTICULATE MATTER (PM) | | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | See attached emission calculations | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

### HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

| | | SOURCE OF | EXPECTED ACTUAL | | POTENTIAL EMISSIONS | | | |
|---|---|---|---|---|---|---|---|---|
| | | EMISSION | (AFTER CONTROLS / LIMITS) | | (BEFORE CONTROLS / LIMITS) | | (AFTER CONTROLS / LIMITS) | |
| **HAZARDOUS AIR POLLUTANT** | **CAS NO.** | FACTOR | lb/hr | tons/yr | lb/hr | tons/yr | lb/hr | tons/yr |
| | | | | See attached emission calculations | | | | |

### TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

| | | SOURCE OF EMISSION | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS | | |
|---|---|---|---|---|---|
| **TOXIC AIR POLLUTANT** | **CAS NO.** | FACTOR | lb/hr | lb/day | lb/yr |
| | | | | See attached emission calculations | |

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B1

## EMISSION SOURCE (WOOD, COAL, OIL, GAS, OTHER FUEL-FIRED BURNER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B1**

EMISSION SOURCE DESCRIPTION: Feldspar Dryer

EMISSION SOURCE ID NO: ES11

CONTROL DEVICE ID NO(S): CD11 and CD12

OPERATING SCENARIO: 1 OF 1

EMISSION POINT (STACK) ID NO(S): EP10

*DESCRIBE USE:* ☐ PROCESS HEAT ☐ SPACE HEAT ☐ ELECTRICAL GENERATION ☐ CONTINUOUS USE ☐ STAND BY/EMERGENCY ☑ OTHER (DESCRIBE): Direct Fired Material Drying

HEATING MECHANISM: ☐ INDIRECT ☑ DIRECT

MAX. FIRING RATE (MMBTU/HOUR): 29.6

### WOOD-FIRED BURNER

*WOOD TYPE:* ☐ BARK ☐ WOOD/BARK ☐ WET WOOD ☐ DRY WOOD ☐ OTHER (DESCRIBE): ____________

PERCENT MOISTURE OF FUEL:_________________

☐ UNCONTROLLED ☐ CONTROLLED WITH FLYASH REINJECTION ☐ CONTROLLED W/O REINJECTION

FUEL FEED METHOD:

HEAT TRANSFER MEDIA: ☐ STEAM ☐ AIR ☐ OTHER (DESCRIBE) ________________

### COAL-FIRED BURNER

*TYPE OF BOILER*

IF OTHER DESCRIBE:

| PULVERIZED | OVERFEED STOKER | UNDERFEED STOKER | SPREADER STOKER | FLUIDIZED BED |
|---|---|---|---|---|
| ☐ WET BED | ☐ UNCONTROLLED | ☐ UNCONTROLLED | ☐ UNCONTROLLED | ☐ CIRCULATING |
| ☐ DRY BED | ☐ CONTROLLED | ☐ CONTROLLED | ☐ FLYASH REINJECTION | ☑ RECIRCULATING |
| | | | ☐ NO FLYASH REINJECTION | |

### OIL/GAS-FIRED BURNER

TYPE OF ~~BOILER~~ DRYER: ☐ UTILITY ☑ INDUSTRIAL ☐ COMMERCIAL ☐ INSTITUTIONAL

TYPE OF FIRING: ☐ NORMAL ☐ TANGENTIAL ☑ LOW NOX BURNERS ☐ NO LOW NOX BURNER

### OTHER FUEL-FIRED BURNER

TYPE(S) OF FUEL: ___________________________ PE

TYPE OF BOILER: ☐ UTILITY ☐ INDUSTRIAL ☐ COMMERCIAL ☐ INSTITUTIONAL

TYPE OF FIRING: ________________ TYPE(S) OF CONTROL(S) (IF ANY): ____________________________________________

### FUEL USAGE (INCLUDE STARTUP/BACKUP FUELS)

| FUEL TYPE | UNITS | MAXIMUM DESIGN CAPACITY (UNIT/HR) | REQUESTED CAPACITY LIMITATION (UNIT/HR) |
|---|---|---|---|
| Natural gas | MMBtu/hr, heat input | 29.6 | |
| | | | |
| | | | |

### FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

| FUEL TYPE | SPECIFIC BTU CONTENT | SULFUR CONTENT (% BY WEIGHT) | ASH CONTENT (% BY WEIGHT) |
|---|---|---|---|
| Natural gas | 1,020 Btu/cubic foot (default value) | | |
| | | | |
| | | | |

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM C1

## CONTROL DEVICE (FABRIC FILTER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C1**

| | |
|---|---|
| CONTROL DEVICE ID NO: CD11 | CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES11 |
| EMISSION POINT (STACK) ID NO(S): EP10 | POSITION IN SERIES OF CONTROLS NO. 1 OF 2 UNITS |
| **OPERATING SCENARIO:** | |
| 1 OF 1 | P.E. SEAL REQUIRED (PER 2q .0112)? ☑ YES ☐ NO |

DESCRIBE CONTROL SYSTEM:

Baghouse to recover product from feldspar dryer exhaust stream.

| | | | | |
|---|---|---|---|---|
| POLLUTANTS COLLECTED: | $PM/PM_{10}/PM_{2.5}$ | | | |
| BEFORE CONTROL EMISSION RATE (LB/HR): | 7,471 | | | |
| CAPTURE EFFICIENCY: | 100 % | % | % | % |
| CONTROL DEVICE EFFICIENCY: | 99.72 % | % | % | % |
| CORRESPONDING OVERALL EFFICIENCY: | 99.72 % | % | % | % |
| EFFICIENCY DETERMINATION CODE: | 4 | | | |
| TOTAL AFTER CONTROL EMISSION RATE (LB/HR): | 20.9 | | | |

PRESSURE DROP (IN $H_20$): MIN: 2 MAX: 6 GAUGE? ☑ YES ☐ NO

| | | |
|---|---|---|
| BULK PARTICLE DENSITY ($LB/FT^3$): 90 | INLET TEMPERATURE (°F): MIN 36 MAX 200 | |
| POLLUTANT LOADING RATE: 7,471 ☑ LB/HR ☐ $GR/FT^3$ | OUTLET TEMPERATURE (°F) MIN 36 MAX 200 | |
| INLET AIR FLOW RATE (ACFM): 16,658 | FILTER OPERATING TEMP (°F): 36 - 199 | |
| NO. OF COMPARTMENTS: 1 | NO. OF BAGS PER COMPARTMENT: 195 | LENGTH OF BAG (IN.): 144 |
| NO. OF CARTRIDGES: 195 | FILTER SURFACE AREA PER CARTRIDGE ($FT^2$): 18 | DIAMETER OF BAG (IN.): 6 |
| TOTAL FILTER SURFACE AREA ($FT^2$): 3,510 | AIR TO CLOTH RATIO: 4.7:1 | |

DRAFT TYPE: ☑ INDUCED/NEGATIVE ☐ FORCED/POSITIVE FILTER MATERIAL: ☐ WOVEN ☑ FELTED

DESCRIBE CLEANING PROCEDURES:

- ☑ AIR PULSE
- ☐ REVERSE FLOW
- ☐ MECHANICAL/SHAKER
- ☐ OTHER:
- ☐ SONIC
- ☐ SIMPLE BAG COLLAPSE
- ☐ RING BAG COLLAPSE

**PARTICLE SIZE DISTRIBUTION**

| SIZE (MICRONS) | WEIGHT % OF TOTAL | CUMULATIVE % |
|---|---|---|
| 0-1 | 0.25 | 0.25 |
| 1-10 | 45.55 | 45.8 |
| 10-25 | 54.2 | 100 |
| 25-50 | 0 | 100 |
| 50-100 | 0 | 100 |
| >100 | 0 | 100 |
| | TOTAL = 100 | |

DESCRIBE INCOMING AIR STREAM:

Exhaust from a natural gas, direct fired material dryer.

Dust particle size distribution has been set based on a modeled feed distribution using Gates-Gaudin-Schuhmann method, and sufficient velocity to lift a 25 µm particle, as there is no data available for this application.

The discharge from this stream reports to the wet scrubber (CD12) for final solids recovery and HF gas emissions reduction.

ON A SEPARATE PAGE, ATTACH A DIAGRAM SHOWING THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S): See Attachment 1

COMMENTS:

The control device efficiency is based on engineering experience with similar emissions units and control devices.

**Attach Additional Sheets As Necessary**

# FORM C8

## CONTROL DEVICE (WET PARTICULATE SCRUBBER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C8**

| | |
|---|---|
| CONTROL DEVICE ID NO: CD12 | CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES11 |
| EMISSION POINT ID NO(S): EP10 | POSITION IN SERIES OF CONTROLS: NO. 2 OF 2 UNITS |
| **OPERATING SCENARIO:** | |
| 1 OF 1 | P.E. SEAL NEEDED (PER 2Q .0112)? ☑ YES ☐ NO |

DESCRIBE CONTROL SYSTEM:

Feldspar dryer dust and HF emissions management. Wet scrubber is post dryer baghouse (CD11)

| | | | |
|---|---|---|---|
| POLLUTANT(S) COLLECTED: | PM/$PM_{10}$/$PM_{2.5}$ | HF | |
| BEFORE CONTROL EMISSION RATE (LB/HR): | 20.9 | 397.6 | |
| CAPTURE EFFICIENCY: | 100 % | 100 % | % |
| CONTROL DEVICE EFFICIENCY: | 99 % | 99.5 % | % |
| CORRESPONDING OVERALL EFFICIENCY: | 99 % | 99.5 % | % |
| EFFICIENCY DETERMINATION CODE: | 4 | 4 | |
| TOTAL AFTER CONTROL EMISSION RATE (LB/HR): | 0.21 | 1.99 | |

| | |
|---|---|
| PRESSURE DROP (IN. $H_20$): 26 MIN 54 MAX | |
| INLET TEMPERATURE ($^oF$): 36 MIN 200 MAX | OUTLET TEMPERATURE ($^oF$): 36 MIN 200 MAX |
| INLET AIR FLOW RATE (ACFM): 16,658 | MOISTURE CONTENT : INLET 1 % OUTLET 1.05 % |
| THROAT VELOCITY (FT/SEC): 56.8 | THROAT TYPE: ☑ FIXED ☐ VARIABLE |
| TYPE OF SYSTEM: Venturi scrubber with packed bed | TYPE OF PACKING USED IF ANY: Polyprolyene fibrous pads |
| ADDITIVE LIQUID SCRUBBING MEDIUM: Water with NaOH/CaCO3 | PERCENT RECIRCULATED: 90-99% |
| MINIMUM LIQUID INJECTION (RECIRCULATION RATE (GAL/MIN): 20 | |

MAKE UP RATE (GAL/MIN): 20 FOR ADDITIVE (GAL/MIN): 4.8

DESCRIBE MAINTENANCE PROCEDURES:

- Daily checks on mechanical components
- Monthly performance checks / preventative maintenance program

DESCRIBE ANY MONITORING DEVICES, GAUGES, TEST PORTS, ETC:

- Manual pH checks
- Pressure Gauge/ DP transducer
- Flow monitor
- Sample ports for reservoir, between venturi and packed bed/demister, and emission stack (post demister)

**PARTICLE SIZE DISTRIBUTION**

| SIZE (MICRONS) | WEIGHT % OF TOTAL | CUMULATIVE % |
|---|---|---|
| 0-1 | 1.1 | 1.1 |
| 1-10 | 95.1 | 96.2 |
| 10-25 | 3.8 | 100 |
| 25-50 | 0 | 100 |
| 50-100 | 0 | 100 |
| >100 | 0 | 100 |
| | TOTAL = 100 | |

ATTACH A DIAGRAM OF THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S): See Attachment 1

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 | **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** | **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>1,000 kW Emergency Generator | EMISSION SOURCE ID NO: ES12 (Concentrator Plant Generator No. 1)<br>ES13 (Concentrator Plant Generator No. 2)<br>ES38 (CL-1 Generator No. 1)<br>ES39 (CL-1 Generator No. 2)<br>ES65 (CL-2 Generator No. 1)<br>ES66 (CL-2 Generator No. 2) |
| | CONTROL DEVICE ID NO(S): |
| OPERATING SCENARIO 1 OF 1 | EMISSION POINT (STACK) ID NO(S):<br>EP11 (Concentrator Plant Generator No. 1)<br>EP12 (Concentrator Plant Generator No. 2)<br>EP37 (CL-1 Generator No. 1)<br>EP38 (CL-1 Generator No. 2)<br>EP62 (CL-2 Generator No. 1)<br>EP63 (CL-2 Generator No. 2) |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
Diesel fueled emergency generator.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

| | | |
|---|---|---|
| ☐ Coal,wood,oil, gas, other burner (Form B1) | ☐ Woodworking (Form B4) | ☐ Manuf. of chemicals/coatings/inks (Form B7) |
| ☑ Int.combustion engine/generator (Form B2) | ☐ Coating/finishing/printing (Form B5) | ☐ Incineration (Form B8) |
| ☐ Liquid storage tanks (Form B3) | ☐ Storage silos/bins (Form B6) | ☐ Other (Form B9) |

START CONSTRUCTION DATE: | DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: | EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR

IS THIS SOURCE SUBJECT TO? ☑ NSPS (SUBPARTS?): IIII ☑ NESHAP (SUBPARTS?): ZZZZ

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

### *CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr |
|---|---|---|---|---|---|---|---|
| PARTICULATE MATTER (PM) | | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

See attached emission calculations

### *HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr |
|---|---|---|---|---|---|---|---|---|

See attached emission calculations

### *TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr | lb/day | lb/yr |
|---|---|---|---|---|---|

See attached emission calculations

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B2

## EMISSION SOURCE (INTERNAL COMBUSTION ENGINES/TURBINES/GENERATORS)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B2**

EMISSION SOURCE DESCRIPTION:
1,000 kW Emergency Generator No. 1

EMISSION SOURCE ID NO: ES12 (Concentrator Plant Generator No. 1)
ES13 (Concentrator Plant Generator No. 2)
ES38 (CL-1 Generator No. 1)
ES39 (CL-1 Generator No. 2)
ES65 (CL-2 Generator No. 1)
ES66 (CL-2 Generator No. 2)

CONTROL DEVICE ID NO(S):

EMISSION POINT (STACK) ID NO(S):
EP11 (Concentrator Plant Generator No. 1)
EP12 (Concentrator Plant Generator No. 2)
EP37 (CL-1 Generator No. 1)
EP38 (CL-1 Generator No. 2)
EP62 (CL-2 Generator No. 1)
EP63 (CL-2 Generator No. 2)

OPERATING SCENARIO: ____1____ OF ____1____

ENGINE SERVICE (CHECK ALL THAT APPLY): ☑ EMERGENCY ☐ SPACE HEAT ☐ ELECTRICAL GENERATION ☐ PEAK SHAVER ☐ OTHER (DESCRIBE): ______

GENERATOR OUTPUT (KW): 1,000

ANTICIPATED ACTUAL HOURS OF OPERATION (HRS/YR): 26

ENGINE OUTPUT (HP): 1,500

**TYPE ICE:** ☐ GASOLINE ENGINE ☐ DIESEL ENGINE UP TO 600 HP ☑ DIESEL ENGINE GREATER THAN 600 HP ☐ DUAL FUEL ENGINE ☐ OTHER (DESCRIBE): ______ (complete below)

**ENGINE TYPE** ☐ RICH BURN ☑ LEAN BURN

**EMISSION REDUCTION MODIFICATIONS** ☐ INJECTION TIMING RETARD ☐ PREIGNITION CHAMBER COMBUSTION ☑ OTHER: Tier 2 Certified

**OR** ☐ STATIONARY GAS TURBINE (complete below) ☐ NATURAL GAS PIPELINE COMPRESSOR OR TURBINE (complete below)

**FUEL:** ☐ NATURAL GAS ☐ OIL ☐ OTHER (DESCRIBE):______

**CYCLE:** ☐ COGENERATION ☐ SIMPLE ☐ REGENERATIVE ☐ COMBINED

**CONTROLS:** ☐ WATER-STEAM INJECTION ☐ UNCONTROLLED ☐ LEAN-PREMIX ☐ OTHER (SPECIFY):______

**ENGINE TYPE:** ☐ 2-CYCLE LEAN BURN ☐ 4-CYCLE LEAN ☐ TURBINE ☐ 4-CYCLE RICH BURN ☐ OTHER (DESCRIBE): ______

**CONTROLS:** ☐ COMBUSTION MODIFICATIONS (DESCRIBE): ______ ☐ NONSELECTIVE CATALYTIC REDUCTION ☐ SELECTIVE CATALYTIC REDUCTION ☐ CLEAN BURN AND PRECOMBUSTION CHAMBER ☐ UNCONTROLLED

### FUEL USAGE (INCLUDE STARTUP/BACKUP FUEL)

| FUEL TYPE | UNITS | MAXIMUM DESIGN CAPACITY (UNIT/HR) | REQUESTED CAPACITY LIMITATION (UNIT/HR) |
|---|---|---|---|
| Diesel | MMBtu/hr | 10.5 | |
| | | | |
| | | | |

### FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

| FUEL TYPE | BTU/UNIT | UNITS | SULFUR CONTENT (% BY WEIGHT) |
|---|---|---|---|
| Diesel | gallon | 137,000 (AP-42 default) | 0.0015 |
| | | | |
| | | | |

### MANUFACTURER'S SPECIFIC EMISSION FACTORS (IF AVAILABLE)

| POLLUTANT | NOX | CO | PM | PM10 | VOC | OTHER |
|---|---|---|---|---|---|---|
| EMISSION FACTOR LB/UNIT | | | | | | |
| UNIT | | | | | | |

DESCRIBE METHODS TO MINIMIZE VISIBLE EMISSIONS DURING IDLING, OR LOW LOAD OPERATIONS:
Engine will only be operated for periodic testing and during emergencies when grid power is not available.

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION: Hydrofluoric Acid Storage Tank | EMISSION SOURCE ID NO: ES14 |
| | CONTROL DEVICE ID NO(S): CD13 |
| OPERATING SCENARIO 1 OF 1 | EMISSION POINT (STACK) ID NO(S): EP13 |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
Hydrofluoric acid storage tank.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Woodworking (Form B4)
- ☐ Manuf. of chemicals/coatings/inks (Form B7)
- ☐ Int.combustion engine/generator (Form B2)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Incineration (Form B8)
- ☑ Liquid storage tanks (Form B3)
- ☐ Storage silos/bins (Form B6)
- ☐ Other (Form B9)

START CONSTRUCTION DATE: DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR

IS THIS SOURCE SUBJECT TO? ☐ NSPS (SUBPARTS?):_____ ☐ NESHAP (SUBPARTS?):_____

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

### CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | tons/yr |
|---|---|---|---|---|---|---|---|
| PARTICULATE MATTER (PM) | See attached emission calculations | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

### HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | tons/yr |
|---|---|---|---|---|---|---|---|---|
| | | See attached emission calculations | | | | | | |

### TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr | lb/day | lb/yr |
|---|---|---|---|---|---|
| | | See attached emission calculations | | | |

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B3

## EMISSION SOURCE (LIQUID STORAGE TANK)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B3**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br><br>Hydrofluoric Acid Storage Tank | EMISSION SOURCE ID NO: ES14<br>CONTROL DEVICE ID NO(S): CD13 |
| OPERATING SCENARIO: ______1________ OF _______1_______ | EMISSION POINT (STACK) ID NO(S): EP13 |

### *EACH STORAGE TANK*

DESCRIBE IN DETAIL THE STORAGE TANK (ATTACH FLOW DIAGRAM):
Hydrofluoric acid storage tank.
See process flow diagram included as Attachment 1.

| | |
|---|---|
| LIQUID STORED: Hydrofluoric acid, 49% by weight | LIQUID MOLECULAR WEIGHT (LB/LB-MOLE): 20.01 |
| TANK CAPACITY (GAL): 25,000 | VAPOR MOLECULAR WEIGHT (LB/LB-MOLE): 20.01 |
| AVERAGE LIQUID SURFACE TEMPERATURE (F): Varies | VAPOR PRESSURE AT AVE. LIQUID SURFACE TEMP (PSIA): Varies |

| | | |
|---|---|---|
| | MAX. LIQUID SURFACE TEMP ($^{o}$F): Varies | MAX. TRUE VAPOR PRESS. (PSIA): Varies |
| | BREATHER VENT SETTINGS (PSIG) ________ VACUUM ________ PRESSURE | |
| SHELL DIAMETER (FT): | SHELL CONDITION: ☐ GOOD ☐ POOR | IS TANK HEATED: ☐ YES ☐ NO |
| SHELL COLOR: | MAXIMUM THROUGHPUT (GAL/YR): 560,000 | MAXIMUM TURNOVERS PER YEAR: |
| WORKING VOLUME (GAL): | ACTUAL THROUGHPUT (GAL/YR): 450,000 | ACTUAL TURNOVERS PER YEAR: |
| MAX. FILLS PER DAY: 1 | MAX. FILLING RATE (GAL/MIN): 44 | MIN. DURATION OF FILL (HR/FILL): 9.5 |

### *VERTICAL FIXED ROOF TANKS*

| | | |
|---|---|---|
| SHELL HEIGHT (FT): | ROOF TYPE: ☐ CONE ☐ DOME | ROOF HEIGHT (FT): |
| AVERAGE LIQUID HEIGHT (FT): | ROOF CONDITION: ☐ GOOD ☐ POOR | |
| MAXIMUM LIQUID HEIGHT (FT): | ROOF COLOR: | |

### *HORIZONTAL TANKS*

| | |
|---|---|
| SHELL LENGTH (FT): | IS TANK UNDERGROUND ?: ☐ YES ☐ NO |

### *FLOATING ROOF TANKS*

**DESCRIBE PERTINENT TANK DATA SUCH AS DECKS, RIM-SEALS, LIQUID DENSITY @ 60 DEG F:**

**FOR ALL TANKS - DESCRIBE ANY MONITORING OR WARNING DEVICES (SUCH AS LEAK AND FUME DETECTION INSTRUMENTATION):**
**See control device form C13.**

**COMMENTS:**

**Attach Additional Sheets As Necessary**

# FORM C6

## CONTROL DEVICE (GASEOUS ABSORBER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C6**

***AS REQUIRED BY 15A NCAC 2Q .0112, THIS FORM MUST BE SEALED BY A PROFESSIONAL ENGINEER (P.E.) LICENSED IN NORTH CAROLINA.***

| | |
|---|---|
| CONTROL DEVICE ID NO: CD13 | CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES14 |
| EMISSION POINT ID NO(S): EP13 | POSITION IN SERIES OF CONTROLS: NO. 1 OF 1 UNITS |
| **OPERATING SCENARIO:** | |
| 1 OF 1 | |

DESCRIBE CONTROL SYSTEM:

Wet venturi scrubber controlling vapors vented from the hydrofluoric acid storage tank.

| | | | | |
|---|---|---|---|---|
| POLLUTANT(S) COLLECTED: | HF | | | |
| BEFORE CONTROL EMISSION RATE (LB/HR): | 15.59 | | | |
| CAPTURE EFFICIENCY: | 100 % | % | % | % |
| CONTROL DEVICE EFFICIENCY: | 99.62 % | % | % | % |
| CORRESPONDING EFFICIENCY: | 99.62 % | % | % | % |
| EFFICIENCY DETERMINATION CODE: | 4 | | | |
| TOTAL EMISSION RATE (LB/HR): | 0.06 | | | |

| | |
|---|---|
| PRESSURE DROP (IN. $H_20$): 6.8 MIN 10 MAX | |
| INLET TEMPERATURE ($^oF$): 42 MIN 105 MAX | OUTLET TEMPERATURE ($^oF$): 42 MIN 115 MAX |
| INLET AIR FLOW RATE (ACFM): 1,500 | GAS VELOCITY (FT/SEC): 115.3 |
| TOTAL GAS PRESSURE (PSIG): | GAS DEW POINT ($^oF$): 125 |

TYPE OF SYSTEM: Venturi scrubber with fiberous packed bed (0.002 inch diameter fibers)

| | | | |
|---|---|---|---|
| PACKED COLUMN | TYPE OF PACKING: 0.002 in diameter fiber | COLUMN LENGTH (FT): 4.3 | COLUMN DIAMETER (FT): 1.5 |
| PLATE COLUMN | PLATE SPACING (INCHES): | COLUMN LENGTH (FT): | COLUMN DIAMETER (FT): |

| | | |
|---|---|---|
| ADDITIVE LIQUID SCRUBBING MEDIUM: Water with $NaOH/NaCO_3$ | PERCENT RECIRCULATED: 90-99%, with bleed in batches to maintain concentrations | |
| MINIMUM LIQUID INJECTION RATE (GAL/MIN): 15 | MAKE UP RATE (GAL/MIN): 15 | FOR ADDITIVE (GAL/MIN): 0.15 |
| pH RANGE: < 1.0 | METHOD pH MONITORING: pH analyzer with titration correlations | |

DESCRIBE MAINTENANCE PROCEDURES:

Daily visual inspections (walkdowns) of entire system
Preventative maintenance on pH meter (periodic inspection and calibration)
Routine differential pressure monitoring
Annual inspection of venturi connection, pump, vessel internal and remaining instruments.

DESCRIBE ANY FIRE DETECTION DEVICES AND ANY MEANS OF FIRE SUPPRESSION:

Equipment within range of fire protection system.

DESCRIBE ANY MONITORING DEVICES, GAUGES, TEST PORTS, ETC:

pH meter to monitor scrubbing liquor.
Differential pressure transmitter to monitor scrubber pressure drop.
Scrubber outlet temperature transmitter to monitor operating temperature.
Manual gauges on discharge pressure and main column.

ATTACH A DIAGRAM OF THE RELATIONSHIP OF CONTROL DEVICE TO ITS EMISSION SOURCE(S): See Attachment 1

COMMENTS:

The control device efficiency is based on engineering experience with similar emissions units and control devices.

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Spodumene Concentrate Conveying | EMISSION SOURCE ID NO: ES15 (CL-1)<br>ES44 (CL-2) |
| | CONTROL DEVICE ID NO(S): CD14 (CL-1)<br>CD36 (CL-2) |
| OPERATING SCENARIO _____1_____ OF _____1_____ | EMISSION POINT (STACK) ID NO(S): EP14 (CL-1)<br>EP41 (CL-2) |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
Spodumene concentrate conveying operations with dust pickups.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Woodworking (Form B4)
- ☐ Manuf. of chemicals/coatings/inks (Form B7)
- ☐ Int.combustion engine/generator (Form B2)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Incineration (Form B8)
- ☐ Liquid storage tanks (Form B3)
- ☐ Storage silos/bins (Form B6)
- ☑ Other (Form B9)

START CONSTRUCTION DATE: DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: EXPECTED OP. SCHEDULE: __24__ HR/DAY __7__ DAY/WK __52__ WK/YR

IS THIS SOURCE SUBJECT TO? ☐ NSPS (SUBPARTS?):__________ ☐ NESHAP (SUBPARTS?):__________

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

### *CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | tons/yr |
|---|---|---|---|---|---|---|---|
| PARTICULATE MATTER (PM) | | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

See attached emission calculations

### *HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | tons/yr |
|---|---|---|---|---|---|---|---|---|

See attached emission calculations

### *TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr | lb/day | lb/yr |
|---|---|---|---|---|---|

See attached emission calculations

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B9

## EMISSION SOURCE (OTHER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B9**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Spodumene Concentrate Conveying | EMISSION SOURCE ID NO: ES15 (CL-1)<br>ES44 (CL-2) |
| | CONTROL DEVICE ID NO(S): CD14 (CL-1)<br>CD36 (CL-2) |
| OPERATING SCENARIO: ______1________ OF _______1_______ | EMISSION POINT (STACK) ID NO(S): EP14 (CL-1)<br>EP41 (CL-2) |

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Spodumene concentrate conveying operations with dust pickups.
See process flow diagram included as Attachment 1.

| **MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS** | | MAX. DESIGN | REQUESTED CAPACITY |
|---|---|---|---|
| TYPE | UNITS | CAPACITY (UNIT/HR) | LIMITATION(UNIT/HR) |
| Spodumene concentrate | ton/hr | 40.6 | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| **MATERIALS ENTERING PROCESS - BATCH OPERATION** | | MAX. DESIGN | REQUESTED CAPACITY |
|---|---|---|---|
| TYPE | UNITS | CAPACITY (UNIT/BATCH) | LIMITATION (UNIT/BATCH) |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| | |
|---|---|
| MAXIMUM DESIGN (BATCHES / HOUR): | |
| REQUESTED LIMITATION (BATCHES / HOUR): | (BATCHES/YR): |
| FUEL USED: | TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR): |
| MAX. CAPACITY HOURLY FUEL USE: | REQUESTED CAPACITY ANNUAL FUEL USE: |

COMMENTS:

**Attach Additional Sheets as Necessary**

# FORM C1

## CONTROL DEVICE (FABRIC FILTER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C1**

| | |
|---|---|
| CONTROL DEVICE ID NO: CD14 (CL-1)<br>CD36 (CL-2) | CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES15 (CL-1)<br>ES44 (CL-2) |
| EMISSION POINT (STACK) ID NO(S): EP14 (CL-1)<br>EP41 (CL-2) | POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS |
| **OPERATING SCENARIO:** | |
| 1 OF 1 | P.E. SEAL REQUIRED (PER 2q .0112)? ☐ YES ☑ NO |

DESCRIBE CONTROL SYSTEM:

Baghouse to control dust emissions gathered from pickup points located at conveyor transfer points.

Unit is a non-mechanical device which relies on material movement to generate the operating pressure within the conveyor transfer points.

| | | | | |
|---|---|---|---|---|
| POLLUTANTS COLLECTED: | $PM/PM_{10}/PM_{2.5}$ | | | |
| BEFORE CONTROL EMISSION RATE (LB/HR): | 112 | | | |
| CAPTURE EFFICIENCY: | 100 % | % | % | % |
| CONTROL DEVICE EFFICIENCY: | 99.996 % | % | % | % |
| CORRESPONDING OVERALL EFFICIENCY: | 99.996 % | % | % | % |
| EFFICIENCY DETERMINATION CODE: | 4 | | | |
| TOTAL AFTER CONTROL EMISSION RATE (LB/HR): | 0.004 | | | |

PRESSURE DROP (IN $H_20$): MIN: 2 MAX: 6 GAUGE? ☑ YES ☐ NO

| | |
|---|---|
| BULK PARTICLE DENSITY ($LB/FT^3$): 90 | INLET TEMPERATURE (°F): MIN 20 MAX 120 |
| POLLUTANT LOADING RATE: 112 ☑ LB/HR ☐ $GR/FT^3$ | OUTLET TEMPERATURE (°F) MIN 20 MAX 120 |
| INLET AIR FLOW RATE (ACFM): 250 | FILTER OPERATING TEMP (°F): 20-120 |

| | | |
|---|---|---|
| NO. OF COMPARTMENTS: 1 | NO. OF BAGS PER COMPARTMENT: 1 | LENGTH OF BAG (IN.): 72 |
| NO. OF CARTRIDGES: 1 | FILTER SURFACE AREA PER CARTRIDGE ($FT^2$): 18 | DIAMETER OF BAG (IN.): 24 |
| TOTAL FILTER SURFACE AREA ($FT^2$): 18 | AIR TO CLOTH RATIO: 13.88:1 | |

DRAFT TYPE: ☐ INDUCED/NEGATIVE ☑ FORCED/POSITIVE FILTER MATERIAL: ☑ WOVEN ☐ FELTED

DESCRIBE CLEANING PROCEDURES:

- ☐ AIR PULSE
- ☐ REVERSE FLOW
- ☐ MECHANICAL/SHAKER
- ☐ OTHER:
- ☐ SONIC
- ☑ SIMPLE BAG COLLAPSE
- ☐ RING BAG COLLAPSE

DESCRIBE INCOMING AIR STREAM:

Dust is lifted during transfer from the head chute of one system to the tail chute of another, the pressure variation caused by this is adsorbed by this unit which is built into chute work, and allows the air to flow through thus reducing air flow to end of transfer chute. Sprays at transfer chute discharge are also included.

**PARTICLE SIZE DISTRIBUTION**

| SIZE (MICRONS) | WEIGHT % OF TOTAL | CUMULATIVE % |
|---|---|---|
| 0-1 | 0 | 0 |
| 1-10 | 1.25 | 1.25 |
| 10-25 | 1.49 | 2.74 |
| 25-50 | 44.2 | 46.9 |
| 50-100 | 20.9 | 67.8 |
| >100 | 32.2 | 100 |
| | TOTAL = 100 | |

ON A SEPARATE PAGE, ATTACH A DIAGRAM SHOWING THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S): See Attachment 1

COMMENTS:

The control device efficiency is based on engineering experience with similar emissions units and control devices.

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Spodumene Concentrate Surge Silo | EMISSION SOURCE ID NO: ES16 (CL-1)<br>ES45 (CL-2) |
| | CONTROL DEVICE ID NO(S): CD15 (CL-1)<br>CD37 (CL-2) |
| OPERATING SCENARIO ___1___ OF ___1___ | EMISSION POINT (STACK) ID NO(S): EP15 (CL-1)<br>EP42 (CL-2) |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
Spodumene concentrate surge silo dust pickup.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Int.combustion engine/generator (Form B2)
- ☐ Liquid storage tanks (Form B3)
- ☐ Woodworking (Form B4)
- ☐ Coating/finishing/printing (Form B5)
- ☑ Storage silos/bins (Form B6)
- ☐ Manuf. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☐ Other (Form B9)

START CONSTRUCTION DATE: DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: EXPECTED OP. SCHEDULE: __24__ HR/DAY __7__ DAY/WK __52__ WK/YR

IS THIS SOURCE SUBJECT TO? ☐ NSPS (SUBPARTS?):__________ ☐ NESHAP (SUBPARTS?):__________

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

### *CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) | |
|---|---|---|---|---|---|---|---|
| | | lb/hr | tons/yr | lb/hr | tons/yr | lb/hr | tons/yr |
| PARTICULATE MATTER (PM) | See attached emission calculations | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

### *HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) | |
|---|---|---|---|---|---|---|---|---|
| | | | lb/hr | tons/yr | lb/hr | tons/yr | lb/hr | tons/yr |
| | | See attached emission calculations | | | | | | |

### *TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS | | |
|---|---|---|---|---|---|
| | | | lb/hr | lb/day | lb/yr |
| | | See attached emission calculations | | | |

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B6

## EMISSION SOURCE (STORAGE SILO/BINS)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B6**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Spodumene Concentrate Surge Silo | EMISSION SOURCE ID NO: ES16 (CL-1)<br>ES45 (CL-2)<br>CONTROL DEVICE ID NO(S): CD15 (CL-1)<br>CD37 (CL-2) |
| OPERATING SCENARIO: 1 OF 1 | EMISSION POINT(STACK) ID NO(S): EP15 (CL-1)<br>EP42 (CL-2) |

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Spodumene concentrate surge silo with dust pickup.
See process flow diagram included as Attachment 1.

| | | | | |
|---|---|---|---|---|
| MATERIAL STORED: Spodumene concentrate | | | | DENSITY OF MATERIAL (LB/FT3): 90 |
| ***CAPACITY*** | CUBIC FEET: | | | TONS: |
| ***DIMENSIONS (FEET)*** | HEIGHT: | DIAMETER: | ***(OR)*** | LENGTH: WIDTH: HEIGHT: |
| ***ANNUAL PRODUCT THROUGHPUT (TONS)*** | | ACTUAL: | | MAXIMUM DESIGN CAPACITY: 356,000 |

| PNEUMATICALLY FILLED | MECHANICALLY FILLED | FILLED FROM |
|---|---|---|
| ☐ BLOWER | ☐ SCREW CONVEYOR | ☐ RAILCAR |
| ☐ COMPRESSOR | ☐ BELT CONVEYOR | ☐ TRUCK |
| ☐ OTHER: | ☐ BUCKET ELEVATOR | ☐ STORAGE PILE |
| | ☐ OTHER: | ☑ OTHER: Conveyor from spodumene receivin |

NO. FILL TUBES:

MAXIMUM ACFM:

MATERIAL IS UNLOADED TO:
Conveyor to calciner rotary kiln

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?
Gravity drop onto slot feeder.

MAXIMUM DESIGN FILLING RATE OF MATERIAL (TONS/HR): 40.6

MAXIMUM DESIGN UNLOADING RATE OF MATERIAL (TONS/HR): 41.1

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM C1

## CONTROL DEVICE (FABRIC FILTER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C1**

| | |
|---|---|
| CONTROL DEVICE ID NO: CD15 (CL-1)<br>CD37 (CL-2) | CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES16 (CL-1)<br>ES45 (CL-2) |
| EMISSION POINT (STACK) ID NO(S): EP15 (CL-1)<br>EP42 (CL-2) | POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS |
| **OPERATING SCENARIO:** | |
| 1 OF 1 | P.E. SEAL REQUIRED (PER 2q .0112)? ☐ YES ☑ NO |

DESCRIBE CONTROL SYSTEM:

Baghouse to control dust emissions generated during material transfer into the storage silo.

Unit is a mechanical device with a 7.5 hp motor to generate a negative pressure as the silo is filled, demand of 1,150 acfm considered normal operation. Has a reverse pulse air system.

| | | | | |
|---|---|---|---|---|
| POLLUTANTS COLLECTED: | $PM/PM_{10}/PM_{2.5}$ | | | |
| BEFORE CONTROL EMISSION RATE (LB/HR): | 450 | | | |
| CAPTURE EFFICIENCY: | 100 % | % | % | % |
| CONTROL DEVICE EFFICIENCY: | 99.996 % | % | % | % |
| CORRESPONDING OVERALL EFFICIENCY: | 99.996 % | % | % | % |
| EFFICIENCY DETERMINATION CODE: | 4 | | | |
| TOTAL AFTER CONTROL EMISSION RATE (LB/HR): | 0.02 | | | |

PRESSURE DROP (IN $H_20$): MIN: 2 MAX: 12 GAUGE? ☑ YES ☐ NO

| | |
|---|---|
| BULK PARTICLE DENSITY ($LB/FT^3$): 90 | INLET TEMPERATURE (°F): MIN 20 MAX 120 |
| POLLUTANT LOADING RATE: 450 ☑ LB/HR ☐ $GR/FT^3$ | OUTLET TEMPERATURE (°F) MIN 20 MAX 120 |
| INLET AIR FLOW RATE (ACFM): 1,150 | FILTER OPERATING TEMP (°F): 20-120 |

| | | |
|---|---|---|
| NO. OF COMPARTMENTS: 1 | NO. OF BAGS PER COMPARTMENT: 16 | LENGTH OF BAG (IN.): 9 |
| NO. OF CARTRIDGES: 1 | FILTER SURFACE AREA PER CARTRIDGE ($FT^2$): 121 | DIAMETER OF BAG (IN.): 9 |
| TOTAL FILTER SURFACE AREA ($FT^2$): 121 | AIR TO CLOTH RATIO: 9.5:1 | |

DRAFT TYPE: ☑ INDUCED/NEGATIVE ☐ FORCED/POSITIVE FILTER MATERIAL: ☑ WOVEN ☐ FELTED

DESCRIBE CLEANING PROCEDURES:

- ☑ AIR PULSE
- ☐ REVERSE FLOW
- ☐ MECHANICAL/SHAKER
- ☐ OTHER:
- ☐ SONIC
- ☐ SIMPLE BAG COLLAPSE
- ☐ RING BAG COLLAPSE

DESCRIBE INCOMING AIR STREAM:
Fan draws air stream from silo chamber into the unit which then intermittently purges to return material back into the silo. Based on elevation drop and material characteristics and there being no forced air flow through the circuit the load carrying is considered to be lower at 2%.

Considered air flow of 1,150 acfm required.

Vendor states unit removes > 0.5μm particles

**PARTICLE SIZE DISTRIBUTION**

| SIZE (MICRONS) | WEIGHT % OF TOTAL | CUMULATIVE % |
|---|---|---|
| 0-1 | 0 | 0 |
| 1-10 | 1.25 | 1.25 |
| 10-25 | 1.49 | 2.74 |
| 25-50 | 44.2 | 46.9 |
| 50-100 | 20.9 | 67.8 |
| >100 | 32.2 | 100 |
| | TOTAL = 100 | |

ON A SEPARATE PAGE, ATTACH A DIAGRAM SHOWING THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S): See Attachment 1

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Spodumene Concentrate Conveyor to Calciner | EMISSION SOURCE ID NO: ES17 (CL-1)<br>ES46 (CL-2) |
| | CONTROL DEVICE ID NO(S): CD16 (CL-1)<br>CD38 (CL-2) |
| OPERATING SCENARIO ___1___ OF ___1___ | EMISSION POINT (STACK) ID NO(S): EP16 (CL-1)<br>EP43 (CL-2) |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
Spodumene concentrate conveying to calciner operation with dust pickups.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Int.combustion engine/generator (Form B2)
- ☐ Liquid storage tanks (Form B3)
- ☐ Woodworking (Form B4)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Storage silos/bins (Form B6)
- ☐ Manuf. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☑ Other (Form B9)

START CONSTRUCTION DATE: DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: EXPECTED OP. SCHEDULE: __24__ HR/DAY __7__ DAY/WK __52__ WK/YR

IS THIS SOURCE SUBJECT TO? ☐ NSPS (SUBPARTS?):__________ ☐ NESHAP (SUBPARTS?):__________

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

### *CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) | |
|---|---|---|---|---|---|---|---|
| | | lb/hr | tons/yr | lb/hr | tons/yr | lb/hr | tons/yr |
| PARTICULATE MATTER (PM) | See attached emission calculations | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

### *HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) | |
|---|---|---|---|---|---|---|---|---|
| | | | lb/hr | tons/yr | lb/hr | tons/yr | lb/hr | tons/yr |
| | | See attached emission calculations | | | | | | |

### *TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS | | |
|---|---|---|---|---|---|
| | | | lb/hr | lb/day | lb/yr |
| | | See attached emission calculations | | | |

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B9

## EMISSION SOURCE (OTHER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B9**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Spodumene Concentrate Conveyor to Calciner | EMISSION SOURCE ID NO: ES17 (CL-1)<br>ES46 (CL-2) |
| | CONTROL DEVICE ID NO(S): CD16 (CL-1)<br>CD38 (CL-2) |
| OPERATING SCENARIO: ______1________ OF _______1_______ | EMISSION POINT (STACK) ID NO(S): EP16 (CL-1)<br>EP43 (CL-2) |

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Spodumene concentrate conveying to calciner operation with dust pickups.
See process flow diagram included as Attachment 1.

| MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS | | MAX. DESIGN | REQUESTED CAPACITY |
|---|---|---|---|
| TYPE | UNITS | CAPACITY (UNIT/HR) | LIMITATION(UNIT/HR) |
| Spodumene concentrate | ton/hr | 37.5 | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| MATERIALS ENTERING PROCESS - BATCH OPERATION | | MAX. DESIGN | REQUESTED CAPACITY |
|---|---|---|---|
| TYPE | UNITS | CAPACITY (UNIT/BATCH) | LIMITATION (UNIT/BATCH) |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| | |
|---|---|
| MAXIMUM DESIGN (BATCHES / HOUR): | |
| REQUESTED LIMITATION (BATCHES / HOUR): | (BATCHES/YR): |
| FUEL USED: | TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR): |
| MAX. CAPACITY HOURLY FUEL USE: | REQUESTED CAPACITY ANNUAL FUEL USE: |

COMMENTS:

**Attach Additional Sheets as Necessary**

# FORM C1

## CONTROL DEVICE (FABRIC FILTER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C1**

| | |
|---|---|
| CONTROL DEVICE ID NO: CD16 (CL-1)<br>CD38 (CL-2) | CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES17 (CL-1)<br>ES46 (CL-2) |
| EMISSION POINT (STACK) ID NO(S): EP16 (CL-1)<br>EP43 (CL-2) | POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS |
| **OPERATING SCENARIO:** | |
| 1 OF 1 | P.E. SEAL REQUIRED (PER 2q .0112)? ☐ YES ☑ NO |

DESCRIBE CONTROL SYSTEM:

Baghouse to control dust emissions gathered from pickup points located at conveyor transfer points.

Unit is a non-mechanical device which relies on material movement to generate the operating pressure within the conveyor transfer points.

| | | | | |
|---|---|---|---|---|
| POLLUTANTS COLLECTED: | $PM/PM_{10}/PM_{2.5}$ | | | |
| BEFORE CONTROL EMISSION RATE (LB/HR): | 112 | | | |
| CAPTURE EFFICIENCY: | 100 % | % | % | % |
| CONTROL DEVICE EFFICIENCY: | 99.996 % | % | % | % |
| CORRESPONDING OVERALL EFFICIENCY: | 99.996 % | % | % | % |
| EFFICIENCY DETERMINATION CODE: | 4 | | | |
| TOTAL AFTER CONTROL EMISSION RATE (LB/HR): | 0.004 | | | |

PRESSURE DROP (IN $H_20$): MIN: 2 MAX: 6 GAUGE? ☑ YES ☐ NO

| | |
|---|---|
| BULK PARTICLE DENSITY ($LB/FT^3$): 90 | INLET TEMPERATURE (°F): MIN 20 MAX 120 |
| POLLUTANT LOADING RATE: 112 ☐ LB/HR ☐ $GR/FT^3$ | OUTLET TEMPERATURE (°F) MIN 20 MAX 120 |
| INLET AIR FLOW RATE (ACFM): 250 | FILTER OPERATING TEMP (°F): 20-120 |

| | | |
|---|---|---|
| NO. OF COMPARTMENTS: 1 | NO. OF BAGS PER COMPARTMENT: 1 | LENGTH OF BAG (IN.): 72 |
| NO. OF CARTRIDGES: 1 | FILTER SURFACE AREA PER CARTRIDGE ($FT^2$): 18 | DIAMETER OF BAG (IN.): 24 |

TOTAL FILTER SURFACE AREA ($FT^2$): 18 AIR TO CLOTH RATIO: 13.88:1

DRAFT TYPE: ☐ INDUCED/NEGATIVE ☑ FORCED/POSITIVE FILTER MATERIAL: ☑ WOVEN ☐ FELTED

DESCRIBE CLEANING PROCEDURES:

- ☐ AIR PULSE
- ☐ REVERSE FLOW
- ☐ MECHANICAL/SHAKER
- ☐ OTHER:
- ☐ SONIC
- ☑ SIMPLE BAG COLLAPSE
- ☐ RING BAG COLLAPSE

DESCRIBE INCOMING AIR STREAM:

Dust is lifted during transfer from the head chute of one system to the tail chute of another, the pressure variation caused by this is adsorbed by this unit which allows the air to flow through thus reducing air flow to end of transfer chute. Sprays at transfer chute discharge are also included.

**PARTICLE SIZE DISTRIBUTION**

| SIZE (MICRONS) | WEIGHT % OF TOTAL | CUMULATIVE % |
|---|---|---|
| 0-1 | 0 | 0 |
| 1-10 | 1.25 | 1.25 |
| 10-25 | 1.49 | 2.74 |
| 25-50 | 44.2 | 46.9 |
| 50-100 | 20.9 | 67.8 |
| >100 | 32.2 | 100 |
| | TOTAL = 100 | |

ON A SEPARATE PAGE, ATTACH A DIAGRAM SHOWING THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S): See Attachment 1

COMMENTS:

The control device efficiency is based on engineering experience with similar emissions units and control devices.

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION: Calciner Rotary Kiln | EMISSION SOURCE ID NO: ES18 (CL-1) ES47 (CL-2) |
| | CONTROL DEVICE ID NO(S): CD17, CD18 (CL-1) CD39, CD40 (CL-2) |
| OPERATING SCENARIO 1 OF 1 | EMISSION POINT (STACK) ID NO(S): EP17 (CL-1) EP44 (CL-2) |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
Calciner rotary kiln used to process spodumene concentrate, direct fired using a 70.05 MMBtu/hr natural gas burner.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Int.combustion engine/generator (Form B2)
- ☐ Liquid storage tanks (Form B3)
- ☐ Woodworking (Form B4)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Storage silos/bins (Form B6)
- ☐ Manuf. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☑ Other (Form B9)

START CONSTRUCTION DATE: DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR

IS THIS SOURCE SUBJECT TO? ☐ NSPS (SUBPARTS?):___ ☐ NESHAP (SUBPARTS?):___

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

***CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE***

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | tons/yr |
|---|---|---|---|---|---|---|---|
| PARTICULATE MATTER (PM) | See attached emission calculations | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

***HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE***

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | tons/yr |
|---|---|---|---|---|---|---|---|---|
| | | See attached emission calculations | | | | | | |

***TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE***

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr | lb/day | lb/yr |
|---|---|---|---|---|---|
| | | See attached emission calculations | | | |

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B9

## EMISSION SOURCE (OTHER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B9**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Calciner Rotary Kiln | EMISSION SOURCE ID NO: ES18 (CL-1)<br>ES47 (CL-2) |
| | CONTROL DEVICE ID NO(S): CD17, CD18 (CL-1)<br>CD39, CD40 (CL-2) |
| OPERATING SCENARIO: 1 OF 1 | EMISSION POINT (STACK) ID NO(S): EP17 (CL-1)<br>EP44 (CL-2) |

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Calciner rotary kiln used to process spodumene concentrate, direct fired using a 75.05 MMBtu/hr natural gas burner.
See process flow diagram included as Attachment 1.

| **MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS** | | MAX. DESIGN | REQUESTED CAPACITY |
|---|---|---|---|
| TYPE | UNITS | CAPACITY (UNIT/HR) | LIMITATION(UNIT/HR) |
| Spodumene concentrate | ton/hr | 37.5 | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| **MATERIALS ENTERING PROCESS - BATCH OPERATION** | | MAX. DESIGN | REQUESTED CAPACITY |
|---|---|---|---|
| TYPE | UNITS | CAPACITY (UNIT/BATCH) | LIMITATION (UNIT/BATCH) |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| | |
|---|---|
| MAXIMUM DESIGN (BATCHES / HOUR): | |
| REQUESTED LIMITATION (BATCHES / HOUR): | (BATCHES/YR): |
| FUEL USED: Natural Gas | TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR): 73.0 MMBtu/hr |
| MAX. CAPACITY HOURLY FUEL USE: | REQUESTED CAPACITY ANNUAL FUEL USE: |

COMMENTS:

**Attach Additional Sheets as Necessary**

# FORM C4

## CONTROL DEVICE (CYCLONE, MULTICYCLONE, OR OTHER MECHANICAL)



| | |
|---|---|
| CONTROL DEVICE ID NO: CD17 (CL-1)<br>CD39 (CL-2) | CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES18 (CL-1)<br>ES47 (CL-2) |
| EMISSION POINT (STACK) ID NO(S): EP17 (CL-1)<br>EP44 (CL-2) | POSITION IN SERIES OF CONTROLS NO. 1 OF 2 UNITS |
| **OPERATING SCENARIO:** 1 OF 1 | P.E. SEAL REQUIRED (PER 2Q .0112)? ☑ YES ☐ NO |

DESCRIBE CONTROL SYSTEM :

Two cyclones operating in parallel with common inlet and outlet duct connections in series with a venturi wet scrubber (CD9).

The material collected by the cyclones is transferred to the spodumene surge silo.

The control device efficiency is based on engineering experience with similar emissions units and control devices.

| | | | | |
|---|---|---|---|---|
| POLLUTANT(S) COLLECTED: | $PM/PM_{10}/PM_{2.5}$ | | | |
| BEFORE CONTROL EMISSION RATE (LB/HR): | 5,732 | | | |
| CAPTURE EFFICIENCY: | 100 % | % | % | % |
| CONTROL DEVICE EFFICIENCY: | 75 % | % | % | % |
| CORRESPONDING OVERALL EFFICIENCY: | 75 % | % | % | % |
| EFFICIENCY DETERMINATION CODE: | 4 | | | |
| TOTAL AFTER CONTROL EMISSION RATE (LB/HR): | 1,433 | | | |

PRESSURE DROP (IN. $H_2O$): 3 MIN 5 MAX

| | |
|---|---|
| INLET TEMPERATURE ($^oF$): 300 MIN 600 MAX | OUTLET TEMPERATURE ($^oF$): 275 MIN 590 MAX |
| INLET AIR FLOW RATE (ACFM): 35,000 | BULK PARTICLE DENSITY ($LB/FT^3$): 65 |
| POLLUTANT LOADING RATE ($GR/FT^3$): 19.1 | |

| ***SETTLING CHAMBER*** | **CYCLONE** | | | **MULTICYCLONE** |
|---|---|---|---|---|
| LENGTH (INCHES): | INLET VELOCITY (FT/SEC): 64 | | ☑ CIRCULAR ☐ RECTANGLE | NO. TUBES: |
| WIDTH (INCHES): | *DIMENSIONS (INCHES) See instructions* | | *IF WET SPRAY UTILIZED* | DIAMETER OF TUBES: 2 Cyclones in parallel |
| HEIGHT (INCHES): | H: 269 | Dd: 12 | LIQUID USED: | HOPPER ASPIRATION SYSTEM? |
| VELOCITY (FT/SEC.): | W: 110 | Lb: 60 | FLOW RATE (GPM): | ☐ YES ☐ NO |
| NO. TRAYS: | De: 33 | Lc: 60 | MAKE UP RATE (GPM): | LOUVERS? |
| NO. BAFFLES: | D: 53.375 | S: 40 | | ☐ YES ☐ NO |
| | TYPE OF CYCLONE: ☑ CONVENTIONAL | | ☐ HIGH EFFICIENCY | ☐ OTHER |

DESCRIBE MAINTENANCE PROCEDURES:

Annual inspection for material wear. Repair as needed.

DESCRIBE INCOMING AIR STREAM:

Exhaust air from the spodumene calciner rotary kiln.

**PARTICLE SIZE DISTRIBUTION**

| SIZE (MICRONS) | WEIGHT % OF TOTAL | CUMULATIVE % |
|---|---|---|
| 0-1 | 0 | 0 |
| 1-10 | 0.5 | 0.5 |
| 10-25 | 12 | 12.5 |
| 25-50 | 25 | 37.5 |
| 50-100 | 30 | 67.5 |
| >100 | 32.5 | 100 |
| | TOTAL = 100 | |

DESCRIBE ANY MONITORING DEVICES, GAUGES, TEST PORTS, ETC:

Inlet and outlet temperature, inlet and outlet pressure gauges

ON A SEPARATE PAGE, ATTACH A DIAGRAM OF THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S): See Attachment 1

**Attach Additional Sheets As Necessary**

# FORM C8

## CONTROL DEVICE (WET PARTICULATE SCRUBBER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C8**

| | |
|---|---|
| CONTROL DEVICE ID NO: CD18 (CL-1)<br>CD40 (CL-2) | CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES18 (CL-1)<br>ES47 (CL-2) |
| EMISSION POINT ID NO(S): EP17 (CL-1)<br>EP44 (CL-2) | POSITION IN SERIES OF CONTROLS: NO. 2 OF 2 UNITS |
| **OPERATING SCENARIO:** | |
| 1 OF 1 | P.E. SEAL NEEDED (PER 2Q .0112)? ☑ YES ☐ NO |

DESCRIBE CONTROL SYSTEM:

Venturi wet scrubber following parallel cyclones (CD8)

| | | | |
|---|---|---|---|
| POLLUTANT(S) COLLECTED: | $PM/PM_{10}/PM_{2.5}$ | | |
| BEFORE CONTROL EMISSION RATE (LB/HR): | 1,433 | | |
| CAPTURE EFFICIENCY: | 100 % | % | % |
| CONTROL DEVICE EFFICIENCY: | 99.7 % | % | % |
| CORRESPONDING OVERALL EFFICIENCY: | 99.7 % | % | % |
| EFFICIENCY DETERMINATION CODE: | 4 | | |
| TOTAL AFTER CONTROL EMISSION RATE (LB/HR): | 4.0 | | |

| | |
|---|---|
| PRESSURE DROP (IN. $H_20$): 8 MIN 12 MAX | |
| INLET TEMPERATURE ($^oF$): 275 MIN 590 MAX | OUTLET TEMPERATURE ($^oF$): 140 MIN 185 MAX |
| INLET AIR FLOW RATE (ACFM): 35,000 | MOISTURE CONTENT : INLET 37 % OUTLET 45 % |
| THROAT VELOCITY (FT/SEC): 60 | THROAT TYPE: ☐ FIXED ☑ VARIABLE |
| TYPE OF SYSTEM: Venturi with adjustable throat and cyclonic separator | TYPE OF PACKING USED IF ANY: Demister mesh pad |
| ADDITIVE LIQUID SCRUBBING MEDIUM: Water only | PERCENT RECIRCULATED: 227% of make-up water |
| MINIMUM LIQUID INJECTION RATE (GAL/MIN): 250 | |

MAKE UP RATE (GAL/MIN): 110 FOR ADDITIVE (GAL/MIN): Not applicable

DESCRIBE MAINTENANCE PROCEDURES:

Annual visual inspection of venturi for wear, cleaning of demister mesh pad, recirculation pump impeller inspection and replacement.

DESCRIBE ANY MONITORING DEVICES, GAUGES, TEST PORTS, ETC:

Venturi differential pressure gauge, cyclonic separator differential pressure gauge, recirculation flow gauge, sump liquid level

**PARTICLE SIZE DISTRIBUTION**

| SIZE (MICRONS) | WEIGHT % OF TOTAL | CUMULATIVE % |
|---|---|---|
| 0-1 | 0 | 0 |
| 1-10 | 0.85 | 0.85 |
| 10-25 | 15 | 15.9 |
| 25-50 | 35 | 50.9 |
| 50-100 | 45 | 95.9 |
| >100 | 4.15 | 100 |
| | TOTAL = 100 | |

ATTACH A DIAGRAM OF THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S): See Attachment 1

COMMENTS:

The control device efficiency is based on engineering experience with similar emissions units and control devices.

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Cooler Discharge Sweep Air | EMISSION SOURCE ID NO: ES19 (CL-1)<br>ES48 (CL-2) |
| | CONTROL DEVICE ID NO(S): CD19 (CL-1)<br>CDCD41 (CL-2) |
| OPERATING SCENARIO _______1__________ OF ________1__________ | EMISSION POINT (STACK) ID NO(S): EP18 (CL-1)<br>EP45 (CL-2) |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
Calcined spodumene cooler exhaust air.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

| | | |
|---|---|---|
| ☐ Coal,wood,oil, gas, other burner (Form B1) | ☐ Woodworking (Form B4) | ☐ Manuf. of chemicals/coatings/inks (Form B7) |
| ☐ Int.combustion engine/generator (Form B2) | ☐ Coating/finishing/printing (Form B5) | ☐ Incineration (Form B8) |
| ☐ Liquid storage tanks (Form B3) | ☐ Storage silos/bins (Form B6) | ☑ Other (Form B9) |

START CONSTRUCTION DATE: DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: EXPECTED OP. SCHEDULE: __24_ HR/DAY __7__ DAY/WK ___52__ WK/YR

IS THIS SOURCE SUBJECT TO? ☐ NSPS (SUBPARTS?):__________________ ☐ NESHAP (SUBPARTS?):________________________

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

### *CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) | |
|---|---|---|---|---|---|---|---|
| | | lb/hr | tons/yr | lb/hr | tons/yr | lb/hr | tons/yr |
| PARTICULATE MATTER (PM) | | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

See attached emission calculations

### *HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) | |
|---|---|---|---|---|---|---|---|---|
| | | | lb/hr | tons/yr | lb/hr | tons/yr | lb/hr | tons/yr |
| | | | | | | | | |

See attached emission calculations

### *TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS | | |
|---|---|---|---|---|---|
| | | | lb/hr | lb/day | lb/yr |
| | | | | | |

See attached emission calculations

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B9

## EMISSION SOURCE (OTHER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B9**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Cooler Discharge Sweep Air | EMISSION SOURCE ID NO: ES19 (CL-1)<br>ES48 (CL-2) |
| | CONTROL DEVICE ID NO(S): CD19 (CL-1)<br>CD41 (CL-2) |
| OPERATING SCENARIO: 1 OF 1 | EMISSION POINT (STACK) ID NO(S): EP18 (CL-1)<br>EP45 (CL-2) |

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Calcined spodumene cooler exhaust air.
See process flow diagram included as Attachment 1.

| MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS | | MAX. DESIGN | REQUESTED CAPACITY |
|---|---|---|---|
| TYPE | UNITS | CAPACITY (UNIT/HR) | LIMITATION(UNIT/HR) |
| Calcined spodumene | ton/hr | 28.7 | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| MATERIALS ENTERING PROCESS - BATCH OPERATION | | MAX. DESIGN | REQUESTED CAPACITY |
|---|---|---|---|
| TYPE | UNITS | CAPACITY (UNIT/BATCH) | LIMITATION (UNIT/BATCH) |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| | |
|---|---|
| MAXIMUM DESIGN (BATCHES / HOUR): | |
| REQUESTED LIMITATION (BATCHES / HOUR): | (BATCHES/YR): |
| FUEL USED: | TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR): |
| MAX. CAPACITY HOURLY FUEL USE: | REQUESTED CAPACITY ANNUAL FUEL USE: |

COMMENTS:

**Attach Additional Sheets as Necessary**

# FORM C1

## CONTROL DEVICE (FABRIC FILTER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C1**

CONTROL DEVICE ID NO: CD19 (CL-1)
CD41 (CL-2)

CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES19 (CL-1)
ES48 (CL-2)

EMISSION POINT (STACK) ID NO(S): EP18 (CL-1)
EP45 (CL-2)

POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS

**OPERATING SCENARIO:** 1 OF 1

P.E. SEAL REQUIRED (PER 2q .0112)? ☐ YES ☑ NO

DESCRIBE CONTROL SYSTEM:

Baghouse to control dust from the cooler discharge.

| | | | | |
|---|---|---|---|---|
| POLLUTANTS COLLECTED: | $PM/PM_{10}/PM_{2.5}$ | | | |
| BEFORE CONTROL EMISSION RATE (LB/HR): | 150 | | | |
| CAPTURE EFFICIENCY: | 100 % | % | % | % |
| CONTROL DEVICE EFFICIENCY: | 99.98 % | % | % | % |
| CORRESPONDING OVERALL EFFICIENCY: | 99.98 % | % | % | % |
| EFFICIENCY DETERMINATION CODE: | 4 | | | |
| TOTAL AFTER CONTROL EMISSION RATE (LB/HR): | 0.03 | | | |

PRESSURE DROP (IN $H_20$): MIN: 4 MAX: 8 GAUGE? ☑ YES ☐ NO

BULK PARTICLE DENSITY ($LB/FT^3$): 50 | INLET TEMPERATURE (°F): MIN 60 MAX 250

POLLUTANT LOADING RATE: 150 ☑ LB/HR ☐ $GR/FT^3$ | OUTLET TEMPERATURE (°F) MIN 55 MAX 245

INLET AIR FLOW RATE (ACFM): 1,500 | FILTER OPERATING TEMP (°F): 55-250

NO. OF COMPARTMENTS: 2 | NO. OF BAGS PER COMPARTMENT: | LENGTH OF BAG (IN.): 35

NO. OF CARTRIDGES: 18 | FILTER SURFACE AREA PER CARTRIDGE ($FT^2$): | DIAMETER OF BAG (IN.): 12 3/4

TOTAL FILTER SURFACE AREA ($FT^2$): 900 | AIR TO CLOTH RATIO: 1.67:1

DRAFT TYPE: ☑ INDUCED/NEGATIVE ☐ FORCED/POSITIVE FILTER MATERIAL: ☑ WOVEN ☐ FELTED

DESCRIBE CLEANING PROCEDURES:

- ☑ AIR PULSE
- ☐ SONIC
- ☐ REVERSE FLOW
- ☐ SIMPLE BAG COLLAPSE
- ☐ MECHANICAL/SHAKER
- ☐ RING BAG COLLAPSE
- ☐ OTHER:

DESCRIBE INCOMING AIR STREAM:

Dust laden ambient air from calciner cooler and cooler discharge. Air is elevated in temperature from calciner cooler environment.

**PARTICLE SIZE DISTRIBUTION**

| SIZE (MICRONS) | WEIGHT % OF TOTAL | CUMULATIVE % |
|---|---|---|
| 0-1 | 0 | 0 |
| 1-10 | 0.75 | 0.75 |
| 10-25 | 18.25 | 19 |
| 25-50 | 37 | 56 |
| 50-100 | 44 | 100 |
| >100 | 0 | 100 |
| | TOTAL = 100 | |

ON A SEPARATE PAGE, ATTACH A DIAGRAM SHOWING THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S): See Attachment 1

COMMENTS:

The control device efficiency is based on engineering experience with similar emissions units and control devices.

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 | **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** | **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Ball Mill Feed Bin | EMISSION SOURCE ID NO: ES20 (CL-1)<br>ES49 (CL-2) |
| | CONTROL DEVICE ID NO(S): CD20 (CL-1)<br>CD42 (CL-2) |
| OPERATING SCENARIO _______1_________ OF _______1_________ | EMISSION POINT (STACK) ID NO(S): EP19 (CL-1)<br>EP46 (CL-2) |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
Ball mill feed bin dust pickup.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Int.combustion engine/generator (Form B2)
- ☐ Liquid storage tanks (Form B3)
- ☐ Woodworking (Form B4)
- ☐ Coating/finishing/printing (Form B5)
- ☑ Storage silos/bins (Form B6)
- ☐ Manuf. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☐ Other (Form B9)

START CONSTRUCTION DATE: | DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: | EXPECTED OP. SCHEDULE: __24_ HR/DAY __7__ DAY/WK ___52__ WK/YR

IS THIS SOURCE SUBJECT TO? ☐ NSPS (SUBPARTS?):____________________ ☐ NESHAP (SUBPARTS?):__________________________

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

***CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE***

| | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) | |
|---|---|---|---|---|---|---|---|
| **AIR POLLUTANT EMITTED** | | lb/hr | tons/yr | lb/hr | tons/yr | lb/hr | tons/yr |
| PARTICULATE MATTER (PM) | See attached emission calculations | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

***HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE***

| | | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) | |
|---|---|---|---|---|---|---|---|---|
| **HAZARDOUS AIR POLLUTANT** | **CAS NO.** | | lb/hr | tons/yr | lb/hr | tons/yr | lb/hr | tons/yr |
| | | See attached emission calculations | | | | | | |

***TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE***

| | | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS | | |
|---|---|---|---|---|---|
| **TOXIC AIR POLLUTANT** | **CAS NO.** | | lb/hr | lb/day | lb/yr |
| | | See attached emission calculations | | | |

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B6

## EMISSION SOURCE (STORAGE SILO/BINS)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B6**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Ball Mill Feed Bin | EMISSION SOURCE ID NO: ES20 (CL-1)<br>ES49 (CL-2)<br>CONTROL DEVICE ID NO(S): CD20 (CL-1)<br>CD42 (CL-2) |
| OPERATING SCENARIO: 1 OF 1 | EMISSION POINT(STACK) ID NO(S): EP19 (CL-1)<br>EP46 (CL-2) |

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Ball mill feed bin with dust pickup.
See process flow diagram included as Attachment 1.

| | | | | |
|---|---|---|---|---|
| MATERIAL STORED: Calcined spodumene | | | | DENSITY OF MATERIAL (LB/FT3): 50 |
| ***CAPACITY*** | CUBIC FEET: | | | TONS: |
| ***DIMENSIONS (FEET)*** | HEIGHT: | DIAMETER: | ***(OR)*** | LENGTH: WIDTH: HEIGHT: |
| ***ANNUAL PRODUCT THROUGHPUT (TONS)*** | ACTUAL: | | | MAXIMUM DESIGN CAPACITY: |

| PNEUMATICALLY FILLED | MECHANICALLY FILLED | FILLED FROM |
|---|---|---|
| ☐ BLOWER | ☐ SCREW CONVEYOR | ☐ RAILCAR |
| ☐ COMPRESSOR | ☐ BELT CONVEYOR | ☐ TRUCK |
| ☐ OTHER: | ☐ BUCKET ELEVATOR | ☐ STORAGE PILE |
| | ☐ OTHER: | ☑ OTHER: Conveyor from cooler |

NO. FILL TUBES:

MAXIMUM ACFM:

MATERIAL IS UNLOADED TO:
Ball Mill

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?
Airlock to enclosed conveyor.

MAXIMUM DESIGN FILLING RATE OF MATERIAL (TONS/HR): 28.7

MAXIMUM DESIGN UNLOADING RATE OF MATERIAL (TONS/HR): 28.7

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM C1
## CONTROL DEVICE (FABRIC FILTER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C1**

| | |
|---|---|
| CONTROL DEVICE ID NO: CD20 (CL-1)<br>CD42 (CL-2) | CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES20 (CL-1)<br>ES49 (CL-2) |
| EMISSION POINT (STACK) ID NO(S): EP19 (CL-1)<br>EP46 (CL-2) | POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS |
| **OPERATING SCENARIO:** | |
| 1 OF 1 | P.E. SEAL REQUIRED (PER 2q .0112)? ☐ YES ☑ NO |

DESCRIBE CONTROL SYSTEM:

Baghouse to control dust emissions generated by material entering the bin.

| | | | | |
|---|---|---|---|---|
| POLLUTANTS COLLECTED: | $PM/PM_{10}/PM_{2.5}$ | | | |
| BEFORE CONTROL EMISSION RATE (LB/HR): | 160 | | | |
| CAPTURE EFFICIENCY: | 100 % | % | % | % |
| CONTROL DEVICE EFFICIENCY: | 99.98 % | % | % | % |
| CORRESPONDING OVERALL EFFICIENCY: | 99.98 % | % | % | % |
| EFFICIENCY DETERMINATION CODE: | 4 | | | |
| TOTAL AFTER CONTROL EMISSION RATE (LB/HR): | 0.03 | | | |

PRESSURE DROP (IN $H_20$): MIN: 3 MAX: 5 GAUGE? ☑ YES ☐ NO

| | |
|---|---|
| BULK PARTICLE DENSITY ($LB/FT^3$): 50 | INLET TEMPERATURE (°F): MIN 60 MAX 225 |
| POLLUTANT LOADING RATE: 160 ☑ LB/HR ☐ $GR/FT^3$ | OUTLET TEMPERATURE (°F) MIN 55 MAX 220 |
| INLET AIR FLOW RATE (ACFM): 1,848 | FILTER OPERATING TEMP (°F): 55-225 |

| | | |
|---|---|---|
| NO. OF COMPARTMENTS: 1 | NO. OF BAGS PER COMPARTMENT: | LENGTH OF BAG (IN.): 36 |
| NO. OF CARTRIDGES: 9 | FILTER SURFACE AREA PER CARTRIDGE ($FT^2$): | DIAMETER OF BAG (IN.): 12 3/4 |
| TOTAL FILTER SURFACE AREA ($FT^2$): 450 | AIR TO CLOTH RATIO: 4.1:1 | |

DRAFT TYPE: ☑ INDUCED/NEGATIVE ☐ FORCED/POSITIVE FILTER MATERIAL: ☑ WOVEN ☐ FELTED

DESCRIBE CLEANING PROCEDURES:

- ☑ AIR PULSE
- ☐ REVERSE FLOW
- ☐ MECHANICAL/SHAKER
- ☐ OTHER:
- ☐ SONIC
- ☐ SIMPLE BAG COLLAPSE
- ☐ RING BAG COLLAPSE

DESCRIBE INCOMING AIR STREAM:

Ambient air venting from bin during filling. Dust entrained during filling and vented by this baghouse.

**PARTICLE SIZE DISTRIBUTION**

| SIZE (MICRONS) | WEIGHT % OF TOTAL | CUMULATIVE % |
|---|---|---|
| 0-1 | 0 | 0 |
| 1-10 | 0.5 | 0.5 |
| 10-25 | 12 | 12.5 |
| 25-50 | 25 | 37.5 |
| 50-100 | 30 | 67.5 |
| >100 | 32.5 | 100 |
| | TOTAL = 100 | |

ON A SEPARATE PAGE, ATTACH A DIAGRAM SHOWING THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S): See Attachment 1

COMMENTS:

The control device efficiency is based on engineering experience with similar emissions units and control devices.

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Pressure Leaching | EMISSION SOURCE ID NO: ES21 (CL-1, Train 1)<br>ES22 (CL-1, Train 2)<br>ES50 (CL-2, Train 1)<br>ES51 (CL-2, Train 2) |
| | CONTROL DEVICE ID NO(S): CD21 (CL-1, Train 1)<br>CD22 (CL-1, Train 2)<br>CD43 (CL-2, Train 1)<br>CD44 (CL-2, Train 2) |
| OPERATING SCENARIO 1 OF 1 | EMISSION POINT (STACK) ID NO(S): EP20 (CL-1, Train 1)<br>EP21 (CL-1, Train 2)<br>EP47 (CL-2, Train 1)<br>EP48 (CL-2, Train 2) |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
Train 1 pressure leaching process area offgases.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Int.combustion engine/generator (Form B2)
- ☐ Liquid storage tanks (Form B3)
- ☐ Woodworking (Form B4)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Storage silos/bins (Form B6)
- ☐ Manuf. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☑ Other (Form B9)

START CONSTRUCTION DATE: DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR

IS THIS SOURCE SUBJECT TO? ☐ NSPS (SUBPARTS?):____ ☐ NESHAP (SUBPARTS?):____

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

### *CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) | |
|---|---|---|---|---|---|---|---|
| | | lb/hr | tons/yr | lb/hr | tons/yr | lb/hr | tons/yr |
| PARTICULATE MATTER (PM) | See attached emission calculations | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

### *HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) | |
|---|---|---|---|---|---|---|---|---|
| | | | lb/hr | tons/yr | lb/hr | tons/yr | lb/hr | tons/yr |
| | | See attached emission calculations | | | | | | |

### *TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS | | |
|---|---|---|---|---|---|
| | | | lb/hr | lb/day | lb/yr |
| | | See attached emission calculations | | | |

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B9

## EMISSION SOURCE (OTHER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B9**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Pressure Leaching | EMISSION SOURCE ID NO: ES21 (CL-1, Train 1)<br>ES22 (CL-1, Train 2)<br>ES50 (CL-2, Train 1)<br>ES51 (CL-2, Train 2) |
| | CONTROL DEVICE ID NO(S): CD21 (CL-1, Train 1)<br>CD22 (CL-1, Train 2)<br>CD43 (CL-2, Train 1)<br>CD44 (CL-2, Train 2) |
| OPERATING SCENARIO: 1 OF 1 | EMISSION POINT (STACK) ID NO(S): EP20 (CL-1, Train 1)<br>EP21 (CL-1, Train 2)<br>EP47 (CL-2, Train 1)<br>EP48 (CL-2, Train 2) |

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Train 1 pressure leaching process area offgases.
See process flow diagram included as Attachment 1.

| **MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS** | | MAX. DESIGN | REQUESTED CAPACITY |
|---|---|---|---|
| TYPE | UNITS | CAPACITY (UNIT/HR) | LIMITATION(UNIT/HR) |
| Offgas | acfm | 7,300 | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| **MATERIALS ENTERING PROCESS - BATCH OPERATION** | | MAX. DESIGN | REQUESTED CAPACITY |
|---|---|---|---|
| TYPE | UNITS | CAPACITY (UNIT/BATCH) | LIMITATION (UNIT/BATCH) |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| | |
|---|---|
| MAXIMUM DESIGN (BATCHES / HOUR): | |
| REQUESTED LIMITATION (BATCHES / HOUR): | (BATCHES/YR): |
| FUEL USED: | TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR): |
| MAX. CAPACITY HOURLY FUEL USE: | REQUESTED CAPACITY ANNUAL FUEL USE: |

COMMENTS:

**Attach Additional Sheets as Necessary**

# FORM C8

## CONTROL DEVICE (WET PARTICULATE SCRUBBER)

REVISED 3/17/22 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C8**

CONTROL DEVICE ID NO: CD21 (CL-1, Train 1)
CD22 (CL-1, Train 2)
CD43 (CL-2, Train 1)
CD44 (CL-2, Train 2)

CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES21 (CL-1, Train 1)
ES22 (CL-1, Train 2)
ES50 (CL-2, Train 1)
ES51 (CL-2, Train 2)

EMISSION POINT ID NO(S): EP20 (CL-1, Train 1)
EP21 (CL-1, Train 2)
EP47 (CL-2, Train 1)
EP48 (CL-2, Train 2)

POSITION IN SERIES OF CONTROLS: NO. 1 OF 1 UNITS

**OPERATING SCENARIO:** 1 OF 1

P.E. SEAL NEEDED (PER 2Q .0112)? ☐ YES ☑ NO

DESCRIBE CONTROL SYSTEM:

Wet venturi scrubber used for pressure leaching gas cleaning.

| | | | |
|---|---|---|---|
| POLLUTANT(S) COLLECTED: | $PM/PM_{10}/PM_{2.5}$ | | |
| BEFORE CONTROL EMISSION RATE (LB/HR): | 178.6 | | |
| CAPTURE EFFICIENCY: | 100 % | % | % |
| CONTROL DEVICE EFFICIENCY: | 99.9 % | % | % |
| CORRESPONDING OVERALL EFFICIENCY: | 99.9 % | % | % |
| EFFICIENCY DETERMINATION CODE: | 4 | | |
| TOTAL AFTER CONTROL EMISSION RATE (LB/HR): | 0.18 | | |

PRESSURE DROP (IN. $H_20$): 16 MIN 180 MAX

INLET TEMPERATURE ($^oF$): 32 MIN 248 MAX | OUTLET TEMPERATURE ($^oF$): 32 MIN 248 MAX

INLET AIR FLOW RATE (ACFM): 9,800 | MOISTURE CONTENT : INLET 0.8 % OUTLET 1.0 %

THROAT VELOCITY (FT/SEC): 150 | THROAT TYPE: ☐ FIXED ☑ VARIABLE

TYPE OF SYSTEM: VENTURI SCRUBBER | TYPE OF PACKING USED IF ANY: N/A

ADDITIVE LIQUID SCRUBBING MEDIUM: Water only | PERCENT RECIRCULATED: 80%

MINIMUM LIQUID INJECTION RATE (GAL/MIN):
132

MAKE UP RATE (GAL/MIN): >22.1 FOR ADDITIVE (GAL/MIN): Not applicable

DESCRIBE MAINTENANCE PROCEDURES:

- Daily checks on mechanical components
- Monthly performance checks / preventative maintenance program

DESCRIBE ANY MONITORING DEVICES, GAUGES, TEST PORTS, ETC:

- Manual pH checks
- Pressure Gauge / DP Transmitter
- Flow monitor
- Level switches for water control

**PARTICLE SIZE DISTRIBUTION**

| SIZE (MICRONS) | WEIGHT % OF TOTAL | CUMULATIVE % |
|---|---|---|
| 0-1 | 0.4 | 0.4 |
| 1-10 | 24.4 | 24.8 |
| 10-25 | 63.7 | 88.5 |
| 25-50 | 11.5 | 100 |
| 50-100 | 0 | 100 |
| >100 | 0 | 100 |
| | TOTAL = 100 | |

ATTACH A DIAGRAM OF THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S): See Attachment 1

COMMENTS:

The control device efficiency is based on engineering experience with similar emissions units and control devices.

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>LiOH Bagging Area Surge Bin/Transporter | EMISSION SOURCE ID NO: ES23 (CL-1, Hopper No. 1)<br>ES24 (CL-1, Hopper No. 2)<br>ES52 (CL-2, Hopper No. 1)<br>ES53 (CL-2, Hopper No. 2) |
| | CONTROL DEVICE ID NO(S): CD23 (CL-1, Hopper No. 1)<br>CD24 (CL-1, Hopper No. 2)<br>CD45 (CL-2, Hopper No. 1)<br>CD46 (CL-2, Hopper No. 2) |
| OPERATING SCENARIO 1 OF 1 | EMISSION POINT (STACK) ID NO(S): EP22 (CL-1, Hopper No. 1)<br>EP23 (CL-1, Hopper No. 2)<br>EP49 (CL-2, Hopper No. 1)<br>EP50 (CL-2, Hopper No. 2) |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
LiOH Bagging Area Surge Bin/Transporter No. 1
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

| | | |
|---|---|---|
| ☐ Coal,wood,oil, gas, other burner (Form B1) | ☐ Woodworking (Form B4) | ☐ Manuf. of chemicals/coatings/inks (Form B7) |
| ☐ Int.combustion engine/generator (Form B2) | ☐ Coating/finishing/printing (Form B5) | ☐ Incineration (Form B8) |
| ☐ Liquid storage tanks (Form B3) | ☑ Storage silos/bins (Form B6) | ☐ Other (Form B9) |

START CONSTRUCTION DATE: DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR

IS THIS SOURCE SUBJECT TO? ☐ NSPS (SUBPARTS?):______ ☐ NESHAP (SUBPARTS?):______

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

### *CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | tons/yr |
|---|---|---|---|---|---|---|---|
| PARTICULATE MATTER (PM) | See attached emission calculations | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

### *HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | tons/yr |
|---|---|---|---|---|---|---|---|---|
| | | See attached emission calculations | | | | | | |

### *TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr | lb/day | lb/yr |
|---|---|---|---|---|---|
| | | See attached emission calculations | | | |

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B6

## EMISSION SOURCE (STORAGE SILO/BINS)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B6**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>LiOH Bagging Area Surge Bin/Transporter | EMISSION SOURCE ID NO: ES23 (CL-1, Hopper No. 1)<br>ES24 (CL-1, Hopper No. 2)<br>ES52 (CL-2, Hopper No. 1)<br>ES53 (CL-2, Hopper No. 2)<br>CONTROL DEVICE ID NO(S): CD23 (CL-1, Hopper No. 1)<br>CD24 (CL-1, Hopper No. 2)<br>CD45 (CL-2, Hopper No. 1)<br>CD46 (CL-2, Hopper No. 2) |
| OPERATING SCENARIO: 1 OF 1 | EMISSION POINT(STACK) ID NO(S): EP22 (CL-1, Hopper No. 1)<br>EP23 (CL-1, Hopper No. 2)<br>EP49 (CL-2, Hopper No. 1)<br>EP50 (CL-2, Hopper No. 2) |

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
LiOH Bagging Area Surge Bin/Transporter
See process flow diagram included as Attachment 1.

| | | | | |
|---|---|---|---|---|
| MATERIAL STORED: Lithium Hydroxide | | | DENSITY OF MATERIAL (LB/FT3): 43.7 | |
| ***CAPACITY*** | CUBIC FEET: | | TONS: | |
| ***DIMENSIONS (FEET)*** | HEIGHT: | DIAMETER: ***(OR)*** | LENGTH: WIDTH: HEIGHT: | |
| ***ANNUAL PRODUCT THROUGHPUT (TONS)*** | | ACTUAL: | MAXIMUM DESIGN CAPACITY: 356,000 | |

| PNEUMATICALLY FILLED | MECHANICALLY FILLED | FILLED FROM |
|---|---|---|
| ☑ BLOWER | ☐ SCREW CONVEYOR | ☐ RAILCAR |
| ☐ COMPRESSOR | ☐ BELT CONVEYOR | ☐ TRUCK |
| ☐ OTHER: | ☐ BUCKET ELEVATOR | ☐ STORAGE PILE |
| | ☐ OTHER: | ☑ OTHER: Lithium hydroxide dryer |

NO. FILL TUBES: 1

MAXIMUM ACFM: 90

MATERIAL IS UNLOADED TO:
Lithium hydroxide bagging area day bins

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?
Gravity drop.

MAXIMUM DESIGN FILLING RATE OF MATERIAL (TONS/HR): 3

MAXIMUM DESIGN UNLOADING RATE OF MATERIAL (TONS/HR): 3

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM C1

## CONTROL DEVICE (FABRIC FILTER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C1**

CONTROL DEVICE ID NO: CD23 (CL-1, Hopper No. 1)
CD24 (CL-1, Hopper No. 2)
CD45 (CL-2, Hopper No. 1)
CD46 (CL-2, Hopper No. 2)

CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES23 (CL-1, Hopper No. 1)
ES24 (CL-1, Hopper No. 2)
ES52 (CL-2, Hopper No. 1)
ES53 (CL-2, Hopper No. 2)

EMISSION POINT (STACK) ID NO(S): EP22 (CL-1, Hopper No. 1)
EP23 (CL-1, Hopper No. 2)
EP49 (CL-2, Hopper No. 1)

POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS

**OPERATING SCENARIO:**

1 OF 1

P.E. SEAL REQUIRED (PER 2q .0112)? ☐ YES ☑ NO

DESCRIBE CONTROL SYSTEM:
Bin vent filter that will be integral for the storage-transfer system which feeds to the surge tank. It will be flanged, gasketed and bolted to the tank. The unit contains four (4) 12-3/4" dia. x 36" PTFE Spun Bond Polyester filters to properly vent the displaced air when product is loaded into the bin.

| | | | | |
|---|---|---|---|---|
| POLLUTANTS COLLECTED: | $PM/PM_{10}/PM_{2.5}$ | | | |
| BEFORE CONTROL EMISSION RATE (LB/HR): | 19 | | | |
| CAPTURE EFFICIENCY: | 100 % | % | % | % |
| CONTROL DEVICE EFFICIENCY: | 99.99 % | % | % | % |
| CORRESPONDING OVERALL EFFICIENCY: | 99.99 % | % | % | % |
| EFFICIENCY DETERMINATION CODE: | 4 | | | |
| TOTAL AFTER CONTROL EMISSION RATE (LB/HR): | 0.002 | | | |

PRESSURE DROP (IN $H_2O$): MIN: 0.5 MAX: 6 GAUGE? ☑ YES ☐ NO

BULK PARTICLE DENSITY ($LB/FT^3$): 50

INLET TEMPERATURE (°F): MIN -20 MAX 240

POLLUTANT LOADING RATE: 19 ☑ LB/HR ☐ $GR/FT^3$

OUTLET TEMPERATURE (°F) MIN -20 MAX 240

INLET AIR FLOW RATE (ACFM): 90

FILTER OPERATING TEMP (°F): Ambient

NO. OF COMPARTMENTS: 1

NO. OF CARTRIDGES PER COMPARTMENT: 4

LENGTH OF CARTRIDGE (IN.): 36

NO. OF CARTRIDGES: 4

FILTER SURFACE AREA PER CARTRIDGE ($FT^2$): 114

DIAMETER OF CARTRIDGE (IN.): 12-3/4

TOTAL FILTER SURFACE AREA ($FT^2$): 456

AIR TO FILTER RATIO: 0.18:1

DRAFT TYPE: ☐ INDUCED/NEGATIVE ☑ FORCED/POSITIVE

FILTER MATERIAL: ☐ WOVEN ☐ FELTED

DESCRIBE CLEANING PROCEDURES:

- ☑ AIR PULSE
- ☐ REVERSE FLOW
- ☐ MECHANICAL/SHAKER
- ☐ OTHER:
- ☐ SONIC
- ☐ SIMPLE BAG COLLAPSE
- ☐ RING BAG COLLAPSE

PARTICLE SIZE DISTRIBUTION

| SIZE (MICRONS) | WEIGHT % OF TOTAL | CUMULATIVE % |
|---|---|---|
| 0-1 | 0 | 0 |
| 1-10 | 0 | 0.0 |
| 10-25 | 0 | 0.0 |
| 25-50 | 0 | 0.0 |
| 50-100 | 0.2 | 0.2 |
| >100 | 99.8 | 100.0 |
| | TOTAL = 100 | |

DESCRIBE INCOMING AIR STREAM:
The bin will receive product gravity fed from the dryer/screen and flow following depressurization of transporter vessel. Product is Lithium Hydroxide.

ON A SEPARATE PAGE, ATTACH A DIAGRAM SHOWING THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S): See Attachment 1

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

EMISSION SOURCE DESCRIPTION:
LiOH Bagging Area Day Tank

EMISSION SOURCE ID NO: ES25 (CL-1, Tank No. 1)
ES26 (CL-1, Tank No. 2)
ES27 (CL-1, Tank No. 3)
ES28 (CL-1, Tank No. 4)
ES54 (CL-2, Tank No. 1)
ES55 (CL-2, Tank No. 2)
ES56 (CL-2, Tank No. 3)
ES57 (CL-2, Tank No. 4)

CONTROL DEVICE ID NO(S): CD25 (CL-1, Tank No. 1)
CD26 (CL-1, Tank No. 2)
CD27 (CL-1, Tank No. 3)
CD28 (CL-1, Tank No. 4)
CD47 (CL-2, Tank No. 1)
CD48 (CL-2, Tank No. 2)
CD49 (CL-2, Tank No. 3)
CD50 (CL-2, Tank No. 4)

OPERATING SCENARIO ___1___ OF ___1___

EMISSION POINT (STACK) ID NO(S): EP24 (CL-1, Tank No. 1)
EP25 (CL-1, Tank No. 2)
EP26 (CL-1, Tank No. 3)
EP27 (CL-1, Tank No. 4)
EP51 (CL-2, Tank No. 1)
EP52 (CL-2, Tank No. 2)
EP53 (CL-2, Tank No. 3)
EP54 (CL-2, Tank No. 4)

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
LiOH Bagging Area Day Tank
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Int.combustion engine/generator (Form B2)
- ☐ Liquid storage tanks (Form B3)
- ☐ Woodworking (Form B4)
- ☐ Coating/finishing/printing (Form B5)
- ☑ Storage silos/bins (Form B6)
- ☐ Manuf. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☐ Other (Form B9)

START CONSTRUCTION DATE: DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: EXPECTED OP. SCHEDULE: __24__ HR/DAY __7__ DAY/WK __52__ WK/YR

IS THIS SOURCE SUBJECT TO? ☐ NSPS (SUBPARTS?):________ ☐ NESHAP (SUBPARTS?):________

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

***CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE***

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | tons/yr | (AFTER CONTROLS / LIMITS) lb/hr | tons/yr |
|---|---|---|---|---|---|---|---|
| PARTICULATE MATTER (PM) | See attached emission calculations | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

***HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE***

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | tons/yr | (AFTER CONTROLS / LIMITS) lb/hr | tons/yr |
|---|---|---|---|---|---|---|---|---|
| | | See attached emission calculations | | | | | | |

***TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE***

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr | lb/day | lb/yr |
|---|---|---|---|---|---|
| | | See attached emission calculations | | | |

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B6

## EMISSION SOURCE (STORAGE SILO/BINS)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B6**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>LiOH Bagging Area Day Tank | EMISSION SOURCE ID NO: ES25 (CL-1, Tank No. 1)<br>ES26 (CL-1, Tank No. 2)<br>ES27 (CL-1, Tank No. 3)<br>ES28 (CL-1, Tank No. 4)<br>ES54 (CL-2, Tank No. 1)<br>ES55 (CL-2, Tank No. 2)<br>ES56 (CL-2, Tank No. 3)<br>ES57 (CL-2, Tank No. 4) |
| | CONTROL DEVICE ID NO(S): CD25 (CL-1, Tank No. 1)<br>CD26 (CL-1, Tank No. 2)<br>CD27 (CL-1, Tank No. 3)<br>CD28 (CL-1, Tank No. 4)<br>CD47 (CL-2, Tank No. 1)<br>CD48 (CL-2, Tank No. 2)<br>CD49 (CL-2, Tank No. 3)<br>CD50 (CL-2, Tank No. 4) |
| OPERATING SCENARIO: ___1___ OF ___1___ | EMISSION POINT(STACK) ID NO(S): EP24 (CL-1, Tank No. 1)<br>EP25 (CL-1, Tank No. 2)<br>EP26 (CL-1, Tank No. 3)<br>EP27 (CL-1, Tank No. 4)<br>EP51 (CL-2, Tank No. 1)<br>EP52 (CL-2, Tank No. 2)<br>EP53 (CL-2, Tank No. 3)<br>EP54 (CL-2, Tank No. 4) |

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
LiOH bagging area day tank with bin vent.
See process flow diagram included as Attachment 1.

| | | | | |
|---|---|---|---|---|
| MATERIAL STORED: Lithium Hydroxide | | | | DENSITY OF MATERIAL (LB/FT3): 43.7 |
| ***CAPACITY*** | CUBIC FEET: | | | TONS: |
| ***DIMENSIONS (FEET)*** | HEIGHT: | DIAMETER: | ***(OR)*** | LENGTH: WIDTH: HEIGHT: |
| ***ANNUAL PRODUCT THROUGHPUT (TONS)*** | | ACTUAL: | | MAXIMUM DESIGN CAPACITY: 356,000 |

| **PNEUMATICALLY FILLED** | **MECHANICALLY FILLED** | **FILLED FROM** |
|---|---|---|
| ☑ BLOWER | ☐ SCREW CONVEYOR | ☐ RAILCAR |
| ☐ COMPRESSOR | ☐ BELT CONVEYOR | ☐ TRUCK |
| ☐ OTHER: | ☐ BUCKET ELEVATOR | ☐ STORAGE PILE |
| | ☐ OTHER: | ☑ OTHER: Surge Bin/Transporter No. 1 |

NO. FILL TUBES: 1

MAXIMUM ACFM: 90

MATERIAL IS UNLOADED TO:
Lithium hydroxide bagging operation

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?
Gravity drop.

MAXIMUM DESIGN FILLING RATE OF MATERIAL (TONS/HR): 3

MAXIMUM DESIGN UNLOADING RATE OF MATERIAL (TONS/HR): 3

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM C1

## CONTROL DEVICE (FABRIC FILTER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C1**

| CONTROL DEVICE ID NO: | CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): |
|---|---|
| CD25 (CL-1, Tank No. 1) | ES25 (CL-1, Tank No. 1) |
| CD26 (CL-1, Tank No. 2) | ES26 (CL-1, Tank No. 2) |
| CD27 (CL-1, Tank No. 3) | ES27 (CL-1, Tank No. 3) |
| CD28 (CL-1, Tank No. 4) | ES28 (CL-1, Tank No. 4) |
| CD47 (CL-2, Tank No. 1) | ES54 (CL-2, Tank No. 1) |
| CD48 (CL-2, Tank No. 2) | ES55 (CL-2, Tank No. 2) |
| CD49 (CL-2, Tank No. 3) | ES56 (CL-2, Tank No. 3) |
| CD50 (CL-2, Tank No. 4) | ES57 (CL-2, Tank No. 4) |

EMISSION POINT (STACK) ID NO(S): EP24 (CL-1, Tank No. 1)
EP25 (CL-1, Tank No. 2)
EP26 (CL-1, Tank No. 3)
EP27 (CL-1, Tank No. 4)
EP51 (CL-2, Tank No. 1)
EP52 (CL-2, Tank No. 2)
EP53 (CL-2, Tank No. 3)
EP54 (CL-2, Tank No. 4)

POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS

**OPERATING SCENARIO:** 1 OF 1

P.E. SEAL REQUIRED (PER 2q .0112)? ☐ YES ☑ NO

DESCRIBE CONTROL SYSTEM:
Bin vent filter that will be integral to the day tank. It will be flanged, gasketed and bolted to the tank and contains (4) 12-3/4" dia. x 36" PTFE Spun Bond Polyester filters to properly separate the air and product when loaded into the tank.

| | | | | |
|---|---|---|---|---|
| POLLUTANTS COLLECTED: | $PM/PM_{10}/PM_{2.5}$ | | | |
| BEFORE CONTROL EMISSION RATE (LB/HR): | 19 | | | |
| CAPTURE EFFICIENCY: | 100 % | % | % | % |
| CONTROL DEVICE EFFICIENCY: | 99.99 % | % | % | % |
| CORRESPONDING OVERALL EFFICIENCY: | 99.99 % | % | % | % |
| EFFICIENCY DETERMINATION CODE: | 4 | | | |
| TOTAL AFTER CONTROL EMISSION RATE (LB/HR): | 0.002 | | | |

PRESSURE DROP (IN $H_20$): MIN: 0.5 MAX: 6 GAUGE? ☑ YES ☐ NO

BULK PARTICLE DENSITY ($LB/FT^3$): 50 | INLET TEMPERATURE (°F): MIN -20 MAX 240

POLLUTANT LOADING RATE: 19 ☑ LB/HR ☐ $GR/FT^3$ | OUTLET TEMPERATURE (°F) MIN -20 MAX 240

INLET AIR FLOW RATE (ACFM): 90 | FILTER OPERATING TEMP (°F): Ambient

NO. OF COMPARTMENTS: 1 | NO. OF CARTRIDGES PER COMPARTMENT: 4 | LENGTH OF CARTRIDGE (IN.): 36

NO. OF CARTRIDGES: 4 | FILTER SURFACE AREA PER CARTRIDGE ($FT^2$): 114 | DIAMETER OF BAG (IN.): 12-3/4" dia. X 36" long

TOTAL FILTER SURFACE AREA ($FT^2$): 456 | AIR TO FILTER RATIO: 0.18:1

DRAFT TYPE: ☐ INDUCED/NEGATIVE ☑ FORCED/POSITIVE FILTER MATERIAL: ☐ WOVEN ☐ FELTED

DESCRIBE CLEANING PROCEDURES:
- ☑ AIR PULSE
- ☐ REVERSE FLOW
- ☐ MECHANICAL/SHAKER
- ☐ OTHER:
- ☐ SONIC
- ☐ SIMPLE BAG COLLAPSE
- ☐ RING BAG COLLAPSE

DESCRIBE INCOMING AIR STREAM:
The day tank will receive product from a dense phase, pressure conveying system at a rate of up to 6,000 PPH at 90 ACFM
Conveyed product is Lithium Hydroxide.

**PARTICLE SIZE DISTRIBUTION**

| SIZE (MICRONS) | WEIGHT % OF TOTAL | CUMULATIVE % |
|---|---|---|
| 0-1 | 0 | 0.000 |
| 1-10 | 0.001 | 0.001 |
| 10-25 | 0.005 | 0.006 |
| 25-50 | 0.01 | 0.016 |
| 50-100 | 0.2 | 0.216 |
| >100 | 99.784 | 100.0 |
| | TOTAL = 100 | |

ON A SEPARATE PAGE, ATTACH A DIAGRAM SHOWING THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S): See Attachment 1

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>LiOH Bagging Operations | EMISSION SOURCE ID NO: ES29 (CL-1)<br>ES58 (CL-2)<br>CONTROL DEVICE ID NO(S): CD29 (CL-1)<br>CD51 (CL-2) |
| OPERATING SCENARIO 1 OF 1 | EMISSION POINT (STACK) ID NO(S): EP28 (CL-1)<br>EP55 (CL-2) |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
LiOH bagging operation dust pickups.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

| | | |
|---|---|---|
| ☐ Coal,wood,oil, gas, other burner (Form B1) | ☐ Woodworking (Form B4) | ☐ Manuf. of chemicals/coatings/inks (Form B7) |
| ☐ Int.combustion engine/generator (Form B2) | ☐ Coating/finishing/printing (Form B5) | ☐ Incineration (Form B8) |
| ☐ Liquid storage tanks (Form B3) | ☐ Storage silos/bins (Form B6) | ☑ Other (Form B9) |

START CONSTRUCTION DATE: DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR

IS THIS SOURCE SUBJECT TO? ☐ NSPS (SUBPARTS?):____ ☐ NESHAP (SUBPARTS?):____

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

***CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE***

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | tons/yr |
|---|---|---|---|---|---|---|---|
| PARTICULATE MATTER (PM) | See attached emission calculations | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

***HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE***

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | tons/yr |
|---|---|---|---|---|---|---|---|---|
| | | See attached emission calculations | | | | | | |

***TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE***

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr | lb/day | lb/yr |
|---|---|---|---|---|---|
| | | See attached emission calculations | | | |

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B9

## EMISSION SOURCE (OTHER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B9**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>LiOH Bagging Operations | EMISSION SOURCE ID NO: ES29 (CL-1)<br>ES58 (CL-2) |
| | CONTROL DEVICE ID NO(S): CD29 (CL-1)<br>CD51 (CL-2) |
| OPERATING SCENARIO: 1 OF 1 | EMISSION POINT (STACK) ID NO(S): EP28 (CL-1)<br>EP55 (CL-2) |

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
LiOH bagging operations dust pickups.
See process flow diagram included as Attachment 1.

| **MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS** | | MAX. DESIGN | REQUESTED CAPACITY |
|---|---|---|---|
| TYPE | UNITS | CAPACITY (UNIT/HR) | LIMITATION(UNIT/HR) |
| LiOH | ton/hr | 9.1 | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| **MATERIALS ENTERING PROCESS - BATCH OPERATION** | | MAX. DESIGN | REQUESTED CAPACITY |
|---|---|---|---|
| TYPE | UNITS | CAPACITY (UNIT/BATCH) | LIMITATION (UNIT/BATCH) |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

MAXIMUM DESIGN (BATCHES / HOUR):

| | |
|---|---|
| REQUESTED LIMITATION (BATCHES / HOUR): | (BATCHES/YR): |
| FUEL USED: | TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR): |
| MAX. CAPACITY HOURLY FUEL USE: | REQUESTED CAPACITY ANNUAL FUEL USE: |

COMMENTS:

**Attach Additional Sheets as Necessary**

# FORM C8

## CONTROL DEVICE (WET PARTICULATE SCRUBBER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C8**

| | |
|---|---|
| CONTROL DEVICE ID NO: CD29 (CL-1)<br>CD51 (CL-2) | CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES29 (CL-1)<br>ES58 (CL-2) |
| EMISSION POINT ID NO(S): EP28 (CL-1)<br>EP55 (CL-2) | POSITION IN SERIES OF CONTROLS: NO. 1 OF 1 UNITS |
| **OPERATING SCENARIO:** | |
| 1 OF 1 | P.E. SEAL NEEDED (PER 2Q .0112)? ☐ YES ☑ NO |

DESCRIBE CONTROL SYSTEM:

Wet scrubber used to control dust generated by the LiOH bagging operations. Flowrates determined based on two bin vent units running at once plus an additional allowance for air indraw.

| | | | |
|---|---|---|---|
| POLLUTANT(S) COLLECTED: | $PM/PM_{10}/PM_{2.5}$ | | |
| BEFORE CONTROL EMISSION RATE (LB/HR): | 7.6 | | |
| CAPTURE EFFICIENCY: | 100 % | % | % |
| CONTROL DEVICE EFFICIENCY: | 99.1 % | % | % |
| CORRESPONDING OVERALL EFFICIENCY: | 99.1 % | % | % |
| EFFICIENCY DETERMINATION CODE: | 4 | | |
| TOTAL AFTER CONTROL EMISSION RATE (LB/HR): | 0.07 | | |

| | |
|---|---|
| PRESSURE DROP (IN. $H_20$): 12 MIN 16 MAX | |
| INLET TEMPERATURE ($^oF$): 42 MIN 110 MAX | OUTLET TEMPERATURE ($^oF$): 42 MIN 110 MAX |
| INLET AIR FLOW RATE (ACFM): 1,600 | MOISTURE CONTENT : INLET 0.1 % OUTLET 1.87 % |
| THROAT VELOCITY (FT/SEC): 164 | THROAT TYPE: ☑ FIXED Adjustable) ☐ VARIABLE |
| TYPE OF SYSTEM: Venturi scrubber | TYPE OF PACKING USED IF ANY: |
| ADDITIVE LIQUID SCRUBBING MEDIUM: Recirculated water only | PERCENT RECIRCULATED: 90% |
| MINIMUM LIQUID INJECTION (RECIRCULATION RATE (GAL/MIN): 18 | |

MAKE UP RATE (GAL/MIN): <1.1 FOR ADDITIVE (GAL/MIN): Not applicable

DESCRIBE MAINTENANCE PROCEDURES:

- Daily checks on mechanical components
- Monthly performance checks / preventative maintenance program

DESCRIBE ANY MONITORING DEVICES, GAUGES, TEST PORTS, ETC:

- Manual pH checks
- Pressure Gauges for liquid pressures
- Venturi dP indicator
- Flow monitors
- Level switches and solenoid for makeup water control

**PARTICLE SIZE DISTRIBUTION**

| SIZE (MICRONS) | WEIGHT % OF TOTAL | CUMULATIVE % |
|---|---|---|
| 0-1 | 1.9 | 1.9 |
| 1-10 | 60.4 | 62.3 |
| 10-25 | 37.7 | 100 |
| 25-50 | 0 | 100 |
| 50-100 | 0 | 100 |
| >100 | 0 | 100 |
| | TOTAL = 100 | |

ATTACH A DIAGRAM OF THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S): See Attachment 1

COMMENTS:

The control device efficiency is based on engineering experience with similar emissions units and control devices and given particle size distribution.

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>LiOH Bagging Area Vacuum | EMISSION SOURCE ID NO: ES30 (CL-1)<br>ES59 (CL-2) |
| | CONTROL DEVICE ID NO(S): CD30 (CL-1)<br>CD52 (CL-2) |
| OPERATING SCENARIO _______1__________ OF ________1__________ | EMISSION POINT (STACK) ID NO(S): EP29 (CL-1)<br>EP56 (CL-2) |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
Vacuum used in bagging area for housekeeping purposes.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Woodworking (Form B4)
- ☐ Manuf. of chemicals/coatings/inks (Form B7)
- ☐ Int.combustion engine/generator (Form B2)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Incineration (Form B8)
- ☐ Liquid storage tanks (Form B3)
- ☐ Storage silos/bins (Form B6)
- ☑ Other (Form B9)

START CONSTRUCTION DATE: DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: EXPECTED OP. SCHEDULE: __24_ HR/DAY __7__ DAY/WK ___52__ WK/YR

IS THIS SOURCE SUBJECT TO? ☐ NSPS (SUBPARTS?):____________________ ☐ NESHAP (SUBPARTS?):__________________________

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

***CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE***

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | tons/yr |
|---|---|---|---|---|---|---|---|
| PARTICULATE MATTER (PM) | | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

See attached emission calculations

***HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE***

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | tons/yr |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

See attached emission calculations

***TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE***

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr | lb/day | lb/yr |
|---|---|---|---|---|---|
| | | | | | |

See attached emission calculations

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B9

## EMISSION SOURCE (OTHER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B9**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>LiOH Bagging Area Vacuum | EMISSION SOURCE ID NO: ES30 (CL-1)<br>ES59 (CL-2) |
| | CONTROL DEVICE ID NO(S): CD30 (CL-1)<br>CD52 (CL-2) |
| OPERATING SCENARIO: ___1___ OF ___1___ | EMISSION POINT (STACK) ID NO(S): EP29 (CL-1)<br>EP56 (CL-2) |

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Vacuum used in bagging area for housekeeping purposes.
See process flow diagram included as Attachment 1.

| MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS | | MAX. DESIGN | REQUESTED CAPACITY |
|---|---|---|---|
| TYPE | UNITS | CAPACITY (UNIT/HR) | LIMITATION(UNIT/HR) |
| LiOH | acfm | 600 | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| MATERIALS ENTERING PROCESS - BATCH OPERATION | | MAX. DESIGN | REQUESTED CAPACITY |
|---|---|---|---|
| TYPE | UNITS | CAPACITY (UNIT/BATCH) | LIMITATION (UNIT/BATCH) |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| | |
|---|---|
| MAXIMUM DESIGN (BATCHES / HOUR): | |
| REQUESTED LIMITATION (BATCHES / HOUR): | (BATCHES/YR): |
| FUEL USED: | TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR): |
| MAX. CAPACITY HOURLY FUEL USE: | REQUESTED CAPACITY ANNUAL FUEL USE: |

COMMENTS:

**Attach Additional Sheets as Necessary**

# FORM C1

## CONTROL DEVICE (FABRIC FILTER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C1**

| | |
|---|---|
| CONTROL DEVICE ID NO: CD30 (CL-1)<br>CD52 (CL-2) | CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES30 (CL-1)<br>ES59 (CL-2) |
| EMISSION POINT (STACK) ID NO(S): EP29 (CL-1)<br>EP56 (CL-2) | POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS |
| **OPERATING SCENARIO:** | |
| 1 OF 1 | P.E. SEAL REQUIRED (PER 2q .0112)? ☐ YES ☑ NO |

DESCRIBE CONTROL SYSTEM:
One (1) filter receiver dust collector. The receiver contains (8) 6" dia. x 41" long Spun Bond Polyester filters. This will be used as a central dust collector predominantly for the bag loading circuit and subsequent cleanup and bag spills, which operates at 4 t/h with 1 t bags.

| | | | | |
|---|---|---|---|---|
| POLLUTANTS COLLECTED: | $PM/PM_{10}/PM_{2.5}$ | | | |
| BEFORE CONTROL EMISSION RATE (LB/HR): | 129 | | | |
| CAPTURE EFFICIENCY: | 100 % | % | % | % |
| CONTROL DEVICE EFFICIENCY: | 99.99 % | % | % | % |
| CORRESPONDING OVERALL EFFICIENCY: | 99.99 % | % | % | % |
| EFFICIENCY DETERMINATION CODE: | 4 | | | |
| TOTAL AFTER CONTROL EMISSION RATE (LB/HR): | 0.01 | | | |

PRESSURE DROP (IN $H_2O$): MIN: 0.5 MAX: 6 GAUGE? ☑ YES ☐ NO

| | | |
|---|---|---|
| BULK PARTICLE DENSITY ($LB/FT^3$): 50 | INLET TEMPERATURE (°F): MIN: -20 MAX: 240 | |
| POLLUTANT LOADING RATE: 129 ☑ LB/HR ☐ $GR/FT^3$ | OUTLET TEMPERATURE (°F) MIN: -20 MAX: 240 | |
| INLET AIR FLOW RATE (ACFM): 600 | FILTER OPERATING TEMP (°F): AMBIENT | |
| NO. OF COMPARTMENTS: 1 | NO. OF FILTERS PER COMPARTMENT: 8 | LENGTH OF FILTER (IN.): 41 |
| NO. OF CARTRIDGES: 8 | FILTER SURFACE AREA PER CARTRIDGE ($FT^2$): 29.5 | DIAMETER OF FILTER (IN.): 6" |
| TOTAL FILTER SURFACE AREA ($FT^2$): 236 | AIR TO CLOTH RATIO: 2.54:1 | |

DRAFT TYPE: ☑ INDUCED/NEGATIVE ☐ FORCED/POSITIVE FILTER MATERIAL: ☐ WOVEN ☐ FELTED

DESCRIBE CLEANING PROCEDURES:

- ☑ AIR PULSE
- ☐ REVERSE FLOW
- ☐ MECHANICAL/SHAKER
- ☐ OTHER:
- ☐ SONIC
- ☐ SIMPLE BAG COLLAPSE
- ☐ RING BAG COLLAPSE

DESCRIBE INCOMING AIR STREAM:
The product is Lithium Hydroxide. The dust collector will receive intermittent product from spills and clean up, as produced by the crystallizer hence the size distribution. The crystallizer size range is 100 µm to 1000 µm.

**PARTICLE SIZE DISTRIBUTION**

| SIZE (MICRONS) | WEIGHT % OF TOTAL | CUMULATIVE % |
|---|---|---|
| 0-1 | NA | NA |
| 1-10 | NA | NA |
| 10-25 | NA | NA |
| 25-50 | 1 | 1 |
| 50-100 | 7 | 8 |
| >100 | 92 | 100 |
| | TOTAL = 100 | |

ON A SEPARATE PAGE, ATTACH A DIAGRAM SHOWING THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S): See Attachment 1

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Lime Receiving and Storage | EMISSION SOURCE ID NO: ES31<br>CONTROL DEVICE ID NO(S): CD31 |
| OPERATING SCENARIO ___1___ OF ___1___ | EMISSION POINT (STACK) ID NO(S): EP30 |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
Lime receiving and storage silo dust pickup.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Woodworking (Form B4)
- ☐ Manuf. of chemicals/coatings/inks (Form B7)
- ☐ Int.combustion engine/generator (Form B2)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Incineration (Form B8)
- ☐ Liquid storage tanks (Form B3)
- ☑ Storage silos/bins (Form B6)
- ☐ Other (Form B9)

START CONSTRUCTION DATE: DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: EXPECTED OP. SCHEDULE: _24_ HR/DAY _7_ DAY/WK _52_ WK/YR

IS THIS SOURCE SUBJECT TO? ☐ NSPS (SUBPARTS?):________ ☐ NESHAP (SUBPARTS?):________

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

### *CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr |
|---|---|---|---|---|---|---|---|
| PARTICULATE MATTER (PM) | | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

See attached emission calculations

### *HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

See attached emission calculations

### *TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr | lb/day | lb/yr |
|---|---|---|---|---|---|
| | | | | | |

See attached emission calculations

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B6

## EMISSION SOURCE (STORAGE SILO/BINS)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B6**

| | | | | | | |
|---|---|---|---|---|---|---|
| EMISSION SOURCE DESCRIPTION: | | | | | EMISSION SOURCE ID NO: ES31 | |
| Lime Receiving and Storage | | | | | CONTROL DEVICE ID NO(S): CD31 | |
| OPERATING SCENARIO: ___1___ OF ___1___ | | | | | EMISSION POINT(STACK) ID NO(S): EP30 | |
| DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):<br>Lime receiving and storage silo dust pickup.<br>See process flow diagram included as Attachment 1. | | | | | | |
| MATERIAL STORED: Lime | | | | DENSITY OF MATERIAL (LB/FT3): 70 | | |
| ***CAPACITY*** | CUBIC FEET: | | | TONS: | | |
| ***DIMENSIONS (FEET)*** | HEIGHT: | DIAMETER: | ***(OR)*** | LENGTH: | WIDTH: | HEIGHT: |
| ***ANNUAL PRODUCT THROUGHPUT (TONS)*** | ACTUAL: | | | | MAXIMUM DESIGN CAPACITY: 170,000 | |

| PNEUMATICALLY FILLED | MECHANICALLY FILLED | FILLED FROM |
|---|---|---|
| ☐ BLOWER | ☐ SCREW CONVEYOR | ☑ RAILCAR |
| ☐ COMPRESSOR | ☐ BELT CONVEYOR | ☐ TRUCK |
| ☐ OTHER: | ☑ BUCKET ELEVATOR | ☐ STORAGE PILE |
| | ☐ OTHER: | ☐ OTHER: |
| NO. FILL TUBES: | | |
| MAXIMUM ACFM: | | |

MATERIAL IS UNLOADED TO:
Lime slaker

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?
Rotary valve to a screw conveyor

MAXIMUM DESIGN FILLING RATE OF MATERIAL (TONS/HR): 33.1

MAXIMUM DESIGN UNLOADING RATE OF MATERIAL (TONS/HR): 19.4

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM C1

## CONTROL DEVICE (FABRIC FILTER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C1**

| | |
|---|---|
| CONTROL DEVICE ID NO: CD31 | CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES31 |
| EMISSION POINT (STACK) ID NO(S): EP30 | POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS |
| **OPERATING SCENARIO:** | |
| 1 OF 1 | P.E. SEAL REQUIRED (PER 2q .0112)? ☐ YES ☑ NO |

DESCRIBE CONTROL SYSTEM:

Baghouse to control dust emissions generated during material transfer into the storage silo.

Unit is a mechanical device with a 15 hp motor to generate a negative pressure as the silo is filled, demand of 2,850 acfm considered normal operation. Has a reverse pulse air system. Intermittent operation during off-loading into silo.

| | | | | |
|---|---|---|---|---|
| POLLUTANTS COLLECTED: | $PM/PM_{10}/PM_{2.5}$ | | | |
| BEFORE CONTROL EMISSION RATE (LB/HR): | 138 | | | |
| CAPTURE EFFICIENCY: | 100 % | % | % | % |
| CONTROL DEVICE EFFICIENCY: | 99.96 % | % | % | % |
| CORRESPONDING OVERALL EFFICIENCY: | 99.96 % | % | % | % |
| EFFICIENCY DETERMINATION CODE: | 4 | | | |
| TOTAL AFTER CONTROL EMISSION RATE (LB/HR): | 0.05 | | | |

PRESSURE DROP (IN $H_20$): MIN: 2 MAX: 32 GAUGE? ☑ YES ☐ NO

| | | |
|---|---|---|
| BULK PARTICLE DENSITY (LB/FT$^3$): 70 | | INLET TEMPERATURE ($^o$F): MIN 40 MAX 120 |
| POLLUTANT LOADING RATE: 138 ☑ LB/HR ☐ GR/FT$^3$ | | OUTLET TEMPERATURE ($^o$F) MIN 40 MAX 120 |
| INLET AIR FLOW RATE (ACFM): 2,850 | | FILTER OPERATING TEMP ($^o$F): Ambient |
| NO. OF COMPARTMENTS: 1 | NO. OF BAGS PER COMPARTMENT: 25 | LENGTH OF BAG (IN.): |
| NO. OF CARTRIDGES: 1 | FILTER SURFACE AREA PER CARTRIDGE (FT$^2$): 326 | DIAMETER OF BAG (IN.): |
| TOTAL FILTER SURFACE AREA (FT$^2$): 326 | AIR TO CLOTH RATIO: 8.74:1 | |

DRAFT TYPE: ☑ INDUCED/NEGATIVE ☐ FORCED/POSITIVE FILTER MATERIAL: ☑ WOVEN ☐ FELTED

DESCRIBE CLEANING PROCEDURES:

☑ AIR PULSE ☐ SONIC
☐ REVERSE FLOW ☐ SIMPLE BAG COLLAPSE
☐ MECHANICAL/SHAKER ☐ RING BAG COLLAPSE
☐ OTHER:

DESCRIBE INCOMING AIR STREAM:

Stream comes from transfer points within lime receiving station, from bucket elevator and silo to maintain a negative pressure in the system, during off loading. Option for offloading from pneumatic conveying during maintenance.

Calculated based on a P80 of 106 μm and cutting a 25 μm for the dust as reported.

**PARTICLE SIZE DISTRIBUTION**

| SIZE (MICRONS) | WEIGHT % OF TOTAL | CUMULATIVE % |
|---|---|---|
| 0-1 | 0.6 | 0.6 |
| 1-10 | 57.9 | 58.5 |
| 10-25 | 41.5 | 100 |
| 25-50 | 0 | 100 |
| 50-100 | 0 | 100 |
| >100 | 0 | 100 |
| | TOTAL = 100 | |

ON A SEPARATE PAGE, ATTACH A DIAGRAM SHOWING THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S): See Attachment 1

COMMENTS:

The control device efficiency is based on engineering experience with similar emissions units and control devices.

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Phosphate Receiving and Storage | EMISSION SOURCE ID NO: ES32 (CL-1)<br>ES60 (CL-2) |
| | CONTROL DEVICE ID NO(S): CD32 (CL-1)<br>CD53 (CL-2) |
| OPERATING SCENARIO ___1___ OF ___1___ | EMISSION POINT (STACK) ID NO(S): EP31 (CL-1)<br>EP57 (CL-2) |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
Phosphate receiving and storage silo dust pickup.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

| | | |
|---|---|---|
| ☐ Coal,wood,oil, gas, other burner (Form B1) | ☐ Woodworking (Form B4) | ☐ Manuf. of chemicals/coatings/inks (Form B7) |
| ☐ Int.combustion engine/generator (Form B2) | ☐ Coating/finishing/printing (Form B5) | ☐ Incineration (Form B8) |
| ☐ Liquid storage tanks (Form B3) | ☑ Storage silos/bins (Form B6) | ☐ Other (Form B9) |

START CONSTRUCTION DATE: DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: EXPECTED OP. SCHEDULE: __24__ HR/DAY __7__ DAY/WK __52__ WK/YR

IS THIS SOURCE SUBJECT TO? ☐ NSPS (SUBPARTS?):__________ ☐ NESHAP (SUBPARTS?):__________

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

### *CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | tons/yr |
|---|---|---|---|---|---|---|---|
| PARTICULATE MATTER (PM) | | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

See attached emission calculations

### *HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | tons/yr |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

See attached emission calculations

### *TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr | lb/day | lb/yr |
|---|---|---|---|---|---|
| | | | | | |

See attached emission calculations

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B6

## EMISSION SOURCE (STORAGE SILO/BINS)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B6**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br><br>Phosphate Receiving and Storage | EMISSION SOURCE ID NO: ES32 (CL-1)<br>ES60 (CL-2)<br>CONTROL DEVICE ID NO(S): CD32 (CL-1)<br>CD53 (CL-2) |
| OPERATING SCENARIO: 1 OF 1 | EMISSION POINT(STACK) ID NO(S): EP31 (CL-1)<br>EP57 (CL-2) |

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Phosphate receiving and storage silo with dust pickup.
See process flow diagram included as Attachment 1.

| | | | | |
|---|---|---|---|---|
| MATERIAL STORED: Phosphate | | | | DENSITY OF MATERIAL (LB/FT3): 80 |
| ***CAPACITY*** | CUBIC FEET: | | | TONS: |
| ***DIMENSIONS (FEET)*** | HEIGHT: | DIAMETER: | ***(OR)*** | LENGTH: WIDTH: HEIGHT: |
| ***ANNUAL PRODUCT THROUGHPUT (TONS)*** | ACTUAL: | | | MAXIMUM DESIGN CAPACITY: 2,000 |

| PNEUMATICALLY FILLED | MECHANICALLY FILLED | FILLED FROM |
|---|---|---|
| ☐ BLOWER | ☐ SCREW CONVEYOR | ☐ RAILCAR |
| ☐ COMPRESSOR | ☐ BELT CONVEYOR | ☑ TRUCK |
| ☐ OTHER: | ☐ BUCKET ELEVATOR | ☐ STORAGE PILE |
| | ☐ OTHER: | ☐ OTHER: |

NO. FILL TUBES:

MAXIMUM ACFM:

MATERIAL IS UNLOADED TO:
Phosphate mixing tank

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?
Rotary valve to screw conveyor

MAXIMUM DESIGN FILLING RATE OF MATERIAL (TONS/HR): 33.1

MAXIMUM DESIGN UNLOADING RATE OF MATERIAL (TONS/HR): 0.2

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM C1

## CONTROL DEVICE (FABRIC FILTER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C1**

| | |
|---|---|
| CONTROL DEVICE ID NO: CD32 (CL-1)<br>CD53 (CL-2) | CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES32 (CL-1)<br>ES60 (CL-2) |
| EMISSION POINT (STACK) ID NO(S): EP31 (CL-1)<br>EP57 (CL-2) | POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS |
| **OPERATING SCENARIO:** | |
| 1 OF 1 | P.E. SEAL REQUIRED (PER 2q .0112)? ☐ YES ☑ NO |

DESCRIBE CONTROL SYSTEM:

Baghouse to control dust emissions generated during material transfer into the storage silo.

Unit is a mechanical device with a 15 hp motor to generate a negative pressure as the silo is filled, demand of 2,850 acfm considered normal operation. Has a reverse pulse air system.

Intermittent operation during off-loading into silo.

| | | | | |
|---|---|---|---|---|
| POLLUTANTS COLLECTED: | $PM/PM_{10}/PM_{2.5}$ | | | |
| BEFORE CONTROL EMISSION RATE (LB/HR): | 69 | | | |
| CAPTURE EFFICIENCY: | 100 % | % | % | % |
| CONTROL DEVICE EFFICIENCY: | 99.93 % | % | % | % |
| CORRESPONDING OVERALL EFFICIENCY: | 99.93 % | % | % | % |
| EFFICIENCY DETERMINATION CODE: | 4 | | | |
| TOTAL AFTER CONTROL EMISSION RATE (LB/HR): | 0.05 | | | |

| | | |
|---|---|---|
| PRESSURE DROP (IN $H_2O$): MIN: 2 MAX: 32 GAUGE? ☑ YES ☐ NO | | |
| BULK PARTICLE DENSITY ($LB/FT^3$): 80 | INLET TEMPERATURE (°F): MIN 20 MAX 120 | |
| POLLUTANT LOADING RATE: 69 ☑ LB/HR ☐ $GR/FT^3$ | OUTLET TEMPERATURE (°F) MIN 20 MAX 120 | |
| INLET AIR FLOW RATE (ACFM): 2,850 | FILTER OPERATING TEMP (°F): Ambient | |
| NO. OF COMPARTMENTS: 1 | NO. OF BAGS PER COMPARTMENT: 25 | LENGTH OF BAG (IN.): |
| NO. OF CARTRIDGES: 1 | FILTER SURFACE AREA PER CARTRIDGE ($FT^2$): 326 | DIAMETER OF BAG (IN.): |
| TOTAL FILTER SURFACE AREA ($FT^2$): 326 | AIR TO CLOTH RATIO: 8.74 | |
| DRAFT TYPE: ☐ INDUCED/NEGATIVE ☐ FORCED/POSITIVE | FILTER MATERIAL: ☑ WOVEN ☐ FELTED | |

DESCRIBE CLEANING PROCEDURES:

- ☑ AIR PULSE
- ☐ REVERSE FLOW
- ☐ MECHANICAL/SHAKER
- ☐ OTHER:
- ☐ SONIC
- ☐ SIMPLE BAG COLLAPSE
- ☐ RING BAG COLLAPSE

**PARTICLE SIZE DISTRIBUTION**

| SIZE (MICRONS) | WEIGHT % OF TOTAL | CUMULATIVE % |
|---|---|---|
| 0-1 | 0.2 | 0.2 |
| 1-10 | 58.3 | 58.5 |
| 10-25 | 41.5 | 100 |
| 25-50 | 0 | 100 |
| 50-100 | 0 | 100 |
| >100 | 0 | 100 |
| | TOTAL = 100 | |

DESCRIBE INCOMING AIR STREAM:

Fan draws air stream from silo chamber into the unit which then intermittently purges to return material back into the silo. Based on elevation drop and material characteristics and there being no forced air flow through the circuit the load carrying is considered to be lower at 2%

Considered air flow of 2,850 acfm required.

Calculated based on a P80 of 106 μm and cutting a 25 μm for the dust as reported.

ON A SEPARATE PAGE, ATTACH A DIAGRAM SHOWING THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S): See Attachment 1

COMMENTS:

The control device efficiency is based on engineering experience with similar emissions units and control devices.

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Sodium Carbonate Receiving and Storage Silo | EMISSION SOURCE ID NO: ES33<br>CONTROL DEVICE ID NO(S): CD33 |
| OPERATING SCENARIO 1 OF 1 | EMISSION POINT (STACK) ID NO(S): EP32 |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
Sodium carbonate receiving and storage silo dust pickups.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

| | | |
|---|---|---|
| ☐ Coal,wood,oil, gas, other burner (Form B1) | ☐ Woodworking (Form B4) | ☐ Manuf. of chemicals/coatings/inks (Form B7) |
| ☐ Int.combustion engine/generator (Form B2) | ☐ Coating/finishing/printing (Form B5) | ☐ Incineration (Form B8) |
| ☐ Liquid storage tanks (Form B3) | ☑ Storage silos/bins (Form B6) | ☐ Other (Form B9) |

START CONSTRUCTION DATE: DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR

IS THIS SOURCE SUBJECT TO? ☐ NSPS (SUBPARTS?):____ ☐ NESHAP (SUBPARTS?):____

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

### *CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr |
|---|---|---|---|---|---|---|---|
| PARTICULATE MATTER (PM) | | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | See attached emission calculations | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

### *HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | See attached emission calculations | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

### *TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/day | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/yr |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | See attached emission calculations | | |
| | | | | | |
| | | | | | |
| | | | | | |

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B6

## EMISSION SOURCE (STORAGE SILO/BINS)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B6**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION: | EMISSION SOURCE ID NO: ES33 |
| Sodium Carbonate Receiving and Storage Silo | CONTROL DEVICE ID NO(S): CD33 |
| OPERATING SCENARIO: 1 OF 1 | EMISSION POINT(STACK) ID NO(S): EP32 |

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Sodium carbonate receiving and storage silo with dust pickups.
See process flow diagram included as Attachment 1.

| | | | | |
|---|---|---|---|---|
| MATERIAL STORED: Sodium carbonate | | | DENSITY OF MATERIAL (LB/FT3): 90 | |
| ***CAPACITY*** | CUBIC FEET: | | TONS: | |
| ***DIMENSIONS (FEET)*** | HEIGHT: | DIAMETER: ***(OR)*** | LENGTH: WIDTH: | HEIGHT: |
| ***ANNUAL PRODUCT THROUGHPUT (TONS)*** | ACTUAL: | | MAXIMUM DESIGN CAPACITY: 54,000 | |

| PNEUMATICALLY FILLED | MECHANICALLY FILLED | FILLED FROM |
|---|---|---|
| ☐ BLOWER | ☐ SCREW CONVEYOR | ☑ RAILCAR |
| ☐ COMPRESSOR | ☐ BELT CONVEYOR | ☐ TRUCK |
| ☐ OTHER: | ☑ BUCKET ELEVATOR | ☐ STORAGE PILE |
| | ☐ OTHER: | ☐ OTHER: Conveyor from cooler |

NO. FILL TUBES:

MAXIMUM ACFM:

MATERIAL IS UNLOADED TO:

Sodium carbonate feeder to the sodium carbonate feeder bin

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?
Rotary valve feeding enclosed screw conveyors.

MAXIMUM DESIGN FILLING RATE OF MATERIAL (TONS/HR): 29.8

MAXIMUM DESIGN UNLOADING RATE OF MATERIAL (TONS/HR): 6.2

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM C1

## CONTROL DEVICE (FABRIC FILTER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C1**

| | |
|---|---|
| CONTROL DEVICE ID NO: CD33 | CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES33 |
| EMISSION POINT (STACK) ID NO(S): EP32 | POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS |
| **OPERATING SCENARIO:** | |
| 1 OF 1 | P.E. SEAL REQUIRED (PER 2q .0112)? ☐ YES ☑ NO |

DESCRIBE CONTROL SYSTEM:

Baghouse to control dust emissions generated during material transfer into the storage silo.

Unit is a mechanical device with a 15 hp motor to generate a negative pressure as the silo is filled, demand of 2,850 acfm considered normal operation. Has a reverse pulse air system.

Intermittent operation during off-loading into silo.

| | | | | |
|---|---|---|---|---|
| POLLUTANTS COLLECTED: | $PM/PM_{10}/PM_{2.5}$ | | | |
| BEFORE CONTROL EMISSION RATE (LB/HR): | 138 | | | |
| CAPTURE EFFICIENCY: | 100 % | % | % | % |
| CONTROL DEVICE EFFICIENCY: | 99.96 % | % | % | % |
| CORRESPONDING OVERALL EFFICIENCY: | 99.96 % | % | % | % |
| EFFICIENCY DETERMINATION CODE: | 4 | | | |
| TOTAL AFTER CONTROL EMISSION RATE (LB/HR): | 0.05 | | | |

PRESSURE DROP (IN $H_20$): MIN: 2 MAX: 32 GAUGE? ☑ YES ☐ NO

| | | |
|---|---|---|
| BULK PARTICLE DENSITY ($LB/FT^3$): 90 | | INLET TEMPERATURE (°F): MIN 20 MAX 120 |
| POLLUTANT LOADING RATE: 138 ☑ LB/HR ☐ $GR/FT^3$ | | OUTLET TEMPERATURE (°F) MIN 20 MAX 120 |
| INLET AIR FLOW RATE (ACFM): 2,850 | | FILTER OPERATING TEMP (°F): Ambient |
| NO. OF COMPARTMENTS: 1 | NO. OF BAGS PER COMPARTMENT: 25 | LENGTH OF BAG (IN.): |
| NO. OF CARTRIDGES: 1 | FILTER SURFACE AREA PER CARTRIDGE ($FT^2$): 326 | DIAMETER OF BAG (IN.): |
| TOTAL FILTER SURFACE AREA ($FT^2$): 326 | AIR TO CLOTH RATIO: 8.74:1 | |

DRAFT TYPE: ☑ INDUCED/NEGATIVE ☐ FORCED/POSITIVE FILTER MATERIAL: ☑ WOVEN ☐ FELTED

DESCRIBE CLEANING PROCEDURES:

- ☑ AIR PULSE
- ☐ REVERSE FLOW
- ☐ MECHANICAL/SHAKER
- ☐ OTHER:
- ☐ SONIC
- ☐ SIMPLE BAG COLLAPSE
- ☐ RING BAG COLLAPSE

**PARTICLE SIZE DISTRIBUTION**

| SIZE (MICRONS) | WEIGHT % OF TOTAL | CUMULATIVE % |
|---|---|---|
| 0-1 | 0 | 0 |
| 1-10 | 58.5 | 58.5 |
| 10-25 | 41.5 | 100 |
| 25-50 | 0 | 100 |
| 50-100 | 0 | 100 |
| >100 | 0 | 100 |
| | TOTAL = 100 | |

DESCRIBE INCOMING AIR STREAM:

Stream comes from transfer points within sodium carbonate loading station, from bucket elevator and silo to maintain a negative pressure in the system, during off loading. Option for offloading from pneumatic conveying during maintenance.

Applied a size distribution from model based on a 106 μm P80, with dust being <25 μm cut off.

ON A SEPARATE PAGE, ATTACH A DIAGRAM SHOWING THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S): See Attachment 1

COMMENTS:

The control device efficiency is based on engineering experience with similar emissions units and control devices.

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Sodium Carbonate Receiving and Feeder Bin | EMISSION SOURCE ID NO: ES34 (CL-1)<br>ES61 (CL-2) |
| | CONTROL DEVICE ID NO(S): CD34 (CL-1)<br>CD54 (CL-2) |
| OPERATING SCENARIO 1 OF 1 | EMISSION POINT (STACK) ID NO(S): EP33 (CL-1)<br>EP58 (CL-2) |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
Sodium carbonate receiving and feeder bin dust pickups.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Int.combustion engine/generator (Form B2)
- ☐ Liquid storage tanks (Form B3)
- ☐ Woodworking (Form B4)
- ☐ Coating/finishing/printing (Form B5)
- ☑ Storage silos/bins (Form B6)
- ☐ Manuf. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☐ Other (Form B9)

START CONSTRUCTION DATE: DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR

IS THIS SOURCE SUBJECT TO? ☐ NSPS (SUBPARTS?):____ ☐ NESHAP (SUBPARTS?):____

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

### *CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr |
|---|---|---|---|---|---|---|---|
| PARTICULATE MATTER (PM) | | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

See attached emission calculations

### *HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr |
|---|---|---|---|---|---|---|---|---|

See attached emission calculations

### *TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr | lb/day | lb/yr |
|---|---|---|---|---|---|

See attached emission calculations

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B6

## EMISSION SOURCE (STORAGE SILO/BINS)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B6**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION: | EMISSION SOURCE ID NO: ES34 (CL-1)<br>ES61 (CL-2) |
| Sodium Carbonate Receiving and Feeder Bin | CONTROL DEVICE ID NO(S): CD34 (CL-1)<br>CD54 (CL-2) |
| OPERATING SCENARIO: 1 OF 1 | EMISSION POINT(STACK) ID NO(S): EP33 (CL-1)<br>EP58 (CL-2) |

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Sodium carbonate receiving and feeder bin with dust pickups.
See process flow diagram included as Attachment 1.

| | | | | |
|---|---|---|---|---|
| MATERIAL STORED: Sodium carbonate | | | | DENSITY OF MATERIAL (LB/FT3): 90 |
| ***CAPACITY*** | CUBIC FEET: | | | TONS: |
| ***DIMENSIONS (FEET)*** | HEIGHT: | DIAMETER: | ***(OR)*** | LENGTH: WIDTH: HEIGHT: |
| ***ANNUAL PRODUCT THROUGHPUT (TONS)*** | | ACTUAL: | | MAXIMUM DESIGN CAPACITY: 54,000 |

| PNEUMATICALLY FILLED | MECHANICALLY FILLED | FILLED FROM |
|---|---|---|
| ☐ BLOWER | ☐ SCREW CONVEYOR | ☑ RAILCAR |
| ☐ COMPRESSOR | ☐ BELT CONVEYOR | ☐ TRUCK |
| ☐ OTHER: | ☑ BUCKET ELEVATOR | ☐ STORAGE PILE |
| | ☐ OTHER: | ☐ OTHER: Conveyor from cooler |

NO. FILL TUBES:

MAXIMUM ACFM:

MATERIAL IS UNLOADED TO:
Carbonate leaching process

BY WHAT METHOD IS MATERIAL UNLOADED FROM SILO?
Rotary valve feeding enclosed screw conveyors.

MAXIMUM DESIGN FILLING RATE OF MATERIAL (TONS/HR): 29.8

MAXIMUM DESIGN UNLOADING RATE OF MATERIAL (TONS/HR): 6.2

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM C1

## CONTROL DEVICE (FABRIC FILTER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C1**

| | |
|---|---|
| CONTROL DEVICE ID NO: CD34 (CL-1)<br>CD54 (CL-2) | CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES34 (CL-1)<br>ES61 (CL-2) |
| EMISSION POINT (STACK) ID NO(S): EP33 (CL-1)<br>EP58 (CL-2) | POSITION IN SERIES OF CONTROLS NO. 1 OF 1 UNITS |
| **OPERATING SCENARIO:** | |
| 1 OF 1 | P.E. SEAL REQUIRED (PER 2q .0112)? ☐ YES ☑ NO |

DESCRIBE CONTROL SYSTEM:

Baghouse to control dust emissions generated during material transfer into the feeder bin.

Unit is a mechanical device with a 15 hp motor to generate a negative pressure as the feeder bin is filled, demand of 2,850 acfm considered normal operation. Has a reverse pulse air system.

Intermittent operation during off-loading into feeder bin

| | | | | |
|---|---|---|---|---|
| POLLUTANTS COLLECTED: | PM/$PM_{10}$/$PM_{2.5}$ | | | |
| BEFORE CONTROL EMISSION RATE (LB/HR): | 138 | | | |
| CAPTURE EFFICIENCY: | 100 % | % | % | % |
| CONTROL DEVICE EFFICIENCY: | 99.96 % | % | % | % |
| CORRESPONDING OVERALL EFFICIENCY: | 99.96 % | % | % | % |
| EFFICIENCY DETERMINATION CODE: | 4 | | | |
| TOTAL AFTER CONTROL EMISSION RATE (LB/HR): | 0.05 | | | |

PRESSURE DROP (IN $H_20$): MIN: 2 MAX: 32 GAUGE? ☑ YES ☐ NO

| | | |
|---|---|---|
| BULK PARTICLE DENSITY (LB/$FT^3$): 90 | INLET TEMPERATURE (°F): MIN 20 MAX 120 | |
| POLLUTANT LOADING RATE: 138 ☑ LB/HR ☐ GR/$FT^3$ | OUTLET TEMPERATURE (°F) MIN 20 MAX 120 | |
| INLET AIR FLOW RATE (ACFM): 2,850 | FILTER OPERATING TEMP (°F): Ambient | |
| NO. OF COMPARTMENTS: 1 | NO. OF BAGS PER COMPARTMENT: 25 | LENGTH OF BAG (IN.): |
| NO. OF CARTRIDGES: 1 | FILTER SURFACE AREA PER CARTRIDGE ($FT^2$): 326 | DIAMETER OF BAG (IN.): |
| TOTAL FILTER SURFACE AREA ($FT^2$): 326 | AIR TO CLOTH RATIO: 8.74:1 | |

DRAFT TYPE: ☑ INDUCED/NEGATIVE ☐ FORCED/POSITIVE FILTER MATERIAL: ☑ WOVEN ☐ FELTED

DESCRIBE CLEANING PROCEDURES:

☑ AIR PULSE ☐ SONIC
☐ REVERSE FLOW ☐ SIMPLE BAG COLLAPSE
☐ MECHANICAL/SHAKER ☐ RING BAG COLLAPSE
☐ OTHER:

**PARTICLE SIZE DISTRIBUTION**

| SIZE (MICRONS) | WEIGHT % OF TOTAL | CUMULATIVE % |
|---|---|---|
| 0-1 | 0 | 0 |
| 1-10 | 58.5 | 58.5 |
| 10-25 | 41.5 | 100 |
| 25-50 | 0 | 100 |
| 50-100 | 0 | 100 |
| >100 | 0 | 100 |
| | TOTAL = 100 | |

DESCRIBE INCOMING AIR STREAM:

Stream comes from transfer points within sodium carbonate loading station, from bucket elevator and silo to maintain a negative pressure in the system, during off loading and for material transfer from the sodium carbonate storage silo to the feeder bin. Option for offloading from pneumatic conveying during maintenance.

Applied a size distribution from model based on a 106 µm P80, with dust being <25 µm cut off.

ON A SEPARATE PAGE, ATTACH A DIAGRAM SHOWING THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S): See Attachment 1

COMMENTS:

The control device efficiency is based on engineering experience with similar emissions units and control devices.

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Boiler | EMISSION SOURCE ID NO: ES35 (CL-1, Boiler 1)<br>ES36 (CL-1, Boiler 2)<br>ES62 (CL-2, Boiler 1)<br>ES63 (CL-2, Boiler 2) |
| | CONTROL DEVICE ID NO(S): |
| OPERATING SCENARIO ___1___ OF ___1___ | EMISSION POINT (STACK) ID NO(S): EP34 (CL-1, Boiler 1)<br>EP35 (CL-1, Boiler 2)<br>EP59 (CL-2, Boiler 1)<br>EP60 (CL-2, Boiler 2) |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
Natural gas fired boiler - 62.4 MMBtu/hr.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

| | | |
|---|---|---|
| ☑ Coal,wood,oil, gas, other burner (Form B1) | ☐ Woodworking (Form B4) | ☐ Manuf. of chemicals/coatings/inks (Form B7) |
| ☐ Int.combustion engine/generator (Form B2) | ☐ Coating/finishing/printing (Form B5) | ☐ Incineration (Form B8) |
| ☐ Liquid storage tanks (Form B3) | ☐ Storage silos/bins (Form B6) | ☐ Other (Form B9) |

START CONSTRUCTION DATE: DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: EXPECTED OP. SCHEDULE: __24__ HR/DAY __7__ DAY/WK __52__ WK/YR

IS THIS SOURCE SUBJECT TO? ☑ NSPS (SUBPARTS?): Dc ☐ NESHAP (SUBPARTS?):

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

### CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | tons/yr |
|---|---|---|---|---|---|---|---|
| PARTICULATE MATTER (PM) | | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

See attached emission calculations

### HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | tons/yr |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

See attached emission calculations

### TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr | lb/day | lb/yr |
|---|---|---|---|---|---|
| | | | | | |

See attached emission calculations

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B1

## EMISSION SOURCE (WOOD, COAL, OIL, GAS, OTHER FUEL-FIRED BURNER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B1**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Boiler No. 1 | EMISSION SOURCE ID NO: ES35 (CL-1, Boiler 1)<br>ES36 (CL-1, Boiler 2)<br>ES62 (CL-2, Boiler 1)<br>ES63 (CL-2, Boiler 2) |
| | CONTROL DEVICE ID NO(S): |
| OPERATING SCENARIO: ____1____ OF ____1____ | EMISSION POINT (STACK) ID NO(S): EP34 (CL-1, Boiler 1)<br>EP35 (CL-1, Boiler 2)<br>EP59 (CL-2, Boiler 1)<br>EP60 (CL-2, Boiler 2) |

*DESCRIBE USE:* ☑ PROCESS HEAT ☐ SPACE HEAT ☐ ELECTRICAL GENERATION
☐ CONTINUOUS USE ☐ STAND BY/EMERGENCY ☐ OTHER (DESCRIBE): __________

HEATING MECHANISM: ☑ INDIRECT ☐ DIRECT

MAX. FIRING RATE (MMBTU/HOUR): 62.4

### WOOD-FIRED BURNER

*WOOD TYPE:* ☐ BARK ☐ WOOD/BARK ☐ WET WOOD ☐ DRY WOOD ☐ OTHER (DESCRIBE): ________

PERCENT MOISTURE OF FUEL:__________

☐ UNCONTROLLED ☐ CONTROLLED WITH FLYASH REINJECTION ☐ CONTROLLED W/O REINJECTION

FUEL FEED METHOD: HEAT TRANSFER MEDIA: ☐ STEAM ☐ AIR ☐ OTHER (DESCRIBE) ________

### COAL-FIRED BURNER

*TYPE OF BOILER* IF OTHER DESCRIBE:

| PULVERIZED | OVERFEED STOKER | UNDERFEED STOKER | SPREADER STOKER | FLUIDIZED BED |
|---|---|---|---|---|
| ☐ WET BED | ☐ UNCONTROLLED | ☐ UNCONTROLLED | ☐ UNCONTROLLED | ☐ CIRCULATING |
| ☐ DRY BED | ☐ CONTROLLED | ☐ CONTROLLED | ☐ FLYASH REINJECTION | ☐ RECIRCULATING |
| | | | ☐ NO FLYASH REINJECTION | |

### OIL/GAS-FIRED BURNER

TYPE OF BOILER: ☐ UTILITY ☑ INDUSTRIAL ☐ COMMERCIAL ☐ INSTITUTIONAL
TYPE OF FIRING: ☐ NORMAL ☐ TANGENTIAL ☑ LOW NOX BURNERS ☐ NO LOW NOX BURNER

### OTHER FUEL-FIRED BURNER

TYPE(S) OF FUEL: ________________ PI
TYPE OF BOILER: ☐ UTILITY ☐ INDUSTRIAL ☐ COMMERCIAL ☐ INSTITUTIONAL
TYPE OF FIRING: __________ TYPE(S) OF CONTROL(S) (IF ANY): ________________

### FUEL USAGE (INCLUDE STARTUP/BACKUP FUELS)

| FUEL TYPE | UNITS | MAXIMUM DESIGN CAPACITY (UNIT/HR) | REQUESTED CAPACITY LIMITATION (UNIT/HR) |
|---|---|---|---|
| Natural gas | MMBtu/hr, heat input | 62.4 | |
| | | | |
| | | | |

### FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

| FUEL TYPE | SPECIFIC BTU CONTENT | SULFUR CONTENT (% BY WEIGHT) | ASH CONTENT (% BY WEIGHT) |
|---|---|---|---|
| Natural gas | 1,020 Btu/cubic foot (default value) | | |
| | | | |
| | | | |

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Boiler | EMISSION SOURCE ID NO: ES37 (CL-1, Boiler 3)<br>ES64 (CL-2, Boiler 3) |
| | CONTROL DEVICE ID NO(S): |
| OPERATING SCENARIO _______1__________ OF ________1__________ | EMISSION POINT (STACK) ID NO(S): EP36 (CL-1, Boiler 3)<br>EP61 (CL-2, Boiler 3) |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
Natural gas fired boiler - 61.9 MMBtu/hr.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

- ☑ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Int.combustion engine/generator (Form B2)
- ☐ Liquid storage tanks (Form B3)
- ☐ Woodworking (Form B4)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Storage silos/bins (Form B6)
- ☐ Manuf. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☐ Other (Form B9)

START CONSTRUCTION DATE: DATE MANUFACTURED:
MANUFACTURER / MODEL NO.: EXPECTED OP. SCHEDULE: __24_ HR/DAY __7__ DAY/WK ___52__ WK/YR
IS THIS SOURCE SUBJECT TO? ☑ NSPS (SUBPARTS?): Dc ☐ NESHAP (SUBPARTS?):
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

### *CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) | |
|---|---|---|---|---|---|---|---|
| | | lb/hr | tons/yr | lb/hr | tons/yr | lb/hr | tons/yr |
| PARTICULATE MATTER (PM) | | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

See attached emission calculations

### *HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) | |
|---|---|---|---|---|---|---|---|---|
| | | | lb/hr | tons/yr | lb/hr | tons/yr | lb/hr | tons/yr |

See attached emission calculations

### *TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS | | |
|---|---|---|---|---|---|
| | | | lb/hr | lb/day | lb/yr |

See attached emission calculations

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B1

## EMISSION SOURCE (WOOD, COAL, OIL, GAS, OTHER FUEL-FIRED BURNER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B1**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Boiler | EMISSION SOURCE ID NO: ES37 (CL-1, Boiler 3)<br>ES64 (CL-2, Boiler 3) |
| | CONTROL DEVICE ID NO(S): |
| OPERATING SCENARIO: ___1___ OF ___1___ | EMISSION POINT (STACK) ID NO(S): EP36 (CL-1, Boiler 3)<br>EP61 (CL-2, Boiler 3) |

*DESCRIBE USE:* ☑ PROCESS HEAT ☐ SPACE HEAT ☐ ELECTRICAL GENERATION
☐ CONTINUOUS USE ☐ STAND BY/EMERGENCY ☐ OTHER (DESCRIBE): ____________

HEATING MECHANISM: ☑ INDIRECT ☐ DIRECT

MAX. FIRING RATE (MMBTU/HOUR): 61.9

### WOOD-FIRED BURNER

*WOOD TYPE:* ☐ BARK ☐ WOOD/BARK ☐ WET WOOD ☐ DRY WOOD ☐ OTHER (DESCRIBE): ____________

PERCENT MOISTURE OF FUEL:________________

☐ UNCONTROLLED ☐ CONTROLLED WITH FLYASH REINJECTION ☐ CONTROLLED W/O REINJECTION

FUEL FEED METHOD: HEAT TRANSFER MEDIA: ☐ STEAM ☐ AIR ☐ OTHER (DESCRIBE) ________________

### COAL-FIRED BURNER

*TYPE OF BOILER* IF OTHER DESCRIBE:

| PULVERIZED | OVERFEED STOKER | UNDERFEED STOKER | SPREADER STOKER | FLUIDIZED BED |
|---|---|---|---|---|
| ☐ WET BED | ☐ UNCONTROLLED | ☐ UNCONTROLLED | ☐ UNCONTROLLED | ☐ CIRCULATING |
| ☐ DRY BED | ☐ CONTROLLED | ☐ CONTROLLED | ☐ FLYASH REINJECTION | ☐ RECIRCULATING |
| | | | ☐ NO FLYASH REINJECTION | |

### OIL/GAS-FIRED BURNER

TYPE OF BOILER: ☐ UTILITY ☑ INDUSTRIAL ☐ COMMERCIAL ☐ INSTITUTIONAL
TYPE OF FIRING: ☐ NORMAL ☐ TANGENTIAL ☑ LOW NOX BURNERS ☐ NO LOW NOX BURNER

### OTHER FUEL-FIRED BURNER

TYPE(S) OF FUEL: ____________________________ PE

TYPE OF BOILER: ☐ UTILITY ☐ INDUSTRIAL ☐ COMMERCIAL ☐ INSTITUTIONAL

TYPE OF FIRING: ________________ TYPE(S) OF CONTROL(S) (IF ANY): ____________________________

### FUEL USAGE (INCLUDE STARTUP/BACKUP FUELS)

| FUEL TYPE | UNITS | MAXIMUM DESIGN CAPACITY (UNIT/HR) | REQUESTED CAPACITY LIMITATION (UNIT/HR) |
|---|---|---|---|
| Natural gas | MMBtu/hr, heat input | 61.9 | |
| | | | |
| | | | |

### FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

| FUEL TYPE | SPECIFIC BTU CONTENT | SULFUR CONTENT (% BY WEIGHT) | ASH CONTENT (% BY WEIGHT) |
|---|---|---|---|
| Natural gas | 1,020 Btu/cubic foot (default value) | | |
| | | | |
| | | | |

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION: Fire Pump | EMISSION SOURCE ID NO: ES40 |
| | CONTROL DEVICE ID NO(S): |
| OPERATING SCENARIO ___1___ OF ___1___ | EMISSION POINT (STACK) ID NO(S): EP39 |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
Diesel fueled fire pump.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☑ Int.combustion engine/generator (Form B2)
- ☐ Liquid storage tanks (Form B3)
- ☐ Woodworking (Form B4)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Storage silos/bins (Form B6)
- ☐ Manuf. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☐ Other (Form B9)

START CONSTRUCTION DATE: DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: EXPECTED OP. SCHEDULE: _24_ HR/DAY _7_ DAY/WK _52_ WK/YR

IS THIS SOURCE SUBJECT TO? ☑ NSPS (SUBPARTS?): IIII ☑ NESHAP (SUBPARTS?): ZZZZ

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

### *CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) | |
|---|---|---|---|---|---|---|---|
| | | lb/hr | tons/yr | lb/hr | tons/yr | lb/hr | tons/yr |
| PARTICULATE MATTER (PM) | See attached emission calculations | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

### *HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) | |
|---|---|---|---|---|---|---|---|---|
| | | | lb/hr | tons/yr | lb/hr | tons/yr | lb/hr | tons/yr |
| | | See attached emission calculations | | | | | | |

### *TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS | | |
|---|---|---|---|---|---|
| | | | lb/hr | lb/day | lb/yr |
| | | See attached emission calculations | | | |

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B2

## EMISSION SOURCE (INTERNAL COMBUSTION ENGINES/TURBINES/GENERATORS)



EMISSION SOURCE DESCRIPTION:
Fire pump

EMISSION SOURCE ID NO: ES40

CONTROL DEVICE ID NO(S):

OPERATING SCENARIO: 1 OF 1

EMISSION POINT (STACK) ID NO(S): EP39

ENGINE SERVICE (CHECK ALL THAT APPLY): ☑ EMERGENCY ☐ SPACE HEAT ☐ ELECTRICAL GENERATION ☐ PEAK SHAVER ☐ OTHER (DESCRIBE): ____

GENERATOR OUTPUT (KW): NA

ANTICIPATED ACTUAL HOURS OF OPERATION (HRS/YR): 26

ENGINE OUTPUT (HP): 363

**TYPE ICE:** ☐ GASOLINE ENGINE ☑ DIESEL ENGINE UP TO 600 HP ☐ DIESEL ENGINE GREATER THAN 600 HP ☐ DUAL FUEL ENGINE ☐ OTHER (DESCRIBE): ____ (complete below)

**ENGINE TYPE** ☐ RICH BURN ☑ LEAN BURN

**EMISSION REDUCTION MODIFICATIONS** ☐ INJECTION TIMING RETARD ☐ PREIGNITION CHAMBER COMBUSTION ☑ OTHER: NSPS Compliant

**OR** ☐ STATIONARY GAS TURBINE (complete below)

**FUEL:** ☐ NATURAL GAS ☐ OIL ☐ OTHER (DESCRIBE): ____

**CYCLE:** ☐ COGENERATION ☐ SIMPLE ☐ REGENERATIVE ☐ COMBINED

**CONTROLS:** ☐ WATER-STEAM INJECTION ☐ UNCONTROLLED ☐ LEAN-PREMIX ☐ OTHER (SPECIFY): ____

☐ NATURAL GAS PIPELINE COMPRESSOR OR TURBINE (complete below)

**ENGINE TYPE:** ☐ 2-CYCLE LEAN BURN ☐ 4-CYCLE LEAN ☐ TURBINE ☐ 4-CYCLE RICH BURN ☐ OTHER (DESCRIBE): ____

**CONTROLS:** ☐ COMBUSTION MODIFICATIONS (DESCRIBE): ____ ☐ NONSELECTIVE CATALYTIC REDUCTION ☐ SELECTIVE CATALYTIC REDUCTION ☐ CLEAN BURN AND PRECOMBUSTION CHAMBER ☐ UNCONTROLLED

### FUEL USAGE (INCLUDE STARTUP/BACKUP FUEL)

| FUEL TYPE | UNITS | MAXIMUM DESIGN CAPACITY (UNIT/HR) | REQUESTED CAPACITY LIMITATION (UNIT/HR) |
|---|---|---|---|
| Diesel | MMBtu/hr | 2.54 | |
| | | | |
| | | | |

### FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

| FUEL TYPE | BTU/UNIT | UNITS | SULFUR CONTENT (% BY WEIGHT) |
|---|---|---|---|
| Diesel | gallon | 137,000 (AP-42 default) | 0.0015 |
| | | | |
| | | | |

### MANUFACTURER'S SPECIFIC EMISSION FACTORS (IF AVAILABLE)

| POLLUTANT | NOX | CO | PM | PM10 | VOC | OTHER |
|---|---|---|---|---|---|---|
| EMISSION FACTOR LB/UNIT | | | | | | |
| UNIT | | | | | | |

DESCRIBE METHODS TO MINIMIZE VISIBLE EMISSIONS DURING IDLING, OR LOW LOAD OPERATIONS:
Engine will only be operated for periodic testing and during emergencies when fire control is needed.

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Hydrochloric Acid Storage Tank | EMISSION SOURCE ID NO: ES41 (CL-1)<br>EP67 (CL-2) |
| | CONTROL DEVICE ID NO(S): CD35 (CL-1)<br>CD55 (CL-2) |
| OPERATING SCENARIO ____1____ OF ____1____ | EMISSION POINT (STACK) ID NO(S): EP40 (CL-1)<br>EP64 (CL-2) |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
Hydrochloric acid storage tank.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Int.combustion engine/generator (Form B2)
- ☑ Liquid storage tanks (Form B3)
- ☐ Woodworking (Form B4)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Storage silos/bins (Form B6)
- ☐ Manuf. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☐ Other (Form B9)

START CONSTRUCTION DATE: DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: EXPECTED OP. SCHEDULE: __24__ HR/DAY __7__ DAY/WK __52__ WK/YR

IS THIS SOURCE SUBJECT TO? ☐ NSPS (SUBPARTS?):__________ ☐ NESHAP (SUBPARTS?):__________

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

### *CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) | |
|---|---|---|---|---|---|---|---|
| | | lb/hr | tons/yr | lb/hr | tons/yr | lb/hr | tons/yr |
| PARTICULATE MATTER (PM) | See attached emission calculations | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

### *HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) | |
|---|---|---|---|---|---|---|---|---|
| | | | lb/hr | tons/yr | lb/hr | tons/yr | lb/hr | tons/yr |
| | | See attached emission calculations | | | | | | |

### *TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE*

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS | | |
|---|---|---|---|---|---|
| | | | lb/hr | lb/day | lb/yr |
| | | See attached emission calculations | | | |

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B3

## EMISSION SOURCE (LIQUID STORAGE TANK)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B3**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br><br>Hydrochloric Acid Storage Tank | EMISSION SOURCE ID NO: ES41 (CL-1)<br>EP67 (CL-2) |
| | CONTROL DEVICE ID NO(S): CD35 (CL-1)<br>CD55 (CL-2) |
| OPERATING SCENARIO: ______1________ OF _______1_______ | EMISSION POINT (STACK) ID NO(S): EP40 (CL-1)<br>EP64 (CL-2) |

### *EACH STORAGE TANK*

DESCRIBE IN DETAIL THE STORAGE TANK (ATTACH FLOW DIAGRAM):
Hydrochloric acid storage tank.
See process flow diagram included as Attachment 1.

| | | |
|---|---|---|
| LIQUID STORED: Hydrochloric acid, 9.8% by weight | LIQUID MOLECULAR WEIGHT (LB/LB-MOLE): 36.46 | |
| TANK CAPACITY (GAL): 7,500 | VAPOR MOLECULAR WEIGHT (LB/LB-MOLE): 36.46 | |
| AVERAGE LIQUID SURFACE TEMPERATURE (F): Varies | VAPOR PRESSURE AT AVE. LIQUID SURFACE TEMP (PSIA): Varies | |
| | MAX. LIQUID SURFACE TEMP ($^oF$): Varies | MAX. TRUE VAPOR PRESS. (PSIA): Varies |
| | BREATHER VENT SETTINGS (PSIG) ________ VACUUM ________ PRESSURE | |
| SHELL DIAMETER (FT): | SHELL CONDITION: ☐ GOOD ☐ POOR | IS TANK HEATED: ☐ YES ☐ NO |
| SHELL COLOR: | MAXIMUM THROUGHPUT (GAL/YR): 2,100 | MAXIMUM TURNOVERS PER YEAR: |
| WORKING VOLUME (GAL): | ACTUAL THROUGHPUT (GAL/YR): 1,800 | ACTUAL TURNOVERS PER YEAR: |
| MAX. FILLS PER DAY: 1 | MAX. FILLING RATE (GAL/MIN): 120 | MIN. DURATION OF FILL (HR/FILL): 0.34 |

### *VERTICAL FIXED ROOF TANKS*

| | | |
|---|---|---|
| SHELL HEIGHT (FT): | ROOF TYPE: ☐ CONE ☐ DOME | ROOF HEIGHT (FT): |
| AVERAGE LIQUID HEIGHT (FT): | ROOF CONDITION: ☐ GOOD ☐ POOR | |
| MAXIMUM LIQUID HEIGHT (FT): | ROOF COLOR: | |

### *HORIZONTAL TANKS*

| | |
|---|---|
| SHELL LENGTH (FT): | IS TANK UNDERGROUND ?: ☐ YES ☐ NO |

### *FLOATING ROOF TANKS*

**DESCRIBE PERTINENT TANK DATA SUCH AS DECKS, RIM-SEALS, LIQUID DENSITY @ 60 DEG F:**

**FOR ALL TANKS - DESCRIBE ANY MONITORING OR WARNING DEVICES (SUCH AS LEAK AND FUME DETECTION INSTRUMENTATION):**
**See control device form C6.**

**COMMENTS:**

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Hydrochloric Acid Dilution Tank | EMISSION SOURCE ID NO: ES42 (CL-1)<br>EP68 (CL-2) |
| | CONTROL DEVICE ID NO(S): CD35 (CL-1)<br>CD55 (CL-2) |
| OPERATING SCENARIO _______1__________ OF ________1__________ | EMISSION POINT (STACK) ID NO(S): EP40 (CL-1)<br>EP64 (CL-2) |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
Hydrochloric acid dilution tank.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Int.combustion engine/generator (Form B2)
- ☑ Liquid storage tanks (Form B3)
- ☐ Woodworking (Form B4)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Storage silos/bins (Form B6)
- ☐ Manuf. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☐ Other (Form B9)

START CONSTRUCTION DATE: DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: EXPECTED OP. SCHEDULE: __24_ HR/DAY __7__ DAY/WK ___52__ WK/YR

IS THIS SOURCE SUBJECT TO? ☐ NSPS (SUBPARTS?):____________________ ☐ NESHAP (SUBPARTS?):____________________________

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

### CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr |
|---|---|---|---|---|---|---|---|
| PARTICULATE MATTER (PM) | See attached emission calculations | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

### HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) tons/yr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) lb/hr | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) tons/yr |
|---|---|---|---|---|---|---|---|---|
| | | See attached emission calculations | | | | | | |

### TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS lb/hr | lb/day | lb/yr |
|---|---|---|---|---|---|
| | | See attached emission calculations | | | |

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B3

## EMISSION SOURCE (LIQUID STORAGE TANK)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B3**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br><br>Hydrochloric Acid Dilution Tank | EMISSION SOURCE ID NO: ES42 (CL-1)<br>EP68 (CL-2)<br>CONTROL DEVICE ID NO(S): CD35 (CL-1)<br>CD55 (CL-2) |
| OPERATING SCENARIO: ______1________ OF _______1_______ | EMISSION POINT (STACK) ID NO(S): EP40 (CL-1)<br>EP64 (CL-2) |

### *EACH STORAGE TANK*

DESCRIBE IN DETAIL THE STORAGE TANK (ATTACH FLOW DIAGRAM):
Hydrochloric acid dilution tank.
See process flow diagram included as Attachment 1.

| | | |
|---|---|---|
| LIQUID STORED: Diluted hydrochloric acid | LIQUID MOLECULAR WEIGHT (LB/LB-MOLE): 36.46 | |
| TANK CAPACITY (GAL): 5,580 | VAPOR MOLECULAR WEIGHT (LB/LB-MOLE): 36.46 | |
| AVERAGE LIQUID SURFACE TEMPERATURE (F): Varies | VAPOR PRESSURE AT AVE. LIQUID SURFACE TEMP (PSIA): Varies | |
| | MAX. LIQUID SURFACE TEMP ($^{o}$F): Varies | MAX. TRUE VAPOR PRESS. (PSIA): Varies |
| | BREATHER VENT SETTINGS (PSIG) ________ VACUUM ________ PRESSURE | |
| SHELL DIAMETER (FT): | SHELL CONDITION: ☐ GOOD ☐ POOR | IS TANK HEATED: ☐ YES ☐ NO |
| SHELL COLOR: | MAXIMUM THROUGHPUT (GAL/YR): 2,100 | MAXIMUM TURNOVERS PER YEAR: |
| WORKING VOLUME (GAL): | ACTUAL THROUGHPUT (GAL/YR): 1,800 | ACTUAL TURNOVERS PER YEAR: |
| MAX. FILLS PER DAY: | MAX. FILLING RATE (GAL/MIN): 22 | MIN. DURATION OF FILL (HR/FILL): |

### *VERTICAL FIXED ROOF TANKS*

| | | |
|---|---|---|
| SHELL HEIGHT (FT): | ROOF TYPE: ☐ CONE ☐ DOME | ROOF HEIGHT (FT): |
| AVERAGE LIQUID HEIGHT (FT): | ROOF CONDITION: ☐ GOOD ☐ POOR | |
| MAXIMUM LIQUID HEIGHT (FT): | ROOF COLOR: | |

### *HORIZONTAL TANKS*

| | |
|---|---|
| SHELL LENGTH (FT): | IS TANK UNDERGROUND ?: ☐ YES ☐ NO |

### *FLOATING ROOF TANKS*

**DESCRIBE PERTINENT TANK DATA SUCH AS DECKS, RIM-SEALS, LIQUID DENSITY @ 60 DEG F:**

**FOR ALL TANKS - DESCRIBE ANY MONITORING OR WARNING DEVICES (SUCH AS LEAK AND FUME DETECTION INSTRUMENTATION):**
**See control device form C6.**

**COMMENTS:**

**Attach Additional Sheets As Necessary**

# FORM B

## SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br>Sulfuric Acid Storage Tank | EMISSION SOURCE ID NO: ES43 (CL-1)<br>EP69 (CL-2) |
| | CONTROL DEVICE ID NO(S): CD35 (CL-1)<br>CD55 (CL-2) |
| OPERATING SCENARIO ___1___ OF ___1___ | EMISSION POINT (STACK) ID NO(S): EP40 (CL-1)<br>EP64 (CL-2) |

**DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):**
Sulfuric acid storage tank.
See process flow diagram included as Attachment 1.

**TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):**

| | | |
|---|---|---|
| ☐ Coal,wood,oil, gas, other burner (Form B1) | ☐ Woodworking (Form B4) | ☐ Manuf. of chemicals/coatings/inks (Form B7) |
| ☐ Int.combustion engine/generator (Form B2) | ☐ Coating/finishing/printing (Form B5) | ☐ Incineration (Form B8) |
| ☑ Liquid storage tanks (Form B3) | ☐ Storage silos/bins (Form B6) | ☐ Other (Form B9) |

START CONSTRUCTION DATE: DATE MANUFACTURED:

MANUFACTURER / MODEL NO.: EXPECTED OP. SCHEDULE: __24_ HR/DAY __7__ DAY/WK ___52__ WK/YR

IS THIS SOURCE SUBJECT TO? ☐ NSPS (SUBPARTS?):____________________ ☐ NESHAP (SUBPARTS?):__________________________

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

***CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE***

| AIR POLLUTANT EMITTED | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) | |
|---|---|---|---|---|---|---|---|
| | | lb/hr | tons/yr | lb/hr | tons/yr | lb/hr | tons/yr |
| PARTICULATE MATTER (PM) | See attached emission calculations | | | | | | |
| PARTICULATE MATTER<10 MICRONS ($PM_{10}$) | | | | | | | |
| PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$) | | | | | | | |
| SULFUR DIOXIDE (SO2) | | | | | | | |
| NITROGEN OXIDES (NOx) | | | | | | | |
| CARBON MONOXIDE (CO) | | | | | | | |
| VOLATILE ORGANIC COMPOUNDS (VOC) | | | | | | | |
| LEAD | | | | | | | |
| OTHER | | | | | | | |

***HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE***

| HAZARDOUS AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS) | | POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS) | |
|---|---|---|---|---|---|---|---|---|
| | | | lb/hr | tons/yr | lb/hr | tons/yr | lb/hr | tons/yr |
| | | See attached emission calculations | | | | | | |

***TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE***

| TOXIC AIR POLLUTANT | CAS NO. | SOURCE OF EMISSION FACTOR | EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS | | |
|---|---|---|---|---|---|
| | | | lb/hr | lb/day | lb/yr |
| | | See attached emission calculations | | | |

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

***COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE***

**Attach Additional Sheets As Necessary**

# FORM B3

## EMISSION SOURCE (LIQUID STORAGE TANK)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **B3**

| | |
|---|---|
| EMISSION SOURCE DESCRIPTION:<br><br>Sulfuric Acid Storage Tank | EMISSION SOURCE ID NO: ES43 (CL-1)<br>EP69 (CL-2) |
| | CONTROL DEVICE ID NO(S): CD35 (CL-1)<br>CD55 (CL-2) |
| OPERATING SCENARIO: ______1________ OF _______1_______ | EMISSION POINT (STACK) ID NO(S): EP40 (CL-1)<br>EP64 (CL-2) |

### *EACH STORAGE TANK*

DESCRIBE IN DETAIL THE STORAGE TANK (ATTACH FLOW DIAGRAM):
Sulfuric acid storage tank.
See process flow diagram included as Attachment 1.

| | |
|---|---|
| LIQUID STORED: Sulfuric acid, 98% by weight | LIQUID MOLECULAR WEIGHT (LB/LB-MOLE): 98 |
| TANK CAPACITY (GAL): 3,000 | VAPOR MOLECULAR WEIGHT (LB/LB-MOLE): 98 |
| AVERAGE LIQUID SURFACE TEMPERATURE (F): Varies | VAPOR PRESSURE AT AVE. LIQUID SURFACE TEMP (PSIA): Varies |

| | | |
|---|---|---|
| | MAX. LIQUID SURFACE TEMP ($^{o}$F): Varies | MAX. TRUE VAPOR PRESS. (PSIA): Varies |
| | BREATHER VENT SETTINGS (PSIG) ________ VACUUM ________ PRESSURE | |
| SHELL DIAMETER (FT): | SHELL CONDITION: ☐ GOOD ☐ POOR | IS TANK HEATED: ☐ YES ☐ NO |
| SHELL COLOR: | MAXIMUM THROUGHPUT (GAL/YR): 2,640 | MAXIMUM TURNOVERS PER YEAR: |
| WORKING VOLUME (GAL): | ACTUAL THROUGHPUT (GAL/YR): 2,261 | ACTUAL TURNOVERS PER YEAR: |
| MAX. FILLS PER DAY: | MAX. FILLING RATE (GAL/MIN): 120 | MIN. DURATION OF FILL (HR/FILL): |

### *VERTICAL FIXED ROOF TANKS*

| | | |
|---|---|---|
| SHELL HEIGHT (FT): | ROOF TYPE: ☐ CONE ☐ DOME | ROOF HEIGHT (FT): |
| AVERAGE LIQUID HEIGHT (FT): | ROOF CONDITION: ☐ GOOD ☐ POOR | |
| MAXIMUM LIQUID HEIGHT (FT): | ROOF COLOR: | |

### *HORIZONTAL TANKS*

| | |
|---|---|
| SHELL LENGTH (FT): | IS TANK UNDERGROUND ?: ☐ YES ☐ NO |

### *FLOATING ROOF TANKS*

**DESCRIBE PERTINENT TANK DATA SUCH AS DECKS, RIM-SEALS, LIQUID DENSITY @ 60 DEG F:**

**FOR ALL TANKS - DESCRIBE ANY MONITORING OR WARNING DEVICES (SUCH AS LEAK AND FUME DETECTION INSTRUMENTATION):**
**See control device form C6.**

**COMMENTS:**

**Attach Additional Sheets As Necessary**

# FORM C6

## CONTROL DEVICE (GASEOUS ABSORBER)

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **C6**

***AS REQUIRED BY 15A NCAC 2Q .0112, THIS FORM MUST BE SEALED BY A PROFESSIONAL ENGINEER (P.E.) LICENSED IN NORTH CAROLINA.***

| | |
|---|---|
| CONTROL DEVICE ID NO: CD35 (CL-1)<br>CD55 (CL-2) | CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): ES41, ES42, ES43 (CL-1)<br>ES67, ES68, ES69 (CL-2) |
| EMISSION POINT ID NO(S): EP40 (CL-1)<br>EP64 (CL-2) | POSITION IN SERIES OF CONTROLS: NO. 1 OF 1 UNITS |
| **OPERATING SCENARIO:** | |
| 1 OF 1 | |

DESCRIBE CONTROL SYSTEM:

Wet scrubber controlling vapors vented from the HCl storage tank, HCl dilution tank and $H_2SO_4$ storage tank.

| POLLUTANT(S) COLLECTED: | HCl (ES41, ES67) | HCl (ES42, ES68) | H2SO4 (ES43, ES69) | |
|---|---|---|---|---|
| BEFORE CONTROL EMISSION RATE (LB/HR): | 20.7 | 0.0003 | 5.59E-05 | |
| CAPTURE EFFICIENCY: | 100 % | 100 % | 100 % | % |
| CONTROL DEVICE EFFICIENCY: | 99.4 % | 69.65 % | 99.4 % | % |
| CORRESPONDING EFFICIENCY: | 99.4 % | 69.65 % | 99.4 % | % |
| EFFICIENCY DETERMINATION CODE: | 4 | 4 | 4 | |
| TOTAL EMISSION RATE (LB/HR): | 0.124 | 0.0001 | 3.35E-07 | |

| | |
|---|---|
| PRESSURE DROP (IN. $H_2$0): 5 MIN 8 MAX | |
| INLET TEMPERATURE ($^oF$): 33 MIN 105 MAX | OUTLET TEMPERATURE ($^oF$): 33 MIN 120 MAX |
| INLET AIR FLOW RATE (ACFM): 16 | GAS VELOCITY (FT/SEC): 105 |
| TOTAL GAS PRESSURE (PSIG): 0.4 | GAS DEW POINT ($^oF$): 146 |

TYPE OF SYSTEM: Wet scrubber

| | | | |
|---|---|---|---|
| PACKED COLUMN X | TYPE OF PACKING: | COLUMN LENGTH (FT): 6 | COLUMN DIAMETER (FT): 0.33 |
| PLATE COLUMN | PLATE SPACING (INCHES): | COLUMN LENGTH (FT): | COLUMN DIAMETER (FT): |

| | |
|---|---|
| ADDITIVE LIQUID SCRUBBING MEDIUM: Water with NaOH/$NaCO_3$ | PERCENT RECIRCULATED: 100%, with bleed in batches to maintain concentrations |
| MINIMUM LIQUID INJECTION RATE (GAL/MIN): 155 | MAKE UP RATE (GAL/MIN): 5, in batches FOR ADDITIVE (GAL/MIN): 0.1 |
| pH RANGE: 9-11 | METHOD pH MONITORING: pH analyzer and manual titrations |

DESCRIBE MAINTENANCE PROCEDURES:

Daily visual inspections (walkdowns) of entire system
Preventative maintenance on pH meter (periodic inspection and calibration)
Annual inspection of venturi connection, pump, vessel internal and remaining instruments.

DESCRIBE ANY FIRE DETECTION DEVICES AND ANY MEANS OF FIRE SUPPRESSION:

Equipment within range of fire protection system.

DESCRIBE ANY MONITORING DEVICES, GAUGES, TEST PORTS, ETC:

pH meter to monitor scrubbing liquor.
Differential pressure transmitter to monitor venturi pressure change, and pressure gauge to confirm vacuum.
Outlet temperature transmitter on circulating water to monitor operating temperature.

ATTACH A DIAGRAM OF THE RELATIONSHIP OF CONTROL DEVICE TO ITS EMISSION SOURCE(S): See Attachment 1

COMMENTS:

The control device efficiency is based on engineering experience with similar emissions units and control devices.

**Attach Additional Sheets As Necessary**

# FORM D1

## FACILITY-WIDE EMISSIONS SUMMARY

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **D1**

**CRITERIA AIR POLLUTANT EMISSIONS INFORMATION - FACILITY-WIDE**

| | **EXPECTED ACTUAL EMISSIONS** (AFTER CONTROLS / LIMITATIONS) | **POTENTIAL EMISSIONS** (BEFORE CONTROLS / LIMITATIONS) | **POTENTIAL EMISSIONS** (AFTER CONTROLS / LIMITATIONS) |
|---|---|---|---|
| **AIR POLLUTANT EMITTED** | tons/yr | tons/yr | tons/yr |
| PARTICULATE MATTER (PM) | 131 | 140,770 | 155 |
| PARTICULATE MATTER < 10 MICRONS ($PM_{10}$) | 79.2 | 140,709 | 93.5 |
| PARTICULATE MATTER < 2.5 MICRONS ($PM_{2.5}$) | 55.6 | 140,682 | 65.7 |
| SULFUR DIOXIDE ($SO_2$) | 34.6 | 35.3 | 34.9 |
| NITROGEN OXIDES (NOx) | 475 | 1,070 | 514 |
| CARBON MONOXIDE (CO) | 1,294 | 1,552 | 1,328 |
| VOLATILE ORGANIC COMPOUNDS (VOC) | 11.6 | 45.3 | 13.9 |
| LEAD | 0.0010 | 0.0012 | 0.0012 |
| GREENHOUSE GASES (GHG) (SHORT TONS) as $CO_2e$ | 256,036 | 347,389 | 300,547 |
| OTHER - $H_2SO_4$ | 0.007 | 0.008 | 0.008 |

**HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION - FACILITY-WIDE**

| | | **EXPECTED ACTUAL EMISSIONS** (AFTER CONTROLS / LIMITATIONS) | **POTENTIAL EMISSIONS** (BEFORE CONTROLS / LIMITATIONS) | **POTENTIAL EMISSIONS** (AFTER CONTROLS / LIMITATIONS) |
|---|---|---|---|---|
| **HAZARDOUS AIR POLLUTANT EMITTED** | CAS NO. | tons/yr | tons/yr | tons/yr |
| Acetaldehyde | 75-07-0 | 0.0000 | 0.0155 | 0.0002 |
| Acrolein | 107-02-8 | 0.0000 | 0.0032 | 0.0000 |
| Arsenic | NA | 0.0004 | 0.0005 | 0.0005 |
| Benzene | 71-43-2 | 0.0047 | 0.2297 | 0.0077 |
| Beryllium | NA | 0.0000 | 0.0000 | 0.0000 |
| 1,3-Butadiene | 106-99-0 | 0.0000 | 0.0004 | 0.0000 |
| Cadmium | NA | 0.0023 | 0.0027 | 0.0027 |
| Chromium | NA | 0.0029 | 0.0034 | 0.0034 |
| Cobalt | NA | 0.0002 | 0.0002 | 0.0002 |
| Dichlorobenzene | 106-46-7 | 0.0025 | 0.0029 | 0.0029 |
| Formaldehyde | 50-00-0 | 0.1567 | 0.2192 | 0.1846 |
| Hexane | 110-54-3 | 3.7586 | 4.4219 | 4.4219 |
| HCl | 7647-01-0 | 0.9240 | 181 | 1.0871 |
| HF | | 9.1416 | 2,003 | 9.6146 |
| Manganese | NA | 0.0008 | 0.0009 | 0.0009 |
| Mercury | NA | 0.0005 | 0.0006 | 0.0006 |
| Naphthalene | 91-20-3 | 0.0013 | 0.0383 | 0.0019 |
| Nickel | NA | 0.0044 | 0.0052 | 0.0052 |
| Polycyclic Organic Matter (POM) | NA | 0.0015 | 0.0620 | 0.0024 |
| Selenium | NA | 0.0001 | 0.0001 | 0.0001 |
| Toluene | 108-88-3 | 0.0072 | 0.0904 | 0.0093 |
| Xylene (mixed isomers) | 1330-20-7 | 0.0001 | 0.0564 | 0.0006 |
| Total HAP | NA | 14.0095 | 2,190 | 15.3463 |
| | | | | |

**TOXIC AIR POLLUTANT EMISSIONS INFORMATION - FACILITY-WIDE**

INDICATE REQUESTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS. EMISSIONS ABOVE THE TOXIC PERMIT EMISSION RATE (TPER) IN 15A NCAC 2Q .0711 MAY REQUIRE AIR DISPERSION MODELING. USE NETTING FORM D2 IF NECESSARY.

| | | | | | Modeling Required ? | | |
|---|---|---|---|---|---|---|---|
| **TOXIC AIR POLLUTANT EMITTED** | CAS NO. | lb/hr | lb/day | lb/year | Yes | No | |
| HCl | 7647-01-0 | 1.09 | | | X | | |
| HF | 7664-39-3 | 2.71 | 65.0 | | X | | |
| $H_2SO_4$ | 7664-93-9 | 0.002 | 0.04 | | | X | |

COMMENTS:

**Attach Additional Sheets As Necessary**

# FORM D4

## EXEMPT AND INSIGNIFICANT ACTIVITIES SUMMARY

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **D4**

| ACTIVITIES EXEMPTED PER 2Q .0102 OR INSIGNIFICANT ACTIVITIES PER 2Q .0503 FOR TITLE V SOURCES | | |
|---|---|---|
| **DESCRIPTION OF EMISSION SOURCE** | **SIZE OR PRODUCTION RATE** | **BASIS FOR EXEMPTION OR INSIGNIFICANT ACTIVITY** |
| **Mining** | | |
| IES01: Mobile Rock Breaking | NA | 2Q .0503(8) |
| IES02: Ore and Waste Rock Loader Operations | NA | 2Q .0503(8) |
| IES03: Mobile Ore Crushing | NA | 2Q .0503(8) |
| IES04: Mobile Waste Rock Crushing Without Screening | NA | 2Q .0503(8) |
| IES05: Ore, Waste Rock, Refuse and Reclaim Conveying | NA | 2Q .0503(8) |
| IES06: Miscellaneous Material Handling | NA | 2Q .0503(8) |

# FORM D4

## EXEMPT AND INSIGNIFICANT ACTIVITIES SUMMARY

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **D4**

| ACTIVITIES EXEMPTED PER 2Q .0102 OR INSIGNIFICANT ACTIVITIES PER 2Q .0503 FOR TITLE V SOURCES | | |
|---|---|---|
| **DESCRIPTION OF EMISSION SOURCE** | **SIZE OR PRODUCTION RATE** | **BASIS FOR EXEMPTION OR INSIGNIFICANT ACTIVITY** |
| **Concentrator** | | |
| IES08: Wind Erosion of ROM Pile | NA | 2Q .0503(8) |
| IES09: Wind Erosion of ROM Pile (Concentrate Alternate Location) | NA | 2Q .0503(8) |
| IES10: Wind Erosion of Waste Rock and Tailings Disposal | NA | 2Q .0503(8) |
| IES11: ROM Pile Loader Operations | NA | 2Q .0503(8) |
| IES12: Wind Erosion of Ore Surge Pile | NA | 2Q .0503(8) |
| IES13: Coarse Ore Handling | NA | 2Q .0503(8) |
| IES14: Miscellaneous Material Handling Operations | NA | 2Q .0503(8) |
| IES15: Miscellaneous Materials Loader Operation | NA | 2Q .0503(8) |
| IES16: Sulfuric Acid Storage Tank | NA | 2Q .0503(8) |
| IES17: Diesel Storage Tank - 20,000 gal | NA | 2Q .0503(8) |
| IES18: Diesel Storage Tank - 7,000 gal | NA | 2Q .0503(8) |
| IES19: Kerosene Storage Tank - 8,000 gal | NA | 2Q .0503(8) |
| IES20: Concentrator Plant Truck Traffic | NA | 2Q .0503(8) |

# FORM D4

## EXEMPT AND INSIGNIFICANT ACTIVITIES SUMMARY

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **D4**

| ACTIVITIES EXEMPTED PER 2Q .0102 OR INSIGNIFICANT ACTIVITIES PER 2Q .0503 FOR TITLE V SOURCES | | |
|---|---|---|
| **DESCRIPTION OF EMISSION SOURCE** | **SIZE OR PRODUCTION RATE** | **BASIS FOR EXEMPTION OR INSIGNIFICANT ACTIVITY** |
| **Carolina Lithium 1** | | |
| IES21: Wind Erosion of Concentrate Surge Pile | NA | 2Q .0503(8) |
| IES22: Concentrate Pile Loader Operations | NA | 2Q .0503(8) |
| IES23: Concentrate Pile Material Handling | NA | 2Q .0503(8) |
| IES24: Lithium Carbonate Reactor | NA | 2Q .0503(8) |
| IES25: Cooling Tower | NA | 2Q .0503(8) |
| IES26 Diesel Storage Tank | NA | 2Q .0503(8) |
| IES27 Truck Traffic | NA | 2Q .0503(8) |
| IES28 Component Leak Fugitives | NA | 2Q .0503(8) |

# FORM D4

## EXEMPT AND INSIGNIFICANT ACTIVITIES SUMMARY

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **D4**

| ACTIVITIES EXEMPTED PER 2Q .0102 OR INSIGNIFICANT ACTIVITIES PER 2Q .0503 FOR TITLE V SOURCES | | |
|---|---|---|
| **DESCRIPTION OF EMISSION SOURCE** | **SIZE OR PRODUCTION RATE** | **BASIS FOR EXEMPTION OR INSIGNIFICANT ACTIVITY** |
| **Carolina Lithium 2** | | |
| IES29: Wind Erosion of Concentrate Surge Pile | NA | 2Q .0503(8) |
| IES30: Concentrate Pile Loader Operations | NA | 2Q .0503(8) |
| IES31: Concentrate Pile Material Handling | NA | 2Q .0503(8) |
| IES32: Lithium Carbonate Reactor | NA | 2Q .0503(8) |
| IES33: Cooling Tower | NA | 2Q .0503(8) |
| IES34 Diesel Storage Tank | NA | 2Q .0503(8) |
| IES35 Truck Traffic | NA | 2Q .0503(8) |
| IES36 Component Leak Fugitives | NA | 2Q .0503(8) |

# FORM D5

## TECHNICAL ANALYSIS TO SUPPORT PERMIT APPLICATION

REVISED 09/22/16 **NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate** **D5**

PROVIDE DETAILED TECHNICAL CALCULATIONS TO SUPPORT ALL EMISSION, CONTROL, AND REGULATORY DEMONSTRATIONS MADE IN THIS APPLICATION. INCLUDE A COMPREHENSIVE PROCESS FLOW DIAGRAM AS NECESSARY TO SUPPORT AND CLARIFY CALCULATIONS AND ASSUMPTIONS. ADDRESS THE FOLLOWING SPECIFIC ISSUES ON SEPARATE PAGES:

**A** **SPECIFIC EMISSIONS SOURCE (EMISSION INFORMATION) (FORM B and B1 through B9) -** SHOW CALCULATIONS USED, INCLUDING EMISSION FACTORS, MATERIAL BALANCES, AND/OR OTHER METHODS FROM WHICH THE POLLUTANT EMISSION RATES IN THIS APPLICATION WERE DERIVED. INCLUDE CALCULATION OF POTENTIAL BEFORE AND, WHERE APPLICABLE, AFTER CONTROLS. CLEARLY STATE ANY ASSUMPTIONS MADE AND PROVIDE ANY REFERENCES AS NEEDED TO SUPPORT MATERIAL BALANCE CALCULATIONS.

**B** **SPECIFIC EMISSION SOURCE (REGULATORY INFORMATION)(FORM E2 - TITLE V ONLY) -** PROVIDE AN ANALYSIS OF ANY REGULATIONS APPLICABLE TO INDIVIDUAL SOURCES AND THE FACILITY AS A WHOLE. INCLUDE A DISCUSSION OUTING METHODS (e.g. FOR TESTING AND/OR MONITORING REQUIREMENTS) FOR COMPLYING WITH APPLICABLE REGULATIONS, PARTICULARLY THOSE REGULATIONS LIMITING EMISSIONS BASED ON PROCESS RATES OR OTHER OPERATIONAL PARAMETERS. PROVIDE JUSTIFICATION FOR AVOIDANCE OF ANY FEDERAL REGULATIONS (PREVENTION OF SIGNIFICANT DETERIORATION (PSD), NEW SOURCE PERFORMANCE STANDARDS (NSPS), NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAPS), TITLE V), INCLUDING EXEMPTIONS FROM THE FEDERAL REGULATIONS WHICH WOULD OTHERWISE BE APPLICABLE TO THIS FACILITY. SUBMIT ANY REQUIRED INFORMATION TO DOCUMENT COMPLIANCE WITH ANY REGULATIONS. INCLUDE EMISSION RATES CALCULATED IN ITEM "A" ABOVE, DATES OF MANUFACTURE, CONTROL EQUIPMENT, ETC. TO SUPPORT THESE CALCULATIONS.

**C** **CONTROL DEVICE ANALYSIS (FORM C and C1 through C9) -** PROVIDE A TECHNICAL EVALUATION WITH SUPPORTING REFERENCES FOR ANY CONTROL EFFICIENCIES LISTED ON SECTION C FORMS, OR USED TO REDUCE EMISSION RATES IN CALCULATIONS UNDER ITEM "A" ABOVE. INCLUDE PERTINENT OPERATING PARAMETERS (e.g. OPERATING CONDITIONS, MANUFACTURING RECOMMENDATIONS, AND PARAMETERS AS APPLIED FOR IN THIS APPLICATION) CRITICAL TO ENSURING PROPER PERFORMANCE OF THE CONTROL DEVICES). INCLUDE AND LIMITATIONS OR MALFUNCTION POTENTIAL FOR THE PARTICULAR CONTROL DEVICES AS EMPLOYED AT THIS FACILITY. DETAIL PROCEDURES FOR ASSURING PROPER OPERATION OF THE CONTROL DEVICE INCLUDING MONITORING SYSTEMS AND MAINTENANCE TO BE PERFORMED.

**D** **PROCESS AND OPERATIONAL COMPLIANCE ANALYSIS - (FORM E3 - TITLE V ONLY)** - SHOWING HOW COMPLIANCE WILL BE ACHIEVED WHEN USING PROCESS, OPERATIONAL, OR OTHER DATA TO DEMONSTRATE COMPLIANCE. REFER TO COMPLIANCE REQUIREMENTS IN THE REGULATORY ANALYSIS IN ITEM "B" WHERE APPROPRIATE. LIST ANY CONDITIONS OR PARAMETERS THAT CAN BE MONITORED AND REPORTED TO DEMONSTRATE COMPLIANCE WITH THE APPLICABLE REGULATIONS.

**E** **PROFESSIONAL ENGINEERING SEAL -** PURSUANT TO 15A NCAC 2Q .0112 "APPLICATION REQUIRING A PROFESSIONAL ENGINEERING SEAL," A PROFESSIONAL ENGINEER REGISTERED IN NORTH CAROLINA SHALL BE REQUIRED TO SEAL TECHNICAL PORTIONS OF THIS APPLICATION FOR NEW SOURCES AND MODIFICATIONS OF EXISTING SOURCES. (SEE INSTRUCTIONS FOR FURTHER APPLICABILITY).

*I,* Robert J. Rella *attest that this application for* the Piedmont Lithium Carolinas, Inc. Carolina Lithium *has been reviewed by me and is accurate, complete and consistent with the information supplied in the engineering plans, calculations, and all other supporting documentation to the best of my knowledge. I further attest that to the best of my knowledge the proposed design has been prepared in accordance with the applicable regulations. Although certain portions of this submittal package may have been developed by other professionals, inclusion of these materials under my seal signifies that I have reviewed this material and have judged it to be consistent with the proposed design. Note: In accordance with NC General Statutes 143-215.6A and 143-215.6B, any person who knowingly makes any false statement, representation, or certification in any application shall be guilty of a Class 2 misdemeanor which may include a fine not to exceed $10,000 as well as civil penalties up to $25,000 per violation.*

**(PLEASE USE BLUE INK TO COMPLETE THE FOLLOWING)**

| | |
|---|---|
| NAME: | Robert J. Rella |
| DATE: | August 22, 2022 |
| COMPANY: | HDR Engineering, Inc. of the Carolinas |
| ADDRESS: | 440 S Church Street, Suite 1000, Charlotte, NC 28202-2075 |
| TELEPHONE: | 704-338-6713 |
| SIGNATURE: | Robert J. Rella |
| PAGES CERTIFIED: | Form C1 for Control Device CD09 |
| | Form C8 for Control Device CD10 |
| | Form C1 for Control Device CD11 |
| | Form C8 for Control Device CD12 |
| | Form C6 for Control Device CD13 |
| | Form C4 for Control Device CD17 (CL-1) and CD39 (CL-2) |
| | Form C8 for Control Device CD18 (CL-1) and CD40 (CL-2) |
| | Form C6 for Control Device CD35 (CL-1) and CD55 (CL-2) |

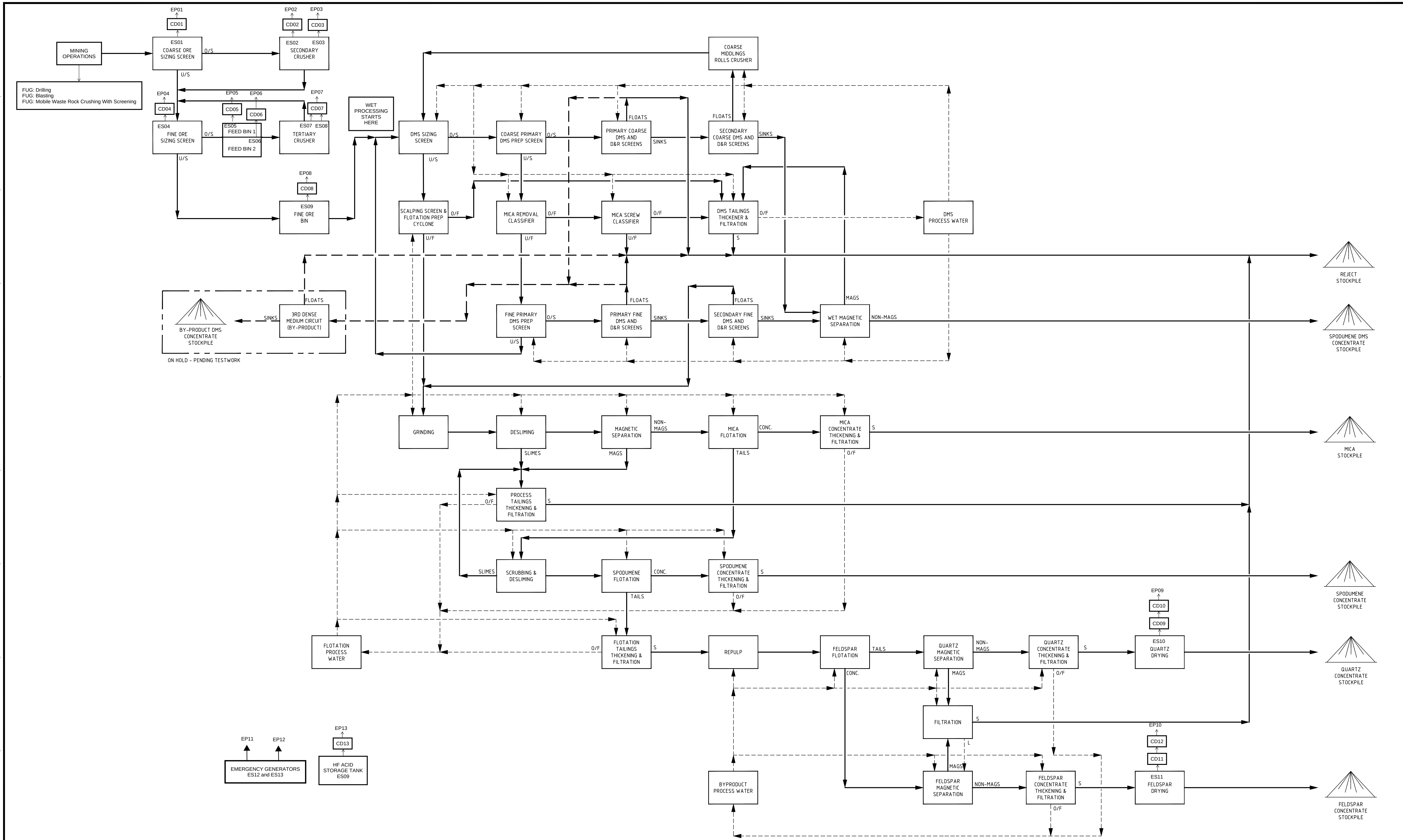
**(IDENTIFY ABOVE EACH PERMIT FORM AND ATTACHMENT THAT IS BEING CERTIFIED BY THIS SEAL)**

**PLACE NORTH CAROLINA SEAL HERE**


**Attach Additional Sheets As Necessary**

# ATTACHMENT 1

Process Flow Diagrams




| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | D | 17JUN21 | ISSUED FOR CLIENT REVIEW | ED | LD | LD | | PG | |
| | | C | 17MAR21 | ISSUED FOR CLIENT REVIEW | AC | AG | LD | | PG | |
| | | B | 18DEC20 | ISSUED FOR CLIENT REVIEW | IV | AG | EG | | PG | |
| - | - | A | 14DEC20 | ISSUED FOR INTERNAL REVIEW | IV | | | | | |
| DRG No. | REFERENCES | REV | DATE | DESCRIPTION | DRAW | CHECK | DESIGN | TECH APP | PROJ APP | |

STAMP/SEAL

PIEDMONT LITHIUM

PRIMERO primero.ca | DESIGN | CONSTRUCT | OPERATE



THIRD ANGLE

PROJECT: PIEDMONT LITHIUM CAROLINAS, INC.
PIEDMONT TSB PROJECT - DFS

TITLE: OVERALL
PROCESS PLANT
BLOCK FLOW DIAGRAM

| SHEET | SCALE | DRG No. | REVISION |
|---|---|---|---|
| ARCH D | NTS | 18605-1200-DRG-PR-001 | D |

D:\CAD PROJECTS\186 PIEDMONT LITHIUM\18605 PIEDMONT LITHIUM FEASIBILITY STUDY\03 DELIVERABLES\PR\18605-1200-DRG-PR-001.DWG 18JUN21 10:28AM ADELA.CRISTEA


CAROLINA LITHIUM 1
SPODUMENE CONCENTRATED
ALPA FEED SYSTEM
ES15 ES16 ES17
CD14 CD15 CD16
EP14 EP15 EP16
CALCINATION
ES18
CALCINE COOLING
ES19
CD19
EP18
COOLING WATER RETURN
BALL MILL FEED BIN
ES20
CD20
EP19
CALCINATION GAS CLEANING
CD18 CD17
EP17
NG BURNNER CONTROL
GRINDING
WASH FILTRATE
CARBONATION SLURRY
BLEED
WASH FILTRATES
PHOSPHATE RECEIVING AND STORAGE
ES32
Na3PO4
CD32
EP31
HP52 LITHIUM PRECIPITATION
SF52 LITHIUM PRECIPITATION FILTRATION
SF12 PRESSURE FILTRATION 2
ANALCIME
HP12 SECONDARY CONVERSION
SF13 POLISHING FILTRATION
ELUATE
CO2
HP51 CARBONATION
CM51 PULPING
FILTRATE
SF51 PRESSURE FILTRATION 1
Na2CO3
SODIUM CARBONATE RECEIVING AND STORAGE SILO
ES33
CD33
EP32
SODIUM CARBONATE RECEIVING AND FEEDER BIN
ES34
CD34
EP33
HM51 AUTOCLAVE FEED
ES21 CD21 EP20
ES22 CD22 EP21
SF51 CAKE PULPING
FEED LIQUOR TO CRYSTALLIZATION PACKAGE
HG51 PRE-HEATING
HL51 CONVERSION
HE01 ION EXCHANGE
LiCO3 RETURN
MOTHER LIQUOR PURGE
COOLED PROCESS CONDENSATES
MC61 CRUDE CRYSTALLIZATION
MC71 PURE CRYSTALLIZATION
MD01 PRODUCT DRYING
LP STEAM
LiOH HANDLING OPERATIONS
EP23 EP24 EP25 EP26 EP27 EP28
CD23 CD24 CD25 CD26 CD27 CD28
EP22 EP23 EP24 EP25 EP26 EP27
HP STEAM
HH51 PRESSURE LEACHING
OFF-GAS
AA11 LIME SLAKING
LiOH BAGGING OPERATIONS
ES29
CD29
EP28
LiOH BAGGING AREA VACUUM
ES30
CD30
EP29
HG52 1st FLASH
EP30
CD31
CaO
LIME RECEIVING AND STORAGE
ES31
NaOH HCl DEMIN WATER
EP40
CD35
HCl STORAGE TANK ES41
HCl DILUTION TANK ES42
H2SO4 STORAGE TANK ES43
EP34 EP35 EP36
BOILER NO. 1 (ES35)
BOILER NO. 2 (ES36)
BOILER NO. 3 (ES37)
HG52 2nd FLASH
EP37 EP38 EP39
EMERGENCY GENERATORS AND FIRE PUMP
ES38, ES39, ES40
01 02 03 05 06 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 27 29 30 31
PIEDMONT LITHIUM
0 Niklso 2021-06-22 JusPaj 2021-06-22 TomPas 2021-06-22 FIRST ISSUE
1 Niklso 2021-08-27 JusPaj 2021-08-27 TomPas 2021-08-27 UPDATED AS INDICATED
REV NAME DATE NAME DATE NAME DATE REVISION TEXT
PREPARED CHECKED APPROVED
STATUS APPROVED FOR DETAIL ENGINEERING
UNITS mm SCALE NA SIZE A1
CUSTOMER PIEDMONT LITHIUM CAROLINAS, INC
PROJECT PHASE IMPLEMENTATION 01
SITE NO S-47182
PROJECT NAME PIEDMONT TSB PROJECT
CUSTOMER DOCUMENT NO
REPLACED BY
REPLACES
LANGUAGE EN
Metso:Outotec
DOCUMENT TITLE
BLOCK DIAGRAM
HYDROMETALLURGICAL LITHIUM PLANT
GENERAL
BLOCK DIAGRAM
EQUIPMENT NO.
PROJECT ID 902620
PLANT CODE ZZZ01
PLANT UNIT CODE ZZ01
DOCUMENT TYPE PFA01
COUNTING NO 00001
REVISION 1
SHEET OF SHEETS 1 / 1
DOCUMENT ID OU100727621
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CAROLINA LITHIUM 2
SPODUMENE CONCENTRATED
ALPA FEED SYSTEM
ES44 ES45 ES46
CD36 CD37 CD38
EP41 EP42 EP43
CALCINATION
ES47
CALCINE COOLING
ES48
CD41
EP45
BALL MILL FEED BIN
ES49
CD42
EP46
COOLING WATER RETURN
CALCINATION GAS CLEANING
CD40 CD39
EP44
NG BURNNER CONTROL
GRINDING
WASH FILTRATE
CARBONATION SLURRY
BLEED
WASH FILTRATES
SF12 PRESSURE FILTRATION 2
ANALCIME
HP12 SECONDARY CONVERSION
SF13 POLISHING FILTRATION
HE01 ION EXCHANGE
Na3PO4
PHOSPHATE RECEIVING AND STORAGE
ES60
CD53
EP57
HP52 LITHIUM PRECIPITATION
SF52 LITHIUM PRECIPITATION FILTRATION
ELUATE
CO2
HP51 CARBONATION
FEED LIQUOR TO CRYSTALLIZATION PACKAGE
LiCO3 RETURN
MOTHER LIQUOR PURGE
COOLED PROCESS CONDENSATES
MC61 CRUDE CRYSTALLIZATION
MC71 PURE CRYSTALLIZATION
MD01 PRODUCT DRYING
LP STEAM
LiOH HANDLING OPERATIONS
EP52 EP53 EP54 EP55 EP56 EP57
CD45 CD46 CD47 CD48 CD49 CD50
EP49 EP50 EP51 EP52 EP53 EP54
LiOH BAGGING OPERATIONS
ES58
CD51
EP55
LiOH BAGGING AREA VACUUM
ES59
CD52
EP56
Na2CO3
SODIUM CARBONATE RECEIVING AND FEEDER BIN
ES61
CD54
EP58
CM51 PULPING
FILTRATE
SF51 PRESSURE FILTRATION 1
SF51 CAKE PULPING
HM51 AUTOCLAVE FEED
ES50 CD43 EP47
ES51 CD44 EP48
HG51 PRE-HEATING
HL51 CONVERSION
HH51 PRESSURE LEACHING
HP STEAM
OFF-GAS
HG52 1st FLASH
HG52 2nd FLASH
AA11 LIME SLAKING
CaO
NaOH
HCl
DEMIN WATER
EP54
CD55
HCl STORAGE TANK ES67
HCl DILUTION TANK ES68
H2SO4 STORAGE TANK ES69
EP62 EP63
EMERGENCY GENERATORS ES65, ES66
EP59 EP60 EP61
BOILER NO. 1 (ES62)
BOILER NO. 2 (ES63)
BOILER NO. 3 (ES64)
01 02 03 05 06 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 27 29 30 31
PIEDMONT LITHIUM
0 Niklso 2021-06-22 JusPaj 2021-06-22 TomPas 2021-06-22 FIRST ISSUE
1 Niklso 2021-08-27 JusPaj 2021-08-27 TomPas 2021-08-27 UPDATED AS INDICATED
REV NAME DATE NAME DATE NAME DATE REVISION TEXT
PREPARED CHECKED APPROVED
STATUS APPROVED FOR DETAIL ENGINEERING
UNITS mm
SCALE NA
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CUSTOMER PIEDMONT LITHIUM CAROLINAS, INC
PROJECT PHASE IMPLEMENTATION 01
SITE NO S-47182
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CUSTOMER DOCUMENT NO
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BLOCK DIAGRAM
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GENERAL
BLOCK DIAGRAM
EQUIPMENT NO.
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PLANT UNIT CODE ZZ01
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REVISION 1
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# ATTACHMENT 2

Emission Calculations

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**

**All values in tons per year (tpy)**

| Pollutant | SITE TOTAL | PSD Major Source Threshold * | Subject to PSD? | Hazardous Air Pollutant Major Source Threshold | Major Source of HAP? |
|---|---|---|---|---|---|
| PM | 155 | 25 | **Yes** | | |
| $PM_{10}$ | 93.5 | 15 | **Yes** | | |
| $PM_{2.5}$ | 65.7 | 10 | **Yes** | | |
| $SO_2$ | 34.9 | 40 | No | | |
| $NO_x$ | 514 | 40 | **Yes** | | |
| CO | 1,328 | 100 | **Yes** | | |
| VOC | 13.9 | 40 | No | | |
| $H_2SO_4$ | 0.008 | 7 | No | | |
| $CO_2e$ | 300,547 | 75,000 | **Yes** | | |
| $CO_2$ | 300,194 | | | | |
| $CH_4$ | 6.67 | | | | |
| $N_2O$ | 0.63 | | | | |
| Lead | 0.0012 | 0.6 | No | 10 | No |
| Acetaldehyde | 0.0002 | | | | No |
| Acrolein | 0.0000 | | | | No |
| Arsenic | 0.0005 | | | | No |
| Benzene | 0.0077 | | | | No |
| Beryllium | 0.0000 | | | | No |
| 1,3-Butadiene | 0.0000 | | | | No |
| Cadmium | 0.0027 | | | | No |
| Chromium | 0.0034 | | | | No |
| Cobalt | 0.0002 | | | | No |
| Dichlorobenzene | 0.0029 | | | | No |
| Formaldehyde | 0.1846 | | | | No |
| Hexane | 4.4219 | | | | No |
| HCl | 1.0871 | | | | No |
| HF | 9.6146 | | | | No |
| Manganese | 0.0009 | | | | No |
| Mercury | 0.0006 | | | | No |
| Naphthalene | 0.0019 | | | | No |
| Nickel | 0.0052 | | | | No |
| POM | 0.0024 | | | | No |
| Selenium | 0.0001 | | | | No |
| Toluene | 0.0093 | | | | No |
| Xylene | 0.0006 | | | | No |
| TOTAL HAP | 15.3463 | | | 25 | No |

* Since at least one PSD-regulated pollutant exceeds the major source threshold of 100 tpy (based on the integrated site being classified as a chemical manufacturing plant) the significant emission increase thresholds are listed and used as the basis of determining which pollutants trigger PSD review. In addition, greenhouse gases are a regulated pollutant for PSD purposes because the project triggers PSD for another non-GHG pollutant.

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**

**All values in tons per year (tpy)**

| | Mining Sources | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Pollutant** | **FUG: Drilling** | **FUG: Blasting** | **Rock Breaking IES01** | **Ore and Waste Rock Loader Operations IES02** | **In-Pit Mobile Ore Crushing IES03** | **In-Pit Mobile Waste Rock Crushing Without Screening IES04** | **FUG: In-Pit Mobile Waste Rock Crusher With Screening** | **Ore, Waste Rock, Refuse and Reclaim Conveyors IES05** | **Miscellaneous Material Handling IES06** | **Wind Erosion of Waste Rock and Tailings Disposal IES07** | **Total** |
| PM | 5.72 | | 12.8 | Negligible | 2.51 | 7.52 | 17.4 | 16.4 | 16.6 | 0.36 | 79.3 |
| $PM_{10}$ | 2.70 | | 6.76 | Negligible | 1.03 | 3.10 | 6.04 | 5.40 | 5.46 | 0.18 | 30.7 |
| $PM_{2.5}$ | 0.41 | | 1.01 | Negligible | 0.20 | 0.61 | 0.54 | 1.53 | 1.54 | 0.03 | 5.87 |
| $SO_2$ | | 33.4 | | | | | | | | | 33.4 |
| $NO_x$ | | 284 | | | | | | | | | 284 |
| CO | | 1,119 | | | | | | | | | 1,119 |
| VOC | | | | | | | | | | | |
| $H_2SO_4$ | | | | | | | | | | | |
| $CO_2e$ | | 6,416 | | | | | | | | | 6,416 |
| $CO_2$ | | 6,394 | | | | | | | | | 6,394 |
| $CH_4$ | | 0.26 | | | | | | | | | 0.26 |
| $N_2O$ | | 0.05 | | | | | | | | | 0.05 |
| Lead | | | | | | | | | | | |
| Acetaldehyde | | | | | | | | | | | |
| Acrolein | | | | | | | | | | | |
| Arsenic | | | | | | | | | | | |
| Benzene | | | | | | | | | | | |
| Beryllium | | | | | | | | | | | |
| 1,3-Butadiene | | | | | | | | | | | |
| Cadmium | | | | | | | | | | | |
| Chromium | | | | | | | | | | | |
| Cobalt | | | | | | | | | | | |
| Dichlorobenzene | | | | | | | | | | | |
| Formaldehyde | | | | | | | | | | | |
| Hexane | | | | | | | | | | | |
| HCl | | | | | | | | | | | |
| HF | | | | | | | | | | | |
| Manganese | | | | | | | | | | | |
| Mercury | | | | | | | | | | | |
| Naphthalene | | | | | | | | | | | |
| Nickel | | | | | | | | | | | |
| POM | | | | | | | | | | | |
| Selenium | | | | | | | | | | | |
| Toluene | | | | | | | | | | | |
| Xylene | | | | | | | | | | | |
| **TOTAL HAP** | | | | | | | | | | | |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**

**All values in tons per year (tpy)**

| | Concentrator Plant | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Wind Erosion of ROM Pile | Wind Erosion of ROM Pile (Concentrate Plant Alternate Location) | Wind Erosion of Waste Rock and Tailings Disposal | ROM Pile Loader Operations | Wind Erosion of Ore Surge Pile | Coarse Ore Handling | Ore Sorting Operations | Secondary Crusher Feed Bin | Secondary Crusher Discharge | Fine Ore Sizing Screen Discharge |
| **Pollutant** | **IES08** | **IES09** | **IES10** | **IES11** | **IES12** | **IES13** | **EP01** | **EP02** | **EP03** | **EP04** |
| PM | 0.08 | 0.08 | 0.36 | Neglible | 0.009 | 5.06 | 0.51 | 0.23 | 0.02 | 0.03 |
| $PM_{10}$ | 0.04 | 0.04 | 0.18 | Neglible | 0.004 | 1.69 | 0.51 | 0.23 | 0.02 | 0.03 |
| $PM_{2.5}$ | 0.006 | 0.006 | 0.03 | Neglible | 0.0007 | 0.19 | 0.51 | 0.23 | 0.02 | 0.03 |
| $SO_2$ | | | | | | | | | | |
| $NO_x$ | | | | | | | | | | |
| CO | | | | | | | | | | |
| VOC | | | | | | | | | | |
| $H_2SO_4$ | | | | | | | | | | |
| $CO_2e$ | | | | | | | | | | |
| $CO_2$ | | | | | | | | | | |
| $CH_4$ | | | | | | | | | | |
| $N_2O$ | | | | | | | | | | |
| Lead | | | | | | | | | | |
| Acetaldehyde | | | | | | | | | | |
| Acrolein | | | | | | | | | | |
| Arsenic | | | | | | | | | | |
| Benzene | | | | | | | | | | |
| Beryllium | | | | | | | | | | |
| 1,3-Butadiene | | | | | | | | | | |
| Cadmium | | | | | | | | | | |
| Chromium | | | | | | | | | | |
| Cobalt | | | | | | | | | | |
| Dichlorobenzene | | | | | | | | | | |
| Formaldehyde | | | | | | | | | | |
| Hexane | | | | | | | | | | |
| HCl | | | | | | | | | | |
| HF | | | | | | | | | | |
| Manganese | | | | | | | | | | |
| Mercury | | | | | | | | | | |
| Naphthalene | | | | | | | | | | |
| Nickel | | | | | | | | | | |
| POM | | | | | | | | | | |
| Selenium | | | | | | | | | | |
| Toluene | | | | | | | | | | |
| Xylene | | | | | | | | | | |
| **TOTAL HAP** | | | | | | | | | | |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**

**All values in tons per year (tpy)**

| | Concentrator Plant | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Tertiary Crusher Feed Bin 1 | Tertiary Crusher Feed Bin 2 | Tertiary Crusher No. 1 | Tertiary Crusher No. 2 | Fine Ore Bin | Miscellaneous Material Handling | Quartz Dryer | Feldspar Dryer | Miscellanous Materials Loader Operations | 1,000 kW Emergency Generator No 1 |
| **Pollutant** | **EP05** | **EP06** | **EP07** | | **EP08** | **IES14** | **EP09** | **EP10** | **IES15** | **EP11** |
| PM | 0.23 | 0.23 | 0.02 | | 0.15 | 4.68 | 0.57 | 0.92 | Neglible | 0.05 |
| $PM_{10}$ | 0.23 | 0.23 | 0.02 | | 0.15 | 1.71 | 0.57 | 0.92 | Neglible | 0.05 |
| $PM_{2.5}$ | 0.23 | 0.23 | 0.02 | | 0.15 | 1.65 | 0.57 | 0.92 | Neglible | 0.05 |
| $SO_2$ | | | | | | | 0.05 | 0.08 | | 0.001 |
| $NO_x$ | | | | | | | 4.10 | 6.36 | | 0.98 |
| CO | | | | | | | 6.89 | 10.68 | | 0.41 |
| VOC | | | | | | | 0.45 | 0.70 | | 0.05 |
| $H_2SO_4$ | | | | | | | | | | |
| $CO_2e$ | | | | | | | 9,793 | 15,192 | | 87 |
| $CO_2$ | | | | | | | 9,783 | 15,177 | | 86 |
| $CH_4$ | | | | | | | 0.18 | 0.29 | | 0.0007 |
| $N_2O$ | | | | | | | 0.018 | 0.029 | | 0.003 |
| Lead | | | | | | | 0.0000 | 0.0001 | | |
| Acetaldehyde | | | | | | | | | | 0.0000 |
| Acrolein | | | | | | | | | | 0.0000 |
| Arsenic | | | | | | | 0.0000 | 0.0000 | | |
| Benzene | | | | | | | 0.0002 | 0.0003 | | 0.0004 |
| Beryllium | | | | | | | 0.0000 | 0.0000 | | |
| 1,3-Butadiene | | | | | | | | | | |
| Cadmium | | | | | | | 0.0001 | 0.0001 | | |
| Chromium | | | | | | | 0.0001 | 0.0002 | | |
| Cobalt | | | | | | | 0.0000 | 0.0000 | | |
| Dichlorobenzene | | | | | | | 0.0001 | 0.0002 | | |
| Formaldehyde | | | | | | | 0.0061 | 0.0095 | | 0.0000 |
| Hexane | | | | | | | 0.1476 | 0.2290 | | |
| HCl | | | | | | | | | | |
| HF | | | | | | | 2.8908 | 6.4610 | | |
| Manganese | | | | | | | 0.0000 | 0.0000 | | |
| Mercury | | | | | | | 0.0000 | 0.0000 | | |
| Naphthalene | | | | | | | 0.0001 | 0.0001 | | 0.0001 |
| Nickel | | | | | | | 0.0002 | 0.0003 | | |
| POM | | | | | | | 0.0001 | 0.0001 | | 0.0001 |
| Selenium | | | | | | | 0.0000 | 0.0000 | | |
| Toluene | | | | | | | 0.0003 | 0.0004 | | 0.0001 |
| Xylene | | | | | | | | | | 0.0001 |
| **TOTAL HAP** | | | | | | | **3.0456** | **6.7012** | | **0.0008** |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**

**All values in tons per year (tpy)**

| | Concentrator Plant | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1,000 kW Emergency Generator No 2 | Hydrofluoric Acid Storage Tank | Sulfuric Acid Storage Tank | Diesel Storage Tank 20,000 gal | Diesel Storage Tank 7,000 gal | Kerosene Storage Tank | Concentrator Plant Truck Traffic | |
| **Pollutant** | **EP12** | **EP13** | **IES16** | **IES17** | **IES18** | **IES19** | **IES20** | **Total** |
| PM | 0.05 | | | | | | 5.81 | 19.1 |
| $PM_{10}$ | 0.05 | | | | | | 1.16 | 7.82 |
| $PM_{2.5}$ | 0.05 | | | | | | 0.29 | 5.16 |
| $SO_2$ | 0.0008 | | | | | | | 0.13 |
| $NO_x$ | 0.98 | | | | | | | 12.4 |
| CO | 0.41 | | | | | | | 18.4 |
| VOC | 0.05 | | | 0.01 | 0.004 | 0.003 | | 1.28 |
| $H_2SO_4$ | | | 0.008 | | | | | 0.008 |
| $CO_2e$ | 87 | | | | | | | 25,159 |
| $CO_2$ | 86 | | | | | | | 25,131 |
| $CH_4$ | 0.0007 | | | | | | | 0.47 |
| $N_2O$ | 0.003 | | | | | | | 0.05 |
| Lead | | | | | | | | 0.0001 |
| Acetaldehyde | 0.0000 | | | | | | | 0.0000 |
| Acrolein | 0.0000 | | | | | | | 0.0000 |
| Arsenic | | | | | | | | 0.0000 |
| Benzene | 0.0004 | | | | | | | 0.0013 |
| Beryllium | | | | | | | | 0.0000 |
| 1,3-Butadiene | | | | | | | | 0.0000 |
| Cadmium | | | | | | | | 0.0002 |
| Chromium | | | | | | | | 0.0003 |
| Cobalt | | | | | | | | 0.0000 |
| Dichlorobenzene | | | | | | | | 0.0003 |
| Formaldehyde | 0.0000 | | | | | | | 0.0158 |
| Hexane | | | | | | | | 0.3765 |
| HCl | | | | | | | | 0.0000 |
| HF | | 0.2628 | | | | | | 9.6146 |
| Manganese | | | | | | | | 0.0001 |
| Mercury | | | | | | | | 0.0001 |
| Naphthalene | 0.0001 | | | | | | | 0.0003 |
| Nickel | | | | | | | | 0.0004 |
| POM | 0.0001 | | | | | | | 0.0004 |
| Selenium | | | | | | | | 0.0000 |
| Toluene | 0.0001 | | | | | | | 0.0010 |
| Xylene | 0.0001 | | | | | | | 0.0002 |
| **TOTAL HAP** | **0.0008** | **0.2628** | | | | | | 10.0112 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**

**All values in tons per year (tpy)**

| | Carolina Lithium 1 (CL-1) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Wind Erosion of Concentrate Surge Pile | Concentrate Pile Loader Operations | Concentrate Pile Material Handling | Spodumene Concentrate Conveying | Spodumene Concentrate Surge Silo | Spodumene Concentrate Conveyor to Calciner | Calciner Rotary Kiln | Cooler Discharge Sweep Air | Ball Mill Feed Bin | Train 1 Pressure Leaching |
| **Pollutant** | **IES21** | **IES22** | **IES23** | **EP14** | **EP15** | **EP16** | **EP17** | **EP18** | **EP19** | **EP20** |
| PM | 0.02 | Neglible | 0.03 | 0.02 | 0.09 | 0.02 | 20.0 | 0.11 | 0.14 | 0.79 |
| $PM_{10}$ | 0.01 | Neglible | 0.009 | 0.02 | 0.09 | 0.02 | 20.0 | 0.11 | 0.14 | 0.79 |
| $PM_{2.5}$ | 0.002 | Neglible | 0.003 | 0.02 | 0.09 | 0.02 | 20.0 | 0.11 | 0.14 | 0.79 |
| $SO_2$ | | | | | | | 0.19 | | | |
| $NO_x$ | | | | | | | 95.0 | | | |
| CO | | | | | | | 27.1 | | | |
| VOC | | | | | | | 1.77 | | | |
| $H_2SO_4$ | | | | | | | | | | |
| $CO_2e$ | | | | | | | 38,492 | | | |
| $CO_2$ | | | | | | | 38,453 | | | |
| $CH_4$ | | | | | | | 0.72 | | | |
| $N_2O$ | | | | | | | 0.07 | | | |
| Lead | | | | | | | 0.0002 | | | |
| Acetaldehyde | | | | | | | | | | |
| Acrolein | | | | | | | | | | |
| Arsenic | | | | | | | 0.0001 | | | |
| Benzene | | | | | | | 0.0007 | | | |
| Beryllium | | | | | | | 0.0000 | | | |
| 1,3-Butadiene | | | | | | | | | | |
| Cadmium | | | | | | | 0.0004 | | | |
| Chromium | | | | | | | 0.0005 | | | |
| Cobalt | | | | | | | 0.0000 | | | |
| Dichlorobenzene | | | | | | | 0.0004 | | | |
| Formaldehyde | | | | | | | 0.0242 | | | |
| Hexane | | | | | | | 0.5801 | | | |
| HCl | | | | | | | | | | |
| HF | | | | | | | | | | |
| Manganese | | | | | | | 0.0001 | | | |
| Mercury | | | | | | | 0.0001 | | | |
| Naphthalene | | | | | | | 0.0002 | | | |
| Nickel | | | | | | | 0.0007 | | | |
| POM | | | | | | | 0.0002 | | | |
| Selenium | | | | | | | 0.0000 | | | |
| Toluene | | | | | | | 0.0011 | | | |
| Xylene | | | | | | | | | | |
| **TOTAL HAP** | | | | | | | **0.6086** | | | |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**

**All values in tons per year (tpy)**

| | Carolina Lithium 1 (CL-1) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Train 2 Pressure Leaching | LiOH Bagging Area Surge Bin/Transporter No. 1 | LiOH Bagging Area Surge Bin/Transporter No. 2 | LiOH Bagging Area Day Tank No. 1 | LiOH Bagging Area Day Tank No. 2 | LiOH Bagging Area Day Tank No. 3 | LiOH Bagging Area Day Tank No. 4 | LiOH Bagging Operation | LiOH Bagging Area Vacuum | Lime Receiving and Storage |
| **Pollutant** | **EP21** | **EP22** | **EP23** | **EP24** | **EP25** | **EP26** | **EP27** | **EP28** | **EP29** | **EP30** |
| PM | 0.79 | 0.007 | 0.007 | 0.007 | 0.007 | 0.007 | 0.007 | 0.31 | 0.05 | 0.21 |
| $PM_{10}$ | 0.79 | 0.007 | 0.007 | 0.007 | 0.007 | 0.007 | 0.007 | 0.31 | 0.05 | 0.21 |
| $PM_{2.5}$ | 0.79 | 0.007 | 0.007 | 0.007 | 0.007 | 0.007 | 0.007 | 0.31 | 0.05 | 0.21 |
| $SO_2$ | | | | | | | | | | |
| $NO_x$ | | | | | | | | | | |
| CO | | | | | | | | | | |
| VOC | | | | | | | | | | |
| $H_2SO_4$ | | | | | | | | | | |
| $CO_2e$ | | | | | | | | | | |
| $CO_2$ | | | | | | | | | | |
| $CH_4$ | | | | | | | | | | |
| $N_2O$ | | | | | | | | | | |
| Lead | | | | | | | | | | |
| Acetaldehyde | | | | | | | | | | |
| Acrolein | | | | | | | | | | |
| Arsenic | | | | | | | | | | |
| Benzene | | | | | | | | | | |
| Beryllium | | | | | | | | | | |
| 1,3-Butadiene | | | | | | | | | | |
| Cadmium | | | | | | | | | | |
| Chromium | | | | | | | | | | |
| Cobalt | | | | | | | | | | |
| Dichlorobenzene | | | | | | | | | | |
| Formaldehyde | | | | | | | | | | |
| Hexane | | | | | | | | | | |
| HCl | | | | | | | | | | |
| HF | | | | | | | | | | |
| Manganese | | | | | | | | | | |
| Mercury | | | | | | | | | | |
| Naphthalene | | | | | | | | | | |
| Nickel | | | | | | | | | | |
| POM | | | | | | | | | | |
| Selenium | | | | | | | | | | |
| Toluene | | | | | | | | | | |
| Xylene | | | | | | | | | | |
| **TOTAL HAP** | | | | | | | | | | |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**

**All values in tons per year (tpy)**

| | Carolina Lithium 1 (CL-1) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Phosphate Receiving and Storage | Sodium Carbonate Receiving and Storage Silo | Sodium Carbonate Receiving and Feeder Bin | Boiler No. 1 | Boiler No. 2 | Boiler No. 3 | 1,000 kW Emergency Generator No. 1 | 1,000 kW Emergency Generator No. 2 | Fire Pump |
| **Pollutant** | **EP31** | **EP32** | **EP33** | **EP34** | **EP35** | **EP36** | **EP37** | **EP38** | **EP39** |
| PM | 0.21 | 0.21 | 0.21 | 1.37 | 1.37 | 1.35 | 0.05 | 0.05 | 0.04 |
| $PM_{10}$ | 0.21 | 0.21 | 0.21 | 1.37 | 1.37 | 1.35 | 0.05 | 0.05 | 0.04 |
| $PM_{2.5}$ | 0.21 | 0.21 | 0.21 | 1.37 | 1.37 | 1.35 | 0.05 | 0.05 | 0.04 |
| $SO_2$ | | | | 0.16 | 0.16 | 0.16 | 0.001 | 0.0008 | 0.0002 |
| $NO_x$ | | | | 3.99 | 3.99 | 3.96 | 0.98 | 0.98 | 0.56 |
| CO | | | | 22.5 | 22.5 | 22.3 | 0.41 | 0.41 | 0.12 |
| VOC | | | | 1.47 | 1.47 | 1.46 | 0.05 | 0.05 | 0.04 |
| $H_2SO_4$ | | | | | | | | | |
| $CO_2e$ | | | | 31,998 | 31,998 | 31,729 | 87 | 87 | 21 |
| $CO_2$ | | | | 31,965 | 31,965 | 31,696 | 86 | 86 | 21 |
| $CH_4$ | | | | 0.60 | 0.60 | 0.60 | 0.0007 | 0.0007 | 0.0002 |
| $N_2O$ | | | | 0.060 | 0.060 | 0.060 | 0.003 | 0.003 | 0.001 |
| Lead | | | | 0.0001 | 0.0001 | 0.0001 | | | |
| Acetaldehyde | | | | | | | 0.0000 | 0.0000 | 0.0001 |
| Acrolein | | | | | | | 0.0000 | 0.0000 | 0.0000 |
| Arsenic | | | | 0.0001 | 0.0001 | 0.0001 | | | |
| Benzene | | | | 0.0006 | 0.0006 | 0.0006 | 0.0004 | 0.0004 | 0.0001 |
| Beryllium | | | | 0.0000 | 0.0000 | 0.0000 | | | |
| 1,3-Butadiene | | | | | | | | | 0.0000 |
| Cadmium | | | | 0.0003 | 0.0003 | 0.0003 | | | |
| Chromium | | | | 0.0004 | 0.0004 | 0.0004 | | | |
| Cobalt | | | | 0.0000 | 0.0000 | 0.0000 | | | |
| Dichlorobenzene | | | | 0.0003 | 0.0003 | 0.0003 | | | |
| Formaldehyde | | | | 0.0201 | 0.0201 | 0.0199 | 0.0000 | 0.0000 | 0.0001 |
| Hexane | | | | 0.4822 | 0.4822 | 0.4782 | | | |
| HCl | | | | | | | | | |
| HF | | | | | | | | | |
| Manganese | | | | 0.0001 | 0.0001 | 0.0001 | | | |
| Mercury | | | | 0.0001 | 0.0001 | 0.0001 | | | |
| Naphthalene | | | | 0.0002 | 0.0002 | 0.0002 | 0.0001 | 0.0001 | 0.0000 |
| Nickel | | | | 0.0006 | 0.0006 | 0.0006 | | | |
| POM | | | | 0.0002 | 0.0002 | 0.0002 | 0.0001 | 0.0001 | 0.0000 |
| Selenium | | | | 0.0000 | 0.0000 | 0.0000 | | | |
| Toluene | | | | 0.0009 | 0.0009 | 0.0009 | 0.0001 | 0.0001 | 0.0001 |
| Xylene | | | | | | | 0.0001 | 0.0001 | 0.0000 |
| **TOTAL HAP** | | | | **0.5059** | **0.5059** | **0.5017** | **0.0008** | **0.0008** | **0.0005** |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**

**All values in tons per year (tpy)**

| | | Carolina Lithium 1 (CL-1) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Hydrochloric Acid Storage Tank | Hydrochloric Acid Dilution Tank | Sulfuric Acid Storage Tank | Lithium Carbonate Reactor | Cooling Tower | Diesel Storage Tank | Truck Traffic | Component Leak Fugitives | |
| **Pollutant** | EP40 | | | IES24 | IES25 | IES26 | IES27 | IES28 | **Total** |
| PM | | | | | 0.12 | | 0.87 | | 28.4 |
| $PM_{10}$ | | | | | 0.12 | | 0.17 | | 27.7 |
| $PM_{2.5}$ | | | | | 0.12 | | 0.04 | | 27.6 |
| $SO_2$ | | | | | | | | | 0.68 |
| $NO_x$ | | | | | | | | | 109 |
| CO | | | | | | | | | 95.3 |
| VOC | | | | | | 0.002 | | | 6.33 |
| $H_2SO_4$ | | | 1.47E-06 | | | | | | 0.000001 |
| $CO_2e$ | | | | 74 | | | | 12 | 134,496 |
| $CO_2$ | | | | 74 | | | | 1 | 134,345 |
| $CH_4$ | | | | | | | | 0.44 | 2.97 |
| $N_2O$ | | | | | | | | | 0.26 |
| Lead | | | | | | | | | 0.0006 |
| Acetaldehyde | | | | | | | | | 0.0001 |
| Acrolein | | | | | | | | | 0.0000 |
| Arsenic | | | | | | | | | 0.0002 |
| Benzene | | | | | | | | | 0.0033 |
| Beryllium | | | | | | | | | 0.0000 |
| 1,3-Butadiene | | | | | | | | | 0.0000 |
| Cadmium | | | | | | | | | 0.0012 |
| Chromium | | | | | | | | | 0.0016 |
| Cobalt | | | | | | | | | 0.0001 |
| Dichlorobenzene | | | | | | | | | 0.0013 |
| Formaldehyde | | | | | | | | | 0.0845 |
| Hexane | | | | | | | | | 2.0227 |
| HCl | 0.5436 | | | | | | | | 0.5436 |
| HF | | | | | | | | | |
| Manganese | | | | | | | | | 0.0004 |
| Mercury | | | | | | | | | 0.0003 |
| Naphthalene | | | | | | | | | 0.0008 |
| Nickel | | | | | | | | | 0.0024 |
| POM | | | | | | | | | 0.0010 |
| Selenium | | | | | | | | | 0.0000 |
| Toluene | | | | | | | | | 0.0042 |
| Xylene | | | | | | | | | 0.0002 |
| **TOTAL HAP** | **0.5436** | | | | | | | | 2.6678 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**

**All values in tons per year (tpy)**

| | Carolina Lithium 2 (CL-2) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Wind Erosion of Concentrate Surge Pile | Concentrate Pile Loader Operations | Concentrate Pile Material Handling | Spodumene Concentrate Conveying | Spodumene Concentrate Surge Silo | Spodumene Concentrate Conveyor to Calciner | Calciner Rotary Kiln | Cooler Discharge Sweep Air | Ball Mill Feed Bin | Train 1 Pressure Leaching |
| **Pollutant** | **IES29** | **IES30** | **IES31** | **EP41** | **EP42** | **EP43** | **EP44** | **EP45** | **EP46** | **EP47** |
| PM | 0.02 | Neglible | 0.03 | 0.02 | 0.09 | 0.02 | 20.0 | 0.11 | 0.14 | 0.79 |
| $PM_{10}$ | 0.01 | Neglible | 0.009 | 0.02 | 0.09 | 0.02 | 20.0 | 0.11 | 0.14 | 0.79 |
| $PM_{2.5}$ | 0.002 | Neglible | 0.003 | 0.02 | 0.09 | 0.02 | 20.0 | 0.11 | 0.14 | 0.79 |
| $SO_2$ | | | | | | | 0.19 | | | |
| $NO_x$ | | | | | | | 95.0 | | | |
| CO | | | | | | | 27.1 | | | |
| VOC | | | | | | | 1.77 | | | |
| $H_2SO_4$ | | | | | | | | | | |
| $CO_2e$ | | | | | | | 38,492 | | | |
| $CO_2$ | | | | | | | 38,453 | | | |
| $CH_4$ | | | | | | | 0.72 | | | |
| $N_2O$ | | | | | | | 0.07 | | | |
| Lead | | | | | | | 0.0002 | | | |
| Acetaldehyde | | | | | | | | | | |
| Acrolein | | | | | | | | | | |
| Arsenic | | | | | | | 0.0001 | | | |
| Benzene | | | | | | | 0.0007 | | | |
| Beryllium | | | | | | | 0.0000 | | | |
| 1,3-Butadiene | | | | | | | | | | |
| Cadmium | | | | | | | 0.0004 | | | |
| Chromium | | | | | | | 0.0005 | | | |
| Cobalt | | | | | | | 0.0000 | | | |
| Dichlorobenzene | | | | | | | 0.0004 | | | |
| Formaldehyde | | | | | | | 0.0242 | | | |
| Hexane | | | | | | | 0.5801 | | | |
| HCl | | | | | | | | | | |
| HF | | | | | | | | | | |
| Manganese | | | | | | | 0.0001 | | | |
| Mercury | | | | | | | 0.0001 | | | |
| Naphthalene | | | | | | | 0.0002 | | | |
| Nickel | | | | | | | 0.0007 | | | |
| POM | | | | | | | 0.0002 | | | |
| Selenium | | | | | | | 0.0000 | | | |
| Toluene | | | | | | | 0.0011 | | | |
| Xylene | | | | | | | | | | |
| **TOTAL HAP** | | | | | | | **0.6086** | | | |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**

**All values in tons per year (tpy)**

| | Carolina Lithium 2 (CL-2) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Train 2 Pressure Leaching | LiOH Bagging Area Surge Bin/Transporter No. 1 | LiOH Bagging Area Surge Bin/Transporter No. 2 | LiOH Bagging Area Day Tank No. 1 | LiOH Bagging Area Day Tank No. 2 | LiOH Bagging Area Day Tank No. 3 | LiOH Bagging Area Day Tank No. 4 | LiOH Bagging Operation | LiOH Bagging Area Vacuum | Phosphate Receiving and Storage |
| **Pollutant** | **EP48** | **EP49** | **EP50** | **EP51** | **EP52** | **EP53** | **EP54** | **EP55** | **EP56** | **EP57** |
| PM | 0.79 | 0.007 | 0.007 | 0.007 | 0.007 | 0.007 | 0.007 | 0.31 | 0.05 | 0.21 |
| $PM_{10}$ | 0.79 | 0.007 | 0.007 | 0.007 | 0.007 | 0.007 | 0.007 | 0.31 | 0.05 | 0.21 |
| $PM_{2.5}$ | 0.79 | 0.007 | 0.007 | 0.007 | 0.007 | 0.007 | 0.007 | 0.31 | 0.05 | 0.21 |
| $SO_2$ | | | | | | | | | | |
| $NO_x$ | | | | | | | | | | |
| CO | | | | | | | | | | |
| VOC | | | | | | | | | | |
| $H_2SO_4$ | | | | | | | | | | |
| $CO_2e$ | | | | | | | | | | |
| $CO_2$ | | | | | | | | | | |
| $CH_4$ | | | | | | | | | | |
| $N_2O$ | | | | | | | | | | |
| Lead | | | | | | | | | | |
| Acetaldehyde | | | | | | | | | | |
| Acrolein | | | | | | | | | | |
| Arsenic | | | | | | | | | | |
| Benzene | | | | | | | | | | |
| Beryllium | | | | | | | | | | |
| 1,3-Butadiene | | | | | | | | | | |
| Cadmium | | | | | | | | | | |
| Chromium | | | | | | | | | | |
| Cobalt | | | | | | | | | | |
| Dichlorobenzene | | | | | | | | | | |
| Formaldehyde | | | | | | | | | | |
| Hexane | | | | | | | | | | |
| HCl | | | | | | | | | | |
| HF | | | | | | | | | | |
| Manganese | | | | | | | | | | |
| Mercury | | | | | | | | | | |
| Naphthalene | | | | | | | | | | |
| Nickel | | | | | | | | | | |
| POM | | | | | | | | | | |
| Selenium | | | | | | | | | | |
| Toluene | | | | | | | | | | |
| Xylene | | | | | | | | | | |
| **TOTAL HAP** | | | | | | | | | | |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**

**All values in tons per year (tpy)**

| | Carolina Lithium 2 (CL-2) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Sodium Carbonate Receiving and Feeder Bin | Boiler No. 1 | Boiler No. 2 | Boiler No. 3 | 1,000 kW Emergency Generator No. 1 | 1,000 kW Emergency Generator No. 2 | Hydrochloric Acid Storage Tank | Hydrochloric Acid Dilution Tank | Sulfuric Acid Storage Tank | Lithium Carbonate Reactor |
| Pollutant | EP58 | EP59 | EP60 | EP61 | EP62 | EP63 | EP64 | | | IES32 |
| PM | 0.21 | 1.37 | 1.37 | 1.35 | 0.05 | 0.05 | | | | |
| $PM_{10}$ | 0.21 | 1.37 | 1.37 | 1.35 | 0.05 | 0.05 | | | | |
| $PM_{2.5}$ | 0.21 | 1.37 | 1.37 | 1.35 | 0.05 | 0.05 | | | | |
| $SO_2$ | | 0.16 | 0.16 | 0.16 | 0.001 | 0.0008 | | | | |
| $NO_x$ | | 3.99 | 3.99 | 3.96 | 0.98 | 0.98 | | | | |
| CO | | 22.5 | 22.5 | 22.3 | 0.41 | 0.41 | | | | |
| VOC | | 1.47 | 1.47 | 1.46 | 0.05 | 0.05 | | | | |
| $H_2SO_4$ | | | | | | | | | 1.47E-06 | |
| $CO_2e$ | | 31,998 | 31,998 | 31,729 | 87 | 87 | | | | 74 |
| $CO_2$ | | 31,965 | 31,965 | 31,696 | 86 | 86 | | | | 74 |
| $CH_4$ | | 0.60 | 0.60 | 0.60 | 0.0007 | 0.0007 | | | | |
| $N_2O$ | | 0.060 | 0.060 | 0.060 | 0.003 | 0.003 | | | | |
| Lead | | 0.0001 | 0.0001 | 0.0001 | | | | | | |
| Acetaldehyde | | | | | 0.0000 | 0.0000 | | | | |
| Acrolein | | | | | 0.0000 | 0.0000 | | | | |
| Arsenic | | 0.0001 | 0.0001 | 0.0001 | 0.0000 | 0.0000 | | | | |
| Benzene | | 0.0006 | 0.0006 | 0.0006 | 0.0004 | 0.0004 | | | | |
| Beryllium | | 0.0000 | 0.0000 | 0.0000 | | | | | | |
| 1,3-Butadiene | | | | | | | | | | |
| Cadmium | | 0.0003 | 0.0003 | 0.0003 | | | | | | |
| Chromium | | 0.0004 | 0.0004 | 0.0004 | | | | | | |
| Cobalt | | 0.0000 | 0.0000 | 0.0000 | | | | | | |
| Dichlorobenzene | | 0.0003 | 0.0003 | 0.0003 | | | | | | |
| Formaldehyde | | 0.0201 | 0.0201 | 0.0199 | 0.0000 | 0.0000 | | | | |
| Hexane | | 0.4822 | 0.4822 | 0.4782 | | | | | | |
| HCl | | | | | | | 0.5436 | | | |
| HF | | | | | | | | | | |
| Manganese | | 0.0001 | 0.0001 | 0.0001 | | | | | | |
| Mercury | | 0.0001 | 0.0001 | 0.0001 | | | | | | |
| Naphthalene | | 0.0002 | 0.0002 | 0.0002 | 0.0001 | 0.0001 | | | | |
| Nickel | | 0.0006 | 0.0006 | 0.0006 | | | | | | |
| POM | | 0.0002 | 0.0002 | 0.0002 | 0.0001 | 0.0001 | | | | |
| Selenium | | 0.0000 | 0.0000 | 0.0000 | | | | | | |
| Toluene | | 0.0009 | 0.0009 | 0.0009 | 0.0001 | 0.0001 | | | | |
| Xylene | | | | | 0.0001 | 0.0001 | | | | |
| **TOTAL HAP** | | **0.5059** | **0.5059** | **0.5017** | **0.0008** | **0.0008** | **0.5436** | | | |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**

**All values in tons per year (tpy)**

| | Carolina Lithium 2 (CL-2) | | | | |
|---|---|---|---|---|---|
| **Pollutant** | **Cooling Tower IES33** | **Diesel Storage Tank IES34** | **Truck Traffic IES35** | **Component Leak Fugitives IES36** | **Total** |
| PM | 0.12 | | 0.87 | | 28.0 |
| $PM_{10}$ | 0.12 | | 0.17 | | 27.2 |
| $PM_{2.5}$ | 0.12 | | 0.04 | | 27.1 |
| $SO_2$ | | | | | 0.68 |
| $NO_x$ | | | | | 109 |
| CO | | | | | 95.2 |
| VOC | | 0.002 | | | 6.29 |
| $H_2SO_4$ | | | | | 0.000001 |
| $CO_2e$ | | | | 12 | 134,476 |
| $CO_2$ | | | | 1 | 134,324 |
| $CH_4$ | | | | 0.44 | 2.97 |
| $N_2O$ | | | | | 0.26 |
| Lead | | | | | 0.0006 |
| Acetaldehyde | | | | | 0.0000 |
| Acrolein | | | | | 0.0000 |
| Arsenic | | | | | 0.0002 |
| Benzene | | | | | 0.0032 |
| Beryllium | | | | | 0.0000 |
| 1,3-Butadiene | | | | | 0.0000 |
| Cadmium | | | | | 0.0012 |
| Chromium | | | | | 0.0016 |
| Cobalt | | | | | 0.0001 |
| Dichlorobenzene | | | | | 0.0013 |
| Formaldehyde | | | | | 0.0844 |
| Hexane | | | | | 2.0227 |
| HCl | | | | | 0.5436 |
| HF | | | | | |
| Manganese | | | | | 0.0004 |
| Mercury | | | | | 0.0003 |
| Naphthalene | | | | | 0.0008 |
| Nickel | | | | | 0.0024 |
| POM | | | | | 0.0010 |
| Selenium | | | | | 0.0000 |
| Toluene | | | | | 0.0041 |
| Xylene | | | | | 0.0002 |
| **TOTAL HAP** | | | | | 2.6673 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**FUG: Drilling**

Operating Hours: 8760 hr/yr

| | Throughput (Facility Design) | | Emission Factor (lb/ton) | | | PTE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | lb/hr | | | tpy | | |
| Operation | tonne/hr | ton/hr | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ |
| Drilling | 7,000 | 7,716 | 1.69E-04 | 8.00E-05 | 1.211E-05 | 1.31 | 0.62 | 0.09 | 5.72 | 2.70 | 0.41 |

NOTES:
1. Emission factor for drilling $PM_{10}$ emissions obtained from Fifth Edition AP-42, Chapter 11.19.2 (8/04).
2. PM and PM2.5 emission factors were calculated using the following particle size multipliers obtained from Fifth Edition AP-42, Chapter 13.2.4 (11/06):
PM: 0.74, PM10: 0.35, PM2.5: 0.053.
2. The throughput was estimated as the sum of all ore and waste rock crusher throughputs.

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**FUG: Blasting**

| | | |
|---|---|---|
| Explosive: | ANFO | |
| Maximum Blast Area: | 25,008 | $ft^2$ (Design) |
| Explosive Usage: | 0.000912 | ton/$ft^2$ of blast area (Design) |
| | 22.8 | ton/blast |
| Annual Number of Blasts: | 1,464 | blasts/yr (Design) |
| Fuel Oil Properties: | 7.05 | lb/gallon (Fifth Edition AP-42, Appendix A) |
| | 0.138 | MMBtu/gal (40 CFR Part 98, Table C-1). |
| | 6% | Typical Content |
| Fuel Oil Contained in ANFO: | 1.37 | ton/blast |
| | 53.6 | MMBtu/blast |

| Pollutant | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| | Number | Units | Source | lb/event | tpy |
| $PM/PM_{10}/PM_{2.5}$ | Per AP-42 (9/88), "Emission factor estimates for stone quarry blasting operations are not presented here because of the sparsity and unreliability of available test data. While a procedure for estimating blasting emissions is presented in Section 8.24, Western Surface Coal Mines, that procedure should not be applied to stone quarries because of dissimilarities in blasting techniques, material blasted and size of blast areas." | | | | |
| $SO_2$ | 2 | lb/ton explosive | AP-42 | 45.6 | 33.4 |
| $NO_x$ | 17 | lb/ton explosive | AP-42 | 388 | 284 |
| CO | 67 | lb/ton explosive | AP-42 | 1,528 | 1,119 |
| $CO_2e$ | | | | 8,765 | 6,416 |
| $CO_2$ | 73.96 | kg/MMBtu | 40 CFR Part 98 | 8,735 | 6,394 |
| $CH_4$ | 0.003 | kg/MMBtu | 40 CFR Part 98 | 0.35 | 0.26 |
| $N_2O$ | 0.0006 | kg/MMBtu | 40 CFR Part 98 | 0.071 | 0.05 |

NOTES:
1. $SO_2$, $NO_x$ and CO emission afactors obtained from Fifth Edition AP-42, Chapter 13.3 (1/95).
2. GHG emission factors obtained from 40 CFR pt. 98 - Mandatory Greenhouse Gas Reporting, Table C-1 and C-2, reflecting the update effective January 1, 2014.
3. $CO_2e$ values correspond to the sum of the individual GHG emissions times the following global warming potentials (GWP) obtained from 40 CFR Part 98, Table A-1, reflecting the update effective January 1, 2014.

| Greenhouse Gas | GWP |
|---|---|
| $CO_2$ | 1 |
| $CH_4$ | 25 |
| $N_2O$ | 298 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**IES01: Mobile Rock Breaking**

Operating Hours: 8760 hr/yr

| Operation | Number of Operations | Throughput, each (Facility Design) | | Emission Factor (lb/ton) | | | PTE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | lb/hr, each | | | tpy, each | | | tpy | | |
| | | tonne/hr | ton/hr | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | | | | PM | $PM_{10}$ | $PM_{2.5}$ |
| Ore Breaking | 2 | 700 | 772 | 0.00021 | 0.0001 | 0.000015 | 0.16 | 0.15 | 0.02 | 0.71 | 0.68 | 0.10 | 1.42 | 1.35 | 0.20 |
| Waste Rock Breaking | 4 | 1,400 | 1,543 | | | | 0.65 | 0.31 | 0.05 | 2.84 | 1.35 | 0.20 | 11.4 | 5.41 | 0.81 |
| | | | | | | | | | | | | Total | 12.8 | 6.76 | 1.01 |

NOTES:
1. Emission factors for primary crushing were judged to be representative of emissions generated by this activity.
2. Emission factors for primary crushing obtained from TCEQ's Rock Crushing Facility Emission Rate Calculation Worksheet, obtained from https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/emiss-calc-rock1.xlsx, accessed December 6, 2021).
3. Each operation is classified as insignificant under 15A NCAC 2Q .0503(8).

**IES02: Ore and Wase Rock Loader Operations**

The ore and waste rock crushers are mobile units that will be operated near the working area of the mine. As such, the loaders moving material from the working area to the crusher hoppers will operate in a stop and go mode and the travel distances will be as short as possible. While Fifth Edition AP-42, Chapter 13.2.2 does contain emission factors for equipment operating on unpaved roads, that methodology does not adequately account for short travel at low speeds or for equipment operating in stop and go mode. Based on this, the fugitive dust generated by loader movement is anticipated to be negligible and, therefore, is not quantified.

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**IES03: Mobile Ore Crushing**

Number of Crushers: 2
Operating Hours: 8760 hr/yr

| Operation | Number of Operations | Throughput (Facility Design) | | Emission Factor (lb/ton) | | | PTE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | lb/hr, each | | | tpy, each | | | tpy, total | | |
| | | tonne/hr | ton/hr | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ |
| Loading | 1 | 700 | 772 | 0.00014 | 0.000046 | 0.000013 | 0.11 | 0.04 | 0.01 | 0.47 | 0.16 | 0.04 | | | |
| Primary Crushing | 1 | | | 0.00021 | 0.0001 | 0.000015 | 0.16 | 0.08 | 0.01 | 0.71 | 0.34 | 0.05 | | | |
| Drop Onto Mobile Conveyor * | 1 | | | 0.00002 | 0.000007 | 0.000002 | 0.02 | 0.005 | 0.002 | 0.07 | 0.02 | 0.007 | | | |
| | | | | | | Total | 0.29 | 0.12 | 0.02 | 1.25 | 0.52 | 0.10 | 2.51 | 1.03 | 0.20 |

NOTES:

1. Emission factors for loading and drops obtained from Fifth Edition AP-42, Chapter 11.19.2 (8/04). Based on an average as-mined material moisture content of 6% and footnote b of Table 11.19.2-2 the controlled emission factors were used.

2. The design of the conveyor transfer point (marked with a *) will include a hood over the head roller, enclosed chutes and skirting from the chute to the conveyor belt. To reflect this equipment design a particulate matter reduction of 85% for partial enclosure of the transfer point was applied to the emission factors based on information obtained from TCEQ's Rock Crushing Facility Emission Rate Calculation Worksheet, obtained from https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/emiss-calc-rock1.xlsx, accessed December 6, 2021).

3. Emission factors for primary crushing obtained from TCEQ's Rock Crushing Facility Emission Rate Calculation Worksheet, obtained from https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/emiss-calc-rock1.xlsx, accessed December 6, 2021).

4. Each mobile ore crusher is classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**IES04: Mobile Waste Rock Crushing Without Screening**

Number of Crushers: 3
Operating Hours: 8760 hr/yr

| Operation | Number of Operations | Throughput (Facility Design) tonne/hr | ton/hr | Emission Factor (lb/ton) PM | $PM_{10}$ | $PM_{2.5}$ | PTE lb/hr, each PM | $PM_{10}$ | $PM_{2.5}$ | tpy, each PM | $PM_{10}$ | $PM_{2.5}$ | tpy, total PM | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Loading | 1 | 1,400 | 1,543 | 0.00014 | 0.000046 | 0.000013 | 0.22 | 0.07 | 0.02 | 0.95 | 0.31 | 0.09 | | | |
| Primary Crushing | 1 | | | 0.00021 | 0.0001 | 0.000015 | 0.32 | 0.15 | 0.02 | 1.42 | 0.68 | 0.10 | | | |
| Drop Onto Mobile Conveyor * | 1 | | | 0.00002 | 0.000007 | 0.000002 | 0.03 | 0.01 | 0.003 | 0.14 | 0.05 | 0.01 | | | |
| | | | | | | Total | 0.57 | 0.24 | 0.05 | 2.51 | 1.03 | 0.20 | 7.5 | 3.10 | 0.61 |

NOTES:

1. Emission factors for loading and drops obtained from Fifth Edition AP-42, Chapter 11.19.2 (8/04). Based on an average as-mined material moisture content of 6% and footnote b of Table 11.19.2-2 the controlled emission factors were used.

2. The design of the conveyor transfer point (marked with a *) will include a hood over the head roller, enclosed chutes and skirting from the chute to the conveyor belt. To reflect this equipment design a particulate matter reduction of 85% for partial enclosure of the transfer point was applied to the emission factors based on information obtained from TCEQ's Rock Crushing Facility Emission Rate Calculation Worksheet, obtained from https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/emiss-calc-rock1.xlsx, accessed December 6, 2021).

3. Emission factors for primary crushing obtained from TCEQ's Rock Crushing Facility Emission Rate Calculation Worksheet, obtained from https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/emiss-calc-rock1.xlsx, accessed December 6, 2021).

4. Each mobile waste rock crusher without screening is classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**FUG: Mobile Waste Rock Crusher with Screening**

Operating Hours: 8760 hr/yr

| Operation | Number of Operations | Throughput (Facility Design) | | Emission Factor (lb/ton) | | | PTE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | lb/hr | | | tpy | | |
| | | tonne/hr | ton/hr | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ |
| Loading | 1 | 1,400 | 1,543 | 0.00014 | 0.000046 | 0.000013 | 0.22 | 0.07 | 0.02 | 0.95 | 0.31 | 0.09 |
| Primary Crushing | 1 | | | 0.00021 | 0.0001 | 0.000015 | 0.32 | 0.15 | 0.02 | 1.42 | 0.68 | 0.10 |
| Screening | 1 | | | 0.0022 | 0.0007 | 0.000050 | 3.40 | 1.14 | 0.08 | 14.9 | 5.00 | 0.34 |
| Drop Onto Mobile Conveyor * | 1 | | | 0.00002 | 0.000007 | 0.000002 | 0.03 | 0.01 | 0.003 | 0.14 | 0.05 | 0.01 |
| | | | | | | Total | 3.97 | 1.38 | 0.12 | 17.4 | 6.04 | 0.54 |

NOTES:

1. Emission factors for loading and drops obtained from Fifth Edition AP-42, Chapter 11.19.2 (8/04). Based on an average as-mined material moisture content of 6% and footnote b of Table 11.19.2-2 the controlled emission factors were used.

2. The design of the conveyor transfer point (marked with a *) will include a hood over the head roller, enclosed chutes and skirting from the chute to the conveyor belt. To reflect this equipment design a particulate matter reduction of 85% for partial enclosure of the transfer point was applied to the emission factors based on information obtained from TCEQ's Rock Crushing Facility Emission Rate Calculation Worksheet, obtained from https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/emiss-calc-rock1.xlsx, accessed December 6, 2021).

3. Emission factors for primary crushing obtained from TCEQ's Rock Crushing Facility Emission Rate Calculation Worksheet, obtained from https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/emiss-calc-rock1.xlsx, accessed December 6, 2021).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**IES05: Ore, Waste Rock, Refuse and Reclaim Conveying**

Operating Hours: 8760 hr/yr

| Operation | Number of Transfer Points | Throughput (Facility Design) | | Emission Factor (lb/ton) | | | PTE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | lb/hr, each transfer | | | tpy, each transfer | | | tpy, total | | |
| | | tonne/hr | ton/hr | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ |
| a - Mobile Conveyors from Ore Crushers to Ore Belts * | 6 | 700 | 772 | 0.00002 | 0.000007 | 0.000002 | 0.02 | 0.005 | 0.002 | 0.07 | 0.02 | 0.007 | 0.43 | 0.14 | 0.04 |
| b - Mobile Conveyors from Waste Rock Crushers to Waste Rock Belts * | 12 | 1,400 | 1,543 | 0.00002 | 0.000007 | 0.000002 | 0.03 | 0.01 | 0.003 | 0.14 | 0.05 | 0.01 | 1.70 | 0.56 | 0.16 |
| c - Pit Ore Belts * | 11 | 300 | 331 | 0.00002 | 0.000007 | 0.000002 | 0.01 | 0.002 | 0.0006 | 0.03 | 0.01 | 0.00 | 0.33 | 0.11 | 0.03 |
| d - Overland Ore Belts * | 3 | 600 | 661 | 0.00002 | 0.000007 | 0.000002 | 0.01 | 0.005 | 0.001 | 0.06 | 0.02 | 0.01 | 0.18 | 0.06 | 0.02 |
| e - Waste Belts * | 15 | 5,600 | 6,173 | 0.00002 | 0.000007 | 0.000002 | 0.13 | 0.04 | 0.01 | 0.57 | 0.19 | 0.05 | 8.52 | 2.80 | 0.79 |
| f - Refuse Belts * | 4 | 6,000 | 6,614 | 0.00002 | 0.000007 | 0.000002 | 0.14 | 0.05 | 0.01 | 0.61 | 0.20 | 0.06 | 2.43 | 0.80 | 0.23 |
| g - Reclaim Belts * | 5 | 5,600 | 6,173 | 0.00002 | 0.000007 | 0.000002 | 0.13 | 0.04 | 0.01 | 0.57 | 0.19 | 0.05 | 2.84 | 0.93 | 0.26 |
| | | | | | | | | | | | | Total | 16.4 | 5.40 | 1.53 |

NOTES:

1. Emission factors obtained from Fifth Edition AP-42, Chapter 11.19.2 (8/04).
2. Based on an average material moisture content of 6% and footnote b of Table 11.19.22 the controlled emission factors were used.
3. The design of each conveyor transfer point (marked with a *) will include a hood over the head roller, enclosed chutes and skirting from the chute to the conveyor belt. To reflect this equipment design a particulate matter reduction of 85% for partial enclosure of the transfer point was applied to the emission factors based on information obtained from TCEQ's Rock Crushing Facility Emission Rate Calculation Worksheet, obtained from https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/emiss-calc-rock1.xlsx, accessed December 6, 2021)
4. Each conveyor transfer is classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**IES06: Miscellaneous Material Handling**

Operating Hours: 8760 hr/yr

| Operation | Number of Transfer Points | Throughput (Facility Design) | | Emission Factor (lb/ton) | | | PTE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | lb/hr, each operation | | | tpy, each operation | | | tpy, total | | |
| | | tonne/hr | ton/hr | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ |
| Ore Telestacker | 1 | 600 | 661 | 0.00014 | 0.000046 | 0.000013 | 0.09 | 0.03 | 0.01 | 0.41 | 0.13 | 0.04 | 0.41 | 0.13 | 0.04 |
| Refuse Stackers | 4 | 6,000 | 6,614 | 0.00014 | 0.000046 | 0.000013 | 0.93 | 0.30 | 0.09 | 4.06 | 1.33 | 0.38 | 16.2 | 5.33 | 1.51 |
| | | | | | | | | | | | | Total | 16.6 | 5.46 | 1.54 |

NOTES:

1. Emission factors obtained from Fifth Edition AP-42, Chapter 11.19.2 (8/04). The conveyor transfer factor used because the equipment will be telescoping and operating to minimize drop distance.
2. Based on an average material moisture content of 6% and footnote b of Table 11.19.22 the controlled emission factors were used.
3. Each operation is classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**IES08: Wind Erosion of ROM Pile**
**IES09: Wind Erosion of Reclaim Pile (Alternate Concentrator Plant Location)**

| | | |
|---|---|---|
| Pile Active: | 365 | days/year |
| Size of Pile: | 0.85 | acres (Facility Design) |
| Material Silt Content: | 1.9 | % |
| Number of Days with >= 0.01 of Precipitation: | 136 | Average for years 2014 - 2018 |
| Occurrence of Wind > 12 mph | 3.5 | % (Based on years 2014 - 2018) |

| Operation | Calculated Emission Factor lb/acre/day | Particle Size Multiplier | | | PTE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | lb/hr | | | tpy | | |
| | | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ |
| ROM Pile | 0.49 | 1 | 0.5 | 0.075 | 0.02 | 0.009 | 0.001 | 0.08 | 0.04 | 0.006 |

NOTES:

1. Emission factor calculated using Equation 4-9 from EPA's "Control of Open Fugitive Dust Sources", September 1988, accessed at https://nepis.epa.gov/Exe/ZyPDF.cgi/91010T54.PDF?Dockey=91010T54.PDF.
2. Material silt content obtained from Fifth Edition AP-42, Table 13.2.4 correesponding to crusher limestone.

3. Number of days with greater than or equal to 0.01 inches of precipitation was obtained from https://www.weatherwx.com/hazardoutlook/nc/cherryville.html.
4. The occurrence of wind speeds greater than 12 mph was calculated based on wind speed information contained in the meteorological data used in the dispersion modeling analysis.
5. The pile is classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**IES10: Wind Erosion of Waste Rock and Tailings Disposal**

| | | |
|---|---|---|
| Pile Active: | 365 | days/year |
| Size of Pile: | 2 | acres (assumed) |
| Material Silt Content: | 1.9 | % |
| Number of Days with >= 0.01 of Precipitation: | 136 | Average for years 2014 - 2018 |
| Occurrence of Wind > 12 mph | 3.5 | % (Based on years 2014 - 2018) |

| Operation | Calculated Emission Factor lb/acre/day | Particle Size Multiplier | | | PTE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | lb/hr | | | tpy | | |
| | | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ |
| Active Area 1 | 0.49 | 1 | 0.5 | 0.075 | 0.04 | 0.02 | 0.003 | 0.18 | 0.09 | 0.013 |
| Active Area 2 | | | | | 0.04 | 0.02 | 0.003 | 0.18 | 0.09 | 0.013 |
| | | | | Total | 0.08 | 0.04 | 0.006 | 0.36 | 0.18 | 0.027 |

NOTES:

1. Emission factor calculated using Equation 4-9 from EPA's "Control of Open Fugitive Dust Sources", September 1988, accessed at https://nepis.epa.gov/Exe/ZyPDF.cgi/91010T54.PDF?Dockey=91010T54.PDF.
2. Material silt content obtained from Fifth Edition AP-42, Table 13.2.4 correesponding to crusher limestone.

3. Number of days with greater than or equal to 0.01 inches of precipitation was obtained from https://www.weatherwx.com/hazardoutlook/nc/cherryville.html.
4. The occurrence of wind speeds greater than 12 mph was calculated based on wind speed information contained in the meteorological data used in the dispersion modeling analysis.
5. Each pile is classified as insignificant under 15A NCAC 2Q .0503(8).

**IES11: ROM Pile Loader Operations**

The ROM pile will be located near the coarse ore hopper. As such, the loaders moving material from the pile to the hopper will operate in a stop and go mode and the travel distances will be as short as possible. While Fifth Edition AP-42, Chapter 13.2.2 does contain emission factors for equipment operating on unpaved roads, that methodology does not adequately account for short travel at low speeds or for equipment operating in stop and go mode. Based on this, the fugitive dust generated by loader movement is anticipated to be negligible and, therefore, is not quantified.

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**IES12: Wind Erosion of Ore Surge Pile**

| | | |
|---|---|---|
| Pile Active: | 365 | days/year |
| Size of Pile: | 0.1 | acres (Facility Design) |
| Material Silt Content: | 1.9 | % |
| Number of Days with >= 0.01 of Precipitation: | 136 | Average for years 2014 - 2018 |
| Occurrence of Wind > 12 mph | 3.5 | % (Based on years 2014 - 2018) |

| Operation | Calculated Emission Factor lb/acre/day | Particle Size Multiplier | | | PTE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | lb/hr | | | tpy | | |
| | | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ |
| ROM Pile | 0.49 | 1 | 0.5 | 0.075 | 0.002 | 0.001 | 0.0002 | 0.009 | 0.004 | 0.0007 |

NOTES:

1. Emission factor calculated using Equation 4-9 from EPA's "Control of Open Fugitive Dust Sources", September 1988, accessed at https://nepis.epa.gov/Exe/ZyPDF.cgi/91010T54.PDF?Dockey=91010T54.PDF.
2. Material silt content obtained from Fifth Edition AP-42, Table 13.2.4 correesponding to crusher limestone.
3. Number of days with greater than or equal to 0.01 inches of precipitation was obtained from https://www.weatherwx.com/hazardoutlook/nc/cherryville.html.
4. The occurrence of wind speeds greater than 12 mph was calculated based on wind speed information contained in the meteorological data used in the dispersion modeling analysis.
5. The pile is classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**IES13: Coarse Ore Handling**

Operating Hours: 8,760 hr/yr

| Operation | Number of Operations | Throughput (Facility Design) | | Emission Factor (lb/ton) | | | PTE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | lb/hr, each operation | | | tpy, each operation | | | tpy, total | | |
| | | tonne/hr | ton/hr | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | | | | PM | $PM_{10}$ | $PM_{2.5}$ |
| Drop Into Alternate Location Conveyor Feed | 1 | 378 | 416 | 0.00014 | 0.000046 | 0.000013 | 0.06 | 0.02 | 0.005 | 0.26 | 0.08 | 0.02 | 0.26 | 0.08 | 0.02 |
| Coarse Ore Conveyance to Alternate Location * | 7 | 378 | 416 | 0.00002 | 0.000007 | 0.000002 | 0.009 | 0.003 | 0.0008 | 0.04 | 0.01 | 0.004 | 0.27 | 0.09 | 0.02 |
| Drop Into Coarse Ore Feed Bin | 1 | 378 | 416 | 0.00014 | 0.000046 | 0.000013 | 0.06 | 0.02 | 0.005 | 0.26 | 0.08 | 0.02 | 0.26 | 0.08 | 0.02 |
| Drop Onto Coarse Ore Conveyor * | 1 | | | 0.00002 | 0.000007 | 0.000002 | 0.009 | 0.003 | 0.0008 | 0.04 | 0.01 | 0.004 | 0.04 | 0.01 | 0.004 |
| Coarse Ore Conveyor Transfer Points * | 2 | | | 0.00002 | 0.000007 | 0.000002 | 0.009 | 0.003 | 0.0008 | 0.04 | 0.01 | 0.004 | 0.08 | 0.03 | 0.01 |
| Coarse Ore Screening | 1 | | | 0.0022 | 0.00074 | 0.000050 | 0.92 | 0.31 | 0.02 | 4.01 | 1.35 | 0.09 | 4.01 | 1.35 | 0.09 |
| Screened Coarse Ore Overs and Unders Drops and Transfers * | 2 | 378 | 416 | 0.00002 | 0.000007 | 0.000002 | 0.009 | 0.003 | 0.0008 | 0.04 | 0.01 | 0.004 | 0.08 | 0.03 | 0.01 |
| Screened Fine Ore Overs and Unders Drops and Transfers * | 2 | 963 | 1,061 | 0.00002 | 0.000007 | 0.000002 | 0.009 | 0.003 | 0.0008 | 0.04 | 0.01 | 0.004 | 0.08 | 0.03 | 0.01 |
| | | | | | | | | | | | | Total | 5.06 | 1.69 | 0.19 |

NOTES:

1. Emission factors obtained from Fifth Edition AP-42, Chapter 11.19.2 (8/04).
2. Based on footnote n of Table 11.19.2-2 the emission factor for tertiary crushing was used for primary and secondary crushing.
3. The design of each conveyor transfer point (marked with a *) will include a hood over the head roller, enclosed chutes and skirting from the chute to the conveyor belt. To reflect this equipment design a particulate matter reduction of 85% for partial enclosure of the transfer point was applied to the emission factors based on information obtained from TCEQ's Rock Crushing Facility Emission Rate Calculation Worksheet, obtained from https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/emiss-calc-rock1.xlsx, accessed December 6, 2021)
4. Each operation is classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Ore Sorting Operations**
**ES01, CD01, EP01**

| | | |
|---|---|---|
| Airflow: | 6,787 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.12 | 0.51 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Secondary Crusher Feed Bin**
**ES02, CD02, EP02**

| | | |
|---|---|---|
| Airflow: | 3,000 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.05 | 0.23 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Secondary Crusher Discharge**
**ES03, CD03, EP03**

| | | |
|---|---|---|
| Airflow: | 205 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.004 | 0.02 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Fine Ore Sizing Screen Discharge**
**ES04, CD04, EP04**

| | | |
|---|---|---|
| Airflow: | 410 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.007 | 0.03 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Tertiary Crusher Feed Bin**
**ES05, CD05, EP05 (Bin No. 1)**
**ES06, CD06, EP06 (Bin No. 2)**

| | | |
|---|---|---|
| Airflow: | 3,000 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.05 | 0.23 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Tertiary Crusher Discharge**
**ES07, CD07, EP07 (Tertiary Crusher No. 1)**
**ES08, CD07, EP07 (Tertiary Crusher No. 2)**

| | | |
|---|---|---|
| Airflow: | 295 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.005 | 0.02 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Fine Ore Bin**
**ES09, CD08, EP08**

| | | |
|---|---|---|
| Airflow: | 2,000 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.03 | 0.15 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**IES14: Miscellaneous Material Handling Operations**

Operating Hours: 8,760 hr/yr

| | | Throughput (Facility Design) | | Emission Factor (lb/ton) | | | PTE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number of | | | | | | lb/hr, each | | | tpy, each | | | tpy, total | | |
| Operation | Operations | tonne/hr | ton/hr | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ |
| Spodumene Concentrate Drops * | 2 | 26.0 | 28.7 | 0.00002 | 0.000007 | 0.000002 | 0.0006 | 0.0002 | 0.00006 | 0.003 | 0.0009 | 0.0002 | 0.005 | 0.002 | 0.0005 |
| Drop Onto Conveyor to Chemical Plants | 1 | 32.0 | 35.3 | 0.00014 | 0.000046 | 0.000013 | 0.005 | 0.002 | 0.0005 | 0.02 | 0.007 | 0.002 | 0.02 | 0.007 | 0.002 |
| Spodumene Export Truck Loading | 1 | | 38.5 | 0.0030 | 0.00110 | 0.00110 | 0.12 | 0.04 | 0.04 | 0.51 | 0.19 | 0.19 | 0.51 | 0.19 | 0.19 |
| Residue from Kings Mountain Truck Unloading | 1 | | 58.7 | 0.0030 | 0.00110 | 0.00110 | 0.18 | 0.06 | 0.06 | 0.77 | 0.28 | 0.28 | 0.77 | 0.28 | 0.28 |
| Waste Rock Conveyance (Alternate Concentrator Plant Location) * | 6 | 343 | 378 | 0.00002 | 0.000007 | 0.000002 | 0.008 | 0.003 | 0.0007 | 0.03 | 0.01 | 0.003 | 0.21 | 0.07 | 0.02 |
| Mica Concentrate Drop * | 1 | 12.4 | 13.6 | 0.00002 | 0.000007 | 0.000002 | 0.0003 | 0.00009 | 0.00003 | 0.001 | 0.0004 | 0.0001 | 0.001 | 0.0004 | 0.0001 |
| Dried Feldspar Concentrate Drops * | 3 | 70.8 | 78.0 | 0.0005 | 0.00017 | 0.00017 | 0.04 | 0.01 | 0.01 | 0.15 | 0.06 | 0.06 | 0.46 | 0.17 | 0.17 |
| Dried Feldspar Truck Loading | 1 | | 88.0 | 0.0030 | 0.00110 | 0.00110 | 0.26 | 0.10 | 0.10 | 1.16 | 0.42 | 0.42 | 1.16 | 0.42 | 0.42 |
| Dried Quartz Concentrate Drops * | 4 | 45.4 | 50.0 | 0.0005 | 0.00017 | 0.00017 | 0.02 | 0.008 | 0.008 | 0.10 | 0.04 | 0.04 | 0.39 | 0.14 | 0.14 |
| Dried Quartz Truck Loading | 1 | | 88.0 | 0.0030 | 0.00110 | 0.00110 | 0.26 | 0.10 | 0.10 | 1.16 | 0.42 | 0.42 | 1.16 | 0.42 | 0.42 |
| | | | | | | | | | | | | Total | 4.68 | 1.71 | 1.65 |

NOTES:

1. Emission factors obtained from Fifth Edition AP-42, Chapter 11.19.2 (8/04). The conveyor transfer emission factor was used to conservatively estimate emissions for truck loading and unloading operations.
2. Based on footnote n of Table 11.19.2-2 the emission factor for tertiary crushing was used for primary and secondary crushing.
3. Except for dried feldspar and quartz, the average material moisture content is greater than 2.88 percent. Therefore, based on footnote b of Table 11.19.22, the controlled emission factors were used.
4. Because the feldspar and quartz are dried the non-controlled material handling emission factors were used.
5. The design of each conveyor transfer point (marked with a *) will include a hood over the head roller, enclosed chutes and skirting from the chute to the conveyor belt. To reflect this equipment design a particulate matter reduction of 85% for partial enclosure of the transfer point was applied to the emission factors based on information obtained from TCEQ's Rock Crushing Facility Emission Rate Calculation Worksheet, obtained from https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/emiss-calc-rock1.xlsx, accessed December 6, 2021)
6. Each operation is classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Quartz Dryer**
**ES10, CD09 and CD10, EP09**

| | | |
|---|---|---|
| Heat Input: | 312 | scfm (Facility Design) |
| | 18,720 | scf/hr |
| | 19.1 | MMBtu/hr (Calculated using gas flow and heat content value |
| Fuel Gas Heat Content: | 1,020 | $Btu/ft^3$ (Fifth Edition AP-42, Table 1.4-1, footnote a) |
| Operating Hours: | 8,760 | hr/yr |
| Fuel: | Natural Gas | |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.13 | lb/hr | Facility Design | 0.13 | 0.57 |
| $SO_2$ | 0.0006 | lb/MMBtu | AP-42 | 0.01 | 0.05 |
| $NO_x$ | 0.049 | lb/MMBtu | AP-42 | 0.94 | 4.10 |
| CO | 0.08 | lb/MMBtu | AP-42 | 1.57 | 6.89 |
| VOC | 0.0054 | lb/MMBtu | AP-42 | 0.10 | 0.45 |
| $CO_2e$ | | | | 2,236 | 9,793 |
| $CO_2$ | 53.06 | kg/MMBtu | 40 CFR Part 98 | 2,234 | 9,783 |
| $CH_4$ | 0.001 | kg/MMBtu | 40 CFR Part 98 | 0.04 | 0.18 |
| $N_2O$ | 0.0001 | kg/MMBtu | 40 CFR Part 98 | 0.004 | 0.02 |
| Lead | 4.902E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Arsenic | 1.96E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Benzene | 2.06E-06 | lb/MMBtu | AP-42 | 0.0000 | 0.0002 |
| Beryllium | < 1.18E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Cadmium | 1.08E-06 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Chromium | 1.37E-06 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Cobalt | 8.24E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Dichlorobenzene | 1.18E-06 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Formaldehyde | 7.35E-05 | lb/MMBtu | AP-42 | 0.0014 | 0.0061 |
| Hexane | 1.76E-03 | lb/MMBtu | AP-42 | 0.0337 | 0.1476 |
| HF | 0.66 | lb/hr | Facility Design | 0.6600 | 2.8908 |
| Manganese | 3.73E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Mercury | 2.55E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Naphthalene | 5.98E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Nickel | 2.06E-06 | lb/MMBtu | AP-42 | 0.0000 | 0.0002 |
| POM | 6.85E-07 | lb/MMBtu | Sum | 0.0000 | 0.0001 |
| 2-Methylnaphthalene | 2.35E-08 | lb/MMBtu | AP-42 | | |
| 3-Methylchloranthrene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| 7,12-Dimethylbenz(a)anthracene | < 1.57E-08 | lb/MMBtu | AP-42 | | |
| Acenaphthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Acenaphthylene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Anthracene | < 2.35E-09 | lb/MMBtu | AP-42 | | |
| Benz(a)anthracene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Benzo(a)pyrene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Benzo(b)fluoranthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Benzo(g,h,i)perylene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Benzo(k)fluoranthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Chrysene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Dibenzo(a,h)anthracene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Fluoranthene | 2.94E-09 | lb/MMBtu | AP-42 | | |
| Fluorene | 2.75E-09 | lb/MMBtu | AP-42 | | |
| Indeno(1,2,3-cd)pyrene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Naphthalene | 5.98E-07 | lb/MMBtu | AP-42 | | |
| Phenanthrene | 1.67E-08 | lb/MMBtu | AP-42 | | |
| Pyrene | 4.90E-09 | lb/MMBtu | AP-42 | | |
| Selenium | < 2.35E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Toluene | 3.33E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0003 |
| **TOTAL HAP** | | | | 0.6953 | 3.0456 |

NOTES:

1. The $PM/PM_{10}/PM_{2.5}$ and HF emission factors are based on the use of a fabric filter and wet scrubber to control dryer emissions.
2. AP-42 (Fifth Edition, July 1998) emission factors are for natural gas boilers <100 MMBtu/hr obtained from https://www3.epa.gov/ttn/chief/ap42/ch01/final/c01s04.pdf, accessed October 1, 2019.
3. The $PM = PM_{10} = PM_{2.5}$ emission factor includes filterable plus condensable particulate matter.
4. GHG emission factors and fuel heat content obtained from 40 CFR pt. 98 - Mandatory Greenhouse Gas Reporting, Table C -1 and C - 2, reflecting the update effective January 1, 2014.
5. $CO_2e$ values correspond to the sum of the individual GHG emissions times the following global warming potentials (GWP) obtained from 40 CFR Part 98, Table A-1, reflecting the update effective January 1, 2014.

| Greenhouse Gas | GWP |
|---|---|
| $CO_2$ | 1 |
| $CH_4$ | 25 |
| $N_2O$ | 298 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Feldspar Dryer**
**ES11, CD11 and CD12, EP10**

| | | |
|---|---|---|
| Heat Input: | 484 | scfm (Facility Design) |
| | 29,040 | scf/hr |
| | 29.6 | MMBtu/hr (Calculated using gas flow and heat content values) |
| Fuel Gas Heat Content: | 1,020 | $Btu/ft^3$ (Fifth Edition AP-42, Table 1.4-1, footnote a) |
| Feldspar Throughput | 77 | dry tons/hr (Facility Design) |
| | 500,000 | dry tons/yr (Requested Limit) |
| Operating Hours: | 8,760 | hr/yr |
| Fuel: | Natural Gas | |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.21 | lb/hr | Facility Design | 0.21 | 0.92 |
| $SO_2$ | 0.0006 | lb/MMBtu | AP-42 | 0.02 | 0.076 |
| $NO_x$ | 0.049 | lb/MMBtu | AP-42 | 1.45 | 6.36 |
| CO | 0.08 | lb/MMBtu | AP-42 | 2.44 | 10.7 |
| VOC | 0.0054 | lb/MMBtu | AP-42 | 0.160 | 0.70 |
| $CO_2e$ | | | | 3,469 | 15,192 |
| $CO_2$ | 53.06 | kg/MMBtu | 40 CFR Part 98 | 3,465 | 15,177 |
| $CH_4$ | 0.001 | kg/MMBtu | 40 CFR Part 98 | 0.07 | 0.29 |
| $N_2O$ | 0.0001 | kg/MMBtu | 40 CFR Part 98 | 0.007 | 0.03 |
| Lead | 4.902E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Arsenic | 1.96E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Benzene | 2.06E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0003 |
| Beryllium | < 1.18E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Cadmium | 1.08E-06 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Chromium | 1.37E-06 | lb/MMBtu | AP-42 | 0.0000 | 0.0002 |
| Cobalt | 8.24E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Dichlorobenzene | 1.18E-06 | lb/MMBtu | AP-42 | 0.0000 | 0.0002 |
| Formaldehyde | 7.35E-05 | lb/MMBtu | AP-42 | 0.0022 | 0.0095 |
| Hexane | 1.76E-03 | lb/MMBtu | AP-42 | 0.0523 | 0.2290 |
| HF | 0.026 | lb/dry ton | Facility Design | 1.9900 | 6.4610 |
| Manganese | 3.73E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Mercury | 2.55E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Naphthalene | 5.98E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Nickel | 2.06E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0003 |
| POM | 6.85E-07 | lb/MMBtu | Sum | 0.0000 | 0.0001 |
| 2-Methylnaphthalene | 2.35E-08 | lb/MMBtu | AP-42 | | |
| 3-Methylchloranthrene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| 7,12-Dimethylbenz(a)anthracene | < 1.57E-08 | lb/MMBtu | AP-42 | | |
| Acenaphthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Acenaphthylene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Anthracene | < 2.35E-09 | lb/MMBtu | AP-42 | | |
| Benz(a)anthracene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Benzo(a)pyrene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Benzo(b)fluoranthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Benzo(g,h,i)perylene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Benzo(k)fluoranthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Chrysene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Dibenzo(a,h)anthracene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Fluoranthene | 2.94E-09 | lb/MMBtu | AP-42 | | |
| Fluorene | 2.75E-09 | lb/MMBtu | AP-42 | | |
| Indeno(1,2,3-cd)pyrene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Naphthalene | 5.98E-07 | lb/MMBtu | AP-42 | | |
| Phenanthrene | 1.67E-08 | lb/MMBtu | AP-42 | | |
| Pyrene | 4.90E-09 | lb/MMBtu | AP-42 | | |
| Selenium | < 2.35E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Toluene | 3.33E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0004 |
| **TOTAL HAP** | | | | 2.0448 | 6.7012 |

NOTES:

1. The $PM/PM_{10}/PM_{2.5}$ and HF emission factors are based on the use of a fabric filter and wet scrubber to control dryer emissions.
2. AP-42 (Fifth Edition, July 1998) emission factors are for natural gas boilers <100 MMBtu/hr obtained from https://www3.epa.gov/ttn/chief/ap42/ch01/final/c01s04.pdf, accessed October 1, 2019.
3. The PM = $PM_{10}$ = $PM_{2.5}$ emission factor includes filterable plus condensable particulate matter.
4. GHG emission factors and fuel heat content obtained from 40 CFR pt. 98 - Mandatory Greenhouse Gas Reporting, Table C -1 and C -2, reflecting the update effective January 1, 2014.
5. $CO_2e$ values correspond to the sum of the individual GHG emissions times the following global warming potentials (GWP) obtained from 40 CFR Part 98, Table A-1, reflecting the update effective January 1, 2014.

| Greenhouse Gas | GWP |
|---|---|
| $CO_2$ | 1 |
| $CH_4$ | 25 |
| $N_2O$ | 298 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**IES15: Miscellanous Materials Loader Operations**

The concentrate handling building will be located adjacent to the concentrator plant feed hopper. As such, the loaders moving material from the building to the hopper will operate in a stop and go mode and the travel distance will be as short as possible. While Fifth Edition AP-42, Chapter 13.2.2 does contain emission factors for equipment operating on unpaved roads, that methodology does not adequately account for short travel at low speeds or for equipment operating in stop and go mode.

Tailings and mica will be moved in a similar manner. Based on this, the fugitive dust generated by loader movements associated with these materials is anticipated to be negligible and, therefore, is not quantified.

**Piedmont Lithium Carolinas, Inc**

**Carolina Lithium Project**

**Air Quality Construction Permit Application**

**Potential to Emit**

**Emergency Generators - 1,000 kW**

**ES12, EP11 (Concentrator Plant, No. 1)**
**ES13, EP12 (Concentrator Plant, No. 2)**
**ES38, EP37 (CL-1, No. 1)**
**ES39, EP38 (CL-1, No. 2)**
**ES65, EP62 (CL-2, No. 1)**
**ES66, EP63 (CL-2, No. 2)**

| | | |
|---|---|---|
| Engine Size | 1,500 | HP |
| Heat Input Rating: | 10.5 | MMBtu/hr (calculated using BSFC = 7000 Btu/HP-hr, per AP-42) |
| Diesel Sulfur Limit: | 0.0015 | percent (15 ppm sulfur diesel) |
| Non-Emergency Operating Hours: | 100 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| PM | 0.0007 | lb/HP-hr | AP-42 | 1.05 | 0.05 |
| $PM_{10}$ | 0.0007 | lb/HP-hr | AP-42 | 1.05 | 0.05 |
| $PM_{2.5}$ | 0.0007 | lb/HP-hr | AP-42 | 1.05 | 0.05 |
| $SO_2$ | 0.0015 | lb/MMBtu | See Note 2 | 0.02 | 0.001 |
| $NO_x$ | 0.013 | lb/HP-hr | AP-42 | 19.5 | 0.98 |
| CO | 0.0055 | lb/HP-hr | AP-42 | 8.25 | 0.41 |
| VOC | 0.000705 | lb/HP-hr | AP-42 | 1.06 | 0.05 |
| $CO_2e$ | | | | 1,733 | 87 |
| $CO_2$ | 73.96 | kg/mmBtu | 40 CFR Part 98 | 1,712 | 86 |
| $CH_4$ | 6.0E-04 | kg/mmBtu | 40 CFR Part 98 | 0.01 | 0.0007 |
| $N_2O$ | 3.0E-03 | kg/mmBtu | 40 CFR Part 98 | 0.07 | 0.003 |
| Acetaldehyde | 2.52E-05 | lb/MMBtu | AP-42 | 2.65E-04 | 1.32E-05 |
| Acrolein | 7.88E-06 | lb/MMBtu | AP-42 | 8.27E-05 | 4.14E-06 |
| Benzene | 7.76E-04 | lb/MMBtu | AP-42 | 8.15E-03 | 4.07E-04 |
| Formaldehyde | 7.89E-05 | lb/MMBtu | AP-42 | 8.28E-04 | 4.14E-05 |
| Naphthalene | 1.30E-04 | lb/MMBtu | AP-42 | 1.37E-03 | 6.83E-05 |
| POM | 2.12E-04 | lb/MMBtu | AP-42 | 2.22E-03 | 1.11E-04 |
| Acenaphthene | 4.68E-06 | lb/MMBtu | AP-42 | | |
| Acenaphthylene | 9.23E-06 | lb/MMBtu | AP-42 | | |
| Anthracene | 1.23E-06 | lb/MMBtu | AP-42 | | |
| Benzo(a)anthracene | 6.22E-07 | lb/MMBtu | AP-42 | | |
| Benzo(a)pyrene | < 2.57E-07 | lb/MMBtu | AP-42 | | |
| Benzo(b)fluoranthene | 1.11E-06 | lb/MMBtu | AP-42 | | |
| Benzo(g,h,i)perylene | < 5.56E-07 | lb/MMBtu | AP-42 | | |
| Benzo(k)fluoranthene | < 2.18E-07 | lb/MMBtu | AP-42 | | |
| Chrysene | 1.53E-06 | lb/MMBtu | AP-42 | | |
| Dibenzo(a,h)anthracene | < 3.46E-07 | lb/MMBtu | AP-42 | | |
| Fluoranthene | 4.03E-06 | lb/MMBtu | AP-42 | | |
| Fluorene | 1.28E-05 | lb/MMBtu | AP-42 | | |
| Indeno(1,2,3-cd)pyrene | < 4.14E-07 | lb/MMBtu | AP-42 | | |
| Naphthalene | 1.30E-04 | lb/MMBtu | AP-42 | | |
| Phenanthrene | 4.08E-05 | lb/MMBtu | AP-42 | | |
| Pyrene | 3.71E-06 | lb/MMBtu | AP-42 | | |
| Toluene | 2.81E-04 | lb/MMBtu | AP-42 | 2.95E-03 | 1.48E-04 |
| Xylene | 1.93E-04 | lb/MMBtu | AP-42 | 2.03E-03 | 1.01E-04 |
| **TOTAL HAP** | | | | | 8.26E-04 |

NOTES:

1. AP-42 emission factors obtained from Fifth Edition AP-42, Chapter 3.4 (October 1996).

2. Calculated using the fuel oil sulfur content and the $SO_2$ calculation equation obtained from AP-42, Table 3.4-1.

3. GHG emission factors obtained from 40 CFR pt. 98 - Mandatory Greenhouse Gas Reporting, Table C-1 and C-2, reflecting the update effective January 1, 2014.

4. $CO_2e$ values correspond to the sum of the individual GHG emissions times the following global warming potentials (GWP) obtained from 40 CFR Part 98, Table A-1, reflecting the update effective January 1, 2014.

| Greenhouse Gas | GWP |
|---|---|
| $CO_2$ | 1 |
| $CH_4$ | 25 |
| $N_2O$ | 298 |

5. Naphthalene is an individual HAP, as well as being one of the compounds included in the individual HAP called polycyclic organic matter (POM). To avoid double counting, only the emissions included in POM are included in the calculation of total HAP.

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Hydrofluoric Acid Storage Tank**
**ES14, CD13, EP13**

Operating Hours: 8760 hr/yr

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| HF | 0.06 | lb/hr | Facility Design | 0.06 | 0.26 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Sulfuric Acid Storage Tank**
**IES16**

Operating Hours: 8,760 hr/yr

Uncontrolled

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $H_2SO_4$ | 0.0018 | lb/hr | Facility Design | 0.0018 | 0.008 |

NOTE:
1. The sulfuric acid storage tank is uncontrolled.
2. This source is classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**IES17: Diesel Storage Tank, 20,000 gal**

| Pollutant | PTE | |
|---|---|---|
| | lb/yr | tpy |
| VOC | 25.30 | 0.01 |

NOTE:
1. Calculated using TankESP software package utilizing the calculation methodology of EPA's Fifth Edition AP-42, Chapter 7.1 (6/20)
2. Assumed maximum throughput of 1,040,000 gal/yr (one turnover per week).
3. This source is classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**IES18: Diesel Storage Tank, 7,000 gal**

| Pollutant | PTE | |
|---|---|---|
| | lb/yr | tpy |
| VOC | 8.97 | 0.004 |

NOTE:
1. Calculated using TankESP software package utilizing the calculation methodology of EPA's Fifth Edition AP-42, Chapter 7.1 (6/20)
2. Assumed maximum throughput of 364,000 gal/yr (one turnover per week).
3. This source is classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**IES19: Kerosene Storage Tank, 8,000 gal**

| | PTE | |
|---|---|---|
| Pollutant | lb/yr | tpy |
| VOC | 5.88 | 0.003 |

NOTE:
1. Calculated using TankESP software package utilizing the calculation methodology of EPA's Fifth Edition AP-42, Chapter 7.1 (6/20)
2. Assumed maximum throughput of 100,000 gal/yr.
3. This source is eligible for exemption under 15A NCAC 2Q .0102(h)(5).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Concentrator Plant Truck Traffic**
**IES20**

Operating Hours: 8,760 hr/yr

| Operation | Type | Vehicle Frequency | | Distance Traveled Per Truck | Vehicle Weight (W) | PM | | | | $PM_{10}$ | | | | $PM_{2.5}$ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | VPD | VPH | VMT | (tons) | Size Multiplier (k) | (sL)[1] ($g/m^2$) | Factor (lb/VMT) | Emissions (lb/hr) | Size Multiplier (k) | (sL)[1] ($g/m^2$) | Factor (lb/VMT) | Emissions (lb/hr) | Size Multiplier (k) | (sL)[1] ($g/m^2$) | Factor (lb/VMT) | Emissions (lb/hr) |
| Spodumene Concentrate Export | Empty | 42 | 1.75 | 0.262 | 10 | 0.011 | 1.1 | 0.1256 | 0.058 | 0.0022 | 1.1 | 0.0251 | 0.0115 | 0.00054 | 1.1 | 0.0062 | 0.0028 |
| | Full | 42 | 1.75 | 0.262 | 32 | 0.011 | 1.1 | 0.4114 | 0.189 | 0.0022 | 1.1 | 0.0823 | 0.0378 | 0.00054 | 1.1 | 0.0202 | 0.0093 |
| Residue Receipt | Empty | 64 | 2.67 | 0.262 | 10 | 0.011 | 1.1 | 0.1256 | 0.088 | 0.0022 | 1.1 | 0.0251 | 0.0176 | 0.00054 | 1.1 | 0.0062 | 0.0043 |
| | Full | 64 | 2.67 | 0.262 | 32 | 0.011 | 1.1 | 0.4114 | 0.288 | 0.0022 | 1.1 | 0.0823 | 0.0576 | 0.00054 | 1.1 | 0.0202 | 0.0141 |
| Quartz Export | Empty | 44 | 1.83 | 0.262 | 10 | 0.011 | 1.1 | 0.1256 | 0.060 | 0.0022 | 1.1 | 0.0251 | 0.0121 | 0.00054 | 1.1 | 0.0062 | 0.0030 |
| | Full | 44 | 1.83 | 0.262 | 32 | 0.011 | 1.1 | 0.4114 | 0.198 | 0.0022 | 1.1 | 0.0823 | 0.0396 | 0.00054 | 1.1 | 0.0202 | 0.0097 |
| Feldspar Export | Empty | 69 | 2.88 | 0.262 | 10 | 0.011 | 1.1 | 0.1256 | 0.095 | 0.0022 | 1.1 | 0.0251 | 0.0190 | 0.00054 | 1.1 | 0.0062 | 0.0047 |
| | Full | 69 | 2.88 | 0.262 | 32 | 0.011 | 1.1 | 0.4114 | 0.310 | 0.0022 | 1.1 | 0.0823 | 0.0621 | 0.00054 | 1.1 | 0.0202 | 0.0152 |
| Mica Export | Empty | 5 | 0.21 | 0.262 | 10 | 0.011 | 1.1 | 0.1256 | 0.007 | 0.0022 | 1.1 | 0.0251 | 0.0014 | 0.00054 | 1.1 | 0.0062 | 0.0003 |
| | Full | 5 | 0.21 | 0.262 | 32 | 0.011 | 1.1 | 0.4114 | 0.022 | 0.0022 | 1.1 | 0.0823 | 0.0045 | 0.00054 | 1.1 | 0.0202 | 0.0011 |
| All Other Materials | Empty | 2 | 0.08 | 0.262 | 10 | 0.011 | 1.1 | 0.1256 | 0.003 | 0.0022 | 1.1 | 0.0251 | 0.0005 | 0.00054 | 1.1 | 0.0062 | 0.0001 |
| | Full | 2 | 0.08 | 0.262 | 32 | 0.011 | 1.1 | 0.4114 | 0.009 | 0.0022 | 1.1 | 0.0823 | 0.0018 | 0.00054 | 1.1 | 0.0202 | 0.0004 |
| | | | | | | | | **Total (lb/hr)** | **1.33** | | | **Total (lb/hr)** | **0.27** | | | **Total (lb/hr)** | **0.07** |
| | | | | | | | | **Total (tpy)** | **5.81** | | | **Total (tpy)** | **1.16** | | | **Total (tpy)** | **0.29** |

Paved Roadways: $EPM10 = k (sL)^{0.91} (W)^{1.02}$

NOTES
1 Emission Factors obtained from Fifth Edition AP-42, Section 13.2.1 (Jan. 2011).
2 The vehicle weights represents the average (i.e., loaded and unloaded) weights of the vehicle traveling on a given road segment.
3 The silt loading value obtained from AP-42 Section 13.2.1, Table 13.2.1-3 and corresponds to the mean silt loading for corn wet mills.
4. The truck traffic is eligible for exemption under 15A NCAC 2Q .0102(h)(5).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Wind Erosion of Concentrate Surge Pile**
**IES21 (CL-1)**
**IES29 (CL-2)**

| | | |
|---|---|---|
| Pile Active: | 365 | days/year |
| Size of Pile: | 0.25 | acres (Facility Design) |
| Material Silt Content: | 1.9 | % |
| Number of Days with >= 0.01 of Precipitation: | 136 | Average for years 2014 - 2018 |
| Occurrence of Wind > 12 mph | 3.5 | % (Based on years 2014 - 2018) |

| Operation | Calculated Emission Factor lb/acre/day | Particle Size Multiplier | | | PTE lb/hr | | | PTE tpy | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ |
| Concentrate Pile | 0.49 | 1 | 0.5 | 0.075 | 0.005 | 0.003 | 0.0004 | 0.02 | 0.01 | 0.002 |

NOTES:

1. Emission factor calculated using Equation 4-9 from EPA's "Control of Open Fugitive Dust Sources", September 1988, accessed at https://nepis.epa.gov/Exe/ZyPDF.cgi/91010T54.PDF?Dockey=91010T54.PDF.
2. Material silt content obtained from Fifth Edition AP-42, Table 13.2.4 correesponding to crusher limestone.

3. Number of days with greater than or equal to 0.01 inches of precipitation was obtained from https://www.weatherwx.com/hazardoutlook/nc/cherryville.html.
4. The occurrence of wind speeds greater than 12 mph was calculated based on wind speed information contained in the meteorological data used in the dispersion modeling analysis.
5. The pile is classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Concentrate Pile Loader Operations**
**IES22 (CL-1)**
**IES30 (CL-2)**

The concentrate pile will be located near the feed hopper. As such, the loaders moving material from the pile to the hopper will operate in a stop and go mode and the travel distances will be as short as possible. While Fifth Edition AP-42, Chapter 13.2.2 does contain emission factors for equipment operating on unpaved roads, that methodology does not adequately account for short travel at low speeds or for equipment operating in stop and go mode. Based on this, the fugitive dust generated by loader movement is anticipated to be negligible and, therefore, is not quantified.

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Concentrate Pile Material Handling**
**IES23 (CL-1)**
**IES31 (CL-2)**

Operating Hours: 8,760 hr/yr

| Operation | Number of Operations | Throughput (Facility Design) | | Emission Factor (lb/ton) | | | PTE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | lb/hr | | | tpy | | |
| | | tonne/hr | ton/hr | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ |
| Drop into Hopper | 1 | 35 | 39 | 0.00014 | 0.000046 | 0.000013 | 0.005 | 0.002 | 0.0005 | 0.02 | 0.008 | 0.002 |
| Drop Onto Spodumene Conveyor * | 1 | | | 0.00002 | 0.000007 | 0.000002 | 0.0008 | 0.0003 | 0.00008 | 0.004 | 0.001 | 0.0003 |
| | | | | | | | | | Total | 0.03 | 0.009 | 0.003 |

NOTES:

1. Emission factors obtained from Fifth Edition AP-42, Chapter 11.19.2 (8/04).
2. Based on footnote n of Table 11.19.2-2 the emission factor for tertiary crushing was used for primary and secondary crushing.
3. The design of each conveyor transfer point (marked with a *) will include a hood over the head roller, enclosed chutes and skirting from the chute to the conveyor belt. To reflect this equipment design a particulate matter reduction of 85% for partial enclosure of the transfer point was applied to the emission factors based on information obtained from TCEQ's Rock Crushing Facility Emission Rate Calculation Worksheet, obtained from https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/emiss-calc-rock1.xlsx, accessed December 6, 2021)
4. Each operation is classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Spodumene Concentrate Conveying**
**ES15, CD14, EP14 (CL-1)**
**ES44, CD36, EP41 (CL-2)**

| | | |
|---|---|---|
| Airflow: | 250 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.004 | 0.02 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Spodumene Concentrate Surge Silo**
**ES16, CD15, EP15 (CL-1)**
**ES45, CD37, EP42 (CL-2)**

| | | |
|---|---|---|
| Airflow: | 1,150 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.02 | 0.09 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Spodumene Concentrate Conveyor to Calciner**
**ES17, CD16, EP16 (CL-1)**
**ES46, CD38, EP43 (CL-2)**

| | | |
|---|---|---|
| Airflow: | 250 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.004 | 0.02 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Calciner Rotary Kiln**
**ES18, CD17 and CD18, EP17 (CL-1)**
**ES47, CD39 and CD40, EP44 (CL-2)**

| | | |
|---|---|---|
| Maximum Concentrated Spodumene Input: | 37.5 | ton/hr (Facility Design) |
| Heat Input | 75.05 | MMBtu/hr (Facility Design) |
| Fuel Gas Heat Content: | 1,020 | Btu/ft$^3$ (Fifth Edition AP-42, Table 1.4-1, footnote a) |
| Exhaust Flow Rate: | 9,292 | dscfm (Facility Design) |
| Operating Hours: | 8,760 | hr/yr |
| Fuel: | Natural Gas | |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | | | | 4.56 | 20.0 |
| Process Generated | 4.0 | lb/hr | Facility Design | 4.0 | 17.5 |
| Fuel Combustion | 0.0075 | lb/MMBtu | AP-42 | 0.56 | 2.45 |
| $SO_2$ | 0.001 | lb/MMBtu | AP-42 | 0.04 | 0.19 |
| $NO_x$ | 21.68 | lb/hr | Facility Design | 21.68 | 95.0 |
| CO | 0.082 | lb/MMBtu | AP-42 | 6.18 | 27.1 |
| VOC | 0.0054 | lb/MMBtu | AP-42 | 0.40 | 1.77 |
| $CO_2e$ | | | | 8,788 | 38,492 |
| $CO_2$ | 53.06 | kg/MMBtu | 40 CFR Part 98 | 8,779 | 38,453 |
| $CH_4$ | 0.001 | kg/MMBtu | 40 CFR Part 98 | 0.17 | 0.72 |
| $N_2O$ | 0.0001 | kg/MMBtu | 40 CFR Part 98 | 0.017 | 0.072 |
| Lead | 4.902E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0002 |
| Arsenic | 1.96E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Benzene | 2.06E-06 | lb/MMBtu | AP-42 | 0.0002 | 0.0007 |
| Beryllium | < 1.18E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Cadmium | 1.08E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0004 |
| Chromium | 1.37E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0005 |
| Cobalt | 8.24E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Dichlorobenzene | 1.18E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0004 |
| Formaldehyde | 7.35E-05 | lb/MMBtu | AP-42 | 0.0055 | 0.0242 |
| Hexane | 1.76E-03 | lb/MMBtu | AP-42 | 0.1324 | 0.5801 |
| Manganese | 3.73E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Mercury | 2.55E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Naphthalene | 5.98E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0002 |
| Nickel | 2.06E-06 | lb/MMBtu | AP-42 | 0.0002 | 0.0007 |
| POM | 6.85E-07 | lb/MMBtu | Sum | 0.0001 | 0.0002 |
| 2-Methylnaphthalene | 2.35E-08 | lb/MMBtu | AP-42 | | |
| 3-Methylchloranthrene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| 7,12-Dimethylbenz(a)anthracene | < 1.57E-08 | lb/MMBtu | AP-42 | | |
| Acenaphthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Acenaphthylene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Anthracene | < 2.35E-09 | lb/MMBtu | AP-42 | | |
| Benz(a)anthracene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Benzo(a)pyrene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Benzo(b)fluoranthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Benzo(g,h,i)perylene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Benzo(k)fluoranthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Chrysene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Dibenzo(a,h)anthracene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Fluoranthene | 2.94E-09 | lb/MMBtu | AP-42 | | |
| Fluorene | 2.75E-09 | lb/MMBtu | AP-42 | | |
| Indeno(1,2,3-cd)pyrene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Naphthalene | 5.98E-07 | lb/MMBtu | AP-42 | | |
| Phenanthrene | 1.67E-08 | lb/MMBtu | AP-42 | | |
| Pyrene | 4.90E-09 | lb/MMBtu | AP-42 | | |
| Selenium | < 2.35E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Toluene | 3.33E-06 | lb/MMBtu | AP-42 | 0.0003 | 0.0011 |
| **TOTAL HAP** | | | | | 0.6086 |

NOTES:

1. AP-42 (Fifth Edition, July 1998) emission factors are for natural gas boilers <100 MMBtu/hr obtained from https://www3.epa.gov/ttn/chief/ap42/ch01/final/c01s04.pdf, accessed October 1, 2019.
2. The $PM = PM_{10} = PM_{2.5}$ emission factor assumed to include filterable plus condensable particulate matter.
3. GHG emission factors and fuel heat content obtained from 40 CFR pt. 98 - Mandatory Greenhouse Gas Reporting, Table C-1 and C-2, reflecting the update effective January 1, 2014.
4. $CO_2e$ values correspond to the sum of the individual GHG emissions times the following global warming potentials (GWP) obtained from 40 CFR Part 98, Table A-1, reflecting the update effective January 1, 2014.

| Greenhouse Gas | GWP |
|---|---|
| $CO_2$ | 1 |
| $CH_4$ | 25 |
| $N_2O$ | 298 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Cooler Discharge Sweep Air**
**ES19, CD19, EP18 (CL-1)**
**ES48, CD41, EP45 (CL-2)**

| | | |
|---|---|---|
| Airflow: | 1,500 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.03 | 0.11 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Ball Mill Feed Bin**
**ES20, CD20, EP19 (CL-1)**
**ES49, CD42, EP46 (CL-2)**

| | | |
|---|---|---|
| Airflow: | 1,848 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.03 | 0.14 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Pressure Leaching**

**ES21, CD21, EP20 (CL-1, Train 1)**
**ES22, CD22, EP21 (CL-1, Train 2)**
**ES50, CD43, EP47 (CL-2, Train 1)**
**ES51, CD44, EP48 (CL-2, Train 2)**

Operating Hours: 8,760 hr/yr

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.18 | lb/hr | Facility Design | 0.18 | 0.79 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**LiOH Bagging Area Surge Bin/Transporter**

**ES23, CD23, EP22 (CL-1, Hopper No. 1)**
**ES24, CD24, EP23 (CL-1, Hopper No. 2)**
**ES52, CD45, EP49 (CL-2, Hopper No. 1)**
**ES53, CD46, EP50 (CL-2, Hopper No. 2)**

| | | |
|---|---|---|
| Airflow: | 90 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.002 | 0.007 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**LiOH Bagging Area Day Tank**

**ES25, CD25, EP24 (CL-1, Tank No. 1)**
**ES26, CD26, EP25 (CL-1, Tank No. 2)**
**ES27, CD27, EP26 (CL-1, Tank No. 3)**
**ES28, CD28, EP27 (CL-1, Tank No. 4)**
**ES54, CD47, EP51 (CL-2, Tank No. 1)**
**ES55, CD48, EP52 (CL-2, Tank No. 2)**
**ES56, CD49, EP53 (CL-2, Tank No. 3)**
**ES57, CD50, EP54 (CL-2, Tank No. 4)**

| | | |
|---|---|---|
| Airflow: | 90 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.002 | 0.007 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**LiOH Bagging Operation**
**ES29, CD29, EP28 (CL-1)**
**ES58, CD51, EP55 (CL-2)**

Operating Hours: 8,760 hr/yr

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.07 | lb/hr | Facility Design | 0.07 | 0.31 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**LiOH Bagging Area Vacuum**
**ES30, CD30, EP29 (CL-1)**
**ES59, CD52, EP56 (CL-2)**

| | | |
|---|---|---|
| Airflow: | 600 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.01 | 0.05 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Lime Receiving and Storage**
**ES31, CD31, EP30**

| | | |
|---|---|---|
| Airflow: | 2,850 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.05 | 0.21 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Phosphate Receiving and Storage**
**ES32, CD32, EP31 (CL-1)**
**ES60, CD53, EP57 (CL-2)**

| | | |
|---|---|---|
| Airflow: | 2,850 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.05 | 0.21 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Sodium Carbonate Receiving and Storage Silo**
**ES33, CD33, EP32**

| | | |
|---|---|---|
| Airflow: | 2,850 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| Pollutant | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.05 | 0.21 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Sodium Carbonate Receiving and Feeder Bin**
**ES34, CD34, EP33 (CL-1)**
**ES61, CD54, EP58 (CL-2)**

| | | |
|---|---|---|
| Airflow: | 2,850 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.05 | 0.21 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**

**ES35, EP34 (CL-1, Boiler No. 1)**
**ES36, EP35 (CL-1, Boiler No. 2)**
**ES62, EP59 (CL-2, Boiler No. 1)**
**ES63, EP60 (CL-2, Boiler No. 2)**

| | | |
|---|---|---|
| | 1,019 | scfm (Facility Design) |
| Heat Input: | 61,164 | scf/hr |
| | 62.4 | MMBtu/hr (Calculated using gas flow and heat content values) |
| Fuel Gas Heat Content: | 1,020 | Btu/ft$^3$ (Fifth Edition AP-42, Table 1.4-1, footnote a) |
| Operating Hours: | 8,760 | hr/yr |
| Fuel: | Natural Gas | |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.005 | lb/MMBtu | BACT | 0.31 | 1.37 |
| $SO_2$ | 0.0006 | lb/MMBtu | AP-42 | 0.04 | 0.16 |
| $NO_x$ | 0.0146 | lb/MMBtu | Facility Design | 0.91 | 3.99 |
| CO | 0.082 | lb/MMBtu | AP-42 | 5.14 | 22.5 |
| VOC | 0.0054 | lb/MMBtu | AP-42 | 0.34 | 1.47 |
| $CO_2e$ | | | | 7,305 | 31,998 |
| $CO_2$ | 53.06 | kg/MMBtu | 40 CFR Part 98 | 7,298 | 31,965 |
| $CH_4$ | 0.001 | kg/MMBtu | 40 CFR Part 98 | 0.14 | 0.60 |
| $N_2O$ | 0.0001 | kg/MMBtu | 40 CFR Part 98 | 0.014 | 0.06 |
| Lead | 4.902E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Arsenic | 1.96E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Benzene | 2.06E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0006 |
| Beryllium | < 1.18E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Cadmium | 1.08E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0003 |
| Chromium | 1.37E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0004 |
| Cobalt | 8.24E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Dichlorobenzene | 1.18E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0003 |
| Formaldehyde | 7.35E-05 | lb/MMBtu | AP-42 | 0.0046 | 0.0201 |
| Hexane | 1.76E-03 | lb/MMBtu | AP-42 | 0.1101 | 0.4822 |
| Manganese | 3.73E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Mercury | 2.55E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Naphthalene | 5.98E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0002 |
| Nickel | 2.06E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0006 |
| POM | 6.85E-07 | lb/MMBtu | Sum | 0.0000 | 0.0002 |
| 2-Methylnaphthalene | 2.35E-08 | lb/MMBtu | AP-42 | | |
| 3-Methylchloranthrene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| 7,12-Dimethylbenz(a)anthracene | < 1.57E-08 | lb/MMBtu | AP-42 | | |
| Acenaphthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Acenaphthylene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Anthracene | < 2.35E-09 | lb/MMBtu | AP-42 | | |
| Benz(a)anthracene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Benzo(a)pyrene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Benzo(b)fluoranthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Benzo(g,h,i)perylene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Benzo(k)fluoranthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Chrysene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Dibenzo(a,h)anthracene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Fluoranthene | 2.94E-09 | lb/MMBtu | AP-42 | | |
| Fluorene | 2.75E-09 | lb/MMBtu | AP-42 | | |
| Indeno(1,2,3-cd)pyrene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Naphthalene | 5.98E-07 | lb/MMBtu | AP-42 | | |
| Phenanthrene | 1.67E-08 | lb/MMBtu | AP-42 | | |
| Pyrene | 4.90E-09 | lb/MMBtu | AP-42 | | |
| Selenium | < 2.35E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Toluene | 3.33E-06 | lb/MMBtu | AP-42 | 0.0002 | 0.0009 |
| **TOTAL HAP** | | | | | 0.5059 |

NOTES:

1. Obtained from AP-42 (Fifth Edition, July 1998,) emission factors are for natural gas boilers <100 MMBtu/hr.
2. The PM = $PM_{10}$ = $PM_{2.5}$ emission factor includes filterable plus condensable particulate matter.
3. The $NO_x$ emission factor was calculated based on a facility design of using low $NO_x$ burners with emissions of 14.9 lb/MMscf.
4. GHG emission factors obtained from 40 CFR pt. 98 - Mandatory Greenhouse Gas Reporting, Table C-1 and C-2, reflecting the update effective January 1, 2014.
5. $CO_2e$ values correspond to the sum of the individual GHG emissions times the following global warming potentials (GWP) obtained from 40 CFR Part 98, Table A-1, reflecting the update effective January 1, 2014.

| Greenhouse Gas | GWP |
|---|---|
| $CO_2$ | 1 |
| $CH_4$ | 25 |
| $N_2O$ | 298 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**ES37, EP36 (CL-1, Boiler No. 3)**
**ES64, EP61 (CL-2, Boiler No. 3)**

| | | |
|---|---|---|
| | 1,011 | scfm (Facility Design) |
| Heat Input: | 60,649 | scf/hr |
| | 61.9 | MMBtu/hr (Calculated using gas flow and heat content values) |
| Fuel Gas Heat Content: | 1,020 | Btu/ft$^3$ (Fifth Edition AP-42, Table 1.4-1, footnote a) |
| Operating Hours: | 8,760 | hr/yr |
| Fuel: | Natural Gas | |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.005 | lb/MMBtu | BACT | 0.31 | 1.35 |
| $SO_2$ | 0.0006 | lb/MMBtu | AP-42 | 0.04 | 0.16 |
| $NO_x$ | 0.0146 | lb/MMBtu | Facility Design | 0.90 | 3.96 |
| CO | 0.082 | lb/MMBtu | AP-42 | 5.09 | 22.3 |
| VOC | 0.0054 | lb/MMBtu | AP-42 | 0.33 | 1.46 |
| $CO_2e$ | | | | 7,244 | 31,729 |
| $CO_2$ | 53.06 | kg/MMBtu | 40 CFR Part 98 | 7,236 | 31,696 |
| $CH_4$ | 0.001 | kg/MMBtu | 40 CFR Part 98 | 0.14 | 0.60 |
| $N_2O$ | 0.0001 | kg/MMBtu | 40 CFR Part 98 | 0.014 | 0.06 |
| Lead | 4.902E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Arsenic | 1.96E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Benzene | 2.06E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0006 |
| Beryllium | < 1.18E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Cadmium | 1.08E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0003 |
| Chromium | 1.37E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0004 |
| Cobalt | 8.24E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Dichlorobenzene | 1.18E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0003 |
| Formaldehyde | 7.35E-05 | lb/MMBtu | AP-42 | 0.0045 | 0.0199 |
| Hexane | 1.76E-03 | lb/MMBtu | AP-42 | 0.1092 | 0.4782 |
| Manganese | 3.73E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Mercury | 2.55E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Naphthalene | 5.98E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0002 |
| Nickel | 2.06E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0006 |
| POM | 6.85E-07 | lb/MMBtu | Sum | 0.0000 | 0.0002 |
| 2-Methylnaphthalene | 2.35E-08 | lb/MMBtu | AP-42 | | |
| 3-Methylchloranthrene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| 7,12-Dimethylbenz(a)anthracene | < 1.57E-08 | lb/MMBtu | AP-42 | | |
| Acenaphthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Acenaphthylene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Anthracene | < 2.35E-09 | lb/MMBtu | AP-42 | | |
| Benz(a)anthracene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Benzo(a)pyrene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Benzo(b)fluoranthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Benzo(g,h,i)perylene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Benzo(k)fluoranthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Chrysene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Dibenzo(a,h)anthracene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Fluoranthene | 2.94E-09 | lb/MMBtu | AP-42 | | |
| Fluorene | 2.75E-09 | lb/MMBtu | AP-42 | | |
| Indeno(1,2,3-cd)pyrene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Naphthalene | 5.98E-07 | lb/MMBtu | AP-42 | | |
| Phenanthrene | 1.67E-08 | lb/MMBtu | AP-42 | | |
| Pyrene | 4.90E-09 | lb/MMBtu | AP-42 | | |
| Selenium | < 2.35E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Toluene | 3.33E-06 | lb/MMBtu | AP-42 | 0.0002 | 0.0009 |
| **TOTAL HAP** | | | | | 0.5017 |

NOTES:
1. Obtained from AP-42 (Fifth Edition, July 1998) emission factors are for natural gas boilers <100 MMBtu/hr.
2. The PM = $PM_{10}$ = $PM_{2.5}$ emission factor includes filterable plus condensable particulate matter.
3. The $NO_x$ emission factor was calculated based on a facility design of using low $NO_x$ burners with emissions of 14.9 lb/MMscf.
4. GHG emission factors obtained from 40 CFR pt. 98 - Mandatory Greenhouse Gas Reporting, Table C-1 and C-2, reflecting the update effective January 1, 2014.
5. $CO_2e$ values correspond to the sum of the individual GHG emissions times the following global warming potentials (GWP) obtained from 40 CFR Part 98, Table A-1, reflecting the update effective January 1, 2014.

| Greenhouse Gas | GWP |
|---|---|
| $CO_2$ | 1 |
| $CH_4$ | 25 |
| $N_2O$ | 298 |

**Piedmont Lithium Carolinas, Inc**

**Carolina Lithium Project**

**Air Quality Construction Permit Application Modification**

**Potential to Emit**

**Fire Pump**

**ES40, EP39**

| | | |
|---|---|---|
| Engine Size | 363 | HP |
| Heat Input Rating: | 2.54 | MMBtu/hr (calculated using BSFC = 7000 Btu/HP-hr, per AP-42) |
| Diesel Sulfur Limit: | 0.0015 | percent (15 ppm sulfur diesel) |
| Non-Emergency Operating Hours: | 100 | hr/yr |

| Pollutant | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| | Number | Units | Source | lb/hr | tpy |
| PM | 0.0022 | lb/HP-hr | AP-42 | 0.80 | 0.04 |
| $PM_{10}$ | 0.0022 | lb/HP-hr | AP-42 | 0.80 | 0.04 |
| $PM_{2.5}$ | 0.0022 | lb/HP-hr | AP-42 | 0.80 | 0.04 |
| $SO_2$ | 0.0015 | lb/MMBtu | See Note 2 | 0.004 | 0.0002 |
| $NO_x$ | 0.031 | lb/HP-hr | AP-42 | 11.3 | 0.56 |
| CO | 0.0067 | lb/HP-hr | AP-42 | 2.42 | 0.12 |
| VOC | 0.00247 | lb/HP-hr | AP-42 | 0.90 | 0.04 |
| $CO_2e$ | | | | 419 | 21 |
| $CO_2$ | 73.96 | kg/mmBtu | 40 CFR Part 98 | 414 | 21 |
| $CH_4$ | 6.0E-04 | kg/mmBtu | 40 CFR Part 98 | 0.003 | 0.0002 |
| $N_2O$ | 3.0E-03 | kg/mmBtu | 40 CFR Part 98 | 0.02 | 0.0008 |
| Acetaldehyde | 7.67E-04 | lb/MMBtu | AP-42 | 1.95E-03 | 9.74E-05 |
| Acrolein | < 9.25E-05 | lb/MMBtu | AP-42 | 2.35E-04 | 1.18E-05 |
| Benzene | 9.33E-04 | lb/MMBtu | AP-42 | 2.37E-03 | 1.19E-04 |
| 1,3-Butadiene | < 3.91E-05 | lb/MMBtu | AP-42 | 9.94E-05 | 4.97E-06 |
| Formaldehyde | 1.18E-03 | lb/MMBtu | AP-42 | 3.00E-03 | 1.50E-04 |
| Naphthalene | 8.48E-05 | lb/MMBtu | AP-42 | 2.15E-04 | 1.08E-05 |
| POM | 1.68E-04 | lb/MMBtu | AP-42 | 4.27E-04 | 2.14E-05 |
| Acenaphthene | < 1.42E-06 | lb/MMBtu | AP-42 | | |
| Acenaphthylene | < 5.06E-06 | lb/MMBtu | AP-42 | | |
| Anthracene | 1.87E-06 | lb/MMBtu | AP-42 | | |
| Benzo(a)anthracene | 1.68E-06 | lb/MMBtu | AP-42 | | |
| Benzo(a)pyrene | < 1.88E-07 | lb/MMBtu | AP-42 | | |
| Benzo(b)fluoranthene | < 9.91E-08 | lb/MMBtu | AP-42 | | |
| Benzo(g,h,i)perylene | < 4.89E-07 | lb/MMBtu | AP-42 | | |
| Benzo(k)fluoranthene | < 1.55E-07 | lb/MMBtu | AP-42 | | |
| Chrysene | 3.53E-07 | lb/MMBtu | AP-42 | | |
| Dibenzo(a,h)anthracene | < 5.83E-07 | lb/MMBtu | AP-42 | | |
| Fluoranthene | 7.61E-06 | lb/MMBtu | AP-42 | | |
| Fluorene | 2.92E-05 | lb/MMBtu | AP-42 | | |
| Indeno(1,2,3-cd)pyrene | < 3.75E-07 | lb/MMBtu | AP-42 | | |
| Naphthalene | 8.48E-05 | lb/MMBtu | AP-42 | | |
| Phenanthrene | 2.94E-05 | lb/MMBtu | AP-42 | | |
| Pyrene | 4.78E-06 | lb/MMBtu | AP-42 | | |
| Toluene | 4.09E-04 | lb/MMBtu | AP-42 | 1.04E-03 | 5.20E-05 |
| Xylene | 2.85E-04 | lb/MMBtu | AP-42 | 7.24E-04 | 3.62E-05 |
| **TOTAL HAP** | | | | | 4.92E-04 |

NOTES:

1. AP-42 emission factors obtained from Fifth Edition AP-42, Chapter 3.3 (October 1996).

2. Calculated using the fuel oil sulfur content and the $SO_2$ calculation equation obtained from AP-42, Table 3.4-1.

3. GHG emission factors obtained from 40 CFR pt. 98 - Mandatory Greenhouse Gas Reporting, Table C-1 and C-2, reflecting the update effective January 1, 2014.

4. $CO_2e$ values correspond to the sum of the individual GHG emissions times the following global warming potentials (GWP) obtained from 40 CFR Part 98, Table A-1, reflecting the update effective January 1, 2014.

| Greenhouse Gas | GWP |
|---|---|
| $CO_2$ | 1 |
| $CH_4$ | 25 |
| $N_2O$ | 298 |

5. Naphthalene is an individual HAP, as well as being one of the compounds included in the individual HAP called polycyclic organic matter (POM). To avoid double counting, only the emissions included in POM are included in the calculation of total HAP.

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Hydrochloric Acid Storage Tank (ES41, CL-1; ES67, CL-2)**
**Hydrochloric Acid Dilution Tank (ES42, CL-1; ES68, CL-2))**
**Sulfuric Acid Dilution Tank (ES43, CL-1; ES69, CL-2))**
**CD35, EP40 (CL-1)**
**CD55, EP64 (CL-2)**

Operating Hours: 8,760 hr/yr

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| HCl | | | Facility Design | 0.12 | 0.54 |
| Storage Tank | 0.124 | lb/hr | Facility Design | 0.12 | |
| Dilution Tank | 0.0001 | lb/hr | Facility Design | 0.0001 | |
| $H_2SO_4$ | 3.35E-07 | lb/hr | Facility Design | 3.35E-07 | 1.47E-06 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Lithium Carbonate Reactor**
**IES24 (CL-1)**
**IES32 (CL-2)**

Operating Hours: 8,760 hr/yr

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $CO_2$ | 17 | lb/hr | Facility Design | 17 | 74 |

NOTE: Each lithium carbonate reactor is eligible to be classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Cooling Tower**
**IES25 (CL-1)**
**IES33 (CL-2)**

Assumptions:

Tower Type: Induced Draft Counter Flow

Tower Parameters

| | | |
|---|---|---|
| TDS | **1,970** | ppm (Facility Design) |
| Water Density: | **8.34** | lb/gal @ 90 °F (lower bound of cooling tower circulating water temperature) |
| Liquid Drift Loss: | **0.00001** | gal/gal (BACT - 0.001% drift) |
| | **0.0834** | lb/kgal (calculated) |

Cooling Water Flow

| | |
|---|---|
| **608.32** | $m^3$/hr (Facility design information) |
| **160,718** | gal/hr (calculated based on 264.2 gal/$m^3$) |
| **161** | (kgal/hr) |

| | | |
|---|---|---|
| Operation Hours: | **8,760** | hr/yr |

Emissions

| Pollutant | PTE | |
|---|---|---|
| | lb/hr | tpy |
| PM/PM10/PM2.5 | 0.0264 | 0.12 |

NOTES:
1. Assumed PM = $PM_{10}$ = $PM_{2.5}$.
2. PTE calculated by multiplying the drift loss by the cooling tower TDS.
3. Each cooling tower is eligible to be classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**7,000 gal Diesel Storage Tank**
**IES26 (CL-1)**
**IES34 (CL-2)**

| | PTE | |
|---|---|---|
| Pollutant | lb/yr | tpy |
| VOC | 3.71 | 0.002 |

NOTE:
1. Calculated using TankESP software package utilizing the calculation methodology of EPA's Fifth Edition AP-42, Chapter 7.1 (6/20)
2. Assumed maximum throughput of 10,000 gal/yr.
3. Each diesel tank is eligible to be classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Truck Traffic**
**IES27 (CL-1)**
**IES35 (CL-2)**

Operating Hours: 8,760 hr/yr

| | | Vehicle Frequency | | Distance Traveled Per Truck | Vehicle Weight (W) | PM | | | | $PM_{10}$ | | | | $PM_{2.5}$ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Size Multiplier | (sL)[1] | Factor | Emissions | Size Multiplier | (sL)[1] | Factor | Emissions | Size Multiplier | (sL)[1] | Factor | Emissions |
| Operation | Type | VPD | VPH | VMT | tons | (k) | $g/m^2$ | lb/VMT | lb/hr | (k) | $g/m^2$ | lb/VMT | lb/hr | (k) | $g/m^2$ | lb/VMT | lb/hr |
| LiOH Product | Empty | 6 | 0.25 | 0.658 | 10 | 0.011 | 1.1 | 0.1256 | 0.02 | 0.0022 | 1.1 | 0.0251 | 0.004 | 0.00054 | 1.1 | 0.0062 | 0.0010 |
| | Full | 6 | 0.25 | 0.297 | 32 | 0.011 | 1.1 | 0.4114 | 0.03 | 0.0022 | 1.1 | 0.0823 | 0.006 | 0.00054 | 1.1 | 0.0202 | 0.0015 |
| All Other Materials | Empty | 18 | 0.75 | 0.658 | 10 | 0.011 | 1.1 | 0.1256 | 0.06 | 0.0022 | 1.1 | 0.0251 | 0.012 | 0.00054 | 1.1 | 0.0062 | 0.0030 |
| | Full | 18 | 0.75 | 0.297 | 30 | 0.011 | 1.1 | 0.3852 | 0.09 | 0.0022 | 1.1 | 0.0770 | 0.017 | 0.00054 | 1.1 | 0.0189 | 0.0042 |
| | | | | | | | | **Total (lb/hr)** | **0.20** | | | **Total (lb/hr)** | **0.04** | | | **Total (lb/hr)** | **0.01** |
| | | | | | | | | **Total (tpy)** | **0.87** | | | **Total (tpy)** | **0.17** | | | **Total (tpy)** | **0.04** |

Paved Roadways: $EPM10 = k\,(sL)^{0.91}\,(W)^{1.02}$

NOTES
1 Emission Factors obtained from Fifth Edition AP-42, Section 13.2.1 (Jan. 2011).
2 The vehicle weights represents the average (i.e., loaded and unloaded) weights of the vehicle traveling on a given road segment.
3 The silt loading value obtained from AP-42 Section 13.2.1, Table 13.2.1-3 and corresponds to the mean silt loading for corn wet mills.
4. The truck traffic is eligible to be classified as insignificant under 15A NCAC 2Q .0503(8).

**Modeled distances for truck traffic**

| | | | |
|---|---|---|---|
| **Chemical Plants** | | | |
| Western Plant Entrance | 685.4 meters | 2249 feet | Assume this segment is two-way traffic, half empty and half full |
| Incoming through Mid-Plant | 373.2 meters | 1224 feet | One-way traffic, full trucks |
| Empty Truck Return Loop | 478.1 meters | 1569 feet | One-way traffic, empty trucks |
| **Total distance** | **2222.1 meters** | **7290 feet** | Entrance back to exit |
| **Primary Concentrator Site** | | | |
| Single Truck Loop | 844.8 meters | 2772 feet | Made one single line volume segment from entrance back to exit (one-way traffic) |
| **Alternate Concentrator Site** | | | |
| Single Truck Loop | 694.3 meters | 2278 feet | Made one single line volume segment from entrance back to exit (one-way traffic) |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Component Leak Fugitives**
**IES28 (CL-1)**
**IES36 (CL-2)**

Operating Hours: 8,760 hr/yr

**Components in $CO_2$ Service**

| | | |
|---|---|---|
| Component Count | Valves | Flanges/Connectors |
| | 6 | 16 |
| Total Leak Emissions (lb/hr/component) | 0.0132 | 0.0040 |
| **Pollutant** | PTE | |
| | lb/hr | tpy |
| $CO_2$e | 0.1 | 1 |
| $CO_2$ | 0.1 | 1 |

**Components in Natural Gas Service**

| | | |
|---|---|---|
| Component Count | Valves | Flanges/Connectors |
| | 4 | 12 |
| Total Leak Emissions (lb/hr/component) | 0.0132 | 0.0040 |
| **Pollutant** | PTE | |
| | lb/hr | tpy |
| $CO_2$e | 3 | 11 |
| Methane | 0.10 | 0.44 |

NOTES:

[1] The emission factors used in these calculations were obtained from EPA's "Protocol for Equipment Leak Emission Estimates", EPA-453/R-95-017, November 1995 (accessed at https://www.epa.gov/sites/default/files/2020-09/documents/protocol_for_equipment_leak_emission_estimates.pdf).

[2] $CO_2$e values correspond to the sum of the individual GHG emissions times the global warming potentials obtained from 40 CFR Part 98, Table A-1, reflecting the update effective January 1, 2014.

3. The component leak fugitives are eligible to be classified as insignificant under 15A NCAC 2Q .0503(8).

# ATTACHMENT 3

Requested State and Federal Enforceable Permit Limits

# *Concentrator Plant*

**Ore Sorting Operations (ES01, CD01, EP01)**

- Operation of a fabric filter (CD01)
- $PM/PM_{10}/PM_{2.5}$ limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Secondary Crusher Feed Bin (ES02, CD02, EP02)**

- Operation of a fabric filter (CD03)
- $PM/PM_{10}/PM_{2.5}$ limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Secondary Crusher Discharge (ES03, CD03, EP03)**

- Operation of a fabric filter (CD02)
- $PM/PM_{10}/PM_{2.5}$ limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Fine Ore Sizing Screen Discharge (ES04, CD04, EP04)**

- Operation of a fabric filter (CD04)
- $PM/PM_{10}/PM_{2.5}$ limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Tertiary Crusher Feed Bin No. 1 (ES05, CD05, EP05)**

- Operation of a fabric filter (CD05)
- $PM/PM_{10}/PM_{2.5}$ limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Tertiary Crusher Feed Bin No. 2 (ES06, CD06, EP06)**

- Operation of a fabric filter (CD06)
- $PM/PM_{10}/PM_{2.5}$ limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Tertiary Crusher Discharge (ES07 and ES08, CD07, EP07)**

- Operation of a fabric filter (CD07)
- $PM/PM_{10}/PM_{2.5}$ limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Fine Ore Bin (ES09, CD08, EP08)**

- Operation of a fabric filter (CD06)
- $PM/PM_{10}/PM_{2.5}$ limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Quartz Dryer (ES10, CD09 and CD10, EP09)**

- Operation of a fabric filter (CD09) followed by a venturi wet scrubber (CD10)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 0.13 lb/hr with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment
- HF emission limit of 0.66 lb/hr with compliance determined by periodic stack testing

**Feldspar Dryer (ES11, CD11 and CD12, EP10)**

- Operation of a fabric filter (CD11) followed by a venturi wet scrubber (CD12)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 0.21 lb/hr with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment
- HF emission limit of 1.99 lb/hr with compliance determined by periodic stack testing
- Annual throughput limit of 500,000 dry tons feldspar/year

**1,000 kW Emergency Generator No. 1 (ES12, EP11)**

- Operation as an emergency stationary internal combustion engine as defined in 40 CFR Part 60, Subpart IIII
- Purchase of a manufacturer certified engine

**1,000 kW Emergency Generator No. 2 (ES13, EP12)**

- Operation as an emergency stationary internal combustion engine as defined in 40 CFR Part 60, Subpart IIII
- Purchase of a manufacturer certified engine

**Hydrofluoric Acid Storage Tank (ES14, CD13, EP13)**

- Operation of a venturi wet scrubber (CD13)
- HF emission limit of 0.06 lb/hr with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

## *CL-1*

**Spodumene Concentrate Conveying (ES15, CD14, EP14)**

- Operation of a fabric filter (CD14)
- $PM/PM_{10}/PM_{2.5}$ limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Spodumene Concentrate Surge Silo (ES16, CD15, EP15)**

- Operation of a fabric filter (CD15)
- $PM/PM_{10}/PM_{2.5}$ limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Spodumene Concentrate Conveyor to Calcine (ES17, CD16, EP16)**

- Operation of a fabric filter (CD16)
- $PM/PM_{10}/PM_{2.5}$ limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Calciner Rotary Kiln (ES18, CD17 and CD18, EP17)**

- Operation of a cyclone (CD17) followed by a venturi wet scrubber (CD18)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 4.56 lb/hr with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment
- NOx emission limit of 21.68 lb/hr with compliance determined by periodic stack testing

**Cooler Discharge Sweep Air (ES19, CD19, EP18)**

- Operation of a fabric filter (CD19)
- $PM/PM_{10}/PM_{2.5}$ limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Ball Mill Feed Mill (ES20, CD20, EP19)**

- Operation of a fabric filter (CD20)
- $PM/PM_{10}/PM_{2.5}$ limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Train 1 Pressure Leaching (ES21, CD21, EP20)**

- Operation of a wet venturi scrubber (CD21)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 0.18 lb/hr with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Train 2 Pressure Leaching (ES22, CD22, EP21)**

- Operation of a wet venturi scrubber (CD22)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 0.18 lb/hr with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**LiOH Bagging Area Surge Bin/Transporter No. 1 (ES23, CD23, EP22)**

- Operation of a fabric filter (CD23)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 0.002 gr/dscf lb/hr with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**LiOH Bagging Area Surge Bin/Transporter No. 2 (ES24, CD24, EP23)**

- Operation of a fabric filter (CD24)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**LiOH Bagging Area Day Tank No. 1 (ES25, CD25, EP24)**

- Operation of a fabric filter (CD25)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**LiOH Bagging Area Day Tank No. 2 (ES26, CD26, EP25)**

- Operation of a fabric filter (CD26)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**LiOH Bagging Area Day Tank No. 3 (ES27, CD27, EP26)**

- Operation of a fabric filter (CD27)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**LiOH Bagging Area Day Tank No. 4 (ES28, CD28, EP27)**

- Operation of a fabric filter (CD28)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**LiOH Bagging Operation (ES29, CD29, EP28)**

- Operation of a venturi wet scrubber (CD29)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**LiOH Bagging Area Vacuum (ES30, CD30, EP29)**

- Operation of a fabric filter (CD30)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Lime Receiving and Storage (ES31, CD31, EP30)**

- Operation of a fabric filter (CD31)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Phosphate Receiving and Storage (ES32, CD32, EP31)**

- Operation of a fabric filter (CD32)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Sodium Carbonate Receiving and Storage Silo (ES33, CD33, EP32)**

- Operation of a fabric filter (CD33)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Sodium Carbonate Receiving and Feeder Bin (ES34, CD31, EP33)**

- Operation of a fabric filter (CD31)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Boilers (ES35, EP34; ES36, EP35; ES37; EP36)**

- None

**1,000 kW Emergency Generator No. 1 (ES38, EP37)**

- Operation as an emergency stationary internal combustion engine as defined in 40 CFR Part 60, Subpart IIII
- Purchase of a manufacturer certified engine

**1,000 kW Emergency Generator No. 2 (ES39, EP38)**

- Operation as an emergency stationary internal combustion engine as defined in 40 CFR Part 60, Subpart IIII
- Purchase of a manufacturer certified engine

**Fire Pump (ES40, EP39)**

- Operation as a fire pump as defined in 40 CFR Part 60, Subpart IIII
- Purchase of a manufacturer certified engine

**Hydrochloric Acid Storage Tank and Dilution Tank (ES41 and ES42, CD35, EP40)**

- Operation of a wet scrubber (CD35)
- HCl emission limit of 0.12 lb/hr (EP40) with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Sulfuric Acid Storage Tanks (ES43, CD35, EP40)**

- None – Vapors from the sulfuric acid storage tank will be collected and sent to the wet scrubber. This is a voluntary control measure by the facility and does not result in the avoidance of any otherwise applicable requirements (including any air toxics evaluation requirements).

## *CL-2*

**Spodumene Concentrate Conveying (ES44, CD36, EP41)**

- Operation of a fabric filter (CD36)
- $PM/PM_{10}/PM_{2.5}$ limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Spodumene Concentrate Surge Silo (ES45, CD37, EP42)**

- Operation of a fabric filter (CD37)
- $PM/PM_{10}/PM_{2.5}$ limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Spodumene Concentrate Conveyor to Calcine (ES46, CD38, EP43)**

- Operation of a fabric filter (CD16)
- $PM/PM_{10}/PM_{2.5}$ limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Calciner Rotary Kiln (ES47, CD39 and CD40, EP44)**

- Operation of a cyclone (CD39) followed by a venturi wet scrubber (CD40)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 4.56 lb/hr with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment
- NOx emission limit of 21.68 lb/hr with compliance determined by periodic stack testing

**Cooler Discharge Sweep Air (ES48, CD41, EP45)**

- Operation of a fabric filter (CD41)
- $PM/PM_{10}/PM_{2.5}$ limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Ball Mill Feed Mill (ES49, CD42, EP46)**

- Operation of a fabric filter (CD42)
- $PM/PM_{10}/PM_{2.5}$ limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Train 1 Pressure Leaching (ES50, CD43, EP47)**

- Operation of a wet venturi scrubber (CD43)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 0.18 lb/hr with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Train 2 Pressure Leaching (ES51, CD44, EP48)**

- Operation of a wet venturi scrubber (CD44)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 0.18 lb/hr with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**LiOH Bagging Area Surge Bin/Transporter No. 1 (ES52, CD45, EP50)**

- Operation of a fabric filter (CD45)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 0.002 gr/dscf lb/hr with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**LiOH Bagging Area Surge Bin/Transporter No. 2 (ES53, CD46, EP50)**

- Operation of a fabric filter (CD46)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**LiOH Bagging Area Day Tank No. 1 (ES54, CD47, EP11)**

- Operation of a fabric filter (CD47)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**LiOH Bagging Area Day Tank No. 2 (55 CD48, EP52)**

- Operation of a fabric filter (CD48)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**LiOH Bagging Area Day Tank No. 3 (ES56, CD49, EP53)**

- Operation of a fabric filter (CD94)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**LiOH Bagging Area Day Tank No. 4 (ES57, CD50, EP54)**

- Operation of a fabric filter (CD50)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**LiOH Bagging Operation (ES58, CD51, EP55)**

- Operation of a venturi wet scrubber (CD51)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**LiOH Bagging Area Vacuum (ES59, CD52, EP56)**

- Operation of a fabric filter (CD52)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Phosphate Receiving and Storage (ES60, CD53, EP57)**

- Operation of a fabric filter (CD53)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Sodium Carbonate Receiving and Feeder Bin (ES61, CD54, EP58)**

- Operation of a fabric filter (CD54)
- $PM/PM_{10}/PM_{2.5}$ emission limit of 0.002 gr/dscf with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Boilers (ES62, EP59; ES63, EP60; ES64; EP61)**

- None

**1,000 kW Emergency Generator No. 1 (ES65, EP62)**

- Operation as an emergency stationary internal combustion engine as defined in 40 CFR Part 60, Subpart IIII
- Purchase of a manufacturer certified engine

**1,000 kW Emergency Generator No. 2 (ES66, EP63)**

- Operation as an emergency stationary internal combustion engine as defined in 40 CFR Part 60, Subpart IIII
- Purchase of a manufacturer certified engine

**Hydrochloric Acid Storage Tank and Dilution Tank (ES67 and ES68, CD55, EP64)**

- Operation of a wet scrubber (CD55)
- HCl emission limit of 0.12 lb/hr (EP64) with compliance determined by periodic stack testing and proper operation and maintenance of the control equipment

**Sulfuric Acid Storage Tanks (ES69, CD55, EP64)**

- None – Vapors from the sulfuric acid storage tank will be collected and sent to the wet scrubber. This is a voluntary control measure by the facility and does not result in the avoidance of any otherwise applicable requirements (including any air toxics evaluation requirements).

# ATTACHMENT 4

Description of Monitoring Devices, Gauges or Test Ports

# *Mining Operations*

**Fugitive and Insignificant Operations**

None

# *Concentrator Plant*

**Insignificant Operations**

None

**Ore Sorting Operations (ES01, CD01, EP01)**

- Pressure drop gauge
- Stack will be equipped with test ports

**Secondary Crusher Feed Bin (ES02, CD02, EP02)**

- Pressure drop gauge
- Stack will be equipped with test ports

**Secondary Crusher Discharge (ES03, CD03, EP03)**

- Pressure drop gauge
- Stack will be equipped with test ports

**Fine Ore Sizing Screen Discharge (ES04, CD04, EP04)**

- Pressure drop gauge
- Stack will be equipped with test ports

**Tertiary Crusher Feed Bin No. 1 (ES05, CD05, EP05)**

- Pressure drop gauge
- Stack will be equipped with test ports

**Tertiary Crusher Feed Bin No. 2 (ES06, CD06, EP06)**

- Pressure drop gauge
- Stack will be equipped with test ports

**Tertiary Crusher Discharge (ES07 and ES08, CD07, EP07)**

- Pressure drop gauge
- Stack will be equipped with test ports

**Fine Ore Bin (ES09, CD08, EP08)**

- Pressure drop gauge
- Stack will be equipped with test ports

**Quartz Dryer (ES10, CD09 and CD10, EP09)**

- Fabric filter (CD09) – Pressure drop gauge
- Venturi wet scrubber (CD10) – Pressure drop gauge, recirculation flow monitor
- Stack will be equipped with test ports

**Feldspar Dryer (ES11, CD11 and CD12, EP10)**

- Fabric filter (CD11) – Pressure drop gauge
- Venturi wet scrubber (CD12) – Pressure drop gauge, recirculation flow monitor
- Stack will be equipped with test ports

**1,000 kW Emergency Generator No. 1 (ES12, EP11)**

- Non-resettable hour meter

**1,000 kW Emergency Generator No. 2 (ES13, EP12)**

- Non-resettable hour meter

**Hydrofluoric Acid Storage Tank (ES14, CD13, EP13)**

- Wet scrubber operational parameters – see Form C6 for CD13
- Stack will be equipped with test ports

## *CL-1*

**Insignificant Operations**

None

**Spodumene Concentrate Conveying (ES15, CD14, EP14)**

- Pressure drop gauge
- Stack will be equipped with test ports

**Spodumene Concentrate Surge Silo (ES16, CD15, EP15)**

- Pressure drop gauge
- Stack will be equipped with test ports

**Spodumene Concentrate Conveyor to Calcine (ES17, CD16, EP16)**

- Pressure drop gauge
- Stack will be equipped with test ports

**Calciner Rotary Kiln (ES18, CD17 and CD18, EP17)**

- Cyclone (CD17) - Pressure drop gauge
- Venturi scrubber (CD18) – Pressure drop gauge, recirculation flow gauge, sump liquid level
- Stack will be equipped with test ports

**Cooler Discharge Sweep Air (ES19, CD19, EP18)**

- Pressure drop gauge
- Stack will be equipped with test ports

**Ball Mill Feed Mill (ES20, CD20, EP19)**

- Pressure drop gauge
- Stack will be equipped with test ports

**Train 1 Pressure Leaching (ES21, CD21, EP20)**

- Pressure drop gauge
- Stack will be equipped with test ports

**Train 2 Pressure Leaching (ES22, CD22, EP21)**

- Pressure drop gauge
- Stack will be equipped with test ports

**LiOH Bagging Area Surge Bin/Transporter No. 1 (ES23, CD23, EP22)**

- Pressure drop gauge
- Stack will be equipped with test ports

**LiOH Bagging Area Surge Bin/Transporter No. 2 (ES24, CD24, EP23)**

- Pressure drop gauge
- Stack will be equipped with test ports

**LiOH Bagging Area Day Tank No. 1 (ES25, CD25, EP24)**

- Pressure drop gauge
- Stack will be equipped with test ports

**<u>LiOH Bagging Area Day Tank No. 2 (ES26, CD26, EP25)</u>**

- Pressure drop gauge
- Stack will be equipped with test ports

**<u>LiOH Bagging Area Day Tank No. 3 (ES27, CD27, EP26)</u>**

- Pressure drop gauge
- Stack will be equipped with test ports

**<u>LiOH Bagging Area Day Tank No. 4 (ES28, CD28, EP27)</u>**

- Pressure drop gauge
- Stack will be equipped with test ports

**<u>LiOH Bagging Operation (ES29, CD29, EP28)</u>**

- Venturi pressure drop gauge, liquid pressure gauges
- Stack will be equipped with test ports

**<u>LiOH Bagging Area Vacuum (ES30, CD30, EP29)</u>**

- Pressure drop gauge
- Stack will be equipped with test ports

**<u>Lime Receiving and Storage (ES31, CD31, EP30)</u>**

- Pressure drop gauge
- Stack will be equipped with test ports

**<u>Phosphate Receiving and Storage (ES32, CD32, EP31)</u>**

- Pressure drop gauge
- Stack will be equipped with test ports

**<u>Sodium Carbonate Receiving and Storage Silo (ES33, CD33, EP32)</u>**

- Pressure drop gauge
- Stack will be equipped with test ports

**<u>Sodium Carbonate Receiving and Feeder Bin (ES34, CD31, EP33)</u>**

- Pressure drop gauge
- Stack will be equipped with test ports

**<u>Boilers (ES35, EP34; ES36, EP35; ES37; EP36)</u>**

- Each stack will be equipped with test ports

**<u>1,000 kW Emergency Generator No. 1 (ES38, EP37)</u>**

- Non-resettable hour meter

**<u>1,000 kW Emergency Generator No. 2 (ES39, EP38)</u>**

- Non-resettable hour meter

**<u>Fire Pump (ES40, EP39)</u>**

- Non-resettable hour meter

**Hydrochloric Acid Storage Tank and Dilution Tank (ES41 and ES42, CD35, EP40)**

- Wet scrubber operational parameters – see Form CD6 for CD35
- Stack will be equipped with test ports

**Sulfuric Acid Storage Tanks (ES43, CD35, EP40)**

- None – Vapors from the sulfuric acid storage tank will be collected and sent to the wet scrubber. This is a voluntary control measure by the facility and does not result in the avoidance of any otherwise applicable requirements (including any air toxics evaluation requirements).

## *CL-2*

**Insignificant Operations**

None

**Spodumene Concentrate Conveying (ES44, CD36, EP41)**

- Pressure drop gauge
- Stack will be equipped with test ports

**Spodumene Concentrate Surge Silo (ES45, CD37, EP42)**

- Pressure drop gauge
- Stack will be equipped with test ports

**Spodumene Concentrate Conveyor to Calcine (ES46, CD38, EP43)**

- Pressure drop gauge
- Stack will be equipped with test ports

**Calciner Rotary Kiln (ES47, CD39 and CD40, EP44)**

- Cyclone (CD39) - Pressure drop gauge
- Venturi scrubber (CD40) – Pressure drop gauge, recirculation flow gauge, sump liquid level
- Stack will be equipped with test ports

**Cooler Discharge Sweep Air (ES48, CD41, EP45)**

- Pressure drop gauge
- Stack will be equipped with test ports

**Ball Mill Feed Mill (ES49, CD42, EP46)**

- Pressure drop gauge
- Stack will be equipped with test ports

**Train 1 Pressure Leaching (ES50, CD43, EP47)**

- Pressure drop gauge
- Stack will be equipped with test ports

**Train 2 Pressure Leaching (ES51, CD44, EP48)**

- Pressure drop gauge
- Stack will be equipped with test ports

**LiOH Bagging Area Surge Bin/Transporter No. 1 (ES52, CD45, EP50)**

- Pressure drop gauge
- Stack will be equipped with test ports

**LiOH Bagging Area Surge Bin/Transporter No. 2 (ES53, CD46, EP50)**

- Pressure drop gauge
- Stack will be equipped with test ports

**LiOH Bagging Area Day Tank No. 1 (ES54, CD47, EP11)**

- Pressure drop gauge
- Stack will be equipped with test ports

**LiOH Bagging Area Day Tank No. 2 (55 CD48, EP52)**

- Pressure drop gauge
- Stack will be equipped with test ports

**LiOH Bagging Area Day Tank No. 3 (ES56, CD49, EP53)**

- Pressure drop gauge
- Stack will be equipped with test ports

**LiOH Bagging Area Day Tank No. 4 (ES57, CD50, EP54)**

- Venturi pressure drop gauge, liquid pressure gauges
- Stack will be equipped with test ports

**LiOH Bagging Operation (ES58, CD51, EP55)**

- Venturi pressure drop gauge, liquid pressure gauges
- Stack will be equipped with test ports

**LiOH Bagging Area Vacuum (ES59, CD52, EP56)**

- Venturi pressure drop gauge, liquid pressure gauges
- Stack will be equipped with test ports

**Phosphate Receiving and Storage (ES60, CD53, EP57)**

- Venturi pressure drop gauge, liquid pressure gauges
- Stack will be equipped with test ports

**Sodium Carbonate Receiving and Feeder Bin (ES61, CD54, EP58)**

- Venturi pressure drop gauge, liquid pressure gauges
- Stack will be equipped with test ports

**Boilers (ES62, EP59; ES63, EP60; ES64; EP61)**

- Each stack will be equipped with test ports

**1,000 kW Emergency Generator No. 1 (ES65, EP62)**

- Non-resettable hour meter

**1,000 kW Emergency Generator No. 2 (ES66, EP63)**

- Non-resettable hour meter

**Hydrochloric Acid Storage Tank and Dilution Tank (ES67 and ES68, CD55, EP64)**

- Wet scrubber operational parameters – see Form CD6 for CD18
- Stack will be equipped with test ports

**Sulfuric Acid Storage Tanks (ES69, CD55, EP64)**

- None – Vapors from the sulfuric acid storage tank will be collected and sent to the wet scrubber. This is a voluntary control measure by the facility and does not result in the avoidance of any otherwise applicable requirements (including any air toxics evaluation requirements).

# ATTACHMENT 5

Regulatory Analysis

**NC SIP Standards (15A NCAC 02D .0500)**

1. **15A NCAC 02D .0503 PARTICULATES FROM FUEL BURNING INDIRECT HEAT EXCHANGERS**

   This rule applies to the following equipment:
   - Boilers, CL-1 (ES35, ES36, ES37)
   - Boilers, CL-2 (ES62, ES63, ES64)

2. **15A NCAC 02D.0509 PARTICULATES FROM MICA OR FELDSPAR PROCESSING PLANTS**

   This rule applies to the following equipment at the Concentrator Plant:
   - Miscellaneous Material Handling Operations (IES14), Mica Concentrate Drop
   - Feldspar Dryer (ES11)
   - Miscellaneous Material Handling Operations (IES14):
     - Dried Feldspar Concentrate Drops
     - Dried Feldspar Truck Loading

3. **15A NCAC 02D.0510 PARTICULATES FROM SAND, GRAVEL, OR CRUSHED STONE OPERATIONS**

   This rule applies to the following equipment:
   Mining
   - FUG: Drilling
   - FUG: Blasting
   - Mobile Rock Breaking (IES01)
   - Ore and Waste Rock Loader Operations (IES02)
   - Mobile Ore Crushing (IES03)
   - Mobile Waste Rock Crushing Without Screening (IES04)
   - FUG: Mobile Waste Rock Crushing With Screening
   - Ore, Waste Rock, Refuse and Reclaim Conveying (IES05)
   - Miscellaneous Material Handling (IES06)

   Concentrator Plant
   - Wind Erosion of ROM Pile (IES08)
   - Wind Erosion of Reclaim Pile, Alternate Concentrator Plant Location (IES09)
   - Wind Erosion of Waste Rock and Tailings Disposal (IES10)
   - ROM Pile Loader Operations (IES11)
   - Wind Erosion of Ore Surge Pile (IES12)
   - Coarse Ore Handling (IES13)
   - Ore Sorting Operations (ES01)
   - Secondary Crusher Feed Bin (ES02)
   - Secondary Crusher Discharge (ES03)
   - Fine Ore Sizing Screen Discharge (ES04)
   - Tertiary Crusher No. 1 Feed Bin (ES05)
   - Tertiary Crusher No. 2 Feed Bin (ES06)
   - Tertiary Crusher No. 1 Discharge (ES07)
   - Tertiary Crusher No. 2 Discharge (ES08)
   - Fine Ore Bin (ES09)

- Miscellaneous Material Handling Operations (IES14), Waste Rock Conveyance (Alternate Concentrator Plant Location)

**4. 15A NCAC 02D.0515 PARTICULATES FROM MISCELLANEOUS INDUSTRIAL PROCESSES**

This rule applies to the following equipment:

CL-1

- Spodumene Concentrate Conveying (EP15)
- Spodumene Concentrate Surge Silo (EP16)
- Spodumene Concentrate Conveyor to Calciner (EP17)
- Calciner Rotary Kiln (EP18)
- Cooler Discharge Sweep Air (EP19)
- Ball Mill Feed Bin (EP20)
- Train 1 Pressure Leaching (EP21)
- Train 2 Pressure Leaching (EP22)
- LiOH Bagging Area Surge Bin/Transporter No. 1 (EP23)
- LiOH Bagging Area Surge Bin/Transporter No. 2 (EP24)
- LiOH Bagging Area Day Tank No. 1 (EP25)
- LiOH Bagging Area Day Tank No. 2 (EP26)
- LiOH Bagging Area Day Tank No. 3 (EP27)
- LiOH Bagging Area Day Tank No. 4 (EP28)
- LiOH Bagging Operation (EP29)
- LiOH Bagging Area Vacuum (EP30)
- Lime Receiving and Storage (EP31)
- Phosphate Receiving and Storage (EP32)
- Sodium Carbonate Receiving and Storage Silo (EP33)
- Sodium Carbonate Receiving and Feeder Bin (EP34)

CL-2

- Spodumene Concentrate Conveying (EP44)
- Spodumene Concentrate Surge Silo (EP45)
- Spodumene Concentrate Conveyor to Calciner (EP46)
- Calciner Rotary Kiln (EP47)
- Cooler Discharge Sweep Air (EP48)
- Ball Mill Feed Bin (EP49)
- Train 1 Pressure Leaching (EP50)
- Train 2 Pressure Leaching (EP51)
- LiOH Bagging Area Surge Bin/Transporter No. 1 (EP52)
- LiOH Bagging Area Surge Bin/Transporter No. 2 (EP53)
- LiOH Bagging Area Day Tank No. 1 (EP54)
- LiOH Bagging Area Day Tank No. 2 (EP55)
- LiOH Bagging Area Day Tank No. 3 (EP56)
- LiOH Bagging Area Day Tank No. 4 (EP57)
- LiOH Bagging Operation (EP58)

- LiOH Bagging Area Vacuum (EP59)
- Phosphate Receiving and Storage (EP60)
- Sodium Carbonate Receiving and Feeder Bin (EP61)

5. **15A NCAC 02D .0516 SULFUR DIOXIDE EMISSIONS FROM COMBUSTION SOURCES**

This rule applies to the following equipment:
Concentrator Plant

- 1,000 kW Emergency Generator No. 1 (ES12)
- 1,000 kW Emergency Generator No. 2 (ES13)

CL-1

- Calciner Rotary Kiln (ES18)
- Boilers (ES35, ES36, ES37)
- 1,000 kW Emergency Generator No. 1 (ES38)
- 1,000 kW Emergency Generator No. 2 (ES39)
- Fire Pump (ES40)

CL-2

- Calciner Rotary Kiln (ES47)
- Boilers (ES62, ES63, ES64)
- 1,000 kW Emergency Generator No. 1 (ES65)
- 1,000 kW Emergency Generator No. 2 (ES66)

6. **15A NCAC 02D .0521 CONTROL OF VISIBLE EMISSIONS**

This rule applies to the following equipment:
Concentrator Plant

- Secondary Crusher Feed Bin (ES02)
- Secondary Crusher Discharge (ES03)
- Fine Ore Sizing Screen Discharge (ES04)
- Tertiary Crusher No. 1 Feed Bin (ES05)
- Tertiary Crusher No. 2 Feed Bin (ES06)
- Tertiary Crusher No. 1 Discharge (ES07)
- Tertiary Crusher No. 2 Discharge (ES08)
- Fine Ore Bin (ES09)
- Quartz Dryer (ES10)
- Feldspar Dryer (ES11)

CL-1

- Spodumene Concentrate Conveying (EP15)
- Spodumene Concentrate Surge Silo (EP16)
- Spodumene Concentrate Conveyor to Calciner (EP17)
- Calciner Rotary Kiln (EP18)
- Cooler Discharge Sweep Air (EP19)
- Ball Mill Feed Bin (EP20)

- Train 1 Pressure Leaching (EP21)
- Train 2 Pressure Leaching (EP22)
- LiOH Bagging Area Surge Bin/Transporter No. 1 (EP23)
- LiOH Bagging Area Surge Bin/Transporter No. 2 (EP24)
- LiOH Bagging Area Day Tank No. 1 (EP25)
- LiOH Bagging Area Day Tank No. 2 (EP26)
- LiOH Bagging Area Day Tank No. 3 (EP27)
- LiOH Bagging Area Day Tank No. 4 (EP28)
- LiOH Bagging Operation (EP29)
- LiOH Bagging Area Vacuum (EP30)
- Lime Receiving and Storage (EP31)
- Phosphate Receiving and Storage (EP32)
- Sodium Carbonate Receiving and Storage Silo (EP33)
- Sodium Carbonate Receiving and Feeder Bin (EP34)
- Boilers (ES35, ES36, ES37)
- 1,000 kW Emergency Generator No. 1 (ES38)
- 1,000 kW Emergency Generator No. 2 (ES39)
- Fire Pump (ES40)

CL-2

- Spodumene Concentrate Conveying (EP44)
- Spodumene Concentrate Surge Silo (EP45)
- Spodumene Concentrate Conveyor to Calciner (EP46)
- Calciner Rotary Kiln (EP47)
- Cooler Discharge Sweep Air (EP48)
- Ball Mill Feed Bin (EP49)
- Train 1 Pressure Leaching (EP50)
- Train 2 Pressure Leaching (EP51)
- LiOH Bagging Area Surge Bin/Transporter No. 1 (EP52)
- LiOH Bagging Area Surge Bin/Transporter No. 2 (EP53)
- LiOH Bagging Area Day Tank No. 1 (EP54)
- LiOH Bagging Area Day Tank No. 2 (EP55)
- LiOH Bagging Area Day Tank No. 3 (EP56)
- LiOH Bagging Area Day Tank No. 4 (EP57)
- LiOH Bagging Operation (EP58)
- LiOH Bagging Area Vacuum (EP59)
- Phosphate Receiving and Storage (EP60)
- Sodium Carbonate Receiving and Feeder Bin (EP61)
- Boilers (ES62, ES63, ES64)
- 1,000 kW Emergency Generator No. 1 (ES65)
- 1,000 kW Emergency Generator No. 2 (ES66)

**7. 15A NCAC 02D .0524 NEW SOURCE PERFORMANCE STANDARDS**

See NSPS discussion below.

8. **15A NCAC 02D .0530 PREVENTION OF SIGNIFICANT DETERIORATION**

The North Carolina Department of Environmental Quality/Division of Air Quality (DAQ) determined that the purpose of all operations associated with the Project is to produce lithium hydroxide. The SIC code for the production of lithium compounds is 2819, making the facility a chemical manufacturing plant for the purposes of the Prevention of Significant Deterioration (PSD) pre-construction permitting program. As such, the PSD major source threshold for PSD-regulated pollutants is 100 tpy.

As shown in Attachment 2 this rule is applicable because the Project has emissions of at least one PSD-regulated pollutant of more than 100 tpy and significant increases for others. The Project triggers PSD for the following pollutants, and is a natural minor for all other PSD-regulated pollutants:

- PM
- $PM_{10}$
- $PM_{2.5}$
- $NO_x$
- CO
- GHG

The required elements of a PSD permit application are included as appendices to this attachment, as follows:

Appendix A – Best Available Control Technology (BACT)

Appendix B – Air Quality Impacts Analysis

Appendix C – Additional Impacts Analysis

9. **15A NCAC 02D .0533 STACK HEIGHT**

This rule applies to each emission unit with a stack.

10. **15A NCAC 02D .0535 EXCESS EMISSIONS REPORTING AND MALFUNCTIONS**

This rule applies to each emission unit to which an emission limitation or standard applies.

11. **15A NCAC 02D .0540 PARTICULATES FROM FUGITIVE DUST EMISSION SOURCES**

This rule applies to the following equipment:
<u>Mining</u>

- FUG: Drilling
- FUG: Blasting
- Mobile Rock Breaking (IES01)
- Ore and Waste Rock Loader Operations (IES02)
- Mobile Ore Crushing (IES03)
- Mobile Waste Rock Crushing Without Screening (IES04)

- FUG: Mobile Waste Rock Crushing With Screening
- Ore, Waste Rock, Refuse and Reclaim Conveying (IES05)
- Miscellaneous Material Handling (IES06)

Concentrator Plant

- Wind Erosion of ROM Pile (IES08)
- Wind Erosion of Reclaim Pile, Alternate Concentrator Plant Location (IES09)
- Wind Erosion of Waste Rock and Tailings Disposal (IES10)
- ROM Pile Loader Operations (IES11)
- Wind Erosion of Ore Surge Pile (IES12)
- Coarse Ore Handling (IES13)
- Miscellaneous Materials Loader Operations (IES15)
- Concentrator Plant Truck Traffic (IES20)

CL-1

- Wind Erosion of Concentrate Surge Pile (IES21)
- Concentrate Pile Loader Operations (IES22)
- Concentrate Pile Material Handling (IES23)
- Cooling Tower (IES25)
- Truck Traffic (IES27)

CL-2

- Wind Erosion of Concentrate Surge Pile (IES29)
- Concentrate Pile Loader Operations (IES30)
- Concentrate Pile Material Handling (IES31)
- Cooling Tower (IES33)
- Truck Traffic (IES35)

**STATE-ENFORCEABLE TAP STANDARDS (15A NCAC 02Q .0700, 15A NCAC 02D .1100), Guidance on Air Dispersion Modeling**

See the air quality analysis in Appendix B of Attachment 5 for a summary of the air toxics evaluation conducted to demonstrate facility compliance with these requirements.

**RACT (15A NCAC 02D .0900, 15A NCAC 02D .1400)** Applicability provided in **15A NCAC 02D .0902** and **15A NCAC 02D .1402**.

1. **15A NCAC 02D .0902**

This rule applies to the facility because it will be located in Gaston County, which is one of the counties listed in 15A NCAC 02D .0902(f). This rule requires compliance with the rules of 15A NCAC 02D .0909 through .0951 and with 15A NCAC 2D .0958, each of which is discussed in the following. Note that any rule that has been repealed is not specifically listed.

- 15A NCAC 02D .0909: Requires compliance with all applicable rules in this Section upon start-up of the source.
- 15A NCAC 02D .0912: Not applicable because the facility is not subject to any rule in this Section that requires testing.

- 15A NCAC 02D .0918 through .0924; .0926 through .0948; and .0954 through .0957: Not applicable – the facility does not have any of the listed source categories.
- 15A NCAC 02D .0925: Not applicable – All petroleum liquid storage tanks at the facility have a capacity of less than 39,000 gallons.
- 15A NCAC 02D .0949: Not applicable – All miscellaneous volatile organic liquid storage tanks, reservoirs, or other containers at the facility have a capacity of less than 50,000 gallons.
- 15A NCAC 02D .0951: Applies because 15A NCAC 02D .0958 applies but does not impose any requirements because no other emissions control rules in the Section apply.
- 15A NCAC 02D .0952: Not applicable – The facility is not petitioning for alternative controls for RACT.
- 15A NCAC 02D .0958: The requirements listed in paragraphs (c) and (d) apply to the facility.

**2. 15A NCAC 02D .1400**

This rule applies to the facility because it will be located in Gaston County, which is one of the counties listed in 15A NCAC 02D .1400(d). Applicability of the other rules in this Section is discussed in the following. Note that any rule that has been repealed is not specifically listed.

- 15A NCAC 02D .1407: The requirements listed in paragraphs (c), (e) and (g) apply to the following equipment:
    - Boilers, CL-1 (ES35, ES36, ES37)
    - Boilers, CL-2 (ES62, ES63, ES64)
- 15A NCAC 02D .1408 and .1424: Not applicable – the facility does not have any of the listed source category.
- 15A NCAC 02D .1409, .1418 and .1423: Not applicable – the facility does not have any of the listed source category [i.e., all stationary internal combustion engines are emergency only units that are exempted from this Section under 15A NCAC 02D .1402(h)(3) and (4)].
- 15A NCAC 02D .1410 through .1412: Not applicable – the facility is not seeking action under any of these rule provisions.

- 15A NCAC 02D .1413: The requirements of this rule apply to the following equipment:
    - Calciner Rotary Kiln, CL-1 (EP18)
    - Calciner Rotary Kiln, CL-2 (EP47)

  An evaluation of BACT for the two rotary kilns in presented in Appendix A of this Attachment. In general, a BACT determination meets or exceeds any RACT determination. Therefore, inclusion of the BACT analysis as part of this application fulfills the requirement of 15A NCAC 02D .1413(b).

- 15A NCAC 02D .1414: The requirements listed in paragraphs (b) and (d) apply to the following equipment:
    - Boilers, CL-1 (ES35, ES36, ES37)
    - Boilers, CL-2 (ES62, ES63, ES64)
- 15A NCAC 02D .1415: The requirements listed in this rule apply to the following equipment:
    - Boilers, CL-1 (ES35, ES36, ES37)
    - Boilers, CL-2 (ES62, ES63, ES64)

**NSPS (15A NCAC 02D .0524, 40 CFR Part 60)**

1. **Subpart Dc: Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units**

   This rule applies to the following equipment:
    - Boilers, CL-1 (ES35, ES36, ES37)
    - Boilers, CL-2 (ES62, ES63, ES64)

2. **Subpart OOO: Standards of Performance for Nonmetallic Mineral Processing Plants**

   This rule applies to the following equipment:
   Mining
    - Mobile Ore Crushing (IES03)
    - Mobile Waste Rock Crushing Without Screening (IES04)
    - FUG: Mobile Waste Rock Crushing With Screening
    - Ore, Waste Rock, Refuse and Reclaim Conveying (IES05)
    - Miscellaneous Material Handling (IES06)

   Concentrator Plant
    - Coarse Ore Handling (IES13)
    - Ore Sorting Operations (ES01)
    - Secondary Crusher Feed Bin (ES02)
    - Secondary Crusher Discharge (ES03)
    - Fine Ore Sizing Screen Discharge (ES04)
    - Tertiary Crusher No. 1 Feed Bin (ES05)
    - Tertiary Crusher No. 2 Feed Bin (ES06)
    - Tertiary Crusher No. 1 Discharge (ES07)
    - Tertiary Crusher No. 2 Discharge (ES08)
    - Fine Ore Bin (ES09)

3. **Subpart IIII: Standards of Performance for Stationary Compression Ignition Internal Combustion Engines**

   The portions of this rule applicable to emergency use engines applies to the following equipment:
   <u>Concentrator Plant</u>
   - 1,000 kW Emergency Generator No. 1 (ES12)
   - 1,000 kW Emergency Generator No. 2 (ES13)

   <u>CL-1</u>
   - 1,000 kW Emergency Generator No. 1 (ES38)
   - 1,000 kW Emergency Generator No. 2 (ES39)
   - Fire Pump (ES40)

   <u>CL-2</u>
   - 1,000 kW Emergency Generator No. 1 (ES65)
   - 1,000 kW Emergency Generator No. 2 (ES66)

**<u>GACT (15A NCAC 02D .1111, 40 CFR Part 63)</u>**

1. **15A NCAC 02D .1111**

See the air quality analysis in Appendix B of Attachment 5 for a summary of the air toxics evaluation conducted to demonstrate facility compliance with these requirements.

2. **40 CFR Part 63**

   Subpart ZZZZ (National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines) applies to the following equipment:
   <u>Concentrator Plant</u>
   - 1,000 kW Emergency Generator No. 1 (ES12)
   - 1,000 kW Emergency Generator No. 2 (ES13)

   <u>CL-1</u>
   - 1,000 kW Emergency Generator No. 1 (ES38)
   - 1,000 kW Emergency Generator No. 2 (ES39)
   - Fire Pump (ES40)

   <u>CL-2</u>
   - 1,000 kW Emergency Generator No. 1 (ES65)
   - 1,000 kW Emergency Generator No. 2 (ES66)

   Per 40 CFR §63.6590(c)(1) compliance with NSPS Subpart IIII (see above) constitutes compliance with NESHAP Subpart ZZZZ and no further requirements apply under Part 63.

3. **No other equipment at the facility is subject to a rule promulgated in 40 CFR Part 63.**
   - The boilers are exempt because each is a gas fired boiler located at an area source of HAP.
   - The facility will not have gasoline dispensing equipment. Therefore, NESHAP Subpart CCCCCC does not apply.

- The facility feedstocks, by-products and products are all inorganic in nature. As such, none of the synthetic organic chemical manufacturing industry (SOCMI) related NESHAP apply.
- The facility does not manufacture chemical preparations containing metal compound of chromium, lead, manganese, or nickel. Therefore, NESHAP BBBBBBB does not apply.

# APPENDIX A

Best Available Control Technology

# Best Available Control Technology

## 1 Overview

### 1.1 Definition of BACT

Federal regulation 40 CFR Part 52.21, Subpart (b)(12) defines a Best Available Control Technology (BACT) analysis as:

> *"an emission limitation (including a visible emission standard) based on the maximum degree of reduction for each pollutant subject to regulation under the Clean Air Act which would be emitted from any proposed major stationary source or major modification which the Administrator [or permitting authority], on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through the application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment, or innovative fuel combustion techniques for control of such pollutant…"*

In summary, BACT is defined as an emission limitation established based on the maximum degree of pollutant reduction, determined on a case-by-case basis, considering technical, economic, energy, and environmental factors. However, BACT cannot be less stringent than emission limits established by an applicable NSPS.

### 1.2 Top-Down BACT Analysis

To bring consistency to the BACT process, the EPA has developed a draft guidance document (March 15, 1990) on the use of the "top-down" approach to BACT determinations. The first step in a top-down BACT analysis is to determine, for the pollutant in question, the most stringent control technology and emission limit available for a similar source or source category. Technologies required under Lowest Achievable Emission Rate (LAER) determinations must be considered. These technologies represent the top control alternative under the BACT analysis. If it can be shown that this level of control is infeasible based on technical, economic, energy, and environmental impacts for the source in question, then the next most stringent level of control is identified and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any technical, economic, energy or environmental consideration.

For this study, the economic analysis used to determine the capital and annual costs of the control technologies was based on methodologies shown in the *EPA Best Available Control Technology Draft Guidance Document* (October, 1990), EPA *BACT Guidelines*, EPA's Clean Air Technology Center Website (https://www.epa.gov/catc/clean-air-technology-center-products, last accessed August 2022) and vendor budgetary cost quotes.

A "Top-Down" BACT analysis basically consists of the following steps:

- *Identify All Control Technologies*. All control technologies for similar processes, as well as LAER technologies are included.

- *Eliminate Technically Infeasible Options*. Technologies demonstrated to be infeasible based on physical, chemical, and engineering principles are excluded from further consideration.

- *Rank Technologies by Control Effectiveness*. Technically feasible control technologies are ranked in the order of highest expected emission reduction to lowest expected emission reduction. The ranking also includes expected emission rate, control effectiveness, energy impacts, environmental impacts (including toxic and hazardous air emissions), and economic impacts.

- *Control Technology Evaluation*. The technology ranking is evaluated, and case-by-case consideration is given to energy, environmental, and economic impacts. The most effective option not rejected is chosen as BACT and is used to express an enforceable emission limitation for the affected emission unit.

### 1.3 Applicable Pollutants and Affected Sources

A BACT analysis is required for each pollutant subject to regulation for which a project would result in a significant net emissions increase at the source. More specifically, BACT must be applied to each new emission unit from which there are emission increases of pollutants subject to PSD review. The Carolina Lithium Project (Project) triggers PSD, and thus is subject to BACT, for the following pollutants:

- CO
- $NO_x$
- $PM/PM_{10}/PM_{2.5}$
- Greenhouse Gas ($CO_2e$)

The Project is also a source of hydrogen fluoride (HF) emissions in excess of the SER established for fluorides in 40 CFR § 52.21(b)(23). However, North Carolina Department of Environmental and Natural Resources previously has determined that the NSR regulated pollutant "fluorides" is intended to address total fluorides. As discussed in a July 17, 2008 memo from the North Carolina Department of Environmental and Natural Resources (accessed at https://deq.nc.gov/media/22009/download#:~:text=In%20summary%2C%20based%20on%20the,HF)%20which%20is%20a%20HAP., HF is not considered part of the PSD-regulated pollutant "fluorides". Therefore, the Project does not trigger PSD for fluorides.

### 1.4 Pollutant Formation and Control Options

The following paragraphs provide a brief description regarding the formation, emission and control of CO, $NO_x$ and $PM/PM_{10}/PM_{2.5}$. GHG emissions are analyzed separately in Section 13.

*1.4.1.1 CO Formation*

CO formation generated by fuel combustion occurs because of incomplete combustion. The oxidation of CO to carbon dioxide ($CO_2$) is dependent on temperature, residence time during the combustion process, and the amount of excess $O_2$ present.

*1.4.1.2 CO Control Options*

Control of CO emissions generated by fuel combustion sources is achieved by ensuring good combustion and through the addition of equipment added to the exhaust stream. The following technologies have been identified for potential control of CO emissions: catalytic oxidation, thermal oxidation, and combustion controls. Catalytic oxidation and thermal oxidation are post-combustion controls designed for the exhaust gas stream for processes with high concentrations of CO.

Good Combustion Practice

The oxidation of CO to $CO_2$ is dependent upon temperature and residence time of the combustion process. The amount of CO generated is dependent upon optimization of these conditions The use of good combustion practice such as high combustion temperatures, adequate combustion air, and proper air/fuel mixing can minimize CO emissions. Optimization of design and tuning of combustion sources is standard practice for combustion sources. Therefore, good combustion practice is considered a feasible control technology for CO emissions.

Catalytic Oxidation

There are a variety of manufacturers who offer oxidation catalysts to control CO emissions. The catalysts are a flue gas treatment technology with a typically honeycomb type of arrangement to allow the maximum surface area exposure to a given gas flow. CO catalysts are generally precious metal based. The use of an oxidation catalyst with sulfur-containing fuels can promote oxidation of $SO_2$ to $SO_3$, which can readily form $H_2SO_4$ in the presence of moisture, causing severe corrosion in the ductwork and downstream control equipment. Oxidation catalysts also require a minimum temperature (>500 °F) for proper operation.

Thermal Oxidation

High temperature oxidation is another method for controlling emissions of CO in the flue gas. This type of system has been reported to achieve up to 95% reduction of CO in the exhaust gas on other types of industrial facilities with high CO emissions and low flow rates. However, all the point sources of CO at the Project have relatively low concentrations of CO that result from the combustion of fuel. A thermal oxidizer combusting fuel would have minimal CO control efficiency and would itself generate CO emissions. For this reason, thermal oxidation for CO control is determined as technically infeasible and will not be considered further for any of the source of CO associated with the Project.

*1.4.2.1 $NO_x$ Formation*

In general, there are two mechanisms of $NO_x$ formation from combustion related sources. These mechanisms include oxidation of nitrogen bound in the fuel, and thermal production of $NO_x$ from atmospheric nitrogen and oxygen. High combustion temperatures cause the nitrogen ($N_2$) and oxygen

($O_2$) molecules in the combustion air to react and form thermal $NO_x$. Because thermal $NO_x$ is primarily a function of combustion temperature, $NO_x$ emission rates vary with burner and source design. Experimental measurements of thermal $NO_x$ formation have shown that the $NO_x$ concentration is exponentially dependent on temperature and is proportional to the $N_2$ concentration in the flame, the square root of the $O_2$ concentration in the flame, and the gas residence time.

#### *1.4.2.2 $NO_x$ Control Options*

Control of $NO_x$ is achieved by minimizing its formation during the combustion process and using equipment added to the exhaust stream. The following technologies have been identified for potential control of $NO_x$ emissions: combustion controls, selective catalytic reduction (SCR), and selective non catalytic reduction (SNCR). The following sections identify potentially available $NO_x$ control technologies for combustion devices.

##### Combustion Controls

Combustion controls such as flue gas recirculation (FGR), reducing air preheat temperature (RAP), oxygen trim (OT), low excess air (LEA), staged combustion air (SCA), low $NO_x$ burners (LNB) and ultra-low NOx burners (UNLB), can be used to reduce $NO_x$ emissions depending on the type of burner, characteristics of fuel and method of firing. In practice, combustion controls have not provided the same degree of $NO_x$ control as provided by add-on post combustion control technologies.

##### Selective Catalytic Reduction

SCR systems are an add-on flue gas treatment (post-combustion control technology) to control $NO_x$ emissions. The SCR process involves the injection of a nitrogen-based reducing agent (reagent) such as ammonia ($NH_3$) or urea to reduce the $NO_x$ in the flue gas to $N_2$ and $H_2O$. The reagent is injected into the flue gas prior to passage through a catalyst bed, which accelerates the $NO_x$ reduction reaction rate. SCR systems generate a small level of $NH_3$ emissions, known as $NH_3$ slip. As the catalyst degrades, $NH_3$ slip will increase, ultimately driving catalyst replacement.

Many types of catalysts, ranging from active metals to highly porous ceramics, are available for different applications. The type of catalyst chosen depends on several operational parameters, such as reaction temperature range, flue gas flow rate, fuel source, catalyst activity and selectivity, operating life, and cost. Catalyst materials include platinum (Pt), vanadium (V), titanium (Ti), tungsten (W), titanium oxide ($TiO_2$), zirconium oxide ($ZrO_2$), vanadium pentoxide ($V_2O_5$), silicon oxide ($SiO_2$), and zeolites (crystalline alumina silicates). The optimum exhaust gas temperature for conventional metal oxide catalysts ranges from about 480 to 750°F.

SCR systems can utilize aqueous $NH_3$, anhydrous $NH_3$, or a urea solution to produce $NH_3$ on demand. Aqueous $NH_3$ is generally transported and stored in concentrations ranging from 19 to 30 percent and therefore requires more storage capacity than anhydrous $NH_3$. Anhydrous $NH_3$ is nearly 100 percent pure in concentration and is a gas at normal atmospheric temperature and pressure. Anhydrous $NH_3$ must be stored and transported under pressure and when stored in quantities greater than 10,000 pounds, is subject to Risk Management Planning (RMP) requirements (40 CFR 68). Urea solutions (urea and water at approximately 32 percent concentration) are used to form $NH_3$ on demand for injection into the flue gas. Generally, a specifically designed duct and decomposition chamber with a small supplemental burner is used to provide an appropriate temperature window and residence time to decompose urea to $NH_3$ and isocyanic acid (HNCO).

Selective Non-Catalytic Reduction

SNCR is another method of post-combustion control. Like SCR, the SNCR process involves the injection of a nitrogen-based reducing agent (reagent) such as $NH_3$ or urea to reduce the $NO_x$ in the flue gas to $N_2$ and $H_2O$. However, the SNCR process works without the use of a catalyst. Instead, the SNCR process occurs within a combustion unit, which acts as the reaction chamber. The heat from the combustion process provides the energy for the $NO_x$ reduction reaction. Flue gas temperatures in the range of 1,500 to 1,900°F, along with adequate reaction time within this temperature range, are required for this technology. SNCR is currently being used for $NO_x$ emission control on coal fired industrial boilers and municipal waste combustors and can achieve $NO_x$ reduction efficiencies of up to 75 percent. However, in typical applications, SNCR provides 30 to 50 percent $NO_x$ reduction.

*1.4.3.1 PM/$PM_{10}$/$PM_{2.5}$ Formation*

For practicality purposes, total suspended particulate (TSP), $PM_{10}$ and $PM_{2.5}$ emissions are addressed concurrently in the BACT analysis. $PM_{10}$ and $PM_{2.5}$, by definition, are a subset of TSP or total PM emissions and, in general terms, the air pollution control equipment used to mitigate these pollutants are the same. General reference to PM in the BACT analysis discussion refers to TSP and $PM_{10}$ and $PM_{2.5}$, unless specifically noted.

Process related PM emissions are generated by a variety of material handling, storage, and processing equipment and is the result of disturbance or movement of dry materials. In general, these emissions can be categorized as either point source (i.e., amenable to capture and control) or fugitive.

PM emissions from combustion sources are a function of the burner configuration, operation practices, and fuel properties. Uncontrolled PM emissions include ash from non-combustibles in the fuel, as well as unburned carbon resulting from incomplete combustion. PM emissions are classified as filterable and condensable. Filterable PM is the portion of total PM present in the exhaust stream as a solid or liquid that can be measured on an EPA Method 5 filter (40 CFR 60, Appendix A). Condensable particulate matter (CPM) forms from the condensing of gases and/or vapors in a flue gas stream after combustion. This is a result of chemical reactions as well as the physical properties and phenomena of matter phase changes (i.e., solid/liquid/gas). In general, material that is not particulate matter at stack conditions can condense or react upon cooling and dilution by ambient air to form a particulate. This formation generally occurs within a few seconds after discharge from an exhaust stack. However, with typical exhaust gas velocities, the particulate matter is being formed (condensed) up to 100 feet away from the exhaust gas exit.

PM emissions from industrial process equipment such as the calciner and material dryers have a combustion related component that is like other combustion source emissions, as well as a process related component that results from the direct contact of combustion exhaust gases with the product being processed. Essentially, the airflow through the process equipment results in the entrainment of PM.

*1.4.3.2 $PM/PM_{10}/PM_{2.5}$ Control Options*

In general, control of non-condensable PM emissions generated by point sources is achieved through the addition of equipment added to the exhaust stream. Five control technologies have been identified as alternatives for the PM generating point sources at the Project: fabric filter baghouse, electrostatic precipitator (ESP), wet electrostatic precipitator (WESP), wet scrubber, and mechanical separator (cyclone). These technologies are considered to have the highest control efficiency of all particulate control options and are listed in the order of anticipated control efficiency. Discussion of control of the condensable fraction of PM will be discussed separately because of its unique nature.

Fabric Filter Baghouse

Fabric filtration in a baghouse consists of several filtering bags that are suspended in a housing. The particulate-laden gas passes through the housing and collects on the fabric of the filter bag. Accumulated particulate matter on the bag surfaces enhance the filtering efficiency. Periodically, the accumulated material or "cake" is removed from the bags using a physical mechanism such as shaking or blasting the bags with compressed air. The dust is collected in a hopper and eventually removed. Electrostatic Precipitator

Electrostatic precipitators (ESPs) remove PM from the flue gas stream using the principle of electrostatic attraction. PM in the exhaust stream is charged with a very high direct current (DC) voltage and the charged particles are attracted to oppositely charged collection plates in the ESP. PM collected by the ESP continues to accumulate on the plates until removed by rapping the electrodes. The dust is then collected in a hopper for disposal. ESPs can handle large gas streams, high particulate loading and can operate at high temperature conditions.

Wet Electrostatic Precipitator

Wet electrostatic precipitators (WESP) operate using the same principles as a standard ESP, but the final cleaning step is different. The collection surfaces are cleaned with water that can be delivered from spray nozzles or by condensing moisture from the flue gas. WESPs effectively reduce particle re-entrainment since the surfaces of the collection plates are constantly cleaned with liquid. WESPs also operate under higher electrical power than standard ESPs and enable higher reduction of very small particles. Operation of a WESP requires the collection and treatment and/or disposal of wastewater containing fly ash from the combustion device.

Wet Scrubber

Numerous wet scrubber designs can be used to control PM emissions with varying degrees of efficiency. Final design generally depends on the specific source type and target pollutants. Designs include mechanically aided scrubbers, orifice scrubbers, packed-bed scrubbers, packed tower scrubbers spray chamber/spray tower scrubbers and venturi scrubbers.

Mechanical Separator

Mechanical separators (cyclones) operate through inertial separation of particles entrained in an exhaust gas stream. The collection efficiency varies as a function of particle size and cyclone design. Cyclone efficiency generally increases with particle size density, inlet duct velocity, cyclone body length, number of revolutions in the cyclone, ratio of cyclone body diameter to gas exit diameter, dust loading and cyclone wall smoothness. Cyclones are designed for many applications and are used extensively on a wide variety of industrial applications.

Condensable Particulate Matter Controls

$PM_{2.5}$ emissions and $PM_{10}$ emissions include gaseous emissions from a source or activity that condense to form particulate matter at ambient temperatures (CPM). The unique nature of CPM in terms of its formation make it difficult to control. Aside from questions concerning the accurate quantification of CPM and test method performance, available technological control options for CPM are limited. The fact that CPM formation occurs outside of the exhaust stack exit point, possibly as far as 100 feet away, makes control of CPM very difficult. The difficulty in control can be summarized in the following three questions:

1. Can CPM formation be prevented? Prevention of CPM formation would entail a form of combustion control that manages complete combustion and controls moisture in the combustion process. Furthermore, accurate real-time quantification of potential CPM formation would need to be developed to manage such combustion control. Currently no standard methods exist for this option. However, the use of natural gas and diesel as a fuel does prevent significant CPM formation as compared to other fuel types (i.e., coal and biomass).

2. Can CPM be removed after formation? Removal of CPM after formation is not technically feasible. As discussed, CPM forms at ambient temperatures which do not occur until after an exhaust stream has exited the stack. Capture of emissions formed outside of the exhaust point of the stack is not reasonable. In essence, it would be the control of secondary pollution formation in the ambient air.

3. Can the stack conditions be altered to promote the formation and capture of CPM before release to the ambient air? In general, this would involve either significant dilution of flue gases in the exhaust stack or significant artificial cooling of hot combustion gases. Dilution of exhaust gases is strictly prohibited by most state air quality laws. Artificial cooling of the high volume exhaust gases from larger combustion sources would be extremely cost prohibitive.

The following paragraphs briefly address current particulate matter control technologies with respect to their technical feasibility for controlling CPM.

*Mechanical Collectors*: Mechanical collectors generally use the inertia of a moving particle in an exhaust gas stream to achieve particulate collection. A particle-laden exhaust stream is forced to rapidly change direction, either through cyclonic flow in a cylinder or by passing through a series of sieve plates in an impingement device. The mass of the particles in the exhaust stream causes them to move outside of the exhaust stream and impact on a collection surface where they then settle into a hopper or are collected in some other manner. Some mechanical collectors are specifically designed (and generally operated in series) to provide high efficiency particulate matter collection down to a particle size of one micrometer. However, as stated previously, at stack conditions, CPM is in a vapor or gaseous form, and thus has no significant difference in mass as compared to the surrounding exhaust gas. Therefore, inertial type mechanical collectors are not technically feasible for the capture of CPM.

*Particulate Scrubbers*: Particulate wet scrubbers exist in many forms. All particulate wet scrubber designs utilize particle and/or droplet inertia as the fundamental force to transfer particles from the gas steam to the liquid steam. Within a scrubber, particle laden air is forced to contact liquid droplets, sheets of liquid on packing material, or jets of liquid from a plate. As with the mechanical collectors, but on a smaller scale, the inertia of droplets or particles causes an impact with the collection media. However, vapors or gases with no significant mass with respect to the surrounding exhaust gases will pass around the “target” droplets, steams, or media. The ability of a particulate wet scrubber to remove particles primarily depends on the aerodynamic diameter of a particle, the velocity of a particle, and the velocity of droplets or collection media. Due to the extremely small (molecular) size of gases and vapors, they tend to follow Brownian diffusion, which means they diffuse slowly and primarily due to their interactions with gas molecules in the exhaust gas steam and are not significantly influenced by inertia.

The only advantage provided by a wet particulate scrubber is the potential ability to reduce the exhaust gas stream temperature to a degree which will promote the condensation of a portion of the CPM. After condensation, the particulate matter will then have a larger diameter and mass, which will allow the mechanics of particle collection to function. However, based on the high temperature and flowrate of exhaust gases produced by most combustion sources, the particulate wet scrubbers cannot sufficiently reduce the exhaust gas temperature to result in particle condensation. Therefore, particulate wet scrubbers are not technically feasible for the capture of CPM.

*Electrostatic Precipitators*: Electrostatic Precipitators (ESP) utilize non-uniform high voltage fields to apply large electrical charges to particulates moving through the field. The charged particles are then attracted to oppositely charged collection plates to promote particulate capture. Gases and vapors are not significantly influenced by the electrical fields and therefore are not captured by dry ESP devices. Like the discussion in the previous section for particulate scrubbing, a wet ESP cannot sufficiently reduce the exhaust gas temperature to result in meaningful particle condensation. Therefore, neither dry nor wet ESP devices are technically feasible for the removal of CPM.

*Fabric Filtration*: Fabric filters are used to collect particulate matter on the surface of filter bags. Most particles are collected by inertial impaction, interception, and sieving. As particles are collected, the layer of particles, or filter cake, that develops increases the chances of capture by reducing the size of the fabric filter holes and increasing the chance for interception and sieving. Fabric filters have some limitations in that they are not used with corrosive or high moisture exhaust gas streams. Corrosive gases can destroy the integrity of the filters, leading to leaks, and high moisture exhaust gases will result in blinding (plugging) of the fabric filters when absorbed by the filter cake.

At stack conditions, CPM is in a vapor or gaseous form, and will mostly pass through both the filter media and any filter cake that has developed. Therefore, fabric filters are not technically feasible for the capture of CPM.

All the source of CPM associated with the Project are generated through the combustion of natural gas and diesel. Given the limitations with respect to control of CPM described above, along with the fact that the RBLC does not include any control determinations for CPM from fuel combustion devices, the BACT analysis and subsequent proposed BACT emission limits will focus only on filterable PM emissions.

## 1.5 Project Economic Evaluation Criteria

Table 1 lists the economic criteria used in the BACT analysis for determination of capital and annual costs of the control technologies.

**Table 1 –Economic Evaluation Criteria**

| Economic Parameters | Value |
|---|---|
| Interest Rate, percent | 7[A] |
| Maintenance Labor and Material Cost | 1.5% of TCI[B] |
| Energy Cost, $/kW-hr | 0.061[C] |

[A] EPA Air Pollution Control Cost Manual, Sixth Edition, November 2017, Chapter 2, Section 2.5.2.
[B] EPA Air Pollution Control Cost Manual, Sixth Edition, April 2019, Chapter 1, Equation 1.39, indicated as "... a fairly standard percentage for maintenance on control equipment". TCI = Total Capital Investment.
[C] Actual Piedmont Lithium Carolinas, LLC electricity cost.

## 1.6 Organization of BACT Analysis

The BACT analysis focuses specifically on emissions associated with the categories of sources associated with the Project. The BACT analysis has been divided into sections that individually address PM, $NO_x$, and CO emissions, as applicable, for each category of emission units. GHG emissions are addressed separately in a final section that includes all applicable emission units.

## 2 BACT Evaluation of Mining Operations

A variety of activities and processes make up the mining operations of the Project, including the following (with pollutants emitted by each listed):

- Drilling of Holes for Blasting, PM
- Blasting, $NO_x$, CO, PM and GHG
- Miscellaneous Material Handling, PM
- Wind Erosion of Piles, PM

BACT determinations for these types of activities were identified through searches of EPA's RACT/BACT/LAER Clearinghouse (RBLC) conducted for the following categories:

- 90.023 – Mining Operations (except 90.032) – no matching RBLC facilities found
- 90.024 – Non-metallic Mineral Processing (except 90.011, 90.017, 90.026)
- 90.999 – Other Mineral Processing Sources
- The terms "drill", "explosive" (no matching RBLC facilities found), "pile", "crusher", "conveyor" and "screening"

### 2.1 BACT for Drilling

The PM emissions generated by the drilling of holes for blasting (FUG: Drilling) are considered fugitive emissions that will occur inside the mining pits. Add on controls for fugitive emissions are not technically feasible as there is no means of capture. A search of the RBLC resulted in a single BACT determination (for drilling and blasting combined) of "Best Practical Methods" as a control method.

Carolina Lithium proposes BACT for the emissions generated during drilling to be Best Practical Methods, corresponding to the following:

- Watering, as needed
- Minimization of the activity during dry, high wind conditions

### 2.2 BACT for Blasting

The $NO_x$, CO, PM and GHG emissions generated by blasting (FUG: Blasting) are considered intermittent fugitive emissions of short duration that will occur inside the mining pits. Add on controls for fugitive emissions are not technically feasible as there is no means of capture. A search of the RBLC resulted in a single BACT determination (for drilling and blasting combined) of "Best Practical Methods" as a control method.

Carolina Lithium proposes BACT for the emissions generated during blasting to be Best Practical Methods, corresponding to the following:

- Watering, as needed
- Minimization of the activity during dry, high wind conditions

## 2.3 BACT for Mobile Rock Breaking Operations

The PM emissions generated by the initial breaking of rock prior to loading into the in-pit crushers (IES01) are considered fugitive emissions that will occur inside the mining pits. Add on controls for fugitive emissions are not technically feasible as there is no means of capture. A search of the RBLC resulted in no BACT determinations for similar processes.

Carolina Lithium proposes BACT for rock breaking to be Best Practical Methods, corresponding to the following:

- Watering, as needed
- Minimization of the activity during dry, high wind conditions

## 2.4 BACT for Mobile Crushing Operations

The PM emissions generated by the mobile ore and waste rock crushers (IES03, IES04 and FUG: Mobile Waste Rock Crusher with Screening) are emissions generated by mobile operations that will occur inside the mining pits. A search of the RBLC resulted in two types of BACT determinations for similar non-mobile processes:

1. Enclosure, capture and control by a baghouse
2. Watering

As mobile operations, capture and control by a baghouse is not technically feasible as BACT.

Carolina Lithium proposes BACT for the in-pit crushers to be Best Practical Methods, corresponding to the following:

- Watering, as needed
- Minimization of the activity during dry, high wind conditions
- Each conveyor transfer point will include a hood over the head roller and enclosed chutes and skirting from the chute to the conveyor belt

## 2.5 BACT for Mobile Conveying Operations

The PM emissions generated by the mobile in-pit and out of pit conveying operations (IES05) are emissions generated by mobile operations. A search of the RBLC resulted in two types of BACT determinations for similar non-mobile processes:

1. Enclosure, capture and control by a control device
2. Development, maintenance and implementation of a site-specific fugitive dust control plan

As mobile operations, capture and control by a baghouse is not technically feasible as BACT.

Carolina Lithium proposes BACT for the mobile conveyors to be Best Practical Methods, corresponding to the following:

- Watering, as needed
- Minimization of the activity during dry, high wind conditions

- Development and implementation of a site-specific dust control plan
- Each conveyor transfer point will include a hood over the head roller and enclosed chutes and skirting from the chute to the conveyor belt

2.6 BACT for Miscellaneous Material Handling

Insignificant levels of PM emissions will be generated by the ore telestacker and mobile refuse stackers (IES06). A search of the RBLC resulted in two types of BACT determinations for similar processes:

1. Enclosure, capture, and control by a control device
2. Dust control plan

Based on the PTE of the ore telestacker (0.41 tpy), which is considered a stationary source, capture and control by a baghouse is not expected to be economically feasible.

As mobile operations, capture and control of the PM emissions from the mobile refuse stackers is not technically feasible as BACT for those operations.

Carolina Lithium proposes BACT for the ore telestacker and the mobile refuse stackers to be Best Practical Methods, corresponding to the following:

- Watering, as needed
- Minimization of the activity during dry, high wind conditions
- Development and implementation of a site-specific dust control plan, including minimization of drop height

2.6 BACT for Storage Pile Wind Erosion

Insignificant levels of PM emissions will be generated by wind erosion of the ROM pile (IES 08 and IES 09), waste rock and tailings disposal active areas (IES10), ore surge pile (IES12), and concentrate surge piles (IES21 and IES29). A search of the RBLC resulted in three types of BACT determinations for similar processes:

1. Enclosure, capture and control by a control device
2. Wet suppression
3. Dust control plan

Based on the PTE of these piles (ranging from 0.009 tpy to 0.18 tpy, each), capture and control by a baghouse is not expected to be economically feasible for any of the piles.

Carolina Lithium proposes BACT for the piles to be Best Practical Methods, corresponding to the following:

- Watering, as needed
- Minimization of the activity during dry, high wind conditions
- Development and implementation of a site-specific dust control plan

### 2.7 BACT for Coarse Ore Handling Operations

Insignificant levels of PM emissions will be generated by the coarse ore handling operations (IES13). A search of the RBLC resulted in two types of BACT determinations for similar processes:

1. Enclosure, capture and control by a control device
2. Development, maintenance, and implementation of a site-specific fugitive dust control plan

Based on the PTE of this equipment (ranging from 0.04 tpy to 4.01 tpy, each), capture and control by a baghouse is not expected to be economically feasible for any of the equipment.

Carolina Lithium proposes BACT for the coarse ore handling operations to be Best Practical Methods, corresponding to the following:

- Watering, as needed
- Minimization of the activity during dry, high wind conditions
- Development and implementation of a site-specific dust control plan
- Each conveyor transfer point will include a hood over the head roller and enclosed chutes and skirting from the chute to the conveyor belt

## 3 BACT Evaluation of Dry Material Handling Processes in the Concentrator and Lithium Hydroxide Plants

A variety of dry material handling activities and processes are part of the concentrator and lithium hydroxide plants. BACT determinations for these types of activities were identified through searches of EPA's RACT/BACT/LAER Clearinghouse (RBLC) conducted for the following categories:

- 90.024 – Non-metallic Mineral Processing (except 90.011, 90.017, 90.026)
- 90.999 – Other Mineral Processing Sources
- The terms "crusher", "conveyor" and "screening"

### 3.1 BACT for Dry Material Handling Processes Venting to Fabric Filters

The following dry material handling activities and processes in the concentrator plant and the two lithium hydroxide plants will generate PM emissions that are collected and routed to a fabric filter for control:

Concentrator Plant

- Ore Sorting – ES01
- Secondary Crusher Feed Bin – ES02
- Secondary Crusher Discharge – ES03
- Fine Ore Sizing Screen Discharge – ES04
- Tertiary Crusher Feed Bin No. 1 and 2 – ES05 and ES06
- Tertiary Crusher No. 1 and 2 – ES07 and ES08
- Fine Ore Bin – ES09

Carolina Lithium 1 (CL-1)

- Spodumene Concentrate Conveying – ES15
- Spodumene Concentrate Surge Silo – ES16
- Spodumene Concentrate Conveyor to Calciner – ES17
- Cooler Discharge Sweep Air – ES19
- Ball Feed Mill Bin – ES20
- LiOH Bagging Area Surge Bin Transporter No. 1 and No. 2 – ES23 and ES24
- LiOH Bagging Area Day Tank – ES25, ES26, ES27 and ES28
- LiOH Bagging Area Vacuum – ES30
- Lime Receiving and Storage – ES31
- Phosphate Receiving – ES32
- Sodium Carbonate Receiving and Storage Silo – ES33
- Sodium Carbonate Receiving and Feeder Bin – ES34

Carolina Lithium 2 (CL-2)

- Spodumene Concentrate Conveying – ES44
- Spodumene Concentrate Surge Silo – ES45
- Spodumene Concentrate Conveyor to Calciner – ES46
- Cooler Discharge Sweep Air – ES48
- Ball Feed Mill Bin – ES49
- LiOH Bagging Area Surge Bin Transporter No. 1 and No. 2 – ES52 and ES53
- LiOH Bagging Area Day Tank – ES54, ES55, ES56 and ES57
- LiOH Bagging Area Vacuum – ES59
- Phosphate Receiving – ES60
- Sodium Carbonate Receiving and Feeder Bin – ES61

Each of the PM control options discussed in Section 1.4.1.2 is technically feasible for each of these emission sources. As discussed, the use of a fabric filter/baghouse for PM control is expected to provide the highest level of control when compared to the other options. EPA policy is that when the top level of control is chosen as BACT no further economic, or environmental evaluation of the other technically feasible control technologies is required.

The vast majority of the BACT determinations found in the RBLC require venting of emissions to a fabric filter/baghouse. The entries included outlet PM concentrations ranging from 0.001 gr/dscf to 0.005 gr/dscf, with most of entries in the 0.002 gr/dscf to 0.003 gr/dscf.

To ensure compliance margin as well as consistency with recent BACT determinations, Carolina Lithium proposes BACT for these operations as the use of a fabric filter/baghouse and an outlet concentration of 0.002 gr/dscf.

### 3.2 BACT for Miscellaneous Concentrator Plant Material Handling Operations

Insignificant levels of PM emissions will be generated by the miscellaneous material handling operations at the Concentrator Plant (IES14). A search of the RBLC resulted in two types of BACT determinations for similar processes:

1. Enclosure, capture and control by a control device
2. Development, maintenance, and implementation of a site-specific fugitive dust control plan

Based on the PTE of this equipment (ranging from 0.001 tpy to 1.16 tpy, each), capture and control by a baghouse is not expected to be economically feasible for any of the equipment.

Carolina Lithium proposes BACT for the miscellaneous concentrator plant material handling operations to be Best Practical Methods, corresponding to the following:

- Watering, as needed
- Minimization of the activity during dry, high wind conditions
- Development and implementation of a site-specific dust control plan
- Each conveyor transfer point will include a hood over the head roller and enclosed chutes and skirting from the chute to the conveyor belt

## 4 BACT Evaluation of Quartz and Feldspar Dryers at the Concentrator Plant

The BACT evaluation presented in this section applies to both the quartz dryer (ES10) and feldspar dryer (ES11) located at the concentrator plant. BACT determinations for these types of activities were identified through searches of EPA's RACT/BACT/LAER Clearinghouse (RBLC) conducted for the term "dryer"

Dryers used in at agriculture products, wood products and biomass-fueled facilities were excluded from this evaluation because most dryers used in these applications have elevated CO emissions (due to toasting of the dried material), which will not be the case for the quartz and feldspar dryers. The only CO emitted by the quartz and feldspar dryers are due to fuel combustion.

### 4.1 CO BACT for Quartz and Feldspar Dryers

The catalyst in a catalytic oxidizer would be poisoned by the HF contained in the exhaust stream. Therefore, the used of a catalytic oxidizer to control CO emissions from the quartz and feldspar dryers is considered technically infeasible.

Each of the RBLC entries for similar types of dryers determined BACT for CO as Good Combustion Practices and most also included Use of Natural Gas.

Carolina Lithium proposes that BACT for CO emissions from both the quartz and the feldspar dryers is the use of natural gas as a fuel and implementation of good combustion practices.

### 4.2 $NO_x$ BACT for Quartz and Feldspar Dryers

The catalyst in SCR would be poisoned by the HF contained in the exhaust stream. The quartz and feldspar dryers each have very low $NO_x$ emissions (4.10 tpy and 6.36 tpy, respectively). Although SNCR is technically feasible, based on these low emissions SNCR is expected to be economically infeasible. The fact that none of the RBLC entries for similar types of dryers determined that BACT for $NO_x$ was add-on controls supports the conclusion that SNCR is not economically feasible. On the contrary, each of the RBLC entries for similar types of dryers determined BACT for $NO_x$ as Low $NO_x$ Burners and most also included Use of Natural Gas.

Carolina Lithium proposes that BACT for $NO_x$ emissions from both the quartz and the feldspar dryers is the use of natural gas as a fuel and low $NO_x$ burners.

### 4.3 PM BACT for Quartz and Feldspar Dryers

Each of the PM control options discussed in Section 1.4.3.2 is technically feasible for each of the dryers. As discussed, the use of a fabric filter/baghouse for PM control is expected to provide the highest level of control when compared to the other options. Further, a wet scrubber will be installed after the baghouse on each dryer whose main purpose is to control HF emissions, but secondary control of PM will also occur. The combination of baghouse followed by wet scrubber represents the top level of control for PM emissions from the dryers. EPA policy is that when the top level of control is chosen as BACT no further economic, or environmental evaluation of the other technically feasible control technologies is required.

The BACT determinations for PM emissions from dryers found in the RBLC consist of the following:

1. Combustion of natural gas
2. Good combustion practices
3. Use of fabric filter/baghouse
4. Cyclone and wet scrubber

Carolina Lithium proposes that BACT for PM from the quartz and feldspar dryers consists of the following:

- Good combustion practices and use of natural gas
- Quartz Dryer – Use of a fabric filter/baghouse followed by a wet scrubber to control PM emissions to 0.13 lb/hr.
- Feldspar Dryer – Use of a fabric filter/baghouse followed by a wet scrubber to control PM emissions to 0.21 lb/hr.

## 5 BACT Evaluation of Emergency Generators and Fire Pump

Several emergency generators and a fire pump will be installed at the concentrator and lithium hydroxide plants:

Concentrator Plant

- 1,000 kW Emergency Generator No. 1 – ES12
- 1,000 kW Emergency Generator No. 2 – ES13

Carolina Lithium 1 (CL-1)

- 1,000 kW Emergency Generator No. 1 – ES38
- 1,000 kW Emergency Generator No. 2 – ES39
- Fire Pump – ES40

Carolina Lithium 2 (CL-2)

- 1,000 kW Emergency Generator No. 1 – ES65
- 1,000 kW Emergency Generator No. 2 – ES66

BACT determinations for these types of activities were identified through searches of EPA's RACT/BACT/LAER Clearinghouse (RBLC) conducted for the term "emergency".

### 5.1 CO BACT for Emergency Generators and Fire Pump

Each emergency generator and the fire pump has very low CO emissions (ranging from 0.12 tpy to 0.41 tpy). Although the add-on CO control option of catalytic oxidation discussed previously is technically feasible, based on these low emissions each is expected to be economically infeasible. For the same reason the use of a Tier 4 certified engine would also be economically infeasible. This is confirmed by the fact that only 15 of the 785 total RBLC entries for emergency generators and fire pumps had determinations requiring the use of Tier 4 engines to control CO. Five of the fifteen were for a facility located in Harris County, TX – a serious nonattainment area for ozone. As such, the requirement to use Tier 4 engines constitutes LAER. The remaining ten entries were for a facility located in Jefferson County, TX – a county that is in attainment for all pollutants. Review of the permit application shows that the permittee stated that the engines would meet the applicable NSPS requirements (which is not Tier 4 engines), but then used the Tier 4 engine emission factors in their calculations. The other 770 RBLC entries determined BACT for CO as combinations of Good Combustion Practices, use of ULSD and compliance with the standards of 40 CFR Subpart III. Based on this information Carolina Lithium does not consider the RBLC's entries requiring Tier 4 engines to represent BACT for emergency generators and fire pumps.

Carolina Lithium proposes that BACT for CO emissions from each emergency generator and the fire pump is the implementation of good combustion practices, use of ULSD and compliance with the standards of Subpart IIII.

### 5.2 $NO_x$ BACT for Emergency Generators and Fire Pump

Each emergency generator and the fire pump has very low NOx emissions (ranging from 0.56 tpy to 0.98 tpy). Although the add-on $NO_x$ control option of SCR discussed previously is technically feasible, based on these low emissions SCR is expected to be economically infeasible. For the same reasons discussing in Section 5.1 above the use of Tier 4 engines is not considered further for $NO_x$ BACT. SNCR is not technically feasible for use on diesel engines because they do not have a combustion zone with the proper temperature or residence time for SNCR to be effective.

Carolina Lithium proposes that BACT for $NO_x$ emissions from each emergency generator and the fire pump is the implementation of good combustion practices, use of ULSD and compliance with the standards of Subpart IIII.

### 5.3 PM BACT for Emergency Generators and Fire Pump

Each emergency generator and the fire pump has very low PM emissions (ranging from 0.04 tpy to 0.05 tpy). Although the add-on PM control option of diesel particulate filter (DPF) is technically feasible, based on these low emissions DPF is expected to be economically infeasible. For the same reasons discussing in Section 5.1 above the use of Tier 4 engines is not considered further for PM BACT.

Therefore, Carolina Lithium proposes that BACT for PM emissions from all the emergency generators and the fire pump is the implementation of good combustion practices, use of ULSD and compliance with the standards of Subpart IIII.

## 6 BACT Evaluation of Spodumene Calciners

A spodumene calciner will be installed at each of the lithium hydroxide plants:

Carolina Lithium 1 (CL-1)

- Spodumene Calciner – ES18

Carolina Lithium 2 (CL-2)

- Spodumene Calciner – ES47

BACT determinations for these types of activities were identified through searches of EPA's RACT/BACT/LAER Clearinghouse (RBLC) conducted for the term "calcine".

### 6.1 CO BACT for Spodumene Calciners

The add-on CO control option of catalytic oxidation discussed previously could be technically feasible, although the control efficiency would be low based on the low concentration of CO combined with the high flow rate of the exhaust gas stream. Further, the oxidation catalyst would be fouled by the high particulate concentration prior to the cyclone/venturi scrubber system (see section 4.3) and the required catalyst temperature would not be met following the cyclone/venturi scrubber system. None of the RBLC entries for calciners determined that BACT for CO was add-on controls. On the contrary, each of the RBLC entries for similar types of calciners determined BACT for CO as Good Combustion Practices.

Carolina Lithium proposes that BACT for CO emissions from the spodumene calciners is the use of natural gas as a fuel and implementation of good combustion practices.

### 6.2 $NO_x$ BACT for Spodumene Calciners

The primary form of $NO_x$ emissions control for the spodumene calciners would be through the application of combustion controls or flue gas treatment (post-combustion) technologies. Combustion-based $NO_x$ formation control processes reduce the quantity of $NO_x$ formed during the combustion process. Post-combustion technologies reduce the $NO_x$ emissions in the flue gas stream after the $NO_x$

has been formed because of the combustion process.  These methods may be used alone or in combination to achieve the various degrees of $NO_x$ emissions required.

### *6.2.1 Identification of $NO_x$ Control Technologies*

The spodumene calciners are direct fired rotary kiln units that do not have a combustion zone with the proper temperature or residence time for SNCR to be effective. Therefore, SNCR is technically infeasible. Based on the exhaust temperature of the calciner SCR is a technically feasible control option, but only if a baghouse is used to reduce the PM loading to acceptable levels (use of the proposed cyclone/venturi scrubber system would reduce the exhaust gas temperature to below the SCR catalyst effectiveness range).

Therefore, the following economic analysis for SCR includes the cost of a baghouse. The calciners design includes the lowest level of NOx achievable without add-on control equipment and is used as the base emissions for economic feasibility purposes.

### *6.2.2 $NO_x$ Control Technology Summary*

Table 2 summarizes the different $NO_x$ control technologies and indicates which technologies have been chosen as technically feasible options for the proposed spodumene calciners.

**Table 2 – $NO_x$ Control Technology Summary**

| Identified Control Technology | Available and Demonstrated Effective | In Service on Similar Units | Technically Feasible for Calciners |
|---|---|---|---|
| SCR | Yes | No | Yes |
| SNCR | Yes | No | No |
| Combustion Controls (Baseline) | Yes | Yes | Yes |

### *6.2.3 Top-Down Ranking*

The $NO_x$ control technologies that are considered technically feasible for implementation on the proposed spodumene calciners have been ranked from most to least effective in terms of emission reduction potential.  Table 3 summarizes the control technology ranking.

**Table 3 – Top-Down Ranking of $NO_x$ Control Technologies**

| Identified Control Technology | Percent $NO_x$ Reduction |
|---|---|
| SCR | 80 |
| Combustion Controls (Baseline) | 0 |

### *6.2.4 Control Technology Evaluation*

The following sections present detailed evaluations of the feasible $NO_x$ control technologies.  Energy, environmental and economic impacts are considered.

SCR

*Energy*: Direct energy penalties associated with the operation of a SCR system are mainly associated with electricity consumption required to operate the SCR system and upgraded fan for the baghouse. The amount of electricity consumed is related to the concentration of $NO_x$ in the exhaust stream to be controlled.

*Environmental*: Detrimental environmental effects resulting from the use of a SCR system include the requirement to store either aqueous ammonia or urea on site and a small amount of secondary air pollutant emissions because of power generation to meet the SCR power consumption demand.

*Economic*: Table 4 presents the capital costs associated with the installation of a SCR to achieve a $NO_x$ removal efficiency of 80%. Capital costs were based on vendor equipment cost estimates and standard engineering estimating practices presented in the EPA Air Pollution Control Cost Manual, as well as additional applicable guidance from the EPA and other resources. See Attachment 1 for the detailed cost calculation evaluation.

*6.2.5 Proposed $NO_x$ BACT Selection*

Table 4 summarizes the results of the Top-Down BACT analysis for $NO_x$ emissions.

The fundamental obstacle to using SCR to control $NO_x$ emissions is the overall economics in comparison to the amount of emission reduction. Further, this cost analysis underestimates the cost of SCR because it does not include the cost of the SCR reagent receiving and storage system (capital cost) or the SCR electrical usage requirements and periodic baghouse bag replacement (annual costs). Based on this, Carolina Lithium proposes that SCR is not an economically feasible control option for NOx emissions from the spodumene calciners.

**Table 4 – Summary of Top-Down BACT for $NO_x$ Emissions from the Spodumene Calciners**

| Control Alternative | Emission Level (tpy) | Emission Reduction (tpy) | Annualized Costs ($/yr) | Cost Effectiveness ($/ton) |
|---|---|---|---|---|
| SCR + Baghouse | 19.0 | 76.0 | 1,321,897 | 17,393 |
| Baseline | 95.0 | - | - | - |

The fundamental obstacle to using SCR to control $NO_x$ emissions is the overall economics in comparison to the amount of emission reduction. Further, this cost analysis underestimates the cost of SCR because it does not include the cost of the SCR reagent receiving and storage system (capital cost) or the SCR electrical usage requirements and periodic baghouse bag replacement (annual costs). Based on this, Carolina Lithium proposes that SCR is not an economically feasible control option for NOx emissions from the spodumene calciners.

The majority of the RBLC entries for calciners determined that BACT for $NO_x$ was low NOx design. One entry determined BACT to be a catalytic baghouse that consists of a system of ceramic filter tubes that are embedded with NOx catalysts. This system also includes reagent injection and was indicated as having a control efficiency of 80%. Because it is basically identical in operation to the SCR plus baghouse system evaluated above and is anticipated to have a similar cost profile, this system is not evaluated in detail.

Based on this discussion and economic evaluation, Carolina Lithium proposes that BACT for NOx emissions from the spodumene calciners is the use of natural gas as a fuel and implementation of low NOx design to achieve an emission rate of 21.68 lb/hr.

### 6.3 PM BACT for Spodumene Calciners

Each of the add-on control for PM discussed in Section 1.4.3.2 are technically feasible for use on the spodumene calciners, although the exhaust air stream would need to be cooled (through dilution with ambient air) for a baghouse to be feasible. Addition of this cooling air would require a larger ID fan to move the additional air volume.

The majority of the RBLC entries for calciners determined that BACT for PM was baghouse or dry ESP, with control efficiencies ranging from 90% to 99.9%. Carolina Lithium's calciner design company has indicated that the cyclone/venturi scrubber system that is planned for each calciner will achieve the same basic level of control as would be reached with a baghouse. The design overall control efficiency of the planned cyclone/ venturi scrubber system is 99.93%, which compares favorably with the highest level of control achieved by the baghouses listed in the RBLC. As indicated previously, EPA policy is that the top-down control technology evaluation is not necessary when the top level of control is chosen.

Carolina Lithium proposes that BACT for PM is the use of a cyclone/ venturi scrubber system to control emissions from the spodumene calciners to 4.56 lb/hr.

## 7 BACT Evaluation of Pressure Leaching

Two pressure leaching vents will be installed at each of the lithium hydroxide plants:

Carolina Lithium 1 (CL-1)

- Pressure Leaching, Train 1 – ES22
- Pressure Leaching, Train 2 – ES23

Carolina Lithium 2 (CL-2)

- Pressure Leaching, Train 1 – ES47
- Pressure Leaching, Train 2 – ES48

BACT determinations for these types of activities were identified through searches of EPA's RACT/BACT/LAER Clearinghouse (RBLC) conducted for the following category:

- 62.999 – Other Inorganic Chemical Manufacturing Sources

The pressure leaching vent stream contains moisture droplets, which makes the dry control options (i.e., baghouse and ESP) technically infeasible.

No RBLC entries for similar processes with PM emissions were identified in the database search. Carolina Lithium's pressure leaching system design company has indicated that the venturi scrubber system that is planned for each pressure leaching process will achieve 99.9% reduction, which is higher than the level of control of a typical wet ESP. Therefore, the venturi wet scrubber is the top level of control that is feasible for this emission unit. As indicated previously, EPA policy is that the top-down control technology evaluation is not necessary when the top level of control is chosen.

Carolina Lithium proposes that BACT for PM emissions from each pressure leaching operation vent is the use of a venturi wet scrubber.

# 8 BACT Evaluation of Lithium Hydroxide Bagging Operations

A lithium hydroxide bagging operations will be installed at each of the lithium hydroxide plants:

Carolina Lithium 1 (CL-1)

- Lithium Hydroxide Bagging – ES29

Carolina Lithium 2 (CL-2)

- Lithium Hydroxide Bagging – ES58

BACT determinations for these types of activities were identified through searches of EPA's RACT/BACT/LAER Clearinghouse (RBLC) conducted for the terms "lithium" and "bagging".

No RBLC entries for similar processes with PM emissions were identified in the database search. Carolina Lithium's lithium hydroxide bagging operations design company has indicated that the venturi scrubber system that is planned for system will achieve 99.1% reduction, which is like the level of control of a typical baghouse, ESP, or wet ESP. Lithium hydroxide has hazard classifications of oral acute toxicity, eye damage and skin corrosion, meaning that it is important to limit potential plant personnel exposure to the substance. Use of a venturi scrubber (the blowdown of which will be directed back into the process to recover the collected, valuable lithium hydroxide) will prevent plant personnel from potentially contacting the lithium hydroxide collected by a dry system. Therefore, the venturi wet scrubber is the top level of control that is feasible for this emission unit. As indicated previously, EPA policy is that the top-down control technology evaluation is not necessary when the top level of control is chosen.

Carolina Lithium proposes that BACT for PM emissions from lithium hydroxide bagging operation is the use of a venturi wet scrubber.

# 9 BACT Evaluation of Truck Traffic on Paved Roads

A variety of incoming and outgoing materials will be transported by trucks traveling on paved roads to the concentrator and lithium hydroxide plants. BACT determinations for this type of activity was identified through a search of EPA's RACT/BACT/LAER Clearinghouse (RBLC) conducted for the following category:

- 99.140 – Paved Roads

All roads with routine truck traffic will be paved. As shown in the PTE calculations the truck traffic emissions will consist of the following values:

Concentrator Plant – IES20

- PM – 5.81 tpy
- $PM_{10}$ – 1.16 tpy
- $PM_{2.5}$ – 0.29 tpy

Carolina Lithium 1 (CL-1) – IES27

- PM – 0.87 tpy
- $PM_{10}$ – 0.17 tpy
- $PM_{2.5}$ – 0.04 tpy

Carolina Lithium 2 (CL-2) – IES35

- PM – 0.87 tpy
- $PM_{10}$ – 0.17 tpy
- $PM_{2.5}$ – 0.04 tpy

Total

- PM – 7.55 tpy
- $PM_{10}$ – 1.50 tpy
- $PM_{2.5}$ – 0.37 tpy

None of the PM control options discussed in Section 1.4.3.2 are technically feasible for emissions generated by truck traffic. As listed in the RBLC BACT determinations, the following PM control options are technically feasible for this type of source:

- Daily water flushing and sweeping (90% control)
- Daily sweeping (assumed 90% control)
- Development and Implementation of Fugitive Dust Control Plan (baseline)

The majority of the BACT determinations found in the RBLC require some combination of water flushing combined with sweeping. However, based on the low total PM emissions from truck traffic operations at the proposed facility, this approach will can be shown to not be economically feasible. At a control efficiency of 90%, the total amount of PM controlled would be 6.80 tpy. To implement daily water flushing and sweeping of the facility roadways 1.4 full time equivalent employees would be required. Assuming an annual salary of $60,000 the annual operating cost due to labor alone would be $84,000, resulting in a cost effectiveness of more than $12,300 per ton of PM removed.

The fundamental obstacle to using sweeping (either alone or with water flushing) to control PM emissions associated with truck traffic is the overall economics in comparison to the amount of emission reduction. Further, this cost analysis underestimates the cost effectiveness because it does not include the cost of the sweeper (capital cost) or the cost of fuel and maintenance for the sweeper (annual costs). Based on this, Carolina Lithium proposes that sweeping (either alone or with water flushing) is not BACT for PM emissions associated with truck traffic.

Carolina Lithium proposes BACT for PM emissions associated with truck traffic is inclusion of measures to minimize paved road emissions in the fugitive dust plan prepared for the facility. Examples of the measure to be implemented include, but are not limited to:

- Clean up of materials spilled on the paved roadways that could generate emissions
- Use of enclosed or tarped trucks transporting materials that could become airborne
- Clean up of materials tracked onto paved roadways from unpaved areas

### 10 BACT for Concentrate Pile Material Handling Operations

Insignificant levels of PM emissions will be generated by the concentrate pile material handling operations (IES23 – CL-1, IES31 – CL-2). A search of the RBLC resulted in two types of BACT determinations for similar processes:

1. Enclosure, capture and control by a control device
2. Development, maintenance, and implementation of a site-specific fugitive dust control plan

Based on the PTE of the equipment (ranging from 0.004 tpy to 0.02 tpy, each), capture and control by a baghouse is not expected to be economically feasible for any of the operations.

Carolina Lithium proposes BACT for the material handling operations to be Best Practical Methods, corresponding to the following:

- Watering, as needed
- Minimization of the activity during dry, high wind conditions
- Development and implementation of a site-specific dust control plan
- Each conveyor transfer point will include a hood over the head roller and enclosed chutes and skirting from the chute to the conveyor belt

## 11 BACT Evaluation of Boilers

Three boilers will be installed at each of the lithium hydroxide plants:

Carolina Lithium 1 (CL-1)

- Boiler No. 1 (62.4 MMBtu/hr) – ES35
- Boiler No. 2 (62.4 MMBtu/hr) – ES36
- Boiler No. 3 (61.9 MMBtu/hr) – ES37

Carolina Lithium 2 (CL-2)

- Boiler No. 1 (62.4 MMBtu/hr) – ES62
- Boiler No. 2 (62.4 MMBtu/hr) – ES63

- Boiler No. 3 (61.9 MMBtu/hr) – ES64

BACT determinations for these types of activities were identified through searches of EPA's RACT/BACT/LAER Clearinghouse (RBLC) conducted for the following category:

- 13.310 – Gaseous Fuel & Gaseous Fuel Mixtures (<100 million BTU/H), Commercial, Institutional-Size Boilers/Furnaces (<100 million BTU/H)

The results were reduced to evaluating boilers and heaters burning only natural gas and with a heat input <50 MMBtu/hr < 75 MMBtu/hr to better manage the results.

11.1 CO BACT for Boilers

The add-on CO control option of catalytic oxidation discussed previously is technically feasible and one of the RBLC entries for boilers determined that BACT for CO was catalytic oxidation. A cost analysis was performed as described below.

The Fifth Edition Chemical Engineer's Handbook (Perry and Chilton) presents a methodology, called the six-tenths factor, for scaling capital costing information from previous studies, the form of which is:

$C_n = r^{0.6} * C$, where

$C_n$ is the new plant cost
r is the ratio of the new to previous capacity
C is the previous plant cost

Agrium KNO (Agrium) recently prepared a BACT analysis to evaluate the cost effectiveness of oxidation catalyst to control CO emissions from a large natural gas fired boiler in the State of Alaska: (https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwif9uuazKj5AhVChIkEHdqZBE4QFnoECAsQAQ&url=https%3A%2F%2Fdec.alaska.gov%2Fmedia%2F21907%2Fcat-ox-cost-analyses-8-9-19.xlsx&usg=AOvVaw0PJOEE6eeg0qiH_Dcmcika.

The catalytic oxidizer for that boiler, with a heat input of 243 MMBtu/hr, had an equipment cost plus auxiliaries cost (C) of $2,277,900 in 2019 dollars. The value of r was calculated as the ratio of heat inputs of the largest proposed boiler (i.e., 62.4 MMBtu/hr) and the Agrium boiler (243 MMBtu/hr). The detailed cost analysis, assuming the same 99% control used in the Agrium analysis, is presented in Attachment 2, and summarized in Table 5. As a note, the economic evaluation does not account for the cost of periodic replacement of the catalyst, or any additional fans needed to overcome the pressure drop added by the catalytic oxidation system.

The fundamental obstacle to using catalytic oxidation to control CO emissions from the boilers is the overall economics in comparison to the amount of emission reduction. Further, this cost analysis underestimates the cost effectiveness as noted above. As noted above only one RBLC entry determined catalytic oxidation to be BACT for a boiler, the rest of the numerous RBLC entries for similar size boilers determined BACT for CO as Good Combustion Practices.

**Table 5 – Summary of Top-Down BACT for CO Emissions from the Boilers**

| Control Alternative | Emission Level (tpy) | Emission Reduction (tpy) | Annualized Costs ($/yr) | Cost Effectiveness ($/ton) |
|---|---|---|---|---|
| Catalytic Oxidation | 0.2 | 22.3 | 291,959 | 13,105 |
| Baseline | 22.5 | - | - | - |

Carolina Lithium proposes that BACT for CO emissions from the boilers is the use of natural gas as a fuel and implementation of good combustion practices.

### 11.2 $NO_x$ BACT for Boilers

The primary form of $NO_x$ emissions control for the boilers would be through the application of combustion controls or flue gas treatment (post-combustion) technologies. Combustion-based $NO_x$ formation control processes reduce the quantity of $NO_x$ formed during the combustion process. Post-combustion technologies reduce the $NO_x$ emissions in the flue gas stream after the $NO_x$ has been formed because of the combustion process. These methods may be used alone or in combination to achieve the various degrees of $NO_x$ emissions required.

#### *11.2.1 Identification of $NO_x$ Control Technologies*

Both SNCR and SCR are technically feasible post-combustion options to control $NO_x$ emissions from the boilers. In addition, combustion controls such as ultra-low NOx burners (ULNB) and LNB (baseline emissions) are technically feasible.

#### *11.2.2 $NO_x$ Control Technology Summary*

Table 6 summarizes the $NO_x$ control technologies and indicates which technologies have been chosen as technically feasible options for the proposed spodumene calciners.

**Table 6 – $NO_x$ Control Technology Summary**

| Identified Control Technology | Available and Demonstrated Effective | In Service on Similar Units | Technically Feasible for Calciners |
|---|---|---|---|
| SCR | Yes | Yes | Yes |
| SNCR | Yes | No | Yes |
| UNLB | Yes | Yes | Yes |
| LNB (Baseline) | Yes | Yes | Yes |

#### *11.2.3 Top-Down Ranking*

The $NO_x$ control technologies that are considered technically feasible for implementation on the proposed boilers have been ranked from most to least effective in terms of emission reduction potential. Table 7 summarizes the control technology ranking.

**Table 7 – Top-Down Ranking of $NO_x$ Control Technologies**

| Identified Control Technology | Percent $NO_x$ Reduction |
|---|---|
| SCR | 80 |
| SNCR | 50 |
| UNLB | 42 |
| LNB (Baseline) | 0 |

*11.2.4 Control Technology Evaluation*

The following sections present detailed evaluations of the feasible $NO_x$ control technologies. Energy, environmental and economic impacts are considered.

SCR

*Energy*: Direct energy penalties associated with the operation of a SCR system are mainly associated with electricity consumption required to operate the SCR system. The amount of electricity consumed is related to the concentration of $NO_x$ in the exhaust stream to be controlled.

*Environmental*: Detrimental environmental effects resulting from the use of a SCR system include the requirement to store either aqueous ammonia or urea on site and a small amount of secondary air pollutant emissions because of power generation to meet the SCR power consumption demand.

*Economic*: Table 8 presents the costs associated with the installation of a SCR to achieve a $NO_x$ removal efficiency of 80%. Capital and operations and maintenance (O&M) costs were developed using generic EPA costing information obtained from EPA's Air Pollution Control Technology Fact Sheet (EPA-452/F-03-032, accessed at https://www.epa.gov/catc/clean-air-technology-center-products#cost on August 3, 2022). The lowest capital cost of $4,000/MMBtu and the O&M cost of $450/MMBtu were used, escalated from 1999 dollars to 2022 dollars using the ENR Construction Cost Index (CCI) values for those years that were obtained from the USDA (accessed at https://www.nrcs.usda.gov/wps/PA_NRCSConsumption/download?cid=STELPRDB1264995&ext=xlsx on August 3, 2022). See Attachment 3 for the detailed cost calculation evaluation.

SNCR

*Energy*: Direct energy penalties associated with the operation of a SNCR system are mainly associated with electricity consumption required to operate the SNCR system. The amount of electricity consumed is related to the concentration of $NO_x$ in the exhaust stream to be controlled.

*Environmental*: Detrimental environmental effects resulting from the use of a SNCR system include the requirement to store either aqueous ammonia or urea on site and a small amount of secondary air pollutant emissions because of power generation to meet the SNCR power consumption demand.

*Economic*: Table 8 presents the costs associated with the installation of a SNCR to achieve a $NO_x$ removal efficiency of 50%. Capital and operations and maintenance (O&M) costs were developed using generic EPA costing information obtained from EPA's Air Pollution Control Technology Fact Sheet (EPA-

452/F-03-031, accessed at https://www.epa.gov/catc/clean-air-technology-center-products#cost on August 3, 2022). The lowest capital cost of $900/MMBtu and the lowest O&M cost of $100/MMBtu were used, escalated from 1999 dollars to 2022 dollars using the ENR Construction Cost Index (CCI) values for those years that were obtained from the USDA (accessed at https://www.nrcs.usda.gov/wps/PA_NRCSConsumption/download?cid=STELPRDB1264995&ext=xlsx on August 3, 2022). See Attachment 3 for the detailed cost calculation evaluation.

UNLB

*Economic*: Table 8 presents the costs associated with the installation of UNLB to achieve a $NO_x$ removal efficiency of 42% (reduction needed to match lowest RBLC entries for UNLB). Capital and operations and maintenance (O&M) costs were developed using costing information for a BACT analysis performed for an 80 MMBtu/hr boiler at the Salem Harbor Redevelopment Project (accessed at https://yosemite.epa.gov/oa/eab_web_docket.nsf/Attachments%20By%20ParentFilingId/21BCD3B0D3C7ECD685257CB70053AECC/$FILE/EXHIBIT%2022B%20-%20Attachment%201_Dec11_2013.pdf on August 3, 2022). The capital cost differential between LNB and UNLB of $100,000 was escalated from 2013 dollars to 2022 dollars using the ENR Construction Cost Index (CCI) values for those years that were obtained from the USDA (accessed at https://www.nrcs.usda.gov/wps/PA_NRCSConsumption/download?cid=STELPRDB1264995&ext=xlsx on August 3, 2022). See Attachment 3 for the detailed cost calculation evaluation.

*11.2.5 Proposed $NO_x$ BACT Selection*

Table 8 summarizes the results of the Top-Down BACT analysis for $NO_x$ emissions.

**Table 8 – Summary of Top-Down BACT for $NO_x$ Emissions from the Spodumene Calciners**

| Control Alternative | Emission Level (tpy) | Emission Reduction (tpy) | Annualized Costs ($/yr) | Cost Effectiveness ($/ton) |
|---|---|---|---|---|
| SCR | 0.80 | 3.19 | 542,448 | 37,777 |
| SNCR | 2.00 | 2.00 | 122,051 | 13,515 |
| UNLB | 2.31 | 1.68 | 28,885 | 16,043 |
| LNB (Baseline) | 3.99 | - | - | - |

The fundamental obstacle to using SCR, SNCR, or UNLB to control $NO_x$ emissions is the overall economics in comparison to the amount of emission reduction. Based on this, Carolina Lithium proposes that SCR, SNCR, and UNLB are each not an economically feasible control option for $NO_x$ emissions from the boilers.

The majority of the RBLC entries for boilers determined that BACT for $NO_x$ was LNB with an emission limit of 0.035 lb/MMBtu. The more stringent entries correspond to either SCR or UNLB equipped control, which was shown above to not be economically feasible.

Carolina Lithium proposes that BACT for NOx emissions from the boilers is the use of natural gas as a fuel and LNB to achieve an emission rate of 0.0146 lb/MMBtu.

### 11.3 PM BACT for Boilers

Each of the add-on control for PM discussed in Section 1.4.3.2 are technically feasible for use on the boilers. However, based on the low PM emissions from the boilers none are anticipated to be economically feasible. Therefore, Carolina Lithium will not consider them further.

The majority of the RBLC entries for calciners determined that BACT for PM from boilers range from 0.005 to 0.008 lb/MMBtu. A few entries have lower limits (ranging from 0.0005 to 0.0024). To maintain some compliance margin (especially given the variability of condensable PM emissions measured by the EPA test methods) Carolina Lithium proposes that BACT for PM emissions from the boiler is the use of natural gas and good combustion practices to achieve an emission rate of 0.005 lb/MMBtu.

## 12 BACT Evaluation of Cooling Towers

Insignificant levels of PM emissions will be generated by the three cell cooling tower (IES25 – CL-1, IES33 – CL-2) that will be installed at each of the lithium hydroxide plants. BACT determinations for these types of activities were identified through searches of EPA's RACT/BACT/LAER Clearinghouse (RBLC) conducted for the term "cooling".

None of the add-on control for PM discussed in Section 1.4.3.2 are technically feasible for use on cooling towers and will not be considered further. The majority of the RBLC entries for cooling towers determined that BACT for PM consists of the use of high efficiency drift eliminators with a drift loss of either 0.0005% or 0.001%.

The Fifth Edition Chemical Engineer's Handbook (Perry and Chilton) presents a methodology, called the six-tenths factor, for scaling capital costing information from previous studies, the form of which is:

$C_n = r^{0.6} * C$, where

$C_n$ is the new plant cost
r is the ratio of the new to previous capacity
C is the previous plant cost

A recent BACT analysis was performed for a project (Hyalus, Inc.) with a cooling tower in the State of Georgia for which a cost analysis was performed to evaluate the two drift loss values from an economic standpoint: (file:///C:/Users/kdunbar/OneDrive%20-%20HDR,%20Inc/Desktop/PLC%20Integrated%20Site%20PSD/PSD%20Permit%20Application/Hyalus%20BACT_psd24026-2350027bactrevision.pdf, accessed August 3, 2022).

The cooling tower for that project, with a circulation rate of 5,760 gpm, had an estimated difference in installation cost (C) for the 0.0005% drift loss option of $10,800 in 2018 dollars. The value of r was calculated as the ratio of circulation rates of the cooling tower cells (2,700 gpm) and the Hyalus cooling tower cells. The detailed cost analysis is presented in Attachment 4 and summarized in Table 9.

**Table 9 – Summary of Top-Down BACT for PM Emissions from the Cooling Towers**

| Control Alternative | Emission Level (tpy) | Emission Reduction (tpy) | Annualized Costs ($/yr) | Cost Effectiveness ($/ton) |
|---|---|---|---|---|
| 0.0005% Drift Loss | 0.06 | 0.06 | 959 | 15,987 |
| 0.001% Drift Loss (Baseline) | 0.12 | - | - | - |

The fundamental obstacle to using the 0.0005% drift loss mist eliminator to control PM emissions from the cooling towers is the overall economics in comparison to the amount of emission reduction. As noted above numerous RBLC entry determined high efficiency mist eliminators with a drift loss of 0.001% to be BACT for cooling towers.

Carolina Lithium proposes that BACT for PM emissions from the cooling towers is the use of a high efficiency mist eliminator with a drift loss of 0.001%.

## 13 BACT Evaluation of GHG Emission Sources

As noted in the introduction to this section, EPA's top-down BACT approach for GHG emissions evaluation will be used. The GHG emissions sources at the proposed facility include fugitive emissions from blasting operations, the quartz and feldspar dryers, calciners, boilers, emergency generator and fire pump diesel engines, lithium carbonate reactor, and fugitive emissions from systems carrying methane or $CO_2$-containing streams (i.e., component leaks). GHG emissions are expressed as $CO_2e$, which considers the global warming potential (GWP) of each GHG and puts it on an equivalent basis to $CO_2$.

It is not technically feasible to capture the fugitive GHGs emitted from the blasting operations, so they are not considered further in this BACT analysis.

The lithium carbonate reactors each has a PTE for $CO_2e$ of 74 tpy and each set of equipment leaks has a PTE for $CO_2e$ of 12 tpy. These sources of GHG emissions are not considered further in this BACT analysis because it is not reasonable to economically capture or control (on a $/ton removed basis) these very small emissions.

On September 11, 2014 the Massachusetts Department of Environmental Protection (MassDEP) issued a final PSD permit to Footprint Power Salem Harbor Development, LP (Footprint) for the construction of the Salem Harbor Redevelopment (SHR) Project (see Federal Register, 79 FR 59489). As part of the permitting process for that facility a BACT analysis was performed for GHG emissions from a variety of combustion sources, the main ones of which were two combustion turbines, each with $CO_2$ emissions 1,122,920 tpy, significantly more than Carlina Lithium's total $CO_2$ emissions of 300,194 tpy. In the Fact Sheet associated with that PSD permit MassDEP made the following statement:

> *The most stringent control technology for control of GHG from a combustion turbine combined cycle unit is by means of carbon capture and storage (CCS). Footprint evaluated the feasibility of CCS based on material published by EPA. CCS is composed of three main components. The first component is the capture or removal of carbon (i.e., $CO_2$) from the exhaust gas. The second component is transport of the captured $CO_2$ to a suitable disposal site, and the third component is the actual disposal of $CO_2$, normally deep underground in geological formations. Footprint pointed out that there is no nearby existing $CO_2$ pipeline infrastructure (see Figure 4-1, December 11, 2013 Applicant submittal); the nearest $CO_2$ pipelines to Massachusetts are in northern Michigan and southern Mississippi. Without such infrastructure, MassDEP agrees that CCS is not feasible at this site.*

The nearest existing CO2 pipeline infrastructure to the Project is the southern Mississippi pipeline. For the same reasons discussed above for Footprint, Carolina Lithium proposes that CCS is not technically feasible. Consistent with other BACT determinations, Carolina Lithium proposes the following as BACT for the listed emission units:

- Dryers, calciners and boilers – use of natural gas as a fuel and good combustion practices
- Emergency generator and fire pump diesel engines – Minimization of use and good combustion practices

# Attachment 1

## Calciner $NO_X$ Cost Evaluation

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Spodumene Calciners - $NO_x$ Control Cost Evaluation**
**Selective Catalytic Reduction (SCR)**

**Rated Heat Input** 75.05 MMBtu/hr

**Capital Cost Summary**

| **Description of Cost** | **Cost** | **Remarks** |
|---|---|---|
| *Direct Equipment Costs* | | |
| SCR (Reactor, catalyst, associated equipment) | $2,260,300 | Equipment Vendor |
| Instrumentation | $226,030 | 10% of equipment cost - CCM [1], Section 3, Chapter 2, Table 2.10 |
| Sales Tax and Freight | $180,824 | 8% of equipment cost - CCM, Section 3, Chapter 2, Table 2.10 |
| **Purchased Equipment Cost (PEC)** | $2,667,154 | PEC |
| *Direct Installation Costs* | | |
| Foundations and Supports | $213,372 | 8% of PEC - CCM, Section 3, Chapter 2, Table 2.10 |
| Handling and Erection | $373,402 | 14% of PEC - CCM, Section 3, Chapter 2, Table 2.10 |
| Electrical | $106,686 | 4% of PEC - CCM, Section 3, Chapter 2, Table 2.10 |
| Piping | $53,343 | 2% of PEC - CCM, Section 3, Chapter 2, Table 2.10 |
| Insulation for Ductwork | $26,672 | 1% of PEC - CCM, Section 3, Chapter 2, Table 2.10 |
| Painting | $26,672 | 1% of PEC - CCM, Section 3, Chapter 2, Table 2.10 |
| **Total Direct Investment (TDI)** | **$3,467,300** | |
| *Indirect Capital Costs* | | |
| Engineering | $266,715 | 10% of PEC - CCM, Section 3, Chapter 2, Table 2.10 |
| Construction and Field Expense | $133,358 | 5% of PEC - CCM, Section 3, Chapter 2, Table 2.10 |
| Contractor Fees | $266,715 | 10% of PEC - CCM, Section 3, Chapter 2, Table 2.10 |
| Start-up Assistance & Performance Test | $53,343 | 2% of PEC - CCM, Section 3, Chapter 2, Table 2.10 |
| Contingency | $26,672 | 1% of PEC - CCM, Section 3, Chapter 2, Table 2.10 |
| **Total Indirect Investment (TII)** | **$746,803** | |
| **Total Capital Investment (TCI)** | **$4,214,103** | **TDI + TII = TCI** |

**Annual Cost**

| **Description of Cost** | **Cost** | **Remarks** |
|---|---|---|
| *Direct Annual Costs* | | |
| Maintenance Labor and Material Cost | $63,212 | See Table 1 of BACT Analysis |
| Ammonia Cost | $39,446 | $0.474/lb anhydrous ammonia, based on similar project price of $180 per ton for 19% ammonia. Vendor indicated usage of anhydrous ammonia is 9.5 lb/hr |
| Annual Catalyst Replacement Cost | $24,055 | Calculated per CCM, Section 4, Chapter 2, Equation 2.67 and 80% reduction |
| *Indirect Annual Costs* | | |
| General and Administrative Charges | $84,282 | 2% of TCI - CCM, Section 3, Chapter 2, Table 2.10 |
| Property Taxes | $42,141 | 1% of TCI - CCM, Section 3, Chapter 2, Table 2.10 |
| Insurance | $42,141 | 1% of TCI - CCM, Section 3, Chapter 2, Table 2.10 |
| Capital Recovery | $462,686 | Capital Cost CRF times TCI [2] |
| **Total Annual Cost** | **$757,963** | |

[1] United States Environmental Protection Agency, Air Pollution Control Cost Manual (CCM), accessed at https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution in July 2022.

[2] Capital Recovery Factor calculated using the following formula (CCM, Section 4, Chapter 2, Equation 2.71):

$$CRF = \frac{i\,(1+i)^n}{((1+i)^n\ -1)}$$

| Item | Interest | Years | CRF |
|---|---|---|---|
| Capital Cost | 7% | 15 | 0.1098 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Spodumene Calciners - $NO_x$ Control Cost Evaluation**
**Baghouse for SCR**

**Capital Cost Summary**

| Description of Cost | Cost | Remarks |
|---|---|---|
| *Direct Equipment Costs* | | |
| Baghouse, bags and auxiliary equipment | $1,150,900 | Equipment Vendor |
| Instrumentation | $115,090 | 10% of equipment cost - CCM [1], Section 6, Chapter 1, Table 1.9 |
| Sales Tax and Freight | $92,072 | 8% of equipment cost - CCM, Section 6, Chapter 1, Table 1.9 |
| **Purchased Equipment Cost (PEC)** | $1,358,062 | PEC |
| *Direct Installation Costs* | | |
| Foundations and Supports | $54,322 | 4% of PEC - CCM, Section 6, Chapter 1, Table 1.9 |
| Handling and Erection | $679,031 | 50% of PEC - CCM, Section 6, Chapter 1, Table 1.9 |
| Electrical | $108,645 | 8% of PEC - CCM, Section 6, Chapter 1, Table 1.9 |
| Piping | $13,581 | 1% of PEC - CCM, Section 6, Chapter 1, Table 1.9 |
| Insulation for Ductwork | $95,064 | 7% of PEC - CCM, Section 6, Chapter 1, Table 1.9 |
| Painting | $54,322 | 4% of PEC - CCM, Section 6, Chapter 1, Table 1.9 |
| **Total Direct Investment (TDI)** | **$2,363,028** | |
| *Indirect Capital Costs* | | |
| Engineering | $135,806 | 10% of PEC - CCM, Section 6, Chapter 1, Table 1.9 |
| Construction and Field Expense | $271,612 | 20% of PEC - CCM, Section 6, Chapter 1, Table 1.9 |
| Contractor Fees | $135,806 | 10% of PEC - CCM, Section 6, Chapter 1, Table 1.9 |
| Start-up Assistance & Performance Test | $27,161 | 2% of PEC - CCM, Section 6, Chapter 1, Table 1.9 |
| Contingency | $40,742 | 3% of PEC - CCM, Section 6, Chapter 1, Table 1.9 |
| **Total Indirect Investment (TII)** | **$611,128** | |
| **Total Capital Investment (TCI)** | **$2,974,156** | **TDI + TII = TCI** |

**Annual Cost**

| Description of Cost | Cost | Remarks |
|---|---|---|
| *Direct Annual Costs* | | |
| Maintenance Labor and Material Cost | $44,612 | See Table 1 of BACT Analysis |
| Fan Motor (88 kW) | $47,024 | Fan size from equipment vendor, electricity cost from Piedmont Lithium Carolinas |
| *Indirect Annual Costs* | | |
| Overhead | $26,767 | 60% of Maintenance Labor and Material Cost - CCM, Section 6, Chapter 1, Table 1.11 |
| General and Administrative Charges | $59,483 | 2% of TCI - CCM, Section 6, Chapter 1, Table 1.9 |
| Property Taxes | $29,742 | 1% of TCI - CCM, Section 6, Chapter 1, Table 1.9 |
| Insurance | $29,742 | 1% of TCI - CCM, Section 6, Chapter 1, Table 1.9 |
| Capital Recovery | $326,546 | Capital Cost CRF times TCI [2] |
| **Total Annual Cost** | **$563,916** | |

[1] United States Environmental Protection Agency, Air Pollution Control Cost Manual (CCM), accessed at https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution in July 2022.
[2] Capital Recovery Factor calculated using the following formula (CCM, Section 4, Chapter 2, Equation 2.71):

$$CRF = \frac{i\,(1+i)^n}{((1+i)^n - 1)}$$

| Item | Interest | Years | CRF |
|---|---|---|---|
| Capital Cost | 7% | 15 | 0.1098 |

# Attachment 2

## Boiler CO Cost Evaluation

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Boilers - CO Control Cost Evaluation**
**Catalytic Oxidation**

**Rated Heat Input** 62.4 MMBtu/hr

**Capital Cost Summary**

| Description of Cost | Cost | Remarks |
|---|---|---|
| *Direct Equipment Costs* | | |
| SCR (Reactor, catalyst, associated equipment) | $503,965 | Six-tenths ratio methodology using Agrium cost |
| Instrumentation | $50,396 | 10% of equipment cost - CCM [1], Section 3, Chapter 3, Table 2.10 |
| Sales Tax and Freight | $40,317 | 8% of equipment cost - CCM, Section 3, Chapter 2, Table 2.10 |
| **Purchased Equipment Cost (PEC)** | $594,679 | PEC |
| *Direct Installation Costs* | | |
| Foundations and Supports | $47,574 | 8% of PEC - CCM, Section 3, Chapter 2, Table 2.10 |
| Handling and Erection | $83,255 | 14% of PEC - CCM, Section 3, Chapter 2, Table 2.10 |
| Electrical | $23,787 | 4% of PEC - CCM, Section 3, Chapter 2, Table 2.10 |
| Piping | $11,894 | 2% of PEC - CCM, Section 3, Chapter 2, Table 2.10 |
| Insulation for Ductwork | $5,947 | 1% of PEC - CCM, Section 3, Chapter 2, Table 2.10 |
| Painting | $5,947 | 1% of PEC - CCM, Section 3, Chapter 2, Table 2.10 |
| **Total Direct Investment (TDI)** | **$773,082** | |
| *Indirect Capital Costs* | | |
| Engineering | $59,468 | 10% of PEC - CCM, Section 3, Chapter 2, Table 2.10 |
| Construction and Field Expense | $29,734 | 5% of PEC - CCM, Section 3, Chapter 2, Table 2.10 |
| Contractor Fees | $59,468 | 10% of PEC - CCM, Section 3, Chapter 2, Table 2.10 |
| Start-up Assistance & Performance Test | $11,894 | 2% of PEC - CCM, Section 3, Chapter 2, Table 2.10 |
| Contingency | $5,947 | 1% of PEC - CCM, Section 3, Chapter 2, Table 2.10 |
| **Total Indirect Investment (TII)** | **$166,510** | |
| **Total Capital Investment (TCI)** | **$939,592** | **TDI + TII = TCI** |

**Annual Cost**

| Description of Cost | Cost | Remarks |
|---|---|---|
| *Direct Annual Costs* | | |
| Maintenance Labor and Material Cost | $14,094 | See Table 1 of BACT Analysis |
| Fuel Cost | $137,120 | Estimated base don $8.00 per MMBtu |
| *Indirect Annual Costs* | | |
| General and Administrative Charges | $18,792 | 2% of TCI - CCM, Section 3, Chapter 2, Table 2.10 |
| Property Taxes | $9,396 | 1% of TCI - CCM, Section 3, Chapter 2, Table 2.10 |
| Insurance | $9,396 | 1% of TCI - CCM, Section 3, Chapter 2, Table 2.10 |
| Capital Recovery | $103,162 | Capital Cost CRF times TCI [2] |
| **Total Annual Cost** | **$291,959** | |

[1] United States Environmental Protection Agency, Air Pollution Control Cost Manual (CCM), accessed at https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution in July 2022.

[2] Capital Recovery Factor calculated using the following formula (CCM, Section 4, Chapter 2, Equation 2.71):

$$CRF = \frac{i\,(1+i)^n}{((1+i)^n\ -1)}$$

| Item | Interest | Years | CRF |
|---|---|---|---|
| Capital Cost | 7% | 15 | 0.1098 |

**CatOx Fuel Usage Estimates (Btu/hr)**

Boiler

| | | |
|---|---|---|
| Heat Input (MMBtu/hr) | 62.4 | Facility design |
| Volumtric flow rate (dscfm) | 9,058 | Calculated using Fd of 8710 dscf/MMBtu, 40 CFR Part 60, Appendix A-7, Table 19-2 |
| density of Air (lb/ft$^3$) | 0.075 | Calculated using https://www.omnicalculator.com/physics/air-density |
| Mass flow rate (lbs/hr) | 40,763 | |
| Tinitial (°F) | 300 | Typical boiler exhaust temperature |
| Tfinal (°F) | 500 | |
| $C_p$(btu/(lb°F)) | 0.24 | Calculated using https://www.engineeringtoolbox.com/air-specific-heat-capacity-d_705.html?vA=68&degree=F&pressure=1bar# |
| ∆H (btu/hr) | 1,956,614 | |

**Notes:**

Tinitial (°F) = Outlet gas temperature from boiler prior to catalytic oxidizer.

Tfinal (°F) = Conservatively assumed to be the lowest operating temperature for a catalytic oxidizer.

Cp(btu/(lb°F)) = Specific Heat of Air

# Attachment 3

## Boiler $NO_X$ Cost Evaluation

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Boilers - NOx Control Cost Evaluation**
**UNLB**

**Rated Heat Input** 62.4 MMBtu/hr

**Capital Cost Summary**

| **Description of Cost** | **Cost** | **Remarks** |
|---|---|---|
| *Direct Equipment Costs* | | |
| Differential Cost of UNLB Compared to LNB | $118,828 | Six-tenths ratio methodology using escalated Salem Harbor cost |
| Instrumentation | $11,883 | 10% of equipment cost - CCM [1], Section 3, Chapter 3, Table 2.10 |
| Sales Tax and Freight | $9,506 | 8% of equipment cost - CCM, Section 3, Chapter 2, Table 2.10 |
| **Purchased Equipment Cost (PEC)** | $140,217 | PEC |
| *Direct Installation Costs* | | |
| Foundations and Supports | UNLB assumed to be the same as LNB | |
| Handling and Erection | | |
| Electrical | | |
| Piping | | |
| Insulation for Ductwork | | |
| Painting | | |
| **Total Direct Investment (TDI)** | **$140,217** | |
| *Indirect Capital Costs* | | |
| Engineering | $14,022 | 10% of PEC - CCM, Section 3, Chapter 2, Table 2.10 |
| Construction and Field Expense | $7,011 | 5% of PEC - CCM, Section 3, Chapter 2, Table 2.10 |
| Contractor Fees | $14,022 | 10% of PEC - CCM, Section 3, Chapter 2, Table 2.10 |
| Start-up Assistance & Performance Test | $2,804 | 2% of PEC - CCM, Section 3, Chapter 2, Table 2.10 |
| Contingency | $1,402 | 1% of PEC - CCM, Section 3, Chapter 2, Table 2.10 |
| **Total Indirect Investment (TII)** | **$39,261** | |
| **Total Capital Investment (TCI)** | **$179,478** | **TDI + TII = TCI** |

**Annual Cost**

| **Description of Cost** | **Cost** | **Remarks** |
|---|---|---|
| *Direct Annual Costs* | | |
| Maintenance Labor and Material Cost | UNLB assumed to be the same as LNB | |
| *Indirect Annual Costs* | | |
| General and Administrative Charges | $3,590 | 2% of TCI - CCM, Section 3, Chapter 2, Table 2.10 |
| Property Taxes | $1,795 | 1% of TCI - CCM, Section 3, Chapter 2, Table 2.10 |
| Insurance | $1,795 | 1% of TCI - CCM, Section 3, Chapter 2, Table 2.10 |
| Capital Recovery | $19,706 | Capital Cost CRF times TCI [2] |
| **Total Annual Cost** | **$26,885** | |

[1] United States Environmental Protection Agency, Air Pollution Control Cost Manual (CCM), accessed at https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution in July 2022.

[2] Capital Recovery Factor calculated using the following formula (CCM, Section 4, Chapter 2, Equation 2.71):

$$CRF = \frac{i\,(1+i)^n}{((1+i)^n\; - 1)}$$

| Item | Interest | Years | CRF |
|---|---|---|---|
| Capital Cost | 7% | 15 | 0.1098 |

# Attachment 4

## Cooling Tower PM Cost Evaluation

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Cooling Towers - PM Control Cost Evaluation**
**High Efficiency Drift Eliminator**

**Circulation Rate** 2700 gpm

**Capital Cost Summary**

| | | |
|---|---|---|
| **Total Capital Investment (TCI)** | $8,737 | Six-tenths ratio methodology using escalated Hyalus, Inc. Facility cost |

**Annual Cost**

| Description of Cost | Cost | Remarks |
|---|---|---|
| Capital Recovery | $959 | Capital Cost CRF times TCI * |
| **Total Annual Cost** | **$959** | |

* Capital Recovery Factor calculated using the following formula (CCM, Section 4, Chapter 2, Equation 2.71):

$$CRF = \frac{i\,(1+i)^n}{((1+i)^n\ -1)}$$

| Item | Interest | Years | CRF |
|---|---|---|---|
| Capital Cost | 7% | 15 | 0.1098 |

# APPENDIX B

## Air Quality Impacts Analysis

# Air Quality Analysis

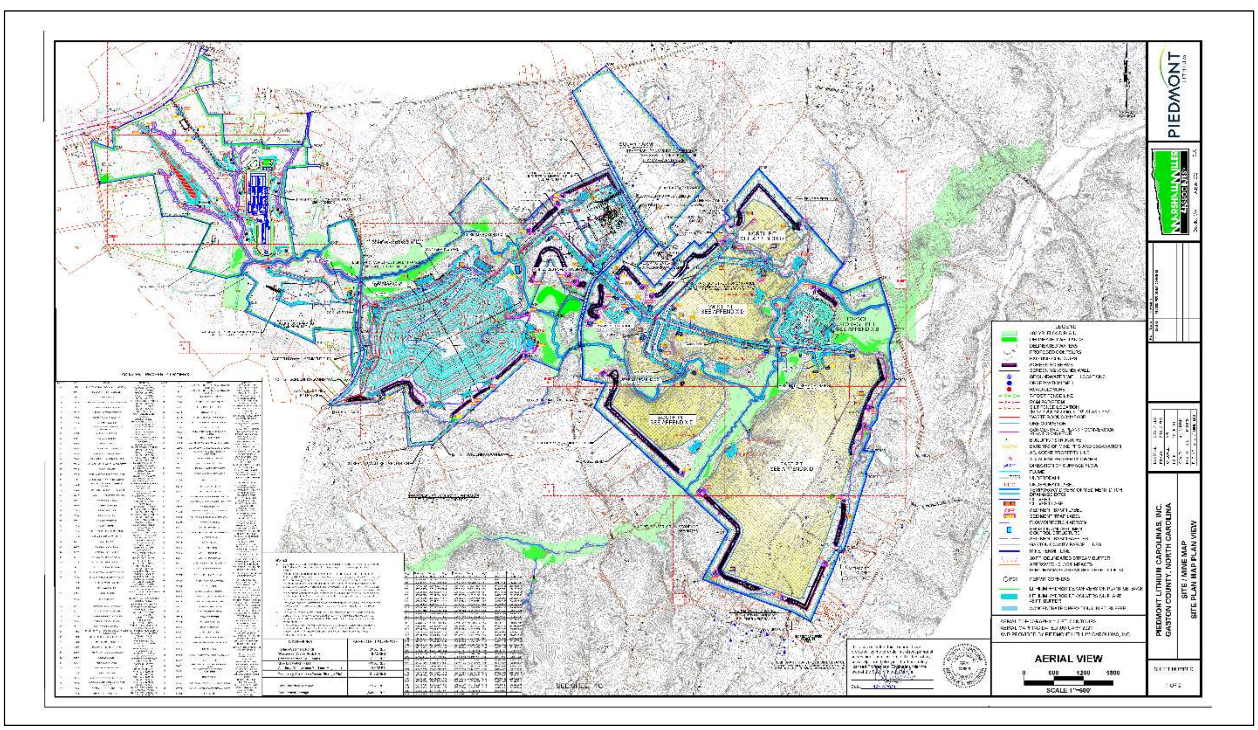
## 1 Project Description

This Air Quality Analysis report (AQA), including dispersion modeling, is part of the Prevention of Significant Deterioration (PSD) permit application for a proposed lithium mining facility (mine) and associated processing facilities (concentrator plant and chemical plant) to be constructed by Piedmont Lithium Carolinas, Inc. (Piedmont) on property within Gaston County, North Carolina.

The modeling methodology is described in the accompanying Air Quality Dispersion Modeling Protocol (Protocol), found in Attachment 1 of this Appendix. This analysis is based on preliminary engineering design and layout for the mine, concentrator plant, and chemical plants (collectively, the integrated site), and follows North Carolina Department of Environmental Quality (NC DEQ) Division of Air Quality (DAQ) Air Quality Analysis Branch (AQAB) PSD Modeling Guidelines, published July 1, 2020. The Protocol was provided to NC DEQ via email on August 22, 2022.

The integrated site spans an area roughly three miles across, and is located roughly two miles east of Cherryville, NC. A wide view of the entire site is shown in Figure 1 below. Please note that this overview map does not include the second chemical plant, which has been added to the detail design drawing in Figure 4.

**Figure 1. Integrated Site Overview**



Within the integrated site, two types of material processing will be done to recover lithium from the spodumene: concentration and chemical conversion. The current design option shows the concentrator plant at the intersection of Whitesides Road and Hephzibah Church Road (Figure 2). However, an alternate option for location of the concentrator plant will also be modeled, with the same plant processes moved west to an area south of the chemical plant, as shown in Figure 3.

The chemical conversion of the concentrated material will be done at the chemical plants. The current design option shows two parallel chemical plants designated CL-1 (east) and CL-2 (west), shown in Figure 4 below.

There will be no haul truck traffic used to transport materials from the mines to the concentrator plant or to the chemical plants. The current operational design of the integrated site uses several stages of conveyors to move material between the active pits and the processing plants, including small mobile conveyors to collect mined material, larger collection conveyors to move the material up to ground level, and large overland conveyors to move the material longer distances to the processing equipment. All of the conveyors are mobile and will change locations throughout the life of the integrated site. There will be a limited number of haul trucks that transport concentrate to the Kings Mountain facility and ship out product to other consumers, as well as deliver reagents and other materials.

Waste rock and tailings will be conveyed first to a storage area once processed, and then back into the pits as backfill when enough space has been cleared. There is a significant amount of this material as the run of mine ore contains only a small percentage of lithium.

**Figure 2. Proposed Concentrator Plant (East Location)**

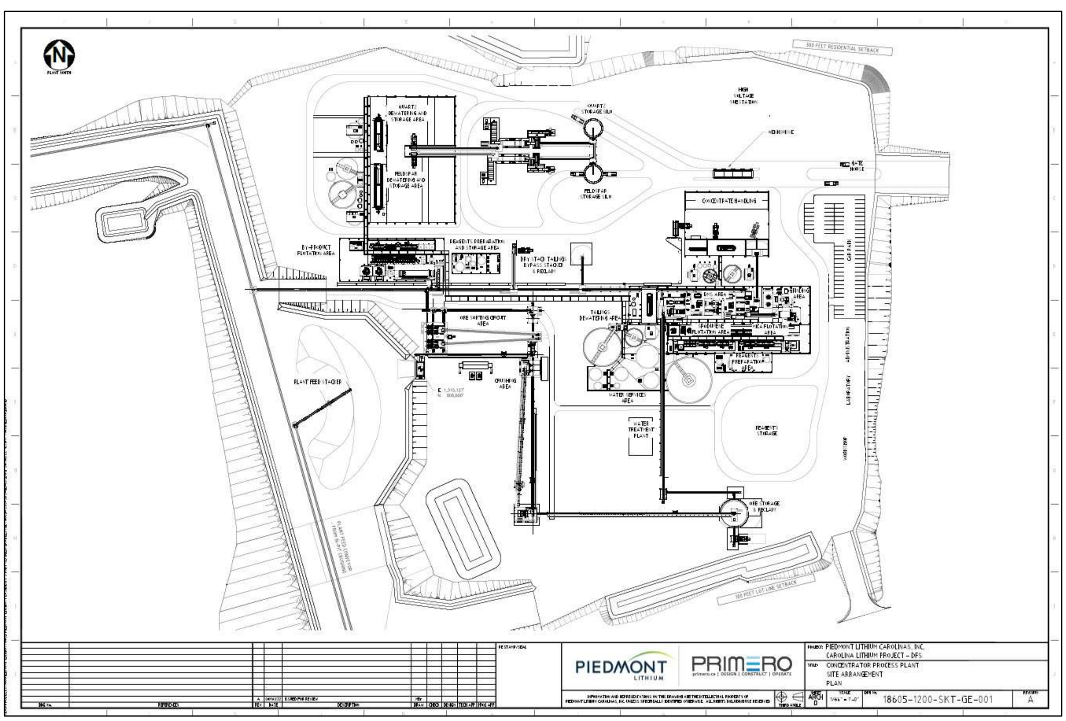


**Figure 3. Proposed Concentrator Plant (Alternate West Location)**

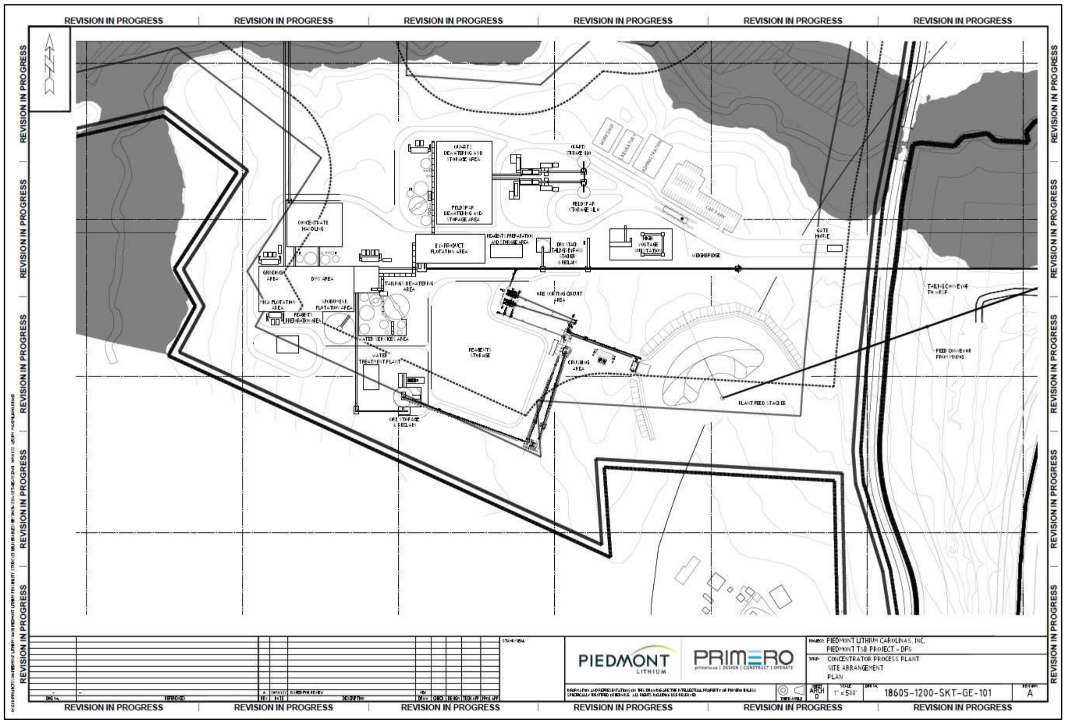
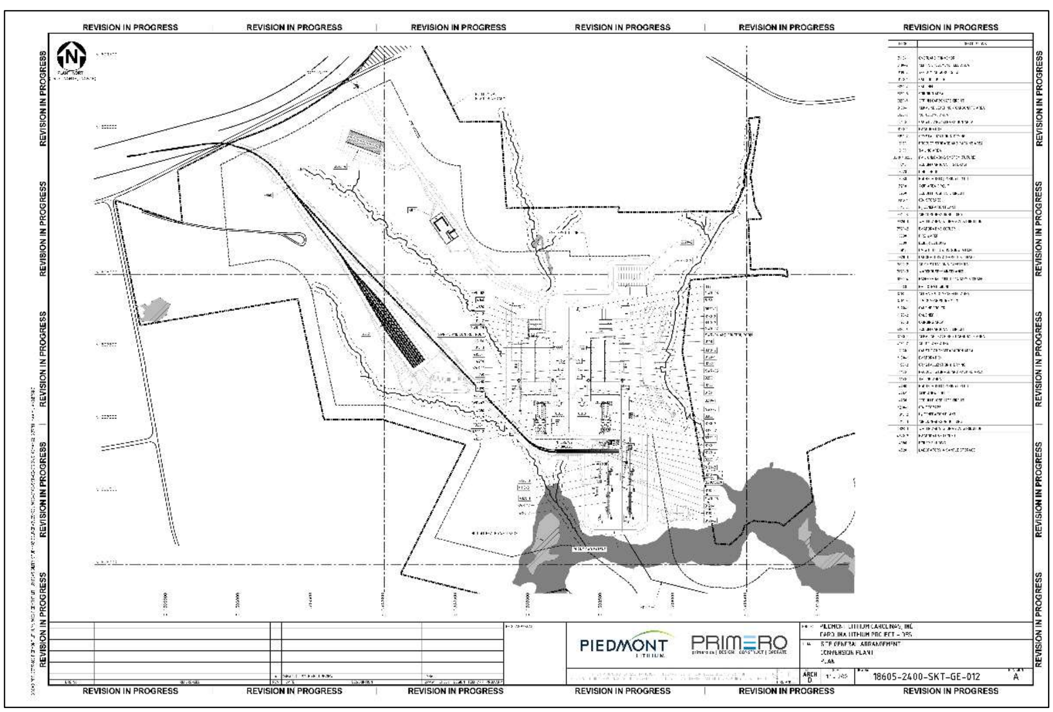



**Figure 4. Proposed Chemical Plants CL-1 and CL-2**



## 2 Applicable Ambient Air Standards

This analysis evaluates ambient air quality impacts against federal and statewide air quality standards, which are described below.

### 2.1 National Ambient Air Quality Standards (NAAQS)

This dispersion modeling analysis will compare modeled impacts to the NAAQS, shown in Table 1 below. NAAQS values are only shown for pollutants that were evaluated in this modeling analysis based on the estimated annual emissions in Table 1.

**Table 1. NAAQS**

| Pollutant | Primary | Secondary |
|---|---|---|
| **$PM_{10}$** | | |
| 24-Hour Average [a] | 150 µg/$m^3$ | 150 µg/$m^3$ |
| **$PM_{2.5}$** | | |
| 24-Hour Average [b] | 35 µg/$m^3$ | 35 µg/$m^3$ |
| Annual Average | 12 µg/$m^3$ | 15 µg/$m^3$ |
| **$NO_2$** | | |
| 1-Hour Average [c] | 100 ppb (188 µg/$m^3$) | |
| Annual Average | 0.053 ppm (100 µg/$m^3$) | 0.053 ppm (100 µg/$m^3$) |
| **CO** | | |
| 1-Hour Average [a] | 35 ppm (40,000 µg/$m^3$) | |
| 8-Hour Average [a] | 9 ppm (10,000 µg/$m^3$) | |
| **O3** | | |
| 8-Hour Average (2008 std.) [d] | 0.075 ppm | 0.075 ppm |
| 8-Hour Average (2015 std.) [d] | 0.070 ppm | 0.070 ppm |

[a] Not to be exceeded more than once per year.
[b] Attained when 98th percentile value, averaged over a 3-year period is less than or equal to standard.
[c] Attained when the 98th percentile value of daily maximum 1-hour concentrations, averaged over a 3-year period is less than or equal to standard.
[d] Attained when 4th highest daily maximum annually, averaged over a 3-year period, is less than or equal to standard.

### 2.2 State Ambient Air Quality Standards (SAAQS)

In addition to the NAAQS, there are SAAQS that are maintained by NC DEQ for various pollutants. Based on the annual emissions estimated for the integrated site shown in Table 5, there is no requirement to model sulfur dioxide ($SO_2$) or lead (Pb) against the SAAQS. Although no longer subject to a NAAQS, current NC DEQ policy is that TSP modeling for the SAAQS is required for any PSD project with a potential to emit (PTE) increase of more than 25 tons per year (TPY) and, therefore, is included.

**Table 2. SAAQS**

| Pollutant | µg/m³ | ppm |
|---|---|---|
| **Total Suspended Particulates (TSP)** [a] | | |
| 24-Hour Average [b] | 150 $\mu g/m^3$ | -- |
| Annual Average | 75 $\mu g/m^3$ | -- |
| **$SO_2$** | | |
| 3-Hour Average [b] | 1,300 $\mu g/m^3$ | 0.5 ppm |
| 24-Hour Average [b] | 365 $\mu g/m^3$ | 0.14 ppm |
| Annual Average | 80 $\mu g/m^3$ | 0.03 ppm |
| **Pb** | | |
| 3-Month Average | 0.15 $\mu g/m^3$ | -- |

[a] TSP modeling for the 24hr and annual SAAQS includes only modeled emissions impacts from the project with no background concentrations added.
[b] Not to be exceeded more than once per year.

2.3 PSD Concentration Increments

The Clean Air Act established the PSD permitting program, which sets the maximum allowable increases in concentrations (increments) above baseline concentrations for certain pollutants in areas of the country in attainment with the NAAQS. Increments are set for both Class I areas, defined as certain national parks and wilderness areas (above a certain size), and for Class II areas, defined as the remainder of the nation's attainment areas. The federal allowable PSD concentration increments for Class I and Class II areas are shown in Table 3 below.

**Table 3. PSD Allowable Concentration Increments ($\mu g/m^3$)**

| Pollutant | Class II | Class I |
|---|---|---|
| **$PM_{10}$** | | |
| 24-Hour Average | 30 | 8 |
| Annual | 17 | 4 |
| **$PM_{2.5}$** | | |
| 24-Hour Average | 9 | 2 |
| Annual Average | 4 | 1 |
| **$NO_2$** | | |
| Annual Average | 25 | 2.5 |

[a] Annual values are not to be exceeded, while all 24-hour increments allow no more than one exceedance per year.

## 2.4 North Carolina Air Toxics

The state of North Carolina regulates toxic air pollutants under Section .0711 of the Toxic Air Pollutant Procedures (15A NCAC02Q). The integrated site will emit toxic air pollutants from a limited number of combustion units including boilers, a calciner rotary kiln, a quartz dryer, and a feldspar dryer. These units are fired on natural gas and are the only sources of benzene at the integrated site (with the exception of emergency engines). Combustion-related emissions are exempt from NC DEQ's air toxics provisions, per 15A NCAC02Q .0702(a)(25) and therefore are not evaluated in this analysis. Furthermore, the emergency engines are each an affected source under 40 CFR Part 63, Subpart ZZZZ, and therefore are also exempt from NC DEQ's air toxics provisions per 15A NCAC02Q .0702(a)(27)(B).

In addition to combustion-related air toxics, hydrofluoric acid (HF) will be emitted by the quartz and feldspar dryers. These HF emissions will be evaluated in this analysis. There are also hydrochloric acid (HCl) storage and dilution tanks, whose emissions will be evaluated in this analysis. Finally, a small amount of sulfuric acid ($H_2SO_4$) emissions will be generated from sulfuric acid storage and dilution tanks. These emissions do not reach the threshold for evaluation with dispersion modeling.

## 2.5 Preconstruction Monitoring of PSD Pollutant Background Concentrations

The most representative/conservative background concentrations were provided for Gaston County by Matt Porter of DAQ and summarized in Table 4. Note these background design values were taken from the 2021 year-ending data collected at the NCORE monitoring site located at Garinger High School, 1130 Eastway Drive, Charlotte, NC (AQS Site ID 37-119-0041).

**Table 4. Background Design Values for PSD Pollutants**

| Pollutant | Averaging Period | Design Value | Units |
|---|---|---|---|
| $PM_{2.5}$ | 24-hour | 18 | µg/m$^3$ |
| $PM_{2.5}$ | Annual | 8 | µg/m$^3$ |
| $PM_{10}$ | 24-hour | 39 | µg/m$^3$ |
| $NO_2$ | 1-hour | 65.8 | µg/m$^3$ |
| $NO_2$ | Annual | 12.6 | µg/m$^3$ |
| CO | 1-hour | 1,629 | µg/m$^3$ |
| CO | 8-hour | 1,260 | µg/m$^3$ |

# 3 Facility Emission Source Characterization

The integrated site will be comprised of all emission sources from the point of material extraction, through material transfers out of the pits to the concentrator plant, material transfers to the chemical plant, material transfers of waste rock and tailings to storage or backfill within the pits, and all processing activities at the concentrator and chemical plants. This wide variety of activities will utilize several modeled source types, in addition to variable operational scenarios and alternate processing locations within the integrated site boundary.

### 3.1 Potential Emissions

Integrated site emissions have been calculated at maximum operational capacity for all units. See Table 5 for a summary of potential emissions and their related PSD Major Source Thresholds.

**Table 5. Integrated Site Emissions and PSD Thresholds**

| Pollutant | Integrated Site PTE (TPY) | PSD Major Source Threshold* (TPY) | Subject to PSD? |
|---|---|---|---|
| **PM** | 155 | 25 | **Yes** |
| **$PM_{10}$** | 93.5 | 15 | **Yes** |
| **$PM_{2.5}$** | 65.7 | 10 | **Yes** |
| **$SO_2$** | 34.9 | 40 | No |
| **$NO_x$** | 514 | 40 | **Yes** |
| **CO** | 1,328 | 100* | **Yes** |
| **VOC** | 13.9 | 40 | No |
| **$H_2SO_4$** | 0.008 | 7 | No |
| **$CO_2e$** | 300,547 | 75,000 | **Yes** |

* Since at least one PSD-regulated pollutant exceeds the major source threshold of 100 tpy (based on the integrated site being classified as a chemical manufacturing plant) the significant emission increase thresholds are listed and used as the basis of determining which pollutants trigger PSD review. In addition, greenhouse gases are a regulated pollutant for PSD purposes because the project triggers PSD for another non-GHG pollutant.

### 3.2 Source Parameters

The source parameters used in the dispersion modeling analysis, including nearby background source explicitly modeled, are presented in Attachment 1 of this Appendix. The nearby source parameters and supplemental emission rate information for Project sources of TSP, HF and HCL are included as Attachment 2 of this Appendix.

## 4 Class II Preliminary Impact Analysis

The Class II Area single-source impact analysis evaluates the PSD-regulated pollutants for which the project is above the PSD Major Source Threshold (see Table 5 above). The modeled impacts for the integrated site are compared to the PSD Significant Impact Levels (SILs) in Table 6. Impacts from the integrated site have been modeled and evaluated against the SILs using the maximum modeled impact, also known as the high-first-high (H1H) concentration, to establish the extent of significant impact for the integrated site.

**Table 6. Model Results and Significant Impact Levels (SILs)**

| Pollutant | Averaging Period | H1H Modeled Result (μg/m$^3$) | SIL (μg/m$^3$) |
|---|---|---|---|
| $PM_{10}$ | 24-hour | 27 | 5 |
| | Annual | 7.6 | 1 |
| $PM_{2.5}$ | 24-hour | 8.9 | 1.2[b] |
| | Annual | 3.0 | 0.3[b] |
| $NO_2$ | 1-hour | 79 | 10[a] |
| | Annual | 6.1 | 1 |
| CO | 1-hour | 226 | 2,000 |
| | 8-hour | 123 | 500 |

*Source: NC DEQ PSD Modeling Guidelines, Table 2 (except as noted).*

[a] Interim 1-hr $NO_2$ SIL Established by DAQ memorandum. See NC DAQ web page for memos: https://deq.nc.gov/about/divisions/air-quality/air-quality-permits/permitting-procedures-memos-guidance
[b] Taken from 40 CFR 51.165(b)(2).

4.1 SIL Analysis Summary

The Significant Impact Area (SIA) was identified during the Class II preliminary impact analysis. Concentrations above the Significant Impact Level (SIL) for each PSD-regulated pollutant and averaging period were mapped and the maximum radius of impact will be used to determine which nearby sources will be included in the cumulative impact analysis. Maximum SIL distances are provided in Table 7 below.

**Table 7. SIL Radius Distances (km)**

| $PM_{2.5}$ | $PM_{10}$ | $NO_2$ | CO |
|---|---|---|---|
| 6.3 | 3.6 | 43.4 | 0 |

The SIL for CO was not exceeded at any point in the receptor grid, therefore the SIL radius is zero and CO is not considered further. The SILs for $PM_{10}$ and $PM_{2.5}$ are 5 μg/m$^3$ and 1.2 μg/m$^3$ respectively, which results in variable SIAs despite having equivalent $PM_{10}$ and $PM_{2.5}$ emissions from most sources at the integrated site. Impact radius plots illustrating these distances are provided for $PM_{2.5}$, $PM_{10}$, and $NO_2$ in Attachment 3 of this Appendix.

### 4.2 Precursor Impacts (Secondary Formation) Analysis

Analysis of ozone impact is accomplished using the EPA's Modeled Emission Rates of Precursors (MERP) guidance. The MERP analysis also provides estimates of secondary $PM_{2.5}$, which are added to the modeled direct $PM_{2.5}$ impacts in this analysis. Based on the integrated site total emissions estimates summarized in Table 5, the resulting MERP estimates of secondary ozone and $PM_{2.5}$ were calculated and incorporated into the cumulative impact analysis.

## 5 Class II Cumulative Impact Analysis

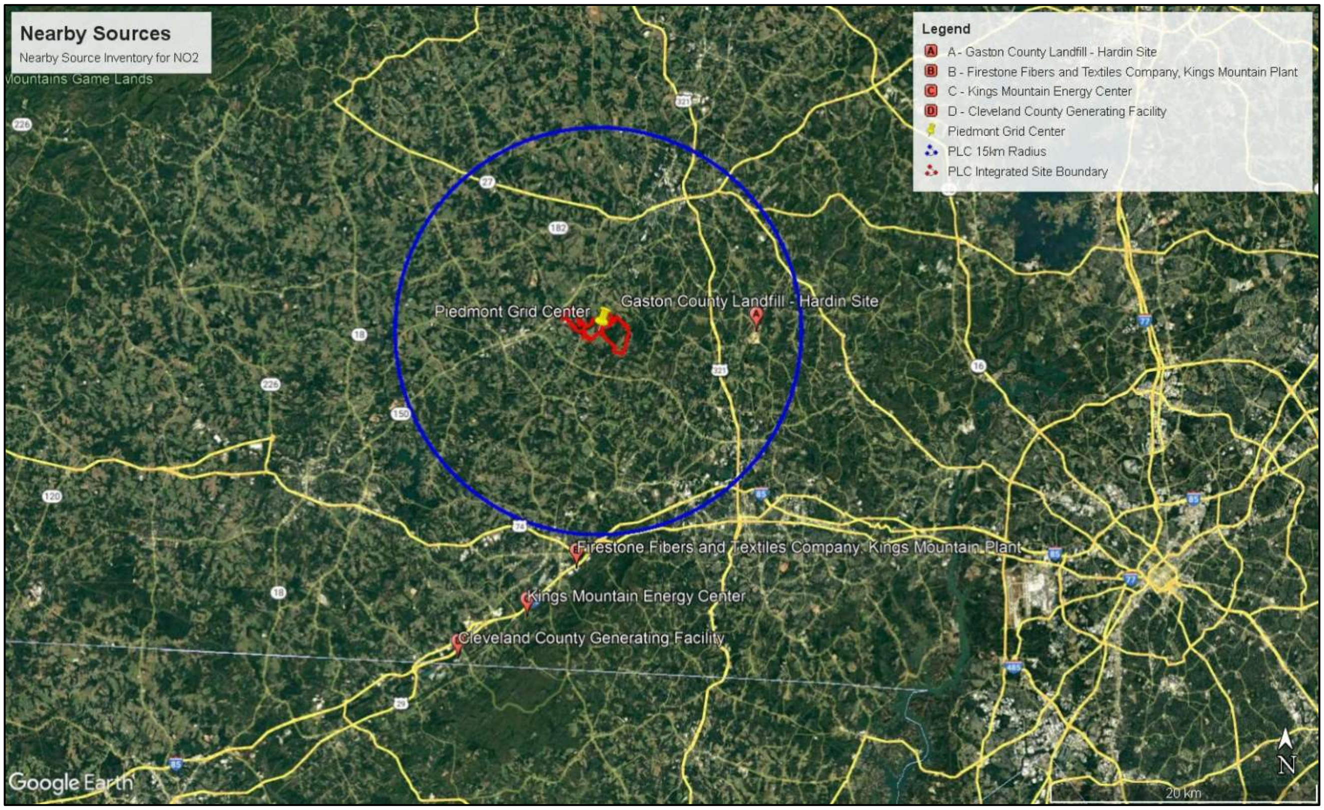
The Class II Area NAAQS cumulative impact analysis was conducted including all relevant nearby sources identified, based on the results of the SIA preliminary analysis.

### 5.1 Nearby Source Emission Inventory

Preliminary nearby source emission information was provided for this analysis by DAQ for permitted facilities within 50 kilometers of the integrated site. Because the 50 kilometer radius surrounding the integrated site extends into South Carolina, additional nearby source emissions information was obtained from SC DHEC for Cherokee and York counties in South Carolina. Facilities within this preliminary inventory were screened for inclusion in the cumulative impact analysis initially based on a "20D screening" method, which evaluates the emissions of a facility and weights them against their spatial distance to the integrated site to remove any sites that would not be expected to contribute materially to any concentrations within the significant impact area. This method compares annual potential emissions (PTE) in tons per year (Q) of the relevant pollutant to a calculated distance 20 times larger than the true distance between the facilities (20D) and allows for the exclusion of any source where $Q < 20D$. For example, if a nearby source of emissions is 10 km from the facility being permitted, the nearby source would be included in the modeling if its PTE for the relevant pollutant were at least 20*10 km or 200 TPY.

Appendix D of the DAQ PSD Modeling Guidelines states that for 1-hour $NO_2$ analyses, the nearby source inventory screening may exclude sources beyond 25 km from the project location or beyond the SIL, whichever is less. Given that the SIL radius established for the 1-hour $NO_2$ impacts from the integrated site is greater than 25 km, this 25 km cutoff was applied to the nearby source inventory. However, nearly 50 unique facilities still remain within a 25 km radius of the integrated site. The inventory was further refined to remove facilities that do not contribute more than "2D" in emissions annually, using the same principles as the $Q < 20D$ methodology but adjusted to twice the distance to the integrated site, rather than 20 times the distance. As shown in Figure 5 there were four sources remaining that contribute annual emissions (tons) more than twice the distance (km) between themselves and the integrated site and that will be included in the cumulative 1-hour $NO_2$ modeling: Gaston County Landfill (GCL), Firestone Fibers and Textiles (FKM), Kings Mountain Energy (KME), and Cleveland County Generating (CCG).

**Figure 5. Nearby Sources for $NO_2$ NAAQS Analysis**




5.2 NAAQS Analysis

The cumulative impact analysis includes emissions from the integrated site, as well as the relevant nearby sources identified through the nearby source screening procedure. Secondary formation of $PM_{2.5}$ and ozone cannot be directly calculated or modeled in AERMOD and were calculated separately using the EPA's MERPs methodology. This calculation is provided in Attachment 4 of this Appendix.

Table 8 below provides a summary of the maximum modeled impacts (including background) for comparison against the NAAQS for all criteria pollutants that were identified for analysis because of modeled impacts above the SIL.

**Table 8. Maximum Modeled Impacts (including background) vs NAAQS**

| Pollutant | Averaging Period | Rank | Concentration ($\mu g/m^3$) | | | | |
|---|---|---|---|---|---|---|---|
| | | | Modeled | MERP | Background | Total | NAAQS |
| $NO_2$ | 1-Hour | H8H [a] | 96.2 [e] | N/A | 65.8 | 162 | 188 |
| $NO_2$ | Annual | Max. [b] | 21.2 | N/A | 12.6 | 33.8 | 100 |
| $PM_{2.5}$ | 24-Hour | H8H [c] | 7.2 | 0.08 | 18 | 25.3 | 35 |
| $PM_{2.5}$ | Annual | Max. 5-yr.[d] Avg. | 2.9 | 0.005 | 8 | 10.9 | 12 |
| $PM_{10}$ | 24-Hour | H6H [f] | 23.6 | N/A | 39 | 62.6 | 150 |

[a] The highest eighth highest (H8H) one-hour $NO_2$ concentration is a three-year (given three years of meteorology) average of the daily maximum one-hour concentrations (i.e., the highest of the eighth highest daily maximum one-hour concentrations among all receptors).
[b] Rank of "Max." refers to selecting the maximum value in any year of meteorology.
[c] The H8H 24-hour $PM_{2.5}$ concentration is based on a five-year average of the annual eighth highest (i.e., 98th percentile) 24-hour values. The highest eighth high value among all receptors is reported here.
[d] The annual modeled $PM_{2.5}$ concentration reported represents the highest (at any receptor) annual value when averaged across the three years of meteorology.
[e] Concentration at second highest receptor, since the highest receptor was adjacent to GCL property, and GCL was the primary contributor to that highest value (see following discussion).
[f] Highest sixth high concentration over the five years of meteorology.

### *5.2.1 Results Discussion – $NO_2$*

There is one receptor in particular, which appears to be adjacent to the property of Gaston County Landfill (GCL), that presents an outlier for the analysis. The modeled impact at this receptor is driven almost entirely by GCL. In the SIL analysis, the integrated site modeled impacts (on a H1H basis for the 1-hour averaging period) did not exceed the SIL of 10 $\mu g/m^3$ for this receptor for any episode.

Similarly for annual $NO_2$, this particular receptor was an outlier for the analysis. The annual $NO_2$ SIL impact radius does not reach the receptor at GLC and was included in the modeling only to provide consistency with the 1-hour $NO_2$ NAAQS receptor grid. The integrated site has a negligible impact (well-below the SIL of 1.0 $\mu g/m^3$) at this receptor for annual $NO_2$.

To confirm Piedmont Lithium's insignificant impact at this receptor, further analysis was performed for this receptor using AERMOD's MAXDCONT output calculation to show impacts from all sources paired in time and space. The individual source results from the $8^{TH}$ rank of the maximum daily 1-hour values averaged over the five years of meteorology is presented in Table 9 below.

**Table 9. $NO_2$ 1-Hour MAXDCONT Results for Receptor of Interest**

| UTM Coordinates | | Source Contributions ($\mu g/m^3$) | | | | | |
|---|---|---|---|---|---|---|---|
| Easting (m) | Northing (m) | PLC Stacks | PLC Alternate Stacks | GCL | FKM | KME | CCG |
| 484,559 | 3,916,208 | 0.005 | 0.007 | 392.7 | 0.004 | 0.000 | 0.000 |

Therefore, this receptor (X = 484559.00, Y = 3916208.00) is not reported in Table 8. Maximum Modeled Impacts (including background) vs NAAQS and is proposed for exclusion from this analysis.

### *5.2.2 Results Discussion – $PM_{10}$*

There were no identified nearby sources for $PM_{10}$ after application of the nearby source inventory screening procedure. There are no significant sources of $PM_{10}$ within the nearest 15 km of the integrated site. Therefore, the integrated site modeled impacts have been added with background concentrations to show the cumulative impact for comparison to the NAAQS.

### *5.2.3 Results Discussion – $PM_{2.5}$*

There were no identified nearby sources for $PM_{2.5}$ after application of the nearby source inventory screening procedure. There are no significant sources of $PM_{2.5}$ within the nearest 15 km of the integrated site. The secondary formation of $PM_{2.5}$ was added along with background concentration to show the cumulative impact of the integrated site for comparison to the NAAQS.

## 6 PSD Class II Increment Analysis

For the PSD Increment Analysis, the following pollutants under evaluation have minor source baseline dates in Gaston County. The baselines for both $PM_{10}$ and $NO_2$ were set in 1989 and were triggered by the Gaston County MSW facility. The baseline date has also been triggered for $SO_2$, however $SO_2$ is not a pollutant of interest for this PSD analysis. The information in Table 10 below was provided by DAQ.

**Table 10. Gaston County, NC PSD Minor Source Baseline Dates**

| Pollutant | Minor Source Baseline Date | Triggered By |
|---|---|---|
| $PM_{10}$ | 05/16/1989 | Gaston County MSW Facility |
| $NO_2$ | 05/16/1989 | Gaston County MSW Facility |

Source: https://deq.nc.gov/media/26393/download?attachment

Nearby increment consumption was evaluated as part of the nearby source emission inventory. The results of the increment modeling are summarized in Table 11.

For $PM_{10}$, the SIL radius of the integrated site was limited to 3.6 km from the center of the property on a 24-hour basis. This SIL radius was selected to represent both the 24-hour and annual averaging periods as it was the largest of the two. There are no PSD increment consumers within this significant impact area, and none were identified within the surrounding vicinity as nearby sources using the 20D screening procedure described discussed previously. With no background increment consumers, the integrated site's maximum modeled $PM_{10}$ and $PM_{2.5}$ impacts identified in the SIL analysis represent the project's modeled increment consumption. Separate increment modeling was not performed.

For $NO_2$, only annual emissions are considered for PSD Increment analysis. The integrated site has a SIL radius of 2.8 km for $NO_2$ annual emissions. Total impacts from the integrated site and the four nearby $NO_x$ sources that were identified for the NAAQS analysis do not exceed the annual $NO_2$ increment standard of 25 μg/m$^3$ at any point for any of the five years modeled. With the exception of the one receptor that is located just east of the Gaston County Landfill – Hardin Site, the annual $NO_2$ impacts are generally less than 25% of the increment standard. Based on this information, separate increment modeling was not performed.

**Table 11. Modeled Impacts vs PSD Class II Allowable Increments**

| Pollutant | Averaging Period | Rank [a] | Increment Consumption (μg/m$^3$) | | | Allowable Increment Consumption (μg/m$^3$) |
|---|---|---|---|---|---|---|
| | | | Modeled | MERP | Total | |
| $NO_2$ | Annual | Max. Year | 21.2 | N/A | 21.2 | 25 |
| $PM_{2.5}$ | 24-Hour | H2H | 8.05 | 0.08 | 8.1 | 9 |
| $PM_{2.5}$ | Annual | Max. Year | 3.04 | 0.005 | 3.1 | 4 |
| $PM_{10}$ | 24-Hour | H2H | 24.9 | N/A | 24.9 | 30 |
| $PM_{10}$ | Annual | Max. Year | 7.6 | N/A | 7.6 | 17 |

[a] Rank of "Max. Year" refers to selecting the maximum value in any year of meteorology, according to PSD rules. Likewise, the highest second highest (H2H) concentration (i.e., the highest of the second highest concentrations among all receptors) is selected, among all years of meteorology, for the 24-hour average, given that the short-term increments may be exceeded once per year under PSD rules.
[b] Concentration at second highest receptor, since the highest receptor was adjacent to GCL property, and GCL was the primary contributor to that highest value.

## 7 SAAQS Analysis

As discussed previously, only TSP triggers a modeling demonstration for compliance with the SAAQS. The modeled results are presented in Table 12 below. There is no requirement to include background concentrations or nearby sources for the SAAQS, therefore the results shown reflect only the impact from the integrated site.

**Table 12. Modeled Impacts vs SAAQS**

| Pollutant | Averaging Time | Maximum Modeled Impact (µg/m3) | SAAQS (µg/m3) |
|---|---|---|---|
| TSP | 24-Hour | 36.3 | 150 |
| TSP | Annual | 7 | 75 |

## 8 Air Toxics Evaluation

The air toxics evaluation summarized in Attachment 5 of this Appendix demonstrates compliance with the NC DEQ air toxics requirements.

# Attachment 1

## Air Quality Dispersion Modeling Protocol

# Air Quality Dispersion Modeling Protocol

Piedmont Lithium

Carolina Lithium Integrated Site

*Gaston County, North Carolina*

August 16, 2022

**Prepared by:**

**HDR Engineering, Inc.**
**1601 Utica Ave S, Suite 600**
**St. Louis Park, MN 55416**

# Contents



# Tables

## Figures



## Appendices

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# 1 Introduction

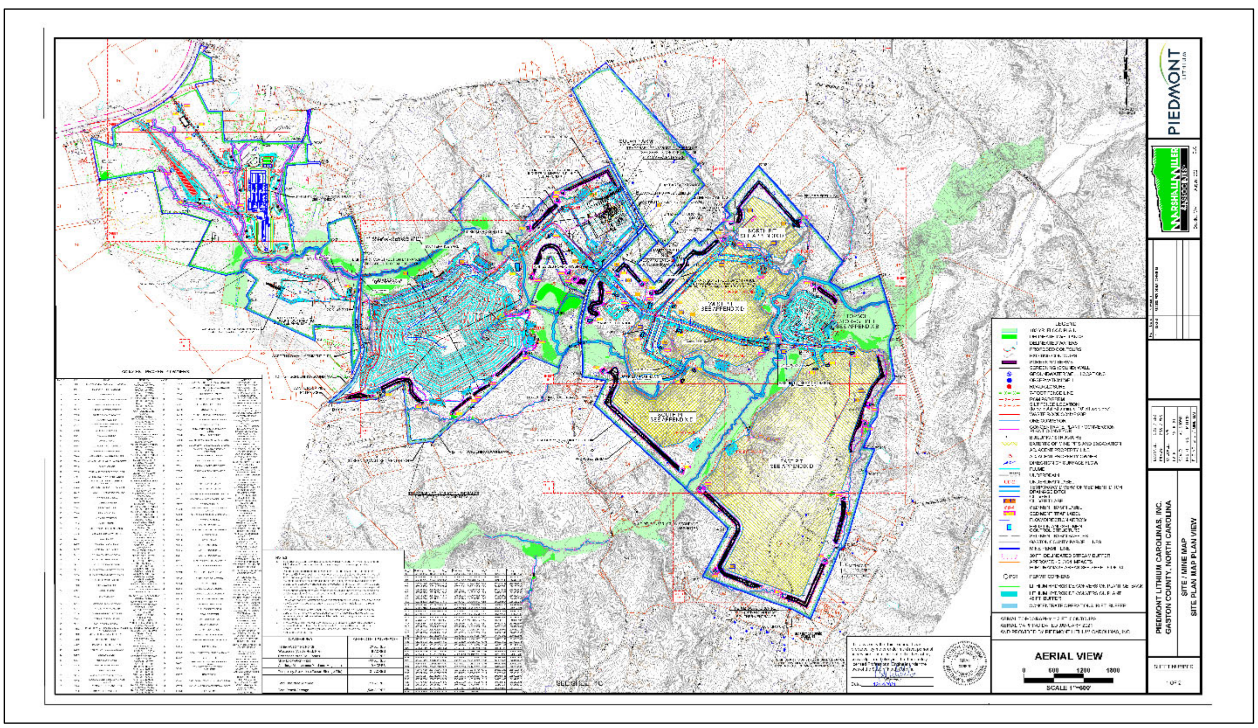
## 1.1 Project Description

The purpose of this Air Quality Dispersion Modeling Protocol (Protocol) is to describe the methodology for performing the air quality analysis, including dispersion modeling, in support of a Prevention of Significant Deterioration (PSD) permit application for a proposed lithium mining facility (mine) and associated processing facilities (concentrator plant and chemical plant) to be constructed by Piedmont Lithium Carolinas, Inc. (Piedmont) on property within Gaston County, North Carolina. The methodology will be based on preliminary engineering design and layout for the mine, concentrator plant, and chemical plants (collectively, the integrated site), and will follow North Carolina Department of Environmental Quality (NC DEQ) Division of Air Quality (DAQ) Air Quality Analysis Branch (AQAB) PSD Modeling Guidelines, published July 1, 2020.

### 1.1.1 Facility Location and Integrated Site Layout

The integrated site spans an area roughly three miles across, and is located roughly two miles east of Cherryville, NC. A wide view of the entire site is shown in Figure 1-1 below. Please note that this overview map does not include the second chemical plant, which has been added to the detail design drawing in Figure 1-4.

**Figure 1-1. Integrated Site Overview**




Within the integrated site, two types of material processing will be done to recover lithium from the spodumene: concentration and chemical conversion. The current design option shows the concentrator plant at the intersection of Whitesides Road and Hephzibah Church Road (Figure 1-2). However, an alternate option for location of the concentrator plant will also be modeled, with the same plant processes moved west to an area south of the chemical plant, as shown in Figure 1-2.

**Figure 1-2. Proposed Concentrator Plant (East Location)**

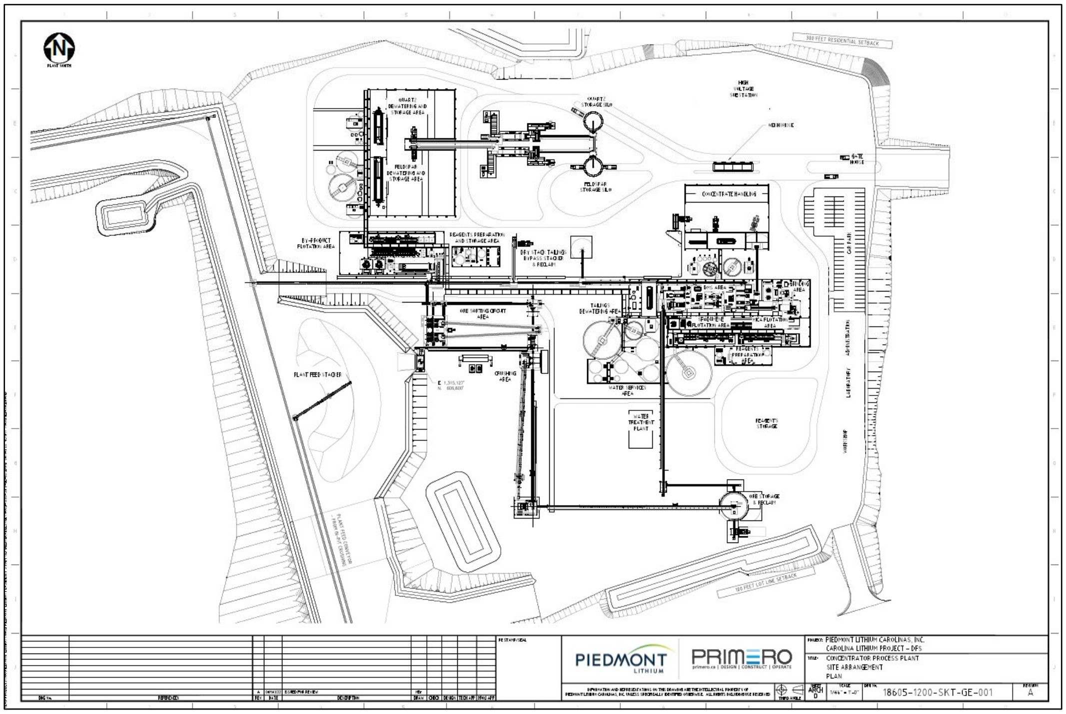
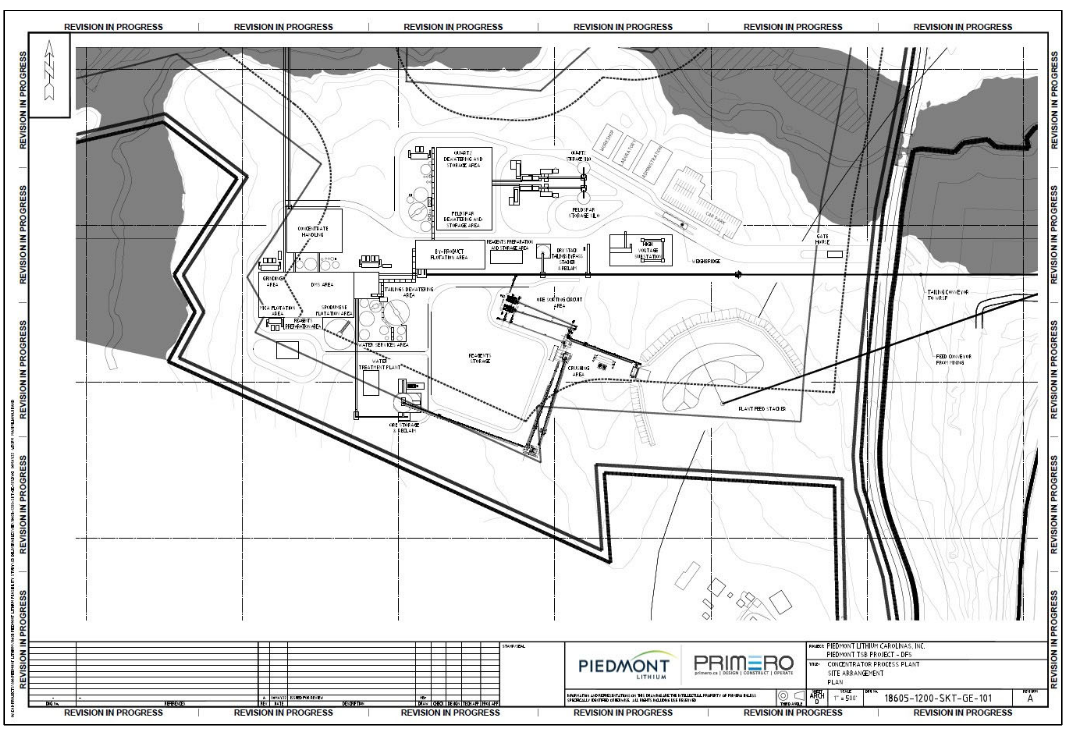
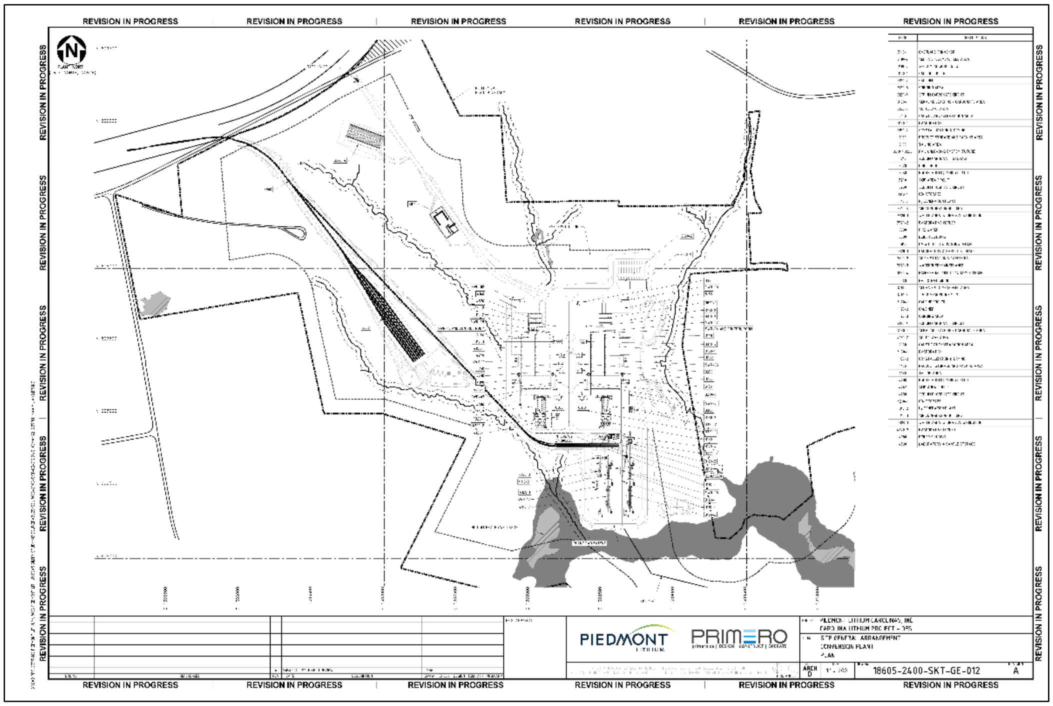



**Figure 1-3. Proposed Concentrator Plant (Alternate West Location)**



The chemical conversion of the concentrated material will be done at the chemical plants. The current design option shows two parallel chemical plants designated CL-1 (east) and CL-2 (west), shown in Figure 1-4 below.

**Figure 1-4. Proposed Chemical Plants CL-1 and CL-2**




There will be no haul truck traffic used to transport materials from the mines to the concentrator plant or to the chemical plants. The current operational design of the integrated site uses several stages of conveyors to move material between the active pits and the processing plants, including small mobile conveyors to collect mined material, larger collection conveyors to move the material up to ground level, and large overland conveyors to move the material longer distances to the processing equipment. All of the conveyors are mobile and will change locations throughout the life of the integrated site. There will be a limited number of haul trucks that transport concentrate to the Kings Mountain facility and ship out product to other consumers, as well as deliver reagents and other materials.

Waste rock and tailings will be conveyed first to a storage area once processed, and then back into the pits as backfill when enough space has been cleared. There is a significant amount of this material as the run of mine ore contains only a small percentage of lithium.

### 1.1.2 Mining Layouts

Three areas for run of mine ore extraction are planned for the integrated site: East Pit, West Pit, and South Pit. A fourth area will be used to store waste rock and tailings until it can be returned to the extraction pits as backfill.

The run of mine ore can be extracted from the current surface level, therefore production will begin with pit depths of zero (equivalent to the existing elevation). The maximum expected pit depths below ground level are listed in Table 1-1 below and will be reached over varying lengths of time.

### Table 1-1. Maximum Pit Depths and Elevations

| Pit | Bottom Elevation (MSL) | Average Top Elevation (MSL) | Estimated Max Depth |
|---|---|---|---|
| East Pit | 83 meters | 268 meters | ~600 feet |
| South Pit | 167 meters | 250 meters | ~270 feet |
| North/West Pit* | 95 meters | 250 meters | ~510 feet |

*Note: The West Pit and North Pit are expected to be combined into a single West Pit after Year 7 of mining operations, pending a mine permit review by the Army Corps of Engineers to allow mining through an unnamed tributary.

There is currently a 12-year mine pit design plan that shows the extraction planned for each area of the integrated site. The first pit to open will be South Pit, followed by East Pit and West Pit. South Pit will be active during Year 1 and Year 2 only, and therefore it will be modeled with those operational characteristics. A layout for Year 2 is shown in Figure 1-5 below.

The total number of conveyors will scale up as the pits reach maximum operations, which is forecast to be in Year 7. This Year 7 design (shown in Figure 1-6 below) includes the maximum number of conveyor points and pieces of equipment performing in-pit excavation, blasting, drilling, crushing, and material handling. Therefore, Year 7 has been selected for dispersion modeling analysis as a worst-case for operational impacts from the run of mine ore extraction, with South Pit modeled at Year 1 and 2 maximum activity levels. Pit depths were modeled at 50% of maximum depth as a worst-case for the level of mining activity in each pit.

**Figure 1-5. Mining Operations Configuration (Operational Year 2)**

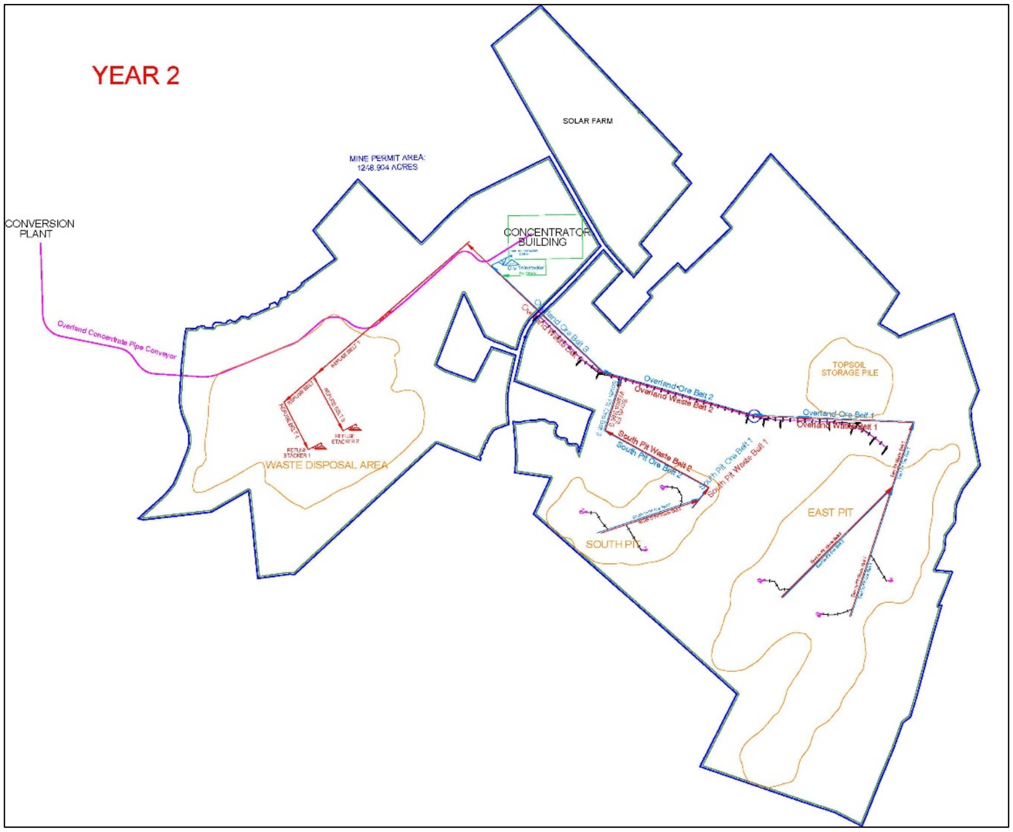
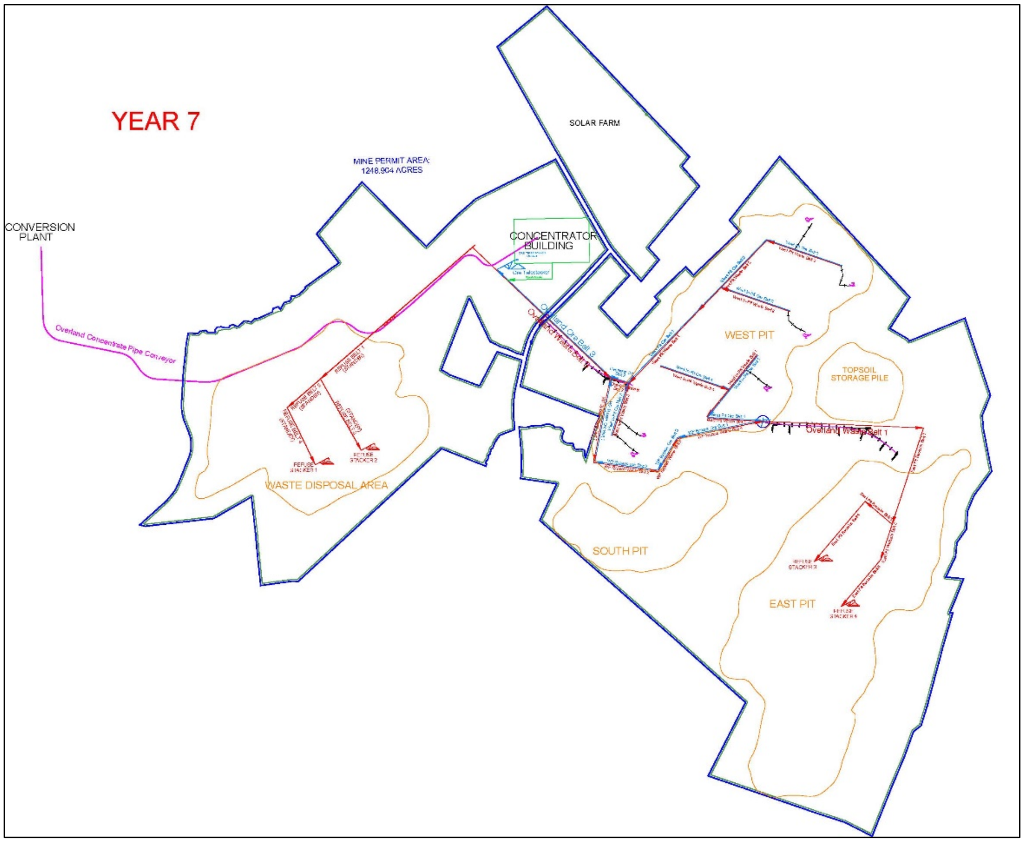


**Figure 1-6. Mining Operations Configuration (Operational Year 7)**




## 1.2 Applicable Ambient Air Standards

This analysis will evaluate ambient air quality impacts against federal and statewide air quality standards, which are described below.

### 1.2.1 National Ambient Air Quality Standards (NAAQS)

This dispersion modeling analysis will compare modeled impacts to the NAAQS, shown in Table 1-2 below. NAAQS values are only shown for pollutants that will be evaluated in this modeling analysis.

### 1.2.2 State Ambient Air Quality Standards (SAAQS)

In addition to the NAAQS, there are SAAQS that are maintained by NC DEQ for various pollutants. The pollutants and averaging periods in Table 1-3 are not considered in the PSD analysis, but will be evaluated against the SAAQS.

## Table 1-2. NAAQS

| Pollutant | Primary | Secondary |
|---|---|---|
| **$PM_{10}$** | | |
| 24-Hour Average [a] | 150 µg/m$^3$ | 150 µg/m$^3$ |
| **$PM_{2.5}$** | | |
| 24-Hour Average [b] | 35 µg/m$^3$ | 35 µg/m$^3$ |
| Annual Average | 12 µg/m$^3$ | 15 µg/m$^3$ |
| **$NO_2$** | | |
| 1-Hour Average [c] | 100 ppb (188 µg/m$^3$) | |
| Annual Average | 0.053 ppm (100 µg/m$^3$) | 0.053 ppm (100 µg/m$^3$) |
| **CO** | | |
| 1-Hour Average [a] | 35 ppm (40,000 µg/m$^3$) | |
| 8-Hour Average [a] | 9 ppm (10,000 µg/m$^3$) | |
| **O3** | | |
| 8-Hour Average (2008 std.) [d] | 0.075 ppm | 0.075 ppm |
| 8-Hour Average (2015 std.) [d] | 0.070 ppm | 0.070 ppm |

[a] Not to be exceeded more than once per year.
[b] Attained when 98th percentile value, averaged over a 3-year period is less than or equal to standard.
[c] Attained when the 98th percentile value of daily maximum 1-hour concentrations, averaged over a 3-year period is less than or equal to standard.
[d] Attained when 4th highest daily maximum annually, averaged over a 3-year period, is less than or equal to standard.

## Table 1-3. SAAQS

| Pollutant | µg/m$^3$ | ppm |
|---|---|---|
| **Total Suspended Particulates (TSP) [a]** | | |
| 24-Hour Average [b] | 150 µg/m$^3$ | -- |
| Annual Average | 75 µg/m$^3$ | -- |
| **$SO_2$** | | |
| 3-Hour Average [b] | 1,300 µg/m$^3$ | 0.5 ppm |
| 24-Hour Average [b] | 365 µg/m$^3$ | 0.14 ppm |
| Annual Average | 80 µg/m$^3$ | 0.03 ppm |
| **Pb** | | |
| 3-Month Average | 0.15 µg/m$^3$ | -- |

[a] TSP modeling for the 24hr and annual SAAQS includes only modeled emissions impacts from the project with no background concentrations added.
[b] Not to be exceeded more than once per year.

### 1.2.3 PSD Concentration Increments

The Clean Air Act established the PSD permitting program, which sets the maximum allowable increases in concentrations (increments) above baseline concentrations for certain pollutants in areas of the country in attainment with the NAAQS. Increments are set for both Class I areas, defined as certain national parks and wilderness areas (above a certain size), and for Class II areas, defined as the remainder of the nation's attainment areas. The federal allowable PSD concentration increments for Class I and Class II areas are shown in Table 1-4 below.

**Table 1-4. PSD Allowable Concentration Increments (μg/m³)**

| Pollutant | Class II | Class I |
|---|---|---|
| **$PM_{10}$** | | |
| 24-Hour Average | 30 | 8 |
| Annual | 17 | 4 |
| **$PM_{2.5}$** | | |
| 24-Hour Average | 9 | 2 |
| Annual Average | 4 | 1 |
| **$NO_2$** | | |
| Annual Average | 25 | 2.5 |
| [a] Annual values are not to be exceeded, while all 24-hour increments allow no more than one exceedance per year. | | |

### 1.2.4 North Carolina Air Toxics

The state of North Carolina regulates toxic air pollutants under Section .0711 of the Toxic Air Pollutant Procedures (15A NCAC02Q). The integrated site will emit toxic air pollutants from a limited number of combustion units including boilers, a calciner rotary kiln, a quartz dryer, and a feldspar dryer. These units are fired on natural gas and are the only sources of benzene at the integrated site (with the exception of emergency engines). Combustion-related emissions are exempt from NC DEQ's air toxics provisions, per 15A NCAC02Q .0702(a)(25) and therefore are not evaluated in this analysis. Furthermore, the emergency engines are each an affected source under 40 CFR Part 63, Subpart ZZZZ, and therefore are also exempt from NC DEQ's air toxics provisions per 15A NCAC02Q .0702(a)(27)(B).

In addition to combustion-related air toxics, hydrofluoric acid (HF) will be emitted by the quartz and feldspar dryers. These HF emissions will be evaluated in this analysis. There are also hydrochloric acid (HCl) storage and dilution tanks, whose emissions will be evaluated in this analysis. Finally, a small amount of sulfuric acid ($H_2SO_4$) emissions will be generated from sulfuric acid storage and dilution tanks. These emissions do not reach the threshold for evaluation with dispersion modeling, as shown in the air toxics evaluation in the emission calculations attached to this protocol as Appendix A.

### 1.2.5 Preconstruction Monitoring of PSD Pollutant Background Concentrations

The most representative/conservative background concentrations were provided for Gaston County by Matt Porter of DAQ. Note these background design values were taken from the 2021 year-ending data collected at the NCORE monitoring site located at Garinger High School, 1130 Eastway Drive, Charlotte, NC (AQS Site ID 37-119-0041).

**Table 1-5. Background Design Values for PSD Pollutants**

| Pollutant | Averaging Period | Design Value | Units |
|---|---|---|---|
| $PM_{2.5}$ | 24-hour | 18 | µg/m$^3$ |
| $PM_{2.5}$ | Annual | 8 | µg/m$^3$ |
| $PM_{10}$ | 24-hour | 39 | µg/m$^3$ |
| $NO_2$ | 1-hour | 65.8 | µg/m$^3$ |
| $NO_2$ | Annual | 12.6 | µg/m$^3$ |
| CO | 1-hour | 1,629 | µg/m$^3$ |
| CO | 8-hour | 1,260 | µg/m$^3$ |

# 2 Facility Emission Source Characterization

The integrated site will be comprised of all emission sources from the point of material extraction, through material transfers out of the pits to the concentrator plant, material transfers to the chemical plant, material transfers of waste rock and tailings to storage or backfill within the pits, and all processing activities at the concentrator and chemical plants. This wide variety of activities will utilize several modeled source types, in addition to variable operational scenarios and alternate processing locations within the integrated site boundary.

### 2.1.1 Modeled Source Types

There will be a number of source types for each of the processes that will be active at the integrated site:

**POINT** Point sources will be used to represent process equipment, including dryers, control equipment, pressure release vents, etc. that emit to the atmosphere through a stack. The stack parameters for these units are not yet designed, and therefore the dispersion modeling analysis will use parameters based on typical dimensions (including diameter and stack height), anticipated exhaust temperatures, preliminary design volumetric flow rates and exit velocities for equipment of similar size.

**AREA** Area sources will be utilized to characterize emissions from material storage piles. This will include the large waste rock pile that will store refuse material until it can be returned to the extraction pits as reclaimed backfill.

**VOLUME** Volume sources will be utilized to analyze emissions from material handling via the overland conveyor system that moves the extracted spodumene material to and from the pits and between each processing area. The dimensions of each volume source will be representative of the size of the conveyor drops and their heights above ground level when outside the pits. Conveyor transfers that occur within the pits will be included in the OPENPIT sources described below. There will also be haul roads to take concentrate to offsite locations, to bring in reagents and other materials, and to ship out product. These haul roads will be modeled with line volume sources that are representative of the size of the vehicles in use.

**OPENPIT** The current design of the integrated site includes three pits for material extraction. The three material extraction pits will be modeled using the OPENPIT source type in AERMOD, with dimensions and locations based on a worst-case year for maximum activity. Over the 12 years of planned pit excavation, Year 7 utilizes the most conveyor points and processing equipment for activities within the pits. Therefore, emissions for in-pit activities will be aligned with Year 7 to provide a worst-case estimate. Emissions assigned to the open pit sources will include drilling, blasting, crushing, material handling to and from the conveyor end points, and conveyor drops that occur within the pits prior to the overland conveyor transfer system.

### 2.1.2 Release Parameters

The emission sources and associated layouts have been modeled with the locations and release parameters found in Appendix B.

### 2.1.3 Potential Emissions

Integrated site emissions have been calculated at maximum operational capacity for all units. The full emission calculation workbook is attached to this modeling protocol as Appendix A. See Table 2-1 for a listing of potential emissions and their related PSD Major Source Thresholds.

**Table 2-1. Integrated Site Emissions and PSD Thresholds**

| Pollutant | Integrated Site PTE (TPY) | PSD Major Source Threshold* (TPY) | Subject to PSD? |
|---|---|---|---|
| **PM** | 155 | 25 | **Yes** |
| **$PM_{10}$** | 93.5 | 15 | **Yes** |
| **$PM_{2.5}$** | 65.7 | 10 | **Yes** |
| **$SO_2$** | 34.9 | 40 | No |
| **$NO_x$** | 514 | 40 | **Yes** |

**Table 2-1. Integrated Site Emissions and PSD Thresholds**

| Pollutant | Integrated Site PTE (TPY) | PSD Major Source Threshold* (TPY) | Subject to PSD? |
|---|---|---|---|
| **CO** | 1,328 | 100* | **Yes** |
| **VOC** | 13.9 | 40 | No |
| **$H_2SO_4$** | 0.008 | 7 | No |
| **$CO_2e$** | 300,547 | 75,000 | **Yes** |

* Since at least one PSD-regulated pollutant exceeds the major source threshold of 100 tpy (based on the integrated site being classified as a chemical manufacturing plant) the significant emission increase thresholds are listed and used as the basis of determining which pollutants trigger PSD review. In addition, greenhouse gases are a regulated pollutant for PSD purposes because the project triggers PSD for another non-GHG pollutant.

### 2.1.4 Operational Scenarios

Emissions are conservatively modeled as occurring at all hours for all sources, pollutants, and averaging periods. In reality, mining within the pits will not occur during the overnight hours. There will not be a daily restriction on hours of operation for the concentrator plant or the chemical plants.

*Startup/Shutdown Conditions*

There are no emission units with control equipment that would produce variable emissions during startup or shutdown conditions, therefore no startup/shutdown scenarios were modeled.

*Emergency Generators and Fire Pump Engine Testing*

There are also some specific emission units that will run intermittently within the integrated site, including diesel-fired emergency power generators and an emergency fire pump. These units are expected to periodically operate for routine maintenance and readiness testing and will not otherwise operate unless necessary for an emergency upset scenario. Due to the intermittent nature of these emissions, modeled impacts are not included in this demonstration.

From page 10 of the North Carolina PSD Modeling Guidance:

*In general, sources should be considered intermittent if they do no contribute significantly to the determination that a specific project will exceed a SIL, or if the source would not be expected to cause or contribute to a modeled exceedance of the NAAQS and/or Class I or Class II Area PSD Increments.*

# 3 Modeling Methodology

This section describes the modeling selections and set-up options for the dispersion analysis.

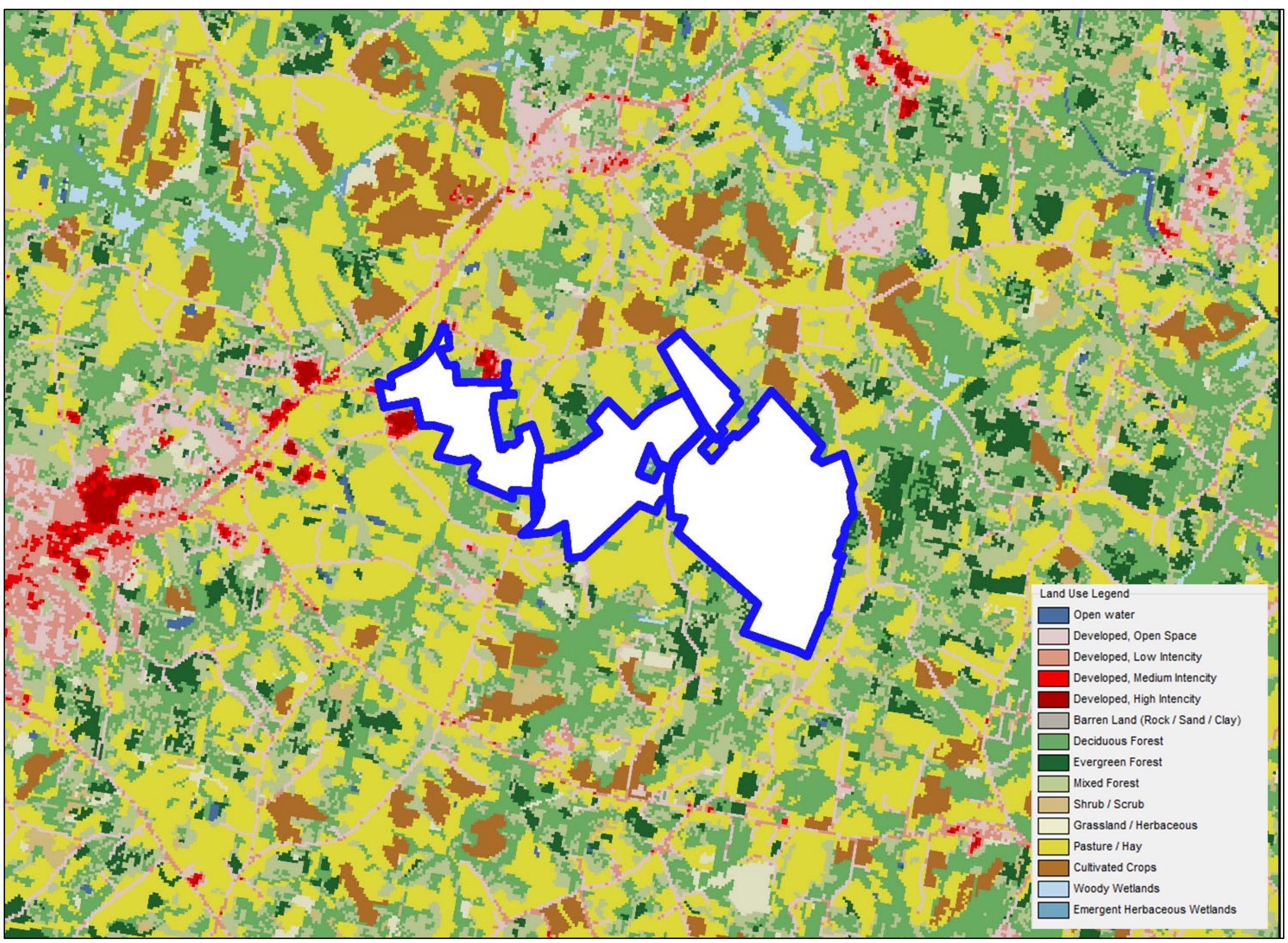
## 3.1 Selected Model and Options

The US EPA's latest version of the AERMOD model (version 22112) will be used in the analysis of direct pollutant emissions. AERMOD settings will include the following options for analysis:

### 3.1.1 Urban/Rural Classification

The integrated site located in Gaston County, North Carolina, roughly three miles east of Cherryville. The property is surrounded by forest and farmland, with low-density rural housing on all sides. The land is largely undeveloped, as shown in Figure 3-1 below. Therefore, the Rural dispersion option is appropriate for executing AERMOD.

**Figure 3-1. Land Use Surrounding the Integrated Site**




Source: USGS NLCD 2016 (GeoTIFF)

### 3.1.2 Building Downwash Analysis

Building downwash parameters will be calculated using US EPA's Building Profile Input Program (BPIP-PRIME) pre-processor for AERMOD. BPIP version 04274 is the regulatory default version of BPIP and will be utilized for this dispersion analysis. There are several structures located at the chemical and concentrator plants within the integrated site that are relevant for downwash calculations, in addition to the stack-tip downwash calculated for the POINT sources.

### 3.1.3 $NO_x$ Conversion Options

When simulating nitrogen dioxide ($NO_2$) emissions, AERMOD includes options to account for the conversion of various nitrogen oxides ($NO_x$) to $NO_2$. There are three tiers of analysis available; Tier 1 assumes full conversion of $NO_x$ to $NO_2$; Tier 2 calculates the balance between $NO_x$ and $NO_2$ using the Ambient Ratio Method 2 (ARM2); Tier 3 involves performing a more detailed analysis with ambient ozone data using the Ozone Limiting Method (OLM) or the Plume Volume Molar Ratio Method (PVMRM).

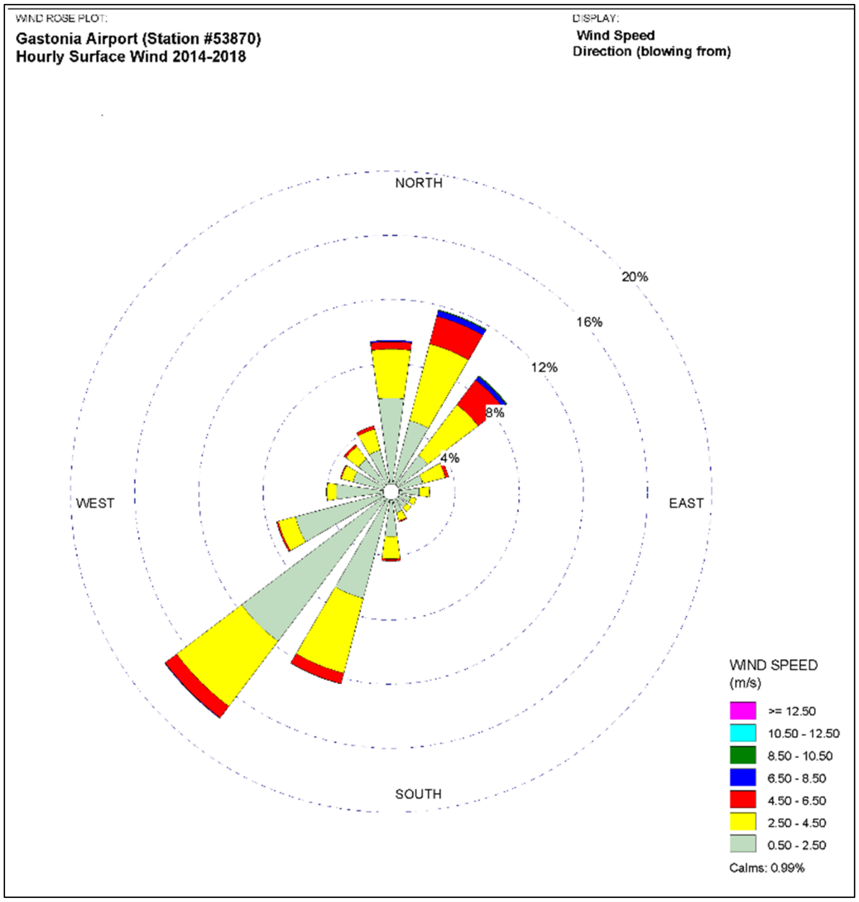
This preliminary SIL analysis utilizes the Tier 1 method, assuming full conversion of $NO_x$ to $NO_2$. Tier 2 conversion may be utilized as necessary when performing the cumulative impact analysis.

## 3.2 Meteorological Data

Meteorological data for Gaston County were provided by DAQ for the five-year period of 2014-2018 and are considered representative for the integrated site. The surface observation data are from Gastonia Municipal Airport in Gastonia, NC (base elevation 242.9 meters), and the corresponding upper air sounding data are from the Piedmont Triad International Airport in Greensboro, NC (KGSO). Meteorological data were processed by DAQ with AERMET version 18081 and include the use of the ADJ_U* option for low-wind adjustments.

Wind roses for the surface observations at Gastonia show predominant wind flow changing with the seasons. There is a primary wind alignment from the southwest during the spring and summer, and a secondary wind alignment from the northeast during the autumn. Figure 3-2 below shows the frequency distribution of wind speed and direction contained within the dataset for the five-year period of 2014-2018.

**Figure 3-2. Wind Rose for Gastonia Municipal Airport, NC (2014-2018)**




## 3.3 Terrain Elevations

The modeling domain will use elevated terrain options and relies on United States Geologic Survey (USGS) National Elevation Dataset (NED) elevation data referenced to the North American Datum of 1983 (NAD83) with a resolution of 1/3rd arc second for the modeling domain. All spatial coordinates are shown in meters and geolocated in Universal Transverse Mercator (UTM) Zone 17.

The terrain data pre-processing program AERMAP will be used to extract elevations for emission sources, structures, and receptors. Where known, terrain elevations will be reset to the design elevation of the processing facilities as there will be some pre-construction land work and clearing ahead of the construction of the chemical and concentrator plants. Similarly, each of the three pits will have an established base elevation as designed during the integrated site's construction. Elevations for the OPENPIT sources are set to this established ground level in AERMOD, and the estimated pit depth and resultant open pit volume will fluctuate as the mine depths change during operations. This open pit depth and volume will be calculated for the worst-case operational year (Year 7) scenario in each of the three pits to characterize the plume rise for emissions escaping the bottom of the pits during active mining and backfilling.

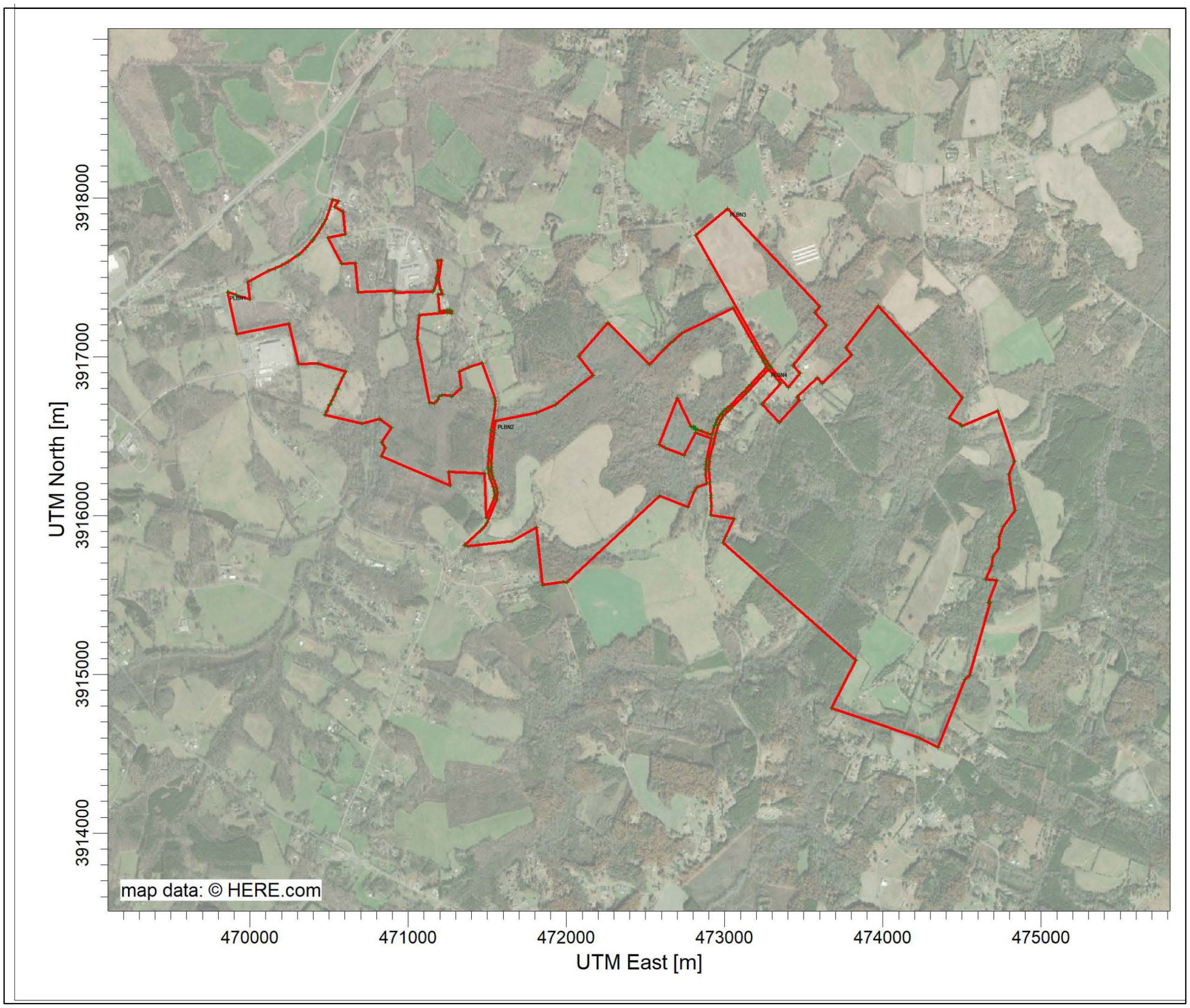
## 3.4 Ambient Air Boundary and Receptor Grid

The integrated site has a complex fence line that encompasses all three mine pits, both proposed locations for the concentrator plant, and the chemical plants in addition to overland conveyor space between each area. The site will also have public roadways that traverse through the property on which ambient air receptors will be placed.

### 3.4.1 Ambient Air Boundaries

Figure 3-3 below illustrates the location of the fence line for each section of the integrated site. Four distinct ambient air boundaries will be required due to the intersection of public roadways through the integrated site. Receptors will be placed along the fence lines at a spacing of 25 meters as described in the Guidelines for Evaluating the Air Quality Impacts of Toxic Pollutants in North Carolina.

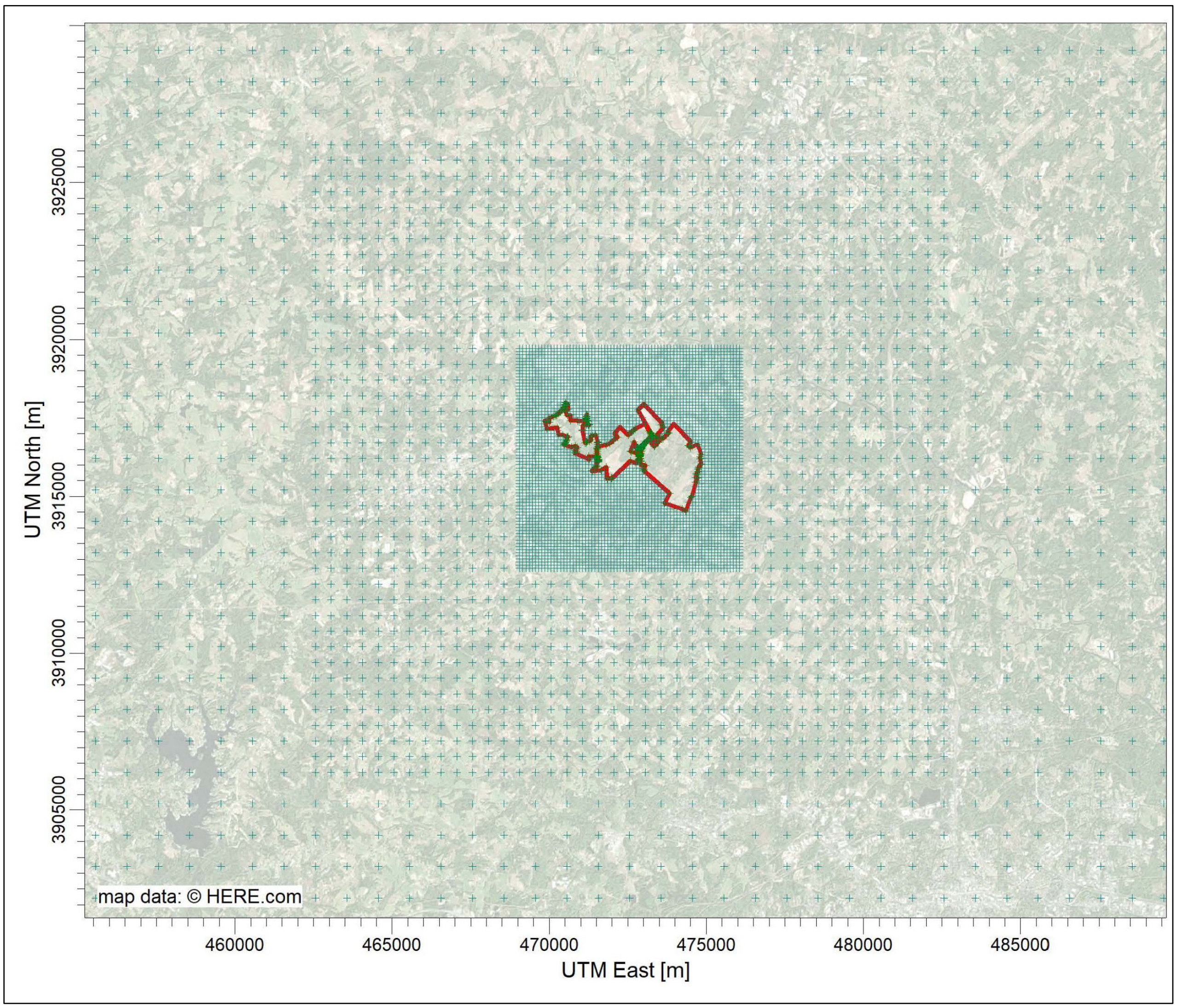
**Figure 3-3. Ambient Air Boundaries**



### 3.4.2 Nested Receptor Grid Spacing

The receptor grid that extends outward from the fence lines into ambient air will be designed in accordance with the PSD Modeling Guidelines, which require a minimum density of 100 meters for areas nearest to the facility and extending 1,000 meters beyond the fence lines. For the coarse receptor grid, a 500-meter receptor density was used from 1,000 to 10,000 meters beyond the fence lines, and a 1,000-meter receptor density was used from 10,000 meters to 50,000 meters to identify the maximum extent of the significant impact area of the integrated site. The complete receptor grid is shown in Figure 3-4 below. This grid will be refined for the cumulative impact analysis once the significant impact area is identified for each pollutant in the analysis.

**Figure 3-4. Preliminary Receptor Grid Layout**



# 4 Class II Preliminary Impact Analysis

The Class II Area single-source impact analysis evaluates the PSD-regulated pollutants for which the project is above the PSD Major Source Threshold (see Table 2-1 above). The modeled impacts for the integrated site are compared to the PSD Significant Impact Levels (SILs) in Table 4-1. Impacts from the integrated site have been modeled and evaluated against the SILs using the maximum modeled impact, also known as the high-first-high (H1H) concentration, to establish the extent of significant impact for the integrated site.

### Table 4-1. Model Results and Significant Impact Levels (SILs)

| Pollutant | Averaging Period | H1H Modeled Result (µg/m³) | SIL (µg/m³) |
|---|---|---|---|
| $PM_{10}$ | 24-hour | 27 | 5 |
| | Annual | 7.6 | 1 |
| $PM_{2.5}$ | 24-hour | 8.9 | 1.2[b] |
| | Annual | 3.0 | 0.3[b] |
| $NO_2$ | 1-hour | 79 | 10[a] |
| | Annual | 6.1 | 1 |
| CO | 1-hour | 226 | 2,000 |
| | 8-hour | 122 | 500 |

*Source: NC DEQ PSD Modeling Guidelines, Table 2 (except as noted).*

[a] Interim 1-hr $NO_2$ SIL Established by DAQ memorandum. See NC DAQ web page for memos: https://deq.nc.gov/about/divisions/air-quality/air-quality-permits/permitting-procedures-memos-guidance
[b] Taken from 40 CFR 51.165(b)(2).

The Significant Impact Area (SIA) was identified during the Class II preliminary impact analysis. Concentrations above the Significant Impact Level (SIL) for each PSD-regulated pollutant and averaging period were mapped and the maximum radius of impact will be used to determine which nearby sources will be included in the cumulative impact analysis. Maximum SIL distances are provided in Table 4-2 below.

### Table 4-2. SIL Radius Distances (km)

| $PM_{2.5}$ | $PM_{10}$ | $NO_2$ | CO |
|---|---|---|---|
| 6.3 | 3.6 | 43.4 | 0 |

The SIL for CO was not exceeded at any point in the receptor grid, therefore the SIL radius is zero. The SILs for $PM_{10}$ and $PM_{2.5}$ are 5 µg/m$^3$ and 1.2 µg/m$^3$ respectively, which results in variable SIAs despite having equivalent $PM_{10}$ and $PM_{2.5}$ emissions from most sources at the integrated site. Impact radius plots illustrating these distances are provided for $PM_{2.5}$, $PM_{10}$, and $NO_2$ in Appendix C.

## 4.1 Precursor Impacts (Secondary Formation) Analysis

Analysis of ozone impact is accomplished using the EPA's Modeled Emission Rates of Precursors (MERP) guidance. The MERP analysis also provides estimates of secondary $PM_{2.5}$, which are added to the modeled direct $PM_{2.5}$ impacts in this analysis. Based on the integrated site total emissions estimates summarized in Table 2-1, the resulting MERP estimates of secondary ozone and $PM_{2.5}$ will be calculated and incorporated into the modeling analysis for the final report.

# 5 Class II Cumulative Impact Analysis

The Class II Area NAAQS cumulative impact analysis will be conducted including all relevant nearby sources identified, based on the results of the SIA preliminary analysis.

## 5.1 Nearby Source Emission Inventory

Preliminary nearby source emission information was provided for this analysis by DAQ for permitted facilities within 50 kilometers of the integrated site. Because the 50-kilometer radius surrounding the integrated site extends into South Carolina, additional nearby source emissions information was obtained from SC DHEC for Cherokee and York counties in South Carolina. Facilities within this preliminary inventory were screened for inclusion in the cumulative impact analysis initially based on a "20D screening" method, which evaluates the emissions of a facility and weights them against their spatial distance to the integrated site to remove any sites that would not be expected to contribute materially to any concentrations within the significant impact area. This method compares annual potential emissions (PTE) in tons per year (Q) of the relevant pollutant to a calculated distance 20 times larger than the true distance between the facilities (20D) and allows for the exclusion of any source where $Q < 20D$. For example, if a nearby source of emissions is 10 km from the facility being permitted, the nearby source would be included in the modeling if its PTE for the relevant pollutant were at least 20*10 km or 200 TPY.

Appendix D of the DAQ PSD Modeling Guidelines states that for 1-hour $NO_2$ analyses, the nearby source inventory screening may exclude sources beyond 25 km from the project location or beyond the SIL, whichever is less. Given that the SIL radius established for the 1-hour $NO_2$ impacts from the integrated site is greater than 25 km, this 25 km cutoff was applied to the nearby source inventory. However, nearly 50 unique facilities still remain within a 25 km radius of the integrated site. The inventory was further refined to remove facilities that do not contribute more than "2D" in emissions annually, using the same principles as the $Q < 20D$ methodology but adjusted to twice the distance to the integrated site, rather than 20 times the distance. There were four sources remaining that contribute annual emissions (tons) more than twice the distance (km) between themselves and the integrated site and that will be included in the cumulative 1-hour $NO_2$ modeling: Gaston County Landfill. Firestone Fibers and Textiles, Kings Mountain Energy, and Cleveland County Generating.

Please see the attached screening workbook in Appendix D for a complete summary of the screening process and listing of nearby sources proposed for inclusion in the cumulative modeling.

# 6 PSD Class II Increment Analysis

For the PSD Increment Analysis, the following pollutants under evaluation have minor source baseline dates in Gaston County. The baselines for both $PM_{10}$ and $NO_2$ were set in 1989 and were triggered by the Gaston County MSW facility. The baseline date has also been triggered for $SO_2$, however $SO_2$ is not a pollutant of interest for this PSD analysis. The table below was provided by DAQ.

**Table 6-1. Gaston County, NC PSD Minor Source Baseline Dates**

| Pollutant | Minor Source Baseline Date | Triggered By |
| --- | --- | --- |
| $PM_{10}$ | 05/16/1989 | Gaston County MSW Facility |
| $NO_2$ | 05/16/1989 | Gaston County MSW Facility |

Source: https://deq.nc.gov/media/26393/download?attachment

Nearby increment consumption has been evaluated as part of the nearby source emission inventory, and the increment emission sources (for both increment consumption and expansion) proposed for inclusion in the modeling analysis are shown in Appendix D.

# 7 Class I Area Analysis

As described in Section 4.7.1 of the PSD Modeling Guidelines, the FLMs require that an applicant for a PSD permit must also demonstrate project emissions would not adversely affect AQRVs at Class I areas. Class I Areas, which are national parks exceeding 6,000 acres, designated wilderness areas, and national memorial parks above 5,000 acres, require special protection of visibility to maintain or attain pristine visual range and be free from perceptible anthropogenic visibility impairment.

The Class I Area nearest to the Project location is the Linville Gorge, located approximately 69 km to the north-northwest of the Project. Following the June 13, 2022 PSD preapplication meeting between Carolina Lithium and the Department, the NCDAQ NSR Preapplication Form was submitted. The originally submitted form is attached, along with an updated version of the form, and each includes a complete list of the nearby Class I areas. Please see Appendix E.

Please note that the originally submitted form erroneously indicated that Swanquarter was the nearest Class I area. During preparation of the PSD permit application Carolina Lithium identified this error (Swanquarter is located much farther away on the east coastline of North Carolina). The updated form corrects this error, as well as updating pollutant emission rates to reflect the results of the BACT analysis.

Carolina Lithium has not received any feedback regarding the Federal Land Manager review of the NCDAQ NSR Preapplication Form that was submitted and based on this, assumes that no detailed analysis of Class I area impacts is required.

The FLMs responsible for protecting Class I area resources have developed guidance for assessing potential impacts to AQRVs (accessed at https://irma.nps.gov/DataStore/DownloadFile/568936). This guidance provides a screening method to determine whether the impact on AQRVs is potentially significant, thereby requiring dispersion and/or deposition modeling and related assessment. This guidance states:

> ". . . the Agencies will consider a source locating greater than 50 km from a Class I area to have negligible impacts with respect to Class I AQRVs if its total $SO_2$, $NO_x$, $PM_{10}$, and $H_2SO_4$ annual emissions (in tons per year, based on 24-hour maximum allowable emissions), divided by the distance (in km) from the Class I area (Q/D) is 10 or less. The Agencies would not request any further Class I AQRV impact analyses from such sources."

The project has total emissions for $SO_2$, $NO_x$, $PM_{10}$, and $H_2SO_4$ of 34.9 + 514 + 93.5 + 0.008 (respectively) = 643 TPY. Given the distance to the nearest Class I area (Linville Gorge Wilderness) is 69 km, the emissions/distance (Q/D) value is 643/69 = 9.3. Because this value is less than 10, no further analysis of AQRVs is needed per the cited FLM guidance.

# 8 Additional Impact Analysis

15A NCAC 02D.0530 incorporates by reference the federal PSD regulations at 40 CFR §51.166 regarding Additional Impacts Analyses for PSD permits. Under the referenced PSD rule clause, Carolina Lithium must assess potential impacts of the Project's emissions on visibility, soils, and vegetation, and the air quality impacts from growth associated with the Facility.

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# Appendix A

## Potential Emission Calculations

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**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**

**All values in tons per year (tpy)**

| Pollutant | SITE TOTAL | PSD Major Source Threshold * | Subject to PSD? | Hazardous Air Pollutant Major Source Threshold | Major Source of HAP? |
|---|---|---|---|---|---|
| PM | 155 | 25 | **Yes** | | |
| $PM_{10}$ | 93.5 | 15 | **Yes** | | |
| $PM_{2.5}$ | 65.7 | 10 | **Yes** | | |
| $SO_2$ | 34.9 | 40 | No | | |
| $NO_x$ | 514 | 40 | **Yes** | | |
| CO | 1,328 | 100 | **Yes** | | |
| VOC | 13.9 | 40 | No | | |
| $H_2SO_4$ | 0.008 | 7 | No | | |
| $CO_2e$ | 300,547 | 75,000 | **Yes** | | |
| $CO_2$ | 300,194 | | | | |
| $CH_4$ | 6.67 | | | | |
| $N_2O$ | 0.63 | | | | |
| Lead | 0.0012 | 0.6 | No | 10 | No |
| Acetaldehyde | 0.0002 | | | | No |
| Acrolein | 0.0000 | | | | No |
| Arsenic | 0.0005 | | | | No |
| Benzene | 0.0077 | | | | No |
| Beryllium | 0.0000 | | | | No |
| 1,3-Butadiene | 0.0000 | | | | No |
| Cadmium | 0.0027 | | | | No |
| Chromium | 0.0034 | | | | No |
| Cobalt | 0.0002 | | | | No |
| Dichlorobenzene | 0.0029 | | | | No |
| Formaldehyde | 0.1846 | | | | No |
| Hexane | 4.4219 | | | | No |
| HCl | 1.0871 | | | | No |
| HF | 9.6146 | | | | No |
| Manganese | 0.0009 | | | | No |
| Mercury | 0.0006 | | | | No |
| Naphthalene | 0.0019 | | | | No |
| Nickel | 0.0052 | | | | No |
| POM | 0.0024 | | | | No |
| Selenium | 0.0001 | | | | No |
| Toluene | 0.0093 | | | | No |
| Xylene | 0.0006 | | | | No |
| TOTAL HAP | 15.3463 | | | 25 | No |

* Since at least one PSD-regulated pollutant exceeds the major source threshold of 100 tpy (based on the integrated site being classified as a chemical manufacturing plant) the significant emission increase thresholds are listed and used as the basis of determining which pollutants trigger PSD review. In addition, greenhouse gases are a regulated pollutant for PSD purposes because the project triggers PSD for another non-GHG pollutant.

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**

**All values in tons per year (tpy)**

| | Mining Sources | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Pollutant** | **FUG: Drilling** | **FUG: Blasting** | **Rock Breaking IES01** | **Ore and Waste Rock Loader Operations IES02** | **In-Pit Mobile Ore Crushing IES03** | **In-Pit Mobile Waste Rock Crushing Without Screening IES04** | **FUG: In-Pit Mobile Waste Rock Crusher With Screening** | **Ore, Waste Rock, Refuse and Reclaim Conveyors IES05** | **Miscellaneous Material Handling IES06** | **Wind Erosion of Waste Rock and Tailings Disposal IES07** | **Total** |
| PM | 5.72 | | 12.8 | Negligible | 2.51 | 7.52 | 17.4 | 16.4 | 16.6 | 0.36 | 79.3 |
| $PM_{10}$ | 2.70 | | 6.76 | Negligible | 1.03 | 3.10 | 6.04 | 5.40 | 5.46 | 0.18 | 30.7 |
| $PM_{2.5}$ | 0.41 | | 1.01 | Negligible | 0.20 | 0.61 | 0.54 | 1.53 | 1.54 | 0.03 | 5.87 |
| $SO_2$ | | 33.4 | | | | | | | | | 33.4 |
| $NO_x$ | | 284 | | | | | | | | | 284 |
| CO | | 1,119 | | | | | | | | | 1,119 |
| VOC | | | | | | | | | | | |
| $H_2SO_4$ | | | | | | | | | | | |
| $CO_2e$ | | 6,416 | | | | | | | | | 6,416 |
| $CO_2$ | | 6,394 | | | | | | | | | 6,394 |
| $CH_4$ | | 0.26 | | | | | | | | | 0.26 |
| $N_2O$ | | 0.05 | | | | | | | | | 0.05 |
| Lead | | | | | | | | | | | |
| Acetaldehyde | | | | | | | | | | | |
| Acrolein | | | | | | | | | | | |
| Arsenic | | | | | | | | | | | |
| Benzene | | | | | | | | | | | |
| Beryllium | | | | | | | | | | | |
| 1,3-Butadiene | | | | | | | | | | | |
| Cadmium | | | | | | | | | | | |
| Chromium | | | | | | | | | | | |
| Cobalt | | | | | | | | | | | |
| Dichlorobenzene | | | | | | | | | | | |
| Formaldehyde | | | | | | | | | | | |
| Hexane | | | | | | | | | | | |
| HCl | | | | | | | | | | | |
| HF | | | | | | | | | | | |
| Manganese | | | | | | | | | | | |
| Mercury | | | | | | | | | | | |
| Naphthalene | | | | | | | | | | | |
| Nickel | | | | | | | | | | | |
| POM | | | | | | | | | | | |
| Selenium | | | | | | | | | | | |
| Toluene | | | | | | | | | | | |
| Xylene | | | | | | | | | | | |
| **TOTAL HAP** | | | | | | | | | | | |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**

**All values in tons per year (tpy)**

| | Concentrator Plant | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Wind Erosion of ROM Pile | Wind Erosion of ROM Pile (Concentrate Plant Alternate Location) | Wind Erosion of Waste Rock and Tailings Disposal | ROM Pile Loader Operations | Wind Erosion of Ore Surge Pile | Coarse Ore Handling | Ore Sorting Operations | Secondary Crusher Feed Bin | Secondary Crusher Discharge | Fine Ore Sizing Screen Discharge |
| **Pollutant** | **IES08** | **IES09** | **IES10** | **IES11** | **IES12** | **IES13** | **EP01** | **EP02** | **EP03** | **EP04** |
| PM | 0.08 | 0.08 | 0.36 | Neglible | 0.009 | 5.06 | 0.51 | 0.23 | 0.02 | 0.03 |
| $PM_{10}$ | 0.04 | 0.04 | 0.18 | Neglible | 0.004 | 1.69 | 0.51 | 0.23 | 0.02 | 0.03 |
| $PM_{2.5}$ | 0.006 | 0.006 | 0.03 | Neglible | 0.0007 | 0.19 | 0.51 | 0.23 | 0.02 | 0.03 |
| $SO_2$ | | | | | | | | | | |
| $NO_x$ | | | | | | | | | | |
| CO | | | | | | | | | | |
| VOC | | | | | | | | | | |
| $H_2SO_4$ | | | | | | | | | | |
| $CO_2e$ | | | | | | | | | | |
| $CO_2$ | | | | | | | | | | |
| $CH_4$ | | | | | | | | | | |
| $N_2O$ | | | | | | | | | | |
| Lead | | | | | | | | | | |
| Acetaldehyde | | | | | | | | | | |
| Acrolein | | | | | | | | | | |
| Arsenic | | | | | | | | | | |
| Benzene | | | | | | | | | | |
| Beryllium | | | | | | | | | | |
| 1,3-Butadiene | | | | | | | | | | |
| Cadmium | | | | | | | | | | |
| Chromium | | | | | | | | | | |
| Cobalt | | | | | | | | | | |
| Dichlorobenzene | | | | | | | | | | |
| Formaldehyde | | | | | | | | | | |
| Hexane | | | | | | | | | | |
| HCl | | | | | | | | | | |
| HF | | | | | | | | | | |
| Manganese | | | | | | | | | | |
| Mercury | | | | | | | | | | |
| Naphthalene | | | | | | | | | | |
| Nickel | | | | | | | | | | |
| POM | | | | | | | | | | |
| Selenium | | | | | | | | | | |
| Toluene | | | | | | | | | | |
| Xylene | | | | | | | | | | |
| **TOTAL HAP** | | | | | | | | | | |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**

**All values in tons per year (tpy)**

| | Concentrator Plant | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Tertiary Crusher Feed Bin 1 | Tertiary Crusher Feed Bin 2 | Tertiary Crusher No. 1 | Tertiary Crusher No. 2 | Fine Ore Bin | Miscellaneous Material Handling | Quartz Dryer | Feldspar Dryer | Miscellanous Materials Loader Operations | 1,000 kW Emergency Generator No 1 |
| **Pollutant** | **EP05** | **EP06** | **EP07** | | **EP08** | **IES14** | **EP09** | **EP10** | **IES15** | **EP11** |
| PM | 0.23 | 0.23 | 0.02 | | 0.15 | 4.68 | 0.57 | 0.92 | Neglible | 0.05 |
| $PM_{10}$ | 0.23 | 0.23 | 0.02 | | 0.15 | 1.71 | 0.57 | 0.92 | Neglible | 0.05 |
| $PM_{2.5}$ | 0.23 | 0.23 | 0.02 | | 0.15 | 1.65 | 0.57 | 0.92 | Neglible | 0.05 |
| $SO_2$ | | | | | | | 0.05 | 0.08 | | 0.001 |
| $NO_x$ | | | | | | | 4.10 | 6.36 | | 0.98 |
| CO | | | | | | | 6.89 | 10.68 | | 0.41 |
| VOC | | | | | | | 0.45 | 0.70 | | 0.05 |
| $H_2SO_4$ | | | | | | | | | | |
| $CO_2e$ | | | | | | | 9,793 | 15,192 | | 87 |
| $CO_2$ | | | | | | | 9,783 | 15,177 | | 86 |
| $CH_4$ | | | | | | | 0.18 | 0.29 | | 0.0007 |
| $N_2O$ | | | | | | | 0.018 | 0.029 | | 0.003 |
| Lead | | | | | | | 0.0000 | 0.0001 | | |
| Acetaldehyde | | | | | | | | | | 0.0000 |
| Acrolein | | | | | | | | | | 0.0000 |
| Arsenic | | | | | | | 0.0000 | 0.0000 | | |
| Benzene | | | | | | | 0.0002 | 0.0003 | | 0.0004 |
| Beryllium | | | | | | | 0.0000 | 0.0000 | | |
| 1,3-Butadiene | | | | | | | | | | |
| Cadmium | | | | | | | 0.0001 | 0.0001 | | |
| Chromium | | | | | | | 0.0001 | 0.0002 | | |
| Cobalt | | | | | | | 0.0000 | 0.0000 | | |
| Dichlorobenzene | | | | | | | 0.0001 | 0.0002 | | |
| Formaldehyde | | | | | | | 0.0061 | 0.0095 | | 0.0000 |
| Hexane | | | | | | | 0.1476 | 0.2290 | | |
| HCl | | | | | | | | | | |
| HF | | | | | | | 2.8908 | 6.4610 | | |
| Manganese | | | | | | | 0.0000 | 0.0000 | | |
| Mercury | | | | | | | 0.0000 | 0.0000 | | |
| Naphthalene | | | | | | | 0.0001 | 0.0001 | | 0.0001 |
| Nickel | | | | | | | 0.0002 | 0.0003 | | |
| POM | | | | | | | 0.0001 | 0.0001 | | 0.0001 |
| Selenium | | | | | | | 0.0000 | 0.0000 | | |
| Toluene | | | | | | | 0.0003 | 0.0004 | | 0.0001 |
| Xylene | | | | | | | | | | 0.0001 |
| **TOTAL HAP** | | | | | | | **3.0456** | **6.7012** | | **0.0008** |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**

**All values in tons per year (tpy)**

| | Concentrator Plant | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1,000 kW Emergency Generator No 2 | Hydrofluoric Acid Storage Tank | Sulfuric Acid Storage Tank | Diesel Storage Tank 20,000 gal | Diesel Storage Tank 7,000 gal | Kerosene Storage Tank | Concentrator Plant Truck Traffic | |
| **Pollutant** | **EP12** | **EP13** | **IES16** | **IES17** | **IES18** | **IES19** | **IES20** | **Total** |
| PM | 0.05 | | | | | | 5.81 | 19.1 |
| $PM_{10}$ | 0.05 | | | | | | 1.16 | 7.82 |
| $PM_{2.5}$ | 0.05 | | | | | | 0.29 | 5.16 |
| $SO_2$ | 0.0008 | | | | | | | 0.13 |
| $NO_x$ | 0.98 | | | | | | | 12.4 |
| CO | 0.41 | | | | | | | 18.4 |
| VOC | 0.05 | | | 0.01 | 0.004 | 0.003 | | 1.28 |
| $H_2SO_4$ | | | 0.008 | | | | | 0.008 |
| $CO_2e$ | 87 | | | | | | | 25,159 |
| $CO_2$ | 86 | | | | | | | 25,131 |
| $CH_4$ | 0.0007 | | | | | | | 0.47 |
| $N_2O$ | 0.003 | | | | | | | 0.05 |
| Lead | | | | | | | | 0.0001 |
| Acetaldehyde | 0.0000 | | | | | | | 0.0000 |
| Acrolein | 0.0000 | | | | | | | 0.0000 |
| Arsenic | | | | | | | | 0.0000 |
| Benzene | 0.0004 | | | | | | | 0.0013 |
| Beryllium | | | | | | | | 0.0000 |
| 1,3-Butadiene | | | | | | | | 0.0000 |
| Cadmium | | | | | | | | 0.0002 |
| Chromium | | | | | | | | 0.0003 |
| Cobalt | | | | | | | | 0.0000 |
| Dichlorobenzene | | | | | | | | 0.0003 |
| Formaldehyde | 0.0000 | | | | | | | 0.0158 |
| Hexane | | | | | | | | 0.3765 |
| HCl | | | | | | | | 0.0000 |
| HF | | 0.2628 | | | | | | 9.6146 |
| Manganese | | | | | | | | 0.0001 |
| Mercury | | | | | | | | 0.0001 |
| Naphthalene | 0.0001 | | | | | | | 0.0003 |
| Nickel | | | | | | | | 0.0004 |
| POM | 0.0001 | | | | | | | 0.0004 |
| Selenium | | | | | | | | 0.0000 |
| Toluene | 0.0001 | | | | | | | 0.0010 |
| Xylene | 0.0001 | | | | | | | 0.0002 |
| **TOTAL HAP** | **0.0008** | **0.2628** | | | | | | 10.0112 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**

**All values in tons per year (tpy)**

| | Carolina Lithium 1 (CL-1) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Wind Erosion of Concentrate Surge Pile | Concentrate Pile Loader Operations | Concentrate Pile Material Handling | Spodumene Concentrate Conveying | Spodumene Concentrate Surge Silo | Spodumene Concentrate Conveyor to Calciner | Calciner Rotary Kiln | Cooler Discharge Sweep Air | Ball Mill Feed Bin | Train 1 Pressure Leaching |
| Pollutant | IES21 | IES22 | IES23 | EP14 | EP15 | EP16 | EP17 | EP18 | EP19 | EP20 |
| PM | 0.02 | Neglible | 0.03 | 0.02 | 0.09 | 0.02 | 20.0 | 0.11 | 0.14 | 0.79 |
| $PM_{10}$ | 0.01 | Neglible | 0.009 | 0.02 | 0.09 | 0.02 | 20.0 | 0.11 | 0.14 | 0.79 |
| $PM_{2.5}$ | 0.002 | Neglible | 0.003 | 0.02 | 0.09 | 0.02 | 20.0 | 0.11 | 0.14 | 0.79 |
| $SO_2$ | | | | | | | 0.19 | | | |
| $NO_x$ | | | | | | | 95.0 | | | |
| CO | | | | | | | 27.1 | | | |
| VOC | | | | | | | 1.77 | | | |
| $H_2SO_4$ | | | | | | | | | | |
| $CO_2e$ | | | | | | | 38,492 | | | |
| $CO_2$ | | | | | | | 38,453 | | | |
| $CH_4$ | | | | | | | 0.72 | | | |
| $N_2O$ | | | | | | | 0.07 | | | |
| Lead | | | | | | | 0.0002 | | | |
| Acetaldehyde | | | | | | | | | | |
| Acrolein | | | | | | | | | | |
| Arsenic | | | | | | | 0.0001 | | | |
| Benzene | | | | | | | 0.0007 | | | |
| Beryllium | | | | | | | 0.0000 | | | |
| 1,3-Butadiene | | | | | | | | | | |
| Cadmium | | | | | | | 0.0004 | | | |
| Chromium | | | | | | | 0.0005 | | | |
| Cobalt | | | | | | | 0.0000 | | | |
| Dichlorobenzene | | | | | | | 0.0004 | | | |
| Formaldehyde | | | | | | | 0.0242 | | | |
| Hexane | | | | | | | 0.5801 | | | |
| HCl | | | | | | | | | | |
| HF | | | | | | | | | | |
| Manganese | | | | | | | 0.0001 | | | |
| Mercury | | | | | | | 0.0001 | | | |
| Naphthalene | | | | | | | 0.0002 | | | |
| Nickel | | | | | | | 0.0007 | | | |
| POM | | | | | | | 0.0002 | | | |
| Selenium | | | | | | | 0.0000 | | | |
| Toluene | | | | | | | 0.0011 | | | |
| Xylene | | | | | | | | | | |
| **TOTAL HAP** | | | | | | | **0.6086** | | | |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**

**All values in tons per year (tpy)**

| | Carolina Lithium 1 (CL-1) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Train 2 Pressure Leaching | LiOH Bagging Area Surge Bin/Transporter No. 1 | LiOH Bagging Area Surge Bin/Transporter No. 2 | LiOH Bagging Area Day Tank No. 1 | LiOH Bagging Area Day Tank No. 2 | LiOH Bagging Area Day Tank No. 3 | LiOH Bagging Area Day Tank No. 4 | LiOH Bagging Operation | LiOH Bagging Area Vacuum | Lime Receiving and Storage |
| **Pollutant** | **EP21** | **EP22** | **EP23** | **EP24** | **EP25** | **EP26** | **EP27** | **EP28** | **EP29** | **EP30** |
| PM | 0.79 | 0.007 | 0.007 | 0.007 | 0.007 | 0.007 | 0.007 | 0.31 | 0.05 | 0.21 |
| $PM_{10}$ | 0.79 | 0.007 | 0.007 | 0.007 | 0.007 | 0.007 | 0.007 | 0.31 | 0.05 | 0.21 |
| $PM_{2.5}$ | 0.79 | 0.007 | 0.007 | 0.007 | 0.007 | 0.007 | 0.007 | 0.31 | 0.05 | 0.21 |
| $SO_2$ | | | | | | | | | | |
| $NO_x$ | | | | | | | | | | |
| CO | | | | | | | | | | |
| VOC | | | | | | | | | | |
| $H_2SO_4$ | | | | | | | | | | |
| $CO_2e$ | | | | | | | | | | |
| $CO_2$ | | | | | | | | | | |
| $CH_4$ | | | | | | | | | | |
| $N_2O$ | | | | | | | | | | |
| Lead | | | | | | | | | | |
| Acetaldehyde | | | | | | | | | | |
| Acrolein | | | | | | | | | | |
| Arsenic | | | | | | | | | | |
| Benzene | | | | | | | | | | |
| Beryllium | | | | | | | | | | |
| 1,3-Butadiene | | | | | | | | | | |
| Cadmium | | | | | | | | | | |
| Chromium | | | | | | | | | | |
| Cobalt | | | | | | | | | | |
| Dichlorobenzene | | | | | | | | | | |
| Formaldehyde | | | | | | | | | | |
| Hexane | | | | | | | | | | |
| HCl | | | | | | | | | | |
| HF | | | | | | | | | | |
| Manganese | | | | | | | | | | |
| Mercury | | | | | | | | | | |
| Naphthalene | | | | | | | | | | |
| Nickel | | | | | | | | | | |
| POM | | | | | | | | | | |
| Selenium | | | | | | | | | | |
| Toluene | | | | | | | | | | |
| Xylene | | | | | | | | | | |
| **TOTAL HAP** | | | | | | | | | | |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**

**All values in tons per year (tpy)**

| | Carolina Lithium 1 (CL-1) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Pollutant** | **Phosphate Receiving and Storage EP31** | **Sodium Carbonate Receiving and Storage Silo EP32** | **Sodium Carbonate Receiving and Feeder Bin EP33** | **Boiler No. 1 EP34** | **Boiler No. 2 EP35** | **Boiler No. 3 EP36** | **1,000 kW Emergency Generator No. 1 EP37** | **1,000 kW Emergency Generator No. 2 EP38** | **Fire Pump EP39** |
| PM | 0.21 | 0.21 | 0.21 | 1.37 | 1.37 | 1.35 | 0.05 | 0.05 | 0.04 |
| $PM_{10}$ | 0.21 | 0.21 | 0.21 | 1.37 | 1.37 | 1.35 | 0.05 | 0.05 | 0.04 |
| $PM_{2.5}$ | 0.21 | 0.21 | 0.21 | 1.37 | 1.37 | 1.35 | 0.05 | 0.05 | 0.04 |
| $SO_2$ | | | | 0.16 | 0.16 | 0.16 | 0.001 | 0.0008 | 0.0002 |
| $NO_x$ | | | | 3.99 | 3.99 | 3.96 | 0.98 | 0.98 | 0.56 |
| CO | | | | 22.5 | 22.5 | 22.3 | 0.41 | 0.41 | 0.12 |
| VOC | | | | 1.47 | 1.47 | 1.46 | 0.05 | 0.05 | 0.04 |
| $H_2SO_4$ | | | | | | | | | |
| $CO_2e$ | | | | 31,998 | 31,998 | 31,729 | 87 | 87 | 21 |
| $CO_2$ | | | | 31,965 | 31,965 | 31,696 | 86 | 86 | 21 |
| $CH_4$ | | | | 0.60 | 0.60 | 0.60 | 0.0007 | 0.0007 | 0.0002 |
| $N_2O$ | | | | 0.060 | 0.060 | 0.060 | 0.003 | 0.003 | 0.001 |
| Lead | | | | 0.0001 | 0.0001 | 0.0001 | | | |
| Acetaldehyde | | | | | | | 0.0000 | 0.0000 | 0.0001 |
| Acrolein | | | | | | | 0.0000 | 0.0000 | 0.0000 |
| Arsenic | | | | 0.0001 | 0.0001 | 0.0001 | | | |
| Benzene | | | | 0.0006 | 0.0006 | 0.0006 | 0.0004 | 0.0004 | 0.0001 |
| Beryllium | | | | 0.0000 | 0.0000 | 0.0000 | | | |
| 1,3-Butadiene | | | | | | | | | 0.0000 |
| Cadmium | | | | 0.0003 | 0.0003 | 0.0003 | | | |
| Chromium | | | | 0.0004 | 0.0004 | 0.0004 | | | |
| Cobalt | | | | 0.0000 | 0.0000 | 0.0000 | | | |
| Dichlorobenzene | | | | 0.0003 | 0.0003 | 0.0003 | | | |
| Formaldehyde | | | | 0.0201 | 0.0201 | 0.0199 | 0.0000 | 0.0000 | 0.0001 |
| Hexane | | | | 0.4822 | 0.4822 | 0.4782 | | | |
| HCl | | | | | | | | | |
| HF | | | | | | | | | |
| Manganese | | | | 0.0001 | 0.0001 | 0.0001 | | | |
| Mercury | | | | 0.0001 | 0.0001 | 0.0001 | | | |
| Naphthalene | | | | 0.0002 | 0.0002 | 0.0002 | 0.0001 | 0.0001 | 0.0000 |
| Nickel | | | | 0.0006 | 0.0006 | 0.0006 | | | |
| POM | | | | 0.0002 | 0.0002 | 0.0002 | 0.0001 | 0.0001 | 0.0000 |
| Selenium | | | | 0.0000 | 0.0000 | 0.0000 | | | |
| Toluene | | | | 0.0009 | 0.0009 | 0.0009 | 0.0001 | 0.0001 | 0.0001 |
| Xylene | | | | | | | 0.0001 | 0.0001 | 0.0000 |
| **TOTAL HAP** | | | | **0.5059** | **0.5059** | **0.5017** | **0.0008** | **0.0008** | **0.0005** |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**

**All values in tons per year (tpy)**

| | | Carolina Lithium 1 (CL-1) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Hydrochloric Acid Storage Tank | Hydrochloric Acid Dilution Tank | Sulfuric Acid Storage Tank | Lithium Carbonate Reactor | Cooling Tower | Diesel Storage Tank | Truck Traffic | Component Leak Fugitives | |
| **Pollutant** | EP40 | | | IES24 | IES25 | IES26 | IES27 | IES28 | **Total** |
| PM | | | | | 0.12 | | 0.87 | | 28.4 |
| $PM_{10}$ | | | | | 0.12 | | 0.17 | | 27.7 |
| $PM_{2.5}$ | | | | | 0.12 | | 0.04 | | 27.6 |
| $SO_2$ | | | | | | | | | 0.68 |
| $NO_x$ | | | | | | | | | 109 |
| CO | | | | | | | | | 95.3 |
| VOC | | | | | | 0.002 | | | 6.33 |
| $H_2SO_4$ | | | 1.47E-06 | | | | | | 0.000001 |
| $CO_2e$ | | | | 74 | | | | 12 | 134,496 |
| $CO_2$ | | | | 74 | | | | 1 | 134,345 |
| $CH_4$ | | | | | | | | 0.44 | 2.97 |
| $N_2O$ | | | | | | | | | 0.26 |
| Lead | | | | | | | | | 0.0006 |
| Acetaldehyde | | | | | | | | | 0.0001 |
| Acrolein | | | | | | | | | 0.0000 |
| Arsenic | | | | | | | | | 0.0002 |
| Benzene | | | | | | | | | 0.0033 |
| Beryllium | | | | | | | | | 0.0000 |
| 1,3-Butadiene | | | | | | | | | 0.0000 |
| Cadmium | | | | | | | | | 0.0012 |
| Chromium | | | | | | | | | 0.0016 |
| Cobalt | | | | | | | | | 0.0001 |
| Dichlorobenzene | | | | | | | | | 0.0013 |
| Formaldehyde | | | | | | | | | 0.0845 |
| Hexane | | | | | | | | | 2.0227 |
| HCl | 0.5436 | | | | | | | | 0.5436 |
| HF | | | | | | | | | |
| Manganese | | | | | | | | | 0.0004 |
| Mercury | | | | | | | | | 0.0003 |
| Naphthalene | | | | | | | | | 0.0008 |
| Nickel | | | | | | | | | 0.0024 |
| POM | | | | | | | | | 0.0010 |
| Selenium | | | | | | | | | 0.0000 |
| Toluene | | | | | | | | | 0.0042 |
| Xylene | | | | | | | | | 0.0002 |
| **TOTAL HAP** | **0.5436** | | | | | | | | 2.6678 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**

**All values in tons per year (tpy)**

| | Carolina Lithium 2 (CL-2) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Wind Erosion of Concentrate Surge Pile | Concentrate Pile Loader Operations | Concentrate Pile Material Handling | Spodumene Concentrate Conveying | Spodumene Concentrate Surge Silo | Spodumene Concentrate Conveyor to Calciner | Calciner Rotary Kiln | Cooler Discharge Sweep Air | Ball Mill Feed Bin | Train 1 Pressure Leaching |
| **Pollutant** | **IES29** | **IES30** | **IES31** | **EP41** | **EP42** | **EP43** | **EP44** | **EP45** | **EP46** | **EP47** |
| PM | 0.02 | Neglible | 0.03 | 0.02 | 0.09 | 0.02 | 20.0 | 0.11 | 0.14 | 0.79 |
| $PM_{10}$ | 0.01 | Neglible | 0.009 | 0.02 | 0.09 | 0.02 | 20.0 | 0.11 | 0.14 | 0.79 |
| $PM_{2.5}$ | 0.002 | Neglible | 0.003 | 0.02 | 0.09 | 0.02 | 20.0 | 0.11 | 0.14 | 0.79 |
| $SO_2$ | | | | | | | 0.19 | | | |
| $NO_x$ | | | | | | | 95.0 | | | |
| CO | | | | | | | 27.1 | | | |
| VOC | | | | | | | 1.77 | | | |
| $H_2SO_4$ | | | | | | | | | | |
| $CO_2e$ | | | | | | | 38,492 | | | |
| $CO_2$ | | | | | | | 38,453 | | | |
| $CH_4$ | | | | | | | 0.72 | | | |
| $N_2O$ | | | | | | | 0.07 | | | |
| Lead | | | | | | | 0.0002 | | | |
| Acetaldehyde | | | | | | | | | | |
| Acrolein | | | | | | | | | | |
| Arsenic | | | | | | | 0.0001 | | | |
| Benzene | | | | | | | 0.0007 | | | |
| Beryllium | | | | | | | 0.0000 | | | |
| 1,3-Butadiene | | | | | | | | | | |
| Cadmium | | | | | | | 0.0004 | | | |
| Chromium | | | | | | | 0.0005 | | | |
| Cobalt | | | | | | | 0.0000 | | | |
| Dichlorobenzene | | | | | | | 0.0004 | | | |
| Formaldehyde | | | | | | | 0.0242 | | | |
| Hexane | | | | | | | 0.5801 | | | |
| HCl | | | | | | | | | | |
| HF | | | | | | | | | | |
| Manganese | | | | | | | 0.0001 | | | |
| Mercury | | | | | | | 0.0001 | | | |
| Naphthalene | | | | | | | 0.0002 | | | |
| Nickel | | | | | | | 0.0007 | | | |
| POM | | | | | | | 0.0002 | | | |
| Selenium | | | | | | | 0.0000 | | | |
| Toluene | | | | | | | 0.0011 | | | |
| Xylene | | | | | | | | | | |
| **TOTAL HAP** | | | | | | | **0.6086** | | | |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**

**All values in tons per year (tpy)**

| | Carolina Lithium 2 (CL-2) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Train 2 Pressure Leaching | LiOH Bagging Area Surge Bin/Transporter No. 1 | LiOH Bagging Area Surge Bin/Transporter No. 2 | LiOH Bagging Area Day Tank No. 1 | LiOH Bagging Area Day Tank No. 2 | LiOH Bagging Area Day Tank No. 3 | LiOH Bagging Area Day Tank No. 4 | LiOH Bagging Operation | LiOH Bagging Area Vacuum | Phosphate Receiving and Storage |
| **Pollutant** | **EP48** | **EP49** | **EP50** | **EP51** | **EP52** | **EP53** | **EP54** | **EP55** | **EP56** | **EP57** |
| PM | 0.79 | 0.007 | 0.007 | 0.007 | 0.007 | 0.007 | 0.007 | 0.31 | 0.05 | 0.21 |
| $PM_{10}$ | 0.79 | 0.007 | 0.007 | 0.007 | 0.007 | 0.007 | 0.007 | 0.31 | 0.05 | 0.21 |
| $PM_{2.5}$ | 0.79 | 0.007 | 0.007 | 0.007 | 0.007 | 0.007 | 0.007 | 0.31 | 0.05 | 0.21 |
| $SO_2$ | | | | | | | | | | |
| $NO_x$ | | | | | | | | | | |
| CO | | | | | | | | | | |
| VOC | | | | | | | | | | |
| $H_2SO_4$ | | | | | | | | | | |
| $CO_2e$ | | | | | | | | | | |
| $CO_2$ | | | | | | | | | | |
| $CH_4$ | | | | | | | | | | |
| $N_2O$ | | | | | | | | | | |
| Lead | | | | | | | | | | |
| Acetaldehyde | | | | | | | | | | |
| Acrolein | | | | | | | | | | |
| Arsenic | | | | | | | | | | |
| Benzene | | | | | | | | | | |
| Beryllium | | | | | | | | | | |
| 1,3-Butadiene | | | | | | | | | | |
| Cadmium | | | | | | | | | | |
| Chromium | | | | | | | | | | |
| Cobalt | | | | | | | | | | |
| Dichlorobenzene | | | | | | | | | | |
| Formaldehyde | | | | | | | | | | |
| Hexane | | | | | | | | | | |
| HCl | | | | | | | | | | |
| HF | | | | | | | | | | |
| Manganese | | | | | | | | | | |
| Mercury | | | | | | | | | | |
| Naphthalene | | | | | | | | | | |
| Nickel | | | | | | | | | | |
| POM | | | | | | | | | | |
| Selenium | | | | | | | | | | |
| Toluene | | | | | | | | | | |
| Xylene | | | | | | | | | | |
| **TOTAL HAP** | | | | | | | | | | |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**

**All values in tons per year (tpy)**

| | Carolina Lithium 2 (CL-2) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Sodium Carbonate Receiving and Feeder Bin** | **Boiler No. 1** | **Boiler No. 2** | **Boiler No. 3** | **1,000 kW Emergency Generator No. 1** | **1,000 kW Emergency Generator No. 2** | **Hydrochloric Acid Storage Tank** | **Hydrochloric Acid Dilution Tank** | **Sulfuric Acid Storage Tank** | **Lithium Carbonate Reactor** |
| **Pollutant** | **EP58** | **EP59** | **EP60** | **EP61** | **EP62** | **EP63** | **EP64** | | | **IES32** |
| PM | 0.21 | 1.37 | 1.37 | 1.35 | 0.05 | 0.05 | | | | |
| $PM_{10}$ | 0.21 | 1.37 | 1.37 | 1.35 | 0.05 | 0.05 | | | | |
| $PM_{2.5}$ | 0.21 | 1.37 | 1.37 | 1.35 | 0.05 | 0.05 | | | | |
| $SO_2$ | | 0.16 | 0.16 | 0.16 | 0.001 | 0.0008 | | | | |
| $NO_x$ | | 3.99 | 3.99 | 3.96 | 0.98 | 0.98 | | | | |
| CO | | 22.5 | 22.5 | 22.3 | 0.41 | 0.41 | | | | |
| VOC | | 1.47 | 1.47 | 1.46 | 0.05 | 0.05 | | | | |
| $H_2SO_4$ | | | | | | | | | 1.47E-06 | |
| $CO_2e$ | | 31,998 | 31,998 | 31,729 | 87 | 87 | | | | 74 |
| $CO_2$ | | 31,965 | 31,965 | 31,696 | 86 | 86 | | | | 74 |
| $CH_4$ | | 0.60 | 0.60 | 0.60 | 0.0007 | 0.0007 | | | | |
| $N_2O$ | | 0.060 | 0.060 | 0.060 | 0.003 | 0.003 | | | | |
| Lead | | 0.0001 | 0.0001 | 0.0001 | | | | | | |
| Acetaldehyde | | | | | 0.0000 | 0.0000 | | | | |
| Acrolein | | | | | 0.0000 | 0.0000 | | | | |
| Arsenic | | 0.0001 | 0.0001 | 0.0001 | 0.0000 | 0.0000 | | | | |
| Benzene | | 0.0006 | 0.0006 | 0.0006 | 0.0004 | 0.0004 | | | | |
| Beryllium | | 0.0000 | 0.0000 | 0.0000 | | | | | | |
| 1,3-Butadiene | | | | | | | | | | |
| Cadmium | | 0.0003 | 0.0003 | 0.0003 | | | | | | |
| Chromium | | 0.0004 | 0.0004 | 0.0004 | | | | | | |
| Cobalt | | 0.0000 | 0.0000 | 0.0000 | | | | | | |
| Dichlorobenzene | | 0.0003 | 0.0003 | 0.0003 | | | | | | |
| Formaldehyde | | 0.0201 | 0.0201 | 0.0199 | 0.0000 | 0.0000 | | | | |
| Hexane | | 0.4822 | 0.4822 | 0.4782 | | | | | | |
| HCl | | | | | | | 0.5436 | | | |
| HF | | | | | | | | | | |
| Manganese | | 0.0001 | 0.0001 | 0.0001 | | | | | | |
| Mercury | | 0.0001 | 0.0001 | 0.0001 | | | | | | |
| Naphthalene | | 0.0002 | 0.0002 | 0.0002 | 0.0001 | 0.0001 | | | | |
| Nickel | | 0.0006 | 0.0006 | 0.0006 | | | | | | |
| POM | | 0.0002 | 0.0002 | 0.0002 | 0.0001 | 0.0001 | | | | |
| Selenium | | 0.0000 | 0.0000 | 0.0000 | | | | | | |
| Toluene | | 0.0009 | 0.0009 | 0.0009 | 0.0001 | 0.0001 | | | | |
| Xylene | | | | | 0.0001 | 0.0001 | | | | |
| **TOTAL HAP** | | **0.5059** | **0.5059** | **0.5017** | **0.0008** | **0.0008** | **0.5436** | | | |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**

**All values in tons per year (tpy)**

| | Carolina Lithium 2 (CL-2) | | | | |
|---|---|---|---|---|---|
| | Cooling Tower | Diesel Storage Tank | Truck Traffic | Component Leak Fugitives | |
| **Pollutant** | **IES33** | **IES34** | **IES35** | **IES36** | **Total** |
| PM | 0.12 | | 0.87 | | 28.0 |
| $PM_{10}$ | 0.12 | | 0.17 | | 27.2 |
| $PM_{2.5}$ | 0.12 | | 0.04 | | 27.1 |
| $SO_2$ | | | | | 0.68 |
| $NO_x$ | | | | | 109 |
| CO | | | | | 95.2 |
| VOC | | 0.002 | | | 6.29 |
| $H_2SO_4$ | | | | | 0.000001 |
| $CO_2e$ | | | | 12 | 134,476 |
| $CO_2$ | | | | 1 | 134,324 |
| $CH_4$ | | | | 0.44 | 2.97 |
| $N_2O$ | | | | | 0.26 |
| Lead | | | | | 0.0006 |
| Acetaldehyde | | | | | 0.0000 |
| Acrolein | | | | | 0.0000 |
| Arsenic | | | | | 0.0002 |
| Benzene | | | | | 0.0032 |
| Beryllium | | | | | 0.0000 |
| 1,3-Butadiene | | | | | 0.0000 |
| Cadmium | | | | | 0.0012 |
| Chromium | | | | | 0.0016 |
| Cobalt | | | | | 0.0001 |
| Dichlorobenzene | | | | | 0.0013 |
| Formaldehyde | | | | | 0.0844 |
| Hexane | | | | | 2.0227 |
| HCl | | | | | 0.5436 |
| HF | | | | | |
| Manganese | | | | | 0.0004 |
| Mercury | | | | | 0.0003 |
| Naphthalene | | | | | 0.0008 |
| Nickel | | | | | 0.0024 |
| POM | | | | | 0.0010 |
| Selenium | | | | | 0.0000 |
| Toluene | | | | | 0.0041 |
| Xylene | | | | | 0.0002 |
| **TOTAL HAP** | | | | | 2.6673 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**FUG: Drilling**

Operating Hours: 8760 hr/yr

| Operation | Throughput (Facility Design) tonne/hr | Throughput (Facility Design) ton/hr | Emission Factor (lb/ton) PM | Emission Factor (lb/ton) $PM_{10}$ | Emission Factor (lb/ton) $PM_{2.5}$ | PTE lb/hr PM | PTE lb/hr $PM_{10}$ | PTE lb/hr $PM_{2.5}$ | PTE tpy PM | PTE tpy $PM_{10}$ | PTE tpy $PM_{2.5}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Drilling | 7,000 | 7,716 | 1.69E-04 | 8.00E-05 | 1.211E-05 | 1.31 | 0.62 | 0.09 | 5.72 | 2.70 | 0.41 |

NOTES:
1. Emission factor for drilling $PM_{10}$ emissions obtained from Fifth Edition AP-42, Chapter 11.19.2 (8/04).
2. PM and PM2.5 emission factors were calculated using the following particle size multipliers obtained from Fifth Edition AP-42, Chapter 13.2.4 (11/06):
PM: 0.74, PM10: 0.35, PM2.5: 0.053.
2. The throughput was estimated as the sum of all ore and waste rock crusher throughputs.

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**FUG: Blasting**

| | | |
|---|---|---|
| Explosive: | ANFO | |
| Maximum Blast Area: | 25,008 | $ft^2$ (Design) |
| Explosive Usage: | 0.000912 | ton/$ft^2$ of blast area (Design) |
| | 22.8 | ton/blast |
| Annual Number of Blasts: | 1,464 | blasts/yr (Design) |
| Fuel Oil Properties: | 7.05 | lb/gallon (Fifth Edition AP-42, Appendix A) |
| | 0.138 | MMBtu/gal (40 CFR Part 98, Table C-1). |
| | 6% | Typical Content |
| Fuel Oil Contained in ANFO: | 1.37 | ton/blast |
| | 53.6 | MMBtu/blast |

| Pollutant | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| | Number | Units | Source | lb/event | tpy |
| $PM/PM_{10}/PM_{2.5}$ | Per AP-42 (9/88), "Emission factor estimates for stone quarry blasting operations are not presented here because of the sparsity and unreliability of available test data. While a procedure for estimating blasting emissions is presented in Section 8.24, Western Surface Coal Mines, that procedure should not be applied to stone quarries because of dissimilarities in blasting techniques, material blasted and size of blast areas." | | | | |
| $SO_2$ | 2 | lb/ton explosive | AP-42 | 45.6 | 33.4 |
| $NO_x$ | 17 | lb/ton explosive | AP-42 | 388 | 284 |
| CO | 67 | lb/ton explosive | AP-42 | 1,528 | 1,119 |
| $CO_2e$ | | | | 8,765 | 6,416 |
| $CO_2$ | 73.96 | kg/MMBtu | 40 CFR Part 98 | 8,735 | 6,394 |
| $CH_4$ | 0.003 | kg/MMBtu | 40 CFR Part 98 | 0.35 | 0.26 |
| $N_2O$ | 0.0006 | kg/MMBtu | 40 CFR Part 98 | 0.071 | 0.05 |

NOTES:

1. $SO_2$, $NO_x$ and CO emission afactors obtained from Fifth Edition AP-42, Chapter 13.3 (1/95).
2. GHG emission factors obtained from 40 CFR pt. 98 - Mandatory Greenhouse Gas Reporting, Table C-1 and C-2, reflecting the update effective January 1, 2014.
3. $CO_2e$ values correspond to the sum of the individual GHG emissions times the following global warming potentials (GWP) obtained from 40 CFR Part 98, Table A-1, reflecting the update effective January 1, 2014.

| Greenhouse Gas | GWP |
|---|---|
| $CO_2$ | 1 |
| $CH_4$ | 25 |
| $N_2O$ | 298 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**IES01: Mobile Rock Breaking**

Operating Hours: 8760 hr/yr

| | | | | | | | PTE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number of | Throughput, each (Facility Design) | | Emission Factor (lb/ton) | | | lb/hr, each | | | tpy, each | | | tpy | | | |
| Operation | Operations | tonne/hr | ton/hr | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | | | | PM | $PM_{10}$ | $PM_{2.5}$ |
| Ore Breaking | 2 | 700 | 772 | 0.00021 | 0.0001 | 0.000015 | 0.16 | 0.15 | 0.02 | 0.71 | 0.68 | 0.10 | 1.42 | 1.35 | 0.20 |
| Waste Rock Breaking | 4 | 1,400 | 1,543 | | | | 0.65 | 0.31 | 0.05 | 2.84 | 1.35 | 0.20 | 11.4 | 5.41 | 0.81 |
| | | | | | | | | | | | | Total | 12.8 | 6.76 | 1.01 |

NOTES:

1. Emission factors for primary crushing were judged to be representative of emissions generated by this activity.
2. Emission factors for primary crushing obtained from TCEQ's Rock Crushing Facility Emission Rate Calculation Worksheet, obtained from https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/emiss-calc-rock1.xlsx, accessed December 6, 2021).
3. Each operation is classified as insignificant under 15A NCAC 2Q .0503(8).

**IES02: Ore and Wase Rock Loader Operations**

The ore and waste rock crushers are mobile units that will be operated near the working area of the mine. As such, the loaders moving material from the working area to the crusher hoppers will operate in a stop and go mode and the travel distances will be as short as possible. While Fifth Edition AP-42, Chapter 13.2.2 does contain emission factors for equipment operating on unpaved roads, that methodology does not adequately account for short travel at low speeds or for equipment operating in stop and go mode. Based on this, the fugitive dust generated by loader movement is anticipated to be negligible and, therefore, is not quantified.

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**IES03: Mobile Ore Crushing**

| | | |
|---|---|---|
| Number of Crushers: | 2 | |
| Operating Hours: | 8760 | hr/yr |

| | | Throughput (Facility Design) | | Emission Factor (lb/ton) | | | PTE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | lb/hr, each | | | tpy, each | | | tpy, total | | |
| Operation | Number of Operations | tonne/hr | ton/hr | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ |
| Loading | 1 | | | 0.00014 | 0.000046 | 0.000013 | 0.11 | 0.04 | 0.01 | 0.47 | 0.16 | 0.04 | | | |
| Primary Crushing | 1 | 700 | 772 | 0.00021 | 0.0001 | 0.000015 | 0.16 | 0.08 | 0.01 | 0.71 | 0.34 | 0.05 | | | |
| Drop Onto Mobile Conveyor * | 1 | | | 0.00002 | 0.000007 | 0.000002 | 0.02 | 0.005 | 0.002 | 0.07 | 0.02 | 0.007 | | | |
| | | | | | | Total | 0.29 | 0.12 | 0.02 | 1.25 | 0.52 | 0.10 | 2.51 | 1.03 | 0.20 |

NOTES:

1. Emission factors for loading and drops obtained from Fifth Edition AP-42, Chapter 11.19.2 (8/04). Based on an average as-mined material moisture content of 6% and footnote b of Table 11.19.2-2 the controlled emission factors were used.

2. The design of the conveyor transfer point (marked with a *) will include a hood over the head roller, enclosed chutes and skirting from the chute to the conveyor belt. To reflect this equipment design a particulate matter reduction of 85% for partial enclosure of the transfer point was applied to the emission factors based on information obtained from TCEQ's Rock Crushing Facility Emission Rate Calculation Worksheet, obtained from https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/emiss-calc-rock1.xlsx, accessed December 6, 2021).

3. Emission factors for primary crushing obtained from TCEQ's Rock Crushing Facility Emission Rate Calculation Worksheet, obtained from https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/emiss-calc-rock1.xlsx, accessed December 6, 2021).

4. Each mobile ore crusher is classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**IES04: Mobile Waste Rock Crushing Without Screening**

Number of Crushers: 3
Operating Hours: 8760 hr/yr

| Operation | Number of Operations | Throughput (Facility Design) | | Emission Factor (lb/ton) | | | PTE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | lb/hr, each | | | tpy, each | | | tpy, total | | |
| | | tonne/hr | ton/hr | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ |
| Loading | 1 | 1,400 | 1,543 | 0.00014 | 0.000046 | 0.000013 | 0.22 | 0.07 | 0.02 | 0.95 | 0.31 | 0.09 | | | |
| Primary Crushing | 1 | | | 0.00021 | 0.0001 | 0.000015 | 0.32 | 0.15 | 0.02 | 1.42 | 0.68 | 0.10 | | | |
| Drop Onto Mobile Conveyor * | 1 | | | 0.00002 | 0.000007 | 0.000002 | 0.03 | 0.01 | 0.003 | 0.14 | 0.05 | 0.01 | | | |
| | | | | | | Total | 0.57 | 0.24 | 0.05 | 2.51 | 1.03 | 0.20 | 7.5 | 3.10 | 0.61 |

NOTES:

1. Emission factors for loading and drops obtained from Fifth Edition AP-42, Chapter 11.19.2 (8/04). Based on an average as-mined material moisture content of 6% and footnote b of Table 11.19.2-2 the controlled emission factors were used.

2. The design of the conveyor transfer point (marked with a *) will include a hood over the head roller, enclosed chutes and skirting from the chute to the conveyor belt. To reflect this equipment design a particulate matter reduction of 85% for partial enclosure of the transfer point was applied to the emission factors based on information obtained from TCEQ's Rock Crushing Facility Emission Rate Calculation Worksheet, obtained from https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/emiss-calc-rock1.xlsx, accessed December 6, 2021).

3. Emission factors for primary crushing obtained from TCEQ's Rock Crushing Facility Emission Rate Calculation Worksheet, obtained from https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/emiss-calc-rock1.xlsx, accessed December 6, 2021).

4. Each mobile waste rock crusher without screening is classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**FUG: Mobile Waste Rock Crusher with Screening**

Operating Hours: 8760 hr/yr

| Operation | Number of Operations | Throughput (Facility Design) | | Emission Factor (lb/ton) | | | PTE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | lb/hr | | | tpy | | |
| | | tonne/hr | ton/hr | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ |
| Loading | 1 | 1,400 | 1,543 | 0.00014 | 0.000046 | 0.000013 | 0.22 | 0.07 | 0.02 | 0.95 | 0.31 | 0.09 |
| Primary Crushing | 1 | | | 0.00021 | 0.0001 | 0.000015 | 0.32 | 0.15 | 0.02 | 1.42 | 0.68 | 0.10 |
| Screening | 1 | | | 0.0022 | 0.0007 | 0.000050 | 3.40 | 1.14 | 0.08 | 14.9 | 5.00 | 0.34 |
| Drop Onto Mobile Conveyor * | 1 | | | 0.00002 | 0.000007 | 0.000002 | 0.03 | 0.01 | 0.003 | 0.14 | 0.05 | 0.01 |
| | | | | | | Total | 3.97 | 1.38 | 0.12 | 17.4 | 6.04 | 0.54 |

NOTES:

1. Emission factors for loading and drops obtained from Fifth Edition AP-42, Chapter 11.19.2 (8/04). Based on an average as-mined material moisture content of 6% and footnote b of Table 11.19.2-2 the controlled emission factors were used.

2. The design of the conveyor transfer point (marked with a *) will include a hood over the head roller, enclosed chutes and skirting from the chute to the conveyor belt. To reflect this equipment design a particulate matter reduction of 85% for partial enclosure of the transfer point was applied to the emission factors based on information obtained from TCEQ's Rock Crushing Facility Emission Rate Calculation Worksheet, obtained from https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/emiss-calc-rock1.xlsx, accessed December 6, 2021).

3. Emission factors for primary crushing obtained from TCEQ's Rock Crushing Facility Emission Rate Calculation Worksheet, obtained from https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/emiss-calc-rock1.xlsx, accessed December 6, 2021).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**IES05: Ore, Waste Rock, Refuse and Reclaim Conveying**

Operating Hours: 8760 hr/yr

| | Number of Transfer Points | Throughput (Facility Design) | | Emission Factor (lb/ton) | | | PTE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | lb/hr, each transfer | | | tpy, each transfer | | | tpy, total | | |
| Operation | | tonne/hr | ton/hr | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ |
| a - Mobile Conveyors from Ore Crushers to Ore Belts * | 6 | 700 | 772 | 0.00002 | 0.000007 | 0.000002 | 0.02 | 0.005 | 0.002 | 0.07 | 0.02 | 0.007 | 0.43 | 0.14 | 0.04 |
| b - Mobile Conveyors from Waste Rock Crushers to Waste Rock Belts * | 12 | 1,400 | 1,543 | 0.00002 | 0.000007 | 0.000002 | 0.03 | 0.01 | 0.003 | 0.14 | 0.05 | 0.01 | 1.70 | 0.56 | 0.16 |
| c - Pit Ore Belts * | 11 | 300 | 331 | 0.00002 | 0.000007 | 0.000002 | 0.01 | 0.002 | 0.0006 | 0.03 | 0.01 | 0.00 | 0.33 | 0.11 | 0.03 |
| d - Overland Ore Belts * | 3 | 600 | 661 | 0.00002 | 0.000007 | 0.000002 | 0.01 | 0.005 | 0.001 | 0.06 | 0.02 | 0.01 | 0.18 | 0.06 | 0.02 |
| e - Waste Belts * | 15 | 5,600 | 6,173 | 0.00002 | 0.000007 | 0.000002 | 0.13 | 0.04 | 0.01 | 0.57 | 0.19 | 0.05 | 8.52 | 2.80 | 0.79 |
| f - Refuse Belts * | 4 | 6,000 | 6,614 | 0.00002 | 0.000007 | 0.000002 | 0.14 | 0.05 | 0.01 | 0.61 | 0.20 | 0.06 | 2.43 | 0.80 | 0.23 |
| g - Reclaim Belts * | 5 | 5,600 | 6,173 | 0.00002 | 0.000007 | 0.000002 | 0.13 | 0.04 | 0.01 | 0.57 | 0.19 | 0.05 | 2.84 | 0.93 | 0.26 |
| | | | | | | | | | | | | Total | 16.4 | 5.40 | 1.53 |

NOTES:

1. Emission factors obtained from Fifth Edition AP-42, Chapter 11.19.2 (8/04).
2. Based on an average material moisture content of 6% and footnote b of Table 11.19.22 the controlled emission factors were used.
3. The design of each conveyor transfer point (marked with a *) will include a hood over the head roller, enclosed chutes and skirting from the chute to the conveyor belt. To reflect this equipment design a particulate matter reduction of 85% for partial enclosure of the transfer point was applied to the emission factors based on information obtained from TCEQ's Rock Crushing Facility Emission Rate Calculation Worksheet, obtained from https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/emiss-calc-rock1.xlsx, accessed December 6, 2021)
4. Each conveyor transfer is classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**IES06: Miscellaneous Material Handling**

Operating Hours: 8760 hr/yr

| Operation | Number of Transfer Points | Throughput (Facility Design) | | Emission Factor (lb/ton) | | | PTE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | lb/hr, each operation | | | tpy, each operation | | | tpy, total | | |
| | | tonne/hr | ton/hr | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ |
| Ore Telestacker | 1 | 600 | 661 | 0.00014 | 0.000046 | 0.000013 | 0.09 | 0.03 | 0.01 | 0.41 | 0.13 | 0.04 | 0.41 | 0.13 | 0.04 |
| Refuse Stackers | 4 | 6,000 | 6,614 | 0.00014 | 0.000046 | 0.000013 | 0.93 | 0.30 | 0.09 | 4.06 | 1.33 | 0.38 | 16.2 | 5.33 | 1.51 |
| | | | | | | | | | | | | Total | 16.6 | 5.46 | 1.54 |

NOTES:

1. Emission factors obtained from Fifth Edition AP-42, Chapter 11.19.2 (8/04). The conveyor transfer factor used because the equipment will be telescoping and operating to minimize drop distance.
2. Based on an average material moisture content of 6% and footnote b of Table 11.19.22 the controlled emission factors were used.
3. Each operation is classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**IES08: Wind Erosion of ROM Pile**
**IES09: Wind Erosion of Reclaim Pile (Alternate Concentrator Plant Location)**

| | | |
|---|---|---|
| Pile Active: | 365 | days/year |
| Size of Pile: | 0.85 | acres (Facility Design) |
| Material Silt Content: | 1.9 | % |
| Number of Days with >= 0.01 of Precipitation: | 136 | Average for years 2014 - 2018 |
| Occurrence of Wind > 12 mph | 3.5 | % (Based on years 2014 - 2018) |

| Operation | Calculated Emission Factor lb/acre/day | Particle Size Multiplier | | | PTE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | lb/hr | | | tpy | | |
| | | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ |
| ROM Pile | 0.49 | 1 | 0.5 | 0.075 | 0.02 | 0.009 | 0.001 | 0.08 | 0.04 | 0.006 |

NOTES:

1. Emission factor calculated using Equation 4-9 from EPA's "Control of Open Fugitive Dust Sources", September 1988, accessed at https://nepis.epa.gov/Exe/ZyPDF.cgi/91010T54.PDF?Dockey=91010T54.PDF.
2. Material silt content obtained from Fifth Edition AP-42, Table 13.2.4 correesponding to crusher limestone.

3. Number of days with greater than or equal to 0.01 inches of precipitation was obtained from https://www.weatherwx.com/hazardoutlook/nc/cherryville.html.
4. The occurrence of wind speeds greater than 12 mph was calculated based on wind speed information contained in the meteorological data used in the dispersion modeling analysis.
5. The pile is classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**IES10: Wind Erosion of Waste Rock and Tailings Disposal**

| | | |
|---|---|---|
| Pile Active: | 365 | days/year |
| Size of Pile: | 2 | acres (assumed) |
| Material Silt Content: | 1.9 | % |
| Number of Days with >= 0.01 of Precipitation: | 136 | Average for years 2014 - 2018 |
| Occurrence of Wind > 12 mph | 3.5 | % (Based on years 2014 - 2018) |

| Operation | Calculated Emission Factor lb/acre/day | Particle Size Multiplier | | | PTE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | lb/hr | | | tpy | | |
| | | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ |
| Active Area 1 | 0.49 | 1 | 0.5 | 0.075 | 0.04 | 0.02 | 0.003 | 0.18 | 0.09 | 0.013 |
| Active Area 2 | | | | | 0.04 | 0.02 | 0.003 | 0.18 | 0.09 | 0.013 |
| | | | | Total | 0.08 | 0.04 | 0.006 | 0.36 | 0.18 | 0.027 |

NOTES:

1. Emission factor calculated using Equation 4-9 from EPA's "Control of Open Fugitive Dust Sources", September 1988, accessed at https://nepis.epa.gov/Exe/ZyPDF.cgi/91010T54.PDF?Dockey=91010T54.PDF.
2. Material silt content obtained from Fifth Edition AP-42, Table 13.2.4 correesponding to crusher limestone.
3. Number of days with greater than or equal to 0.01 inches of precipitation was obtained from https://www.weatherwx.com/hazardoutlook/nc/cherryville.html.
4. The occurrence of wind speeds greater than 12 mph was calculated based on wind speed information contained in the meteorological data used in the dispersion modeling analysis.
5. Each pile is classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**IES11: ROM Pile Loader Operations**

The ROM pile will be located near the coarse ore hopper. As such, the loaders moving material from the pile to the hopper will operate in a stop and go mode and the travel distances will be as short as possible. While Fifth Edition AP-42, Chapter 13.2.2 does contain emission factors for equipment operating on unpaved roads, that methodology does not adequately account for short travel at low speeds or for equipment operating in stop and go mode. Based on this, the fugitive dust generated by loader movement is anticipated to be negligible and, therefore, is not quantified.

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**IES12: Wind Erosion of Ore Surge Pile**

| | | |
|---|---|---|
| Pile Active: | 365 | days/year |
| Size of Pile: | 0.1 | acres (Facility Design) |
| Material Silt Content: | 1.9 | % |
| Number of Days with >= 0.01 of Precipitation: | 136 | Average for years 2014 - 2018 |
| Occurrence of Wind > 12 mph | 3.5 | % (Based on years 2014 - 2018) |

| Operation | Calculated Emission Factor lb/acre/day | Particle Size Multiplier | | | PTE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | lb/hr | | | tpy | | |
| | | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ |
| ROM Pile | 0.49 | 1 | 0.5 | 0.075 | 0.002 | 0.001 | 0.0002 | 0.009 | 0.004 | 0.0007 |

NOTES:

1. Emission factor calculated using Equation 4-9 from EPA's "Control of Open Fugitive Dust Sources", September 1988, accessed at https://nepis.epa.gov/Exe/ZyPDF.cgi/91010T54.PDF?Dockey=91010T54.PDF.
2. Material silt content obtained from Fifth Edition AP-42, Table 13.2.4 correesponding to crusher limestone.
3. Number of days with greater than or equal to 0.01 inches of precipitation was obtained from https://www.weatherwx.com/hazardoutlook/nc/cherryville.html.
4. The occurrence of wind speeds greater than 12 mph was calculated based on wind speed information contained in the meteorological data used in the dispersion modeling analysis.
5. The pile is classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**IES13: Coarse Ore Handling**

Operating Hours: 8,760 hr/yr

| Operation | Number of Operations | Throughput (Facility Design) | | Emission Factor (lb/ton) | | | PTE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | lb/hr, each operation | | | tpy, each operation | | | tpy, total | | |
| | | tonne/hr | ton/hr | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | | | | PM | $PM_{10}$ | $PM_{2.5}$ |
| Drop Into Alternate Location Conveyor Feed | 1 | 378 | 416 | 0.00014 | 0.000046 | 0.000013 | 0.06 | 0.02 | 0.005 | 0.26 | 0.08 | 0.02 | 0.26 | 0.08 | 0.02 |
| Coarse Ore Conveyance to Alternate Location * | 7 | 378 | 416 | 0.00002 | 0.000007 | 0.000002 | 0.009 | 0.003 | 0.0008 | 0.04 | 0.01 | 0.004 | 0.27 | 0.09 | 0.02 |
| Drop Into Coarse Ore Feed Bin | 1 | 378 | 416 | 0.00014 | 0.000046 | 0.000013 | 0.06 | 0.02 | 0.005 | 0.26 | 0.08 | 0.02 | 0.26 | 0.08 | 0.02 |
| Drop Onto Coarse Ore Conveyor * | 1 | | | 0.00002 | 0.000007 | 0.000002 | 0.009 | 0.003 | 0.0008 | 0.04 | 0.01 | 0.004 | 0.04 | 0.01 | 0.004 |
| Coarse Ore Conveyor Transfer Points * | 2 | | | 0.00002 | 0.000007 | 0.000002 | 0.009 | 0.003 | 0.0008 | 0.04 | 0.01 | 0.004 | 0.08 | 0.03 | 0.01 |
| Coarse Ore Screening | 1 | | | 0.0022 | 0.00074 | 0.000050 | 0.92 | 0.31 | 0.02 | 4.01 | 1.35 | 0.09 | 4.01 | 1.35 | 0.09 |
| Screened Coarse Ore Overs and Unders Drops and Transfers * | 2 | 378 | 416 | 0.00002 | 0.000007 | 0.000002 | 0.009 | 0.003 | 0.0008 | 0.04 | 0.01 | 0.004 | 0.08 | 0.03 | 0.01 |
| Screened Fine Ore Overs and Unders Drops and Transfers * | 2 | 963 | 1,061 | 0.00002 | 0.000007 | 0.000002 | 0.009 | 0.003 | 0.0008 | 0.04 | 0.01 | 0.004 | 0.08 | 0.03 | 0.01 |
| | | | | | | | | | | | | Total | 5.06 | 1.69 | 0.19 |

NOTES:
1. Emission factors obtained from Fifth Edition AP-42, Chapter 11.19.2 (8/04).
2. Based on footnote n of Table 11.19.2-2 the emission factor for tertiary crushing was used for primary and secondary crushing.
3. The design of each conveyor transfer point (marked with a *) will include a hood over the head roller, enclosed chutes and skirting from the chute to the conveyor belt. To reflect this equipment design a particulate matter reduction of 85% for partial enclosure of the transfer point was applied to the emission factors based on information obtained from TCEQ's Rock Crushing Facility Emission Rate Calculation Worksheet, obtained from https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/emiss-calc-rock1.xlsx, accessed December 6, 2021)
4. Each operation is classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Ore Sorting Operations**
**ES01, CD01, EP01**

| | | |
|---|---|---|
| Airflow: | 6,787 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.12 | 0.51 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Secondary Crusher Feed Bin**
**ES02, CD02, EP02**

| | | |
|---|---|---|
| Airflow: | 3,000 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.05 | 0.23 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Secondary Crusher Discharge**
**ES03, CD03, EP03**

| | | |
|---|---|---|
| Airflow: | 205 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.004 | 0.02 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Fine Ore Sizing Screen Discharge**
**ES04, CD04, EP04**

| | | |
|---|---|---|
| Airflow: | 410 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.007 | 0.03 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Tertiary Crusher Feed Bin**
**ES05, CD05, EP05 (Bin No. 1)**
**ES06, CD06, EP06 (Bin No. 2)**

| | | |
|---|---|---|
| Airflow: | 3,000 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.05 | 0.23 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Tertiary Crusher Discharge**
**ES07, CD07, EP07 (Tertiary Crusher No. 1)**
**ES08, CD07, EP07 (Tertiary Crusher No. 2)**

| | | |
|---|---|---|
| Airflow: | 295 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.005 | 0.02 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Fine Ore Bin**
**ES09, CD08, EP08**

| | | |
|---|---|---|
| Airflow: | 2,000 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.03 | 0.15 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**IES14: Miscellaneous Material Handling Operations**

Operating Hours: 8,760 hr/yr

| Operation | Number of Operations | Throughput (Facility Design) | | Emission Factor (lb/ton) | | | PTE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | lb/hr, each | | | tpy, each | | | tpy, total | | |
| | | tonne/hr | ton/hr | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ |
| Spodumene Concentrate Drops * | 2 | 26.0 | 28.7 | 0.00002 | 0.000007 | 0.000002 | 0.0006 | 0.0002 | 0.00006 | 0.003 | 0.0009 | 0.0002 | 0.005 | 0.002 | 0.0005 |
| Drop Onto Conveyor to Chemical Plants | 1 | 32.0 | 35.3 | 0.00014 | 0.000046 | 0.000013 | 0.005 | 0.002 | 0.0005 | 0.02 | 0.007 | 0.002 | 0.02 | 0.007 | 0.002 |
| Spodumene Export Truck Loading | 1 | | 38.5 | 0.0030 | 0.00110 | 0.00110 | 0.12 | 0.04 | 0.04 | 0.51 | 0.19 | 0.19 | 0.51 | 0.19 | 0.19 |
| Residue from Kings Mountain Truck Unloading | 1 | | 58.7 | 0.0030 | 0.00110 | 0.00110 | 0.18 | 0.06 | 0.06 | 0.77 | 0.28 | 0.28 | 0.77 | 0.28 | 0.28 |
| Waste Rock Conveyance (Alternate Concentrator Plant Location) * | 6 | 343 | 378 | 0.00002 | 0.000007 | 0.000002 | 0.008 | 0.003 | 0.0007 | 0.03 | 0.01 | 0.003 | 0.21 | 0.07 | 0.02 |
| Mica Concentrate Drop * | 1 | 12.4 | 13.6 | 0.00002 | 0.000007 | 0.000002 | 0.0003 | 0.00009 | 0.00003 | 0.001 | 0.0004 | 0.0001 | 0.001 | 0.0004 | 0.0001 |
| Dried Feldspar Concentrate Drops * | 3 | 70.8 | 78.0 | 0.0005 | 0.00017 | 0.00017 | 0.04 | 0.01 | 0.01 | 0.15 | 0.06 | 0.06 | 0.46 | 0.17 | 0.17 |
| Dried Feldspar Truck Loading | 1 | | 88.0 | 0.0030 | 0.00110 | 0.00110 | 0.26 | 0.10 | 0.10 | 1.16 | 0.42 | 0.42 | 1.16 | 0.42 | 0.42 |
| Dried Quartz Concentrate Drops * | 4 | 45.4 | 50.0 | 0.0005 | 0.00017 | 0.00017 | 0.02 | 0.008 | 0.008 | 0.10 | 0.04 | 0.04 | 0.39 | 0.14 | 0.14 |
| Dried Quartz Truck Loading | 1 | | 88.0 | 0.0030 | 0.00110 | 0.00110 | 0.26 | 0.10 | 0.10 | 1.16 | 0.42 | 0.42 | 1.16 | 0.42 | 0.42 |
| | | | | | | | | | | | | Total | 4.68 | 1.71 | 1.65 |

NOTES:
1. Emission factors obtained from Fifth Edition AP-42, Chapter 11.19.2 (8/04). The conveyor transfer emission factor was used to conservatively estimate emissions for truck loading and unloading operations.
2. Based on footnote n of Table 11.19.2-2 the emission factor for tertiary crushing was used for primary and secondary crushing.
3. Except for dried feldspar and quartz, the average material moisture content is greater than 2.88 percent. Therefore, based on footnote b of Table 11.19.22, the controlled emission factors were used.
4. Because the feldspar and quartz are dried the non-controlled material handling emission factors were used.
5. The design of each conveyor transfer point (marked with a *) will include a hood over the head roller, enclosed chutes and skirting from the chute to the conveyor belt. To reflect this equipment design a particulate matter reduction of 85% for partial enclosure of the transfer point was applied to the emission factors based on information obtained from TCEQ's Rock Crushing Facility Emission Rate Calculation Worksheet, obtained from https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/emiss-calc-rock1.xlsx, accessed December 6, 2021)
6. Each operation is classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Quartz Dryer**
**ES10, CD09 and CD10, EP09**

| | | |
|---|---|---|
| Heat Input: | 312 | scfm (Facility Design) |
| | 18,720 | scf/hr |
| | 19.1 | MMBtu/hr (Calculated using gas flow and heat content value |
| Fuel Gas Heat Content: | 1,020 | Btu/ft$^3$ (Fifth Edition AP-42, Table 1.4-1, footnote a) |
| Operating Hours: | 8,760 | hr/yr |
| Fuel: | Natural Gas | |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.13 | lb/hr | Facility Design | 0.13 | 0.57 |
| $SO_2$ | 0.0006 | lb/MMBtu | AP-42 | 0.01 | 0.05 |
| $NO_x$ | 0.049 | lb/MMBtu | AP-42 | 0.94 | 4.10 |
| CO | 0.08 | lb/MMBtu | AP-42 | 1.57 | 6.89 |
| VOC | 0.0054 | lb/MMBtu | AP-42 | 0.10 | 0.45 |
| $CO_2e$ | | | | 2,236 | 9,793 |
| $CO_2$ | 53.06 | kg/MMBtu | 40 CFR Part 98 | 2,234 | 9,783 |
| $CH_4$ | 0.001 | kg/MMBtu | 40 CFR Part 98 | 0.04 | 0.18 |
| $N_2O$ | 0.0001 | kg/MMBtu | 40 CFR Part 98 | 0.004 | 0.02 |
| Lead | 4.902E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Arsenic | 1.96E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Benzene | 2.06E-06 | lb/MMBtu | AP-42 | 0.0000 | 0.0002 |
| Beryllium | < 1.18E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Cadmium | 1.08E-06 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Chromium | 1.37E-06 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Cobalt | 8.24E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Dichlorobenzene | 1.18E-06 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Formaldehyde | 7.35E-05 | lb/MMBtu | AP-42 | 0.0014 | 0.0061 |
| Hexane | 1.76E-03 | lb/MMBtu | AP-42 | 0.0337 | 0.1476 |
| HF | 0.66 | lb/hr | Facility Design | 0.6600 | 2.8908 |
| Manganese | 3.73E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Mercury | 2.55E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Naphthalene | 5.98E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Nickel | 2.06E-06 | lb/MMBtu | AP-42 | 0.0000 | 0.0002 |
| POM | 6.85E-07 | lb/MMBtu | Sum | 0.0000 | 0.0001 |
| 2-Methylnaphthalene | 2.35E-08 | lb/MMBtu | AP-42 | | |
| 3-Methylchloranthrene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| 7,12-Dimethylbenz(a)anthracene | < 1.57E-08 | lb/MMBtu | AP-42 | | |
| Acenaphthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Acenaphthylene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Anthracene | < 2.35E-09 | lb/MMBtu | AP-42 | | |
| Benz(a)anthracene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Benzo(a)pyrene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Benzo(b)fluoranthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Benzo(g,h,i)perylene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Benzo(k)fluoranthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Chrysene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Dibenzo(a,h)anthracene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Fluoranthene | 2.94E-09 | lb/MMBtu | AP-42 | | |
| Fluorene | 2.75E-09 | lb/MMBtu | AP-42 | | |
| Indeno(1,2,3-cd)pyrene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Naphthalene | 5.98E-07 | lb/MMBtu | AP-42 | | |
| Phenanthrene | 1.67E-08 | lb/MMBtu | AP-42 | | |
| Pyrene | 4.90E-09 | lb/MMBtu | AP-42 | | |
| Selenium | < 2.35E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Toluene | 3.33E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0003 |
| **TOTAL HAP** | | | | 0.6953 | 3.0456 |

NOTES:

1. The $PM/PM_{10}/PM_{2.5}$ and HF emission factors are based on the use of a fabric filter and wet scrubber to control dryer emissions.
2. AP-42 (Fifth Edition, July 1998) emission factors are for natural gas boilers <100 MMBtu/hr obtained from https://www3.epa.gov/ttn/chief/ap42/ch01/final/c01s04.pdf, accessed October 1, 2019.
3. The $PM = PM_{10} = PM_{2.5}$ emission factor includes filterable plus condensable particulate matter.
4. GHG emission factors and fuel heat content obtained from 40 CFR pt. 98 - Mandatory Greenhouse Gas Reporting, Table C -1 and C - 2, reflecting the update effective January 1, 2014.
5. $CO_2e$ values correspond to the sum of the individual GHG emissions times the following global warming potentials (GWP) obtained from 40 CFR Part 98, Table A-1, reflecting the update effective January 1, 2014.

| Greenhouse Gas | GWP |
|---|---|
| $CO_2$ | 1 |
| $CH_4$ | 25 |
| $N_2O$ | 298 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Feldspar Dryer**
**ES11, CD11 and CD12, EP10**

| | | |
|---|---|---|
| Heat Input: | 484 | scfm (Facility Design) |
| | 29,040 | scf/hr |
| | 29.6 | MMBtu/hr (Calculated using gas flow and heat content values) |
| Fuel Gas Heat Content: | 1,020 | Btu/ft$^3$ (Fifth Edition AP-42, Table 1.4-1, footnote a) |
| Feldspar Throughput | 77 | dry tons/hr (Facility Design) |
| | 500,000 | dry tons/yr (Requested Limit) |
| Operating Hours: | 8,760 | hr/yr |
| Fuel: | Natural Gas | |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.21 | lb/hr | Facility Design | 0.21 | 0.92 |
| $SO_2$ | 0.0006 | lb/MMBtu | AP-42 | 0.02 | 0.076 |
| $NO_x$ | 0.049 | lb/MMBtu | AP-42 | 1.45 | 6.36 |
| CO | 0.08 | lb/MMBtu | AP-42 | 2.44 | 10.7 |
| VOC | 0.0054 | lb/MMBtu | AP-42 | 0.160 | 0.70 |
| $CO_2e$ | | | | 3,469 | 15,192 |
| $CO_2$ | 53.06 | kg/MMBtu | 40 CFR Part 98 | 3,465 | 15,177 |
| $CH_4$ | 0.001 | kg/MMBtu | 40 CFR Part 98 | 0.07 | 0.29 |
| $N_2O$ | 0.0001 | kg/MMBtu | 40 CFR Part 98 | 0.007 | 0.03 |
| Lead | 4.902E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Arsenic | 1.96E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Benzene | 2.06E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0003 |
| Beryllium | < 1.18E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Cadmium | 1.08E-06 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Chromium | 1.37E-06 | lb/MMBtu | AP-42 | 0.0000 | 0.0002 |
| Cobalt | 8.24E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Dichlorobenzene | 1.18E-06 | lb/MMBtu | AP-42 | 0.0000 | 0.0002 |
| Formaldehyde | 7.35E-05 | lb/MMBtu | AP-42 | 0.0022 | 0.0095 |
| Hexane | 1.76E-03 | lb/MMBtu | AP-42 | 0.0523 | 0.2290 |
| HF | 0.026 | lb/dry ton | Facility Design | 1.9900 | 6.4610 |
| Manganese | 3.73E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Mercury | 2.55E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Naphthalene | 5.98E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Nickel | 2.06E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0003 |
| POM | 6.85E-07 | lb/MMBtu | Sum | 0.0000 | 0.0001 |
| 2-Methylnaphthalene | 2.35E-08 | lb/MMBtu | AP-42 | | |
| 3-Methylchloranthrene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| 7,12-Dimethylbenz(a)anthracene | < 1.57E-08 | lb/MMBtu | AP-42 | | |
| Acenaphthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Acenaphthylene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Anthracene | < 2.35E-09 | lb/MMBtu | AP-42 | | |
| Benz(a)anthracene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Benzo(a)pyrene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Benzo(b)fluoranthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Benzo(g,h,i)perylene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Benzo(k)fluoranthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Chrysene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Dibenzo(a,h)anthracene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Fluoranthene | 2.94E-09 | lb/MMBtu | AP-42 | | |
| Fluorene | 2.75E-09 | lb/MMBtu | AP-42 | | |
| Indeno(1,2,3-cd)pyrene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Naphthalene | 5.98E-07 | lb/MMBtu | AP-42 | | |
| Phenanthrene | 1.67E-08 | lb/MMBtu | AP-42 | | |
| Pyrene | 4.90E-09 | lb/MMBtu | AP-42 | | |
| Selenium | < 2.35E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Toluene | 3.33E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0004 |
| **TOTAL HAP** | | | | 2.0448 | 6.7012 |

NOTES:

1. The $PM/PM_{10}/PM_{2.5}$ and HF emission factors are based on the use of a fabric filter and wet scrubber to control dryer emissions.
2. AP-42 (Fifth Edition, July 1998) emission factors are for natural gas boilers <100 MMBtu/hr obtained from https://www3.epa.gov/ttn/chief/ap42/ch01/final/c01s04.pdf, accessed October 1, 2019.
3. The $PM = PM_{10} = PM_{2.5}$ emission factor includes filterable plus condensable particulate matter.
4. GHG emission factors and fuel heat content obtained from 40 CFR pt. 98 - Mandatory Greenhouse Gas Reporting, Table C -1 and C -2, reflecting the update effective January 1, 2014.
5. $CO_2e$ values correspond to the sum of the individual GHG emissions times the following global warming potentials (GWP) obtained from 40 CFR Part 98, Table A-1, reflecting the update effective January 1, 2014.

| Greenhouse Gas | GWP |
|---|---|
| $CO_2$ | 1 |
| $CH_4$ | 25 |
| $N_2O$ | 298 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**IES15: Miscellanous Materials Loader Operations**

The concentrate handling building will be located adjacent to the concentrator plant feed hopper. As such, the loaders moving material from the building to the hopper will operate in a stop and go mode and the travel distance will be as short as possible. While Fifth Edition AP-42, Chapter 13.2.2 does contain emission factors for equipment operating on unpaved roads, that methodology does not adequately account for short travel at low speeds or for equipment operating in stop and go mode.

Tailings and mica will be moved in a similar manner. Based on this, the fugitive dust generated by loader movements associated with these materials is anticipated to be negligible and, therefore, is not quantified.

**Piedmont Lithium Carolinas, Inc**

**Carolina Lithium Project**

**Air Quality Construction Permit Application**

**Potential to Emit**

**Emergency Generators - 1,000 kW**

**ES12, EP11 (Concentrator Plant, No. 1)**
**ES13, EP12 (Concentrator Plant, No. 2)**
**ES38, EP37 (CL-1, No. 1)**
**ES39, EP38 (CL-1, No. 2)**
**ES65, EP62 (CL-2, No. 1)**
**ES66, EP63 (CL-2, No. 2)**

| | | |
|---|---|---|
| Engine Size | 1,500 | HP |
| Heat Input Rating: | 10.5 | MMBtu/hr (calculated using BSFC = 7000 Btu/HP-hr, per AP-42) |
| Diesel Sulfur Limit: | 0.0015 | percent (15 ppm sulfur diesel) |
| Non-Emergency Operating Hours: | 100 | hr/yr |

| Pollutant | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| | Number | Units | Source | lb/hr | tpy |
| PM | 0.0007 | lb/HP-hr | AP-42 | 1.05 | 0.05 |
| $PM_{10}$ | 0.0007 | lb/HP-hr | AP-42 | 1.05 | 0.05 |
| $PM_{2.5}$ | 0.0007 | lb/HP-hr | AP-42 | 1.05 | 0.05 |
| $SO_2$ | 0.0015 | lb/MMBtu | See Note 2 | 0.02 | 0.001 |
| $NO_x$ | 0.013 | lb/HP-hr | AP-42 | 19.5 | 0.98 |
| CO | 0.0055 | lb/HP-hr | AP-42 | 8.25 | 0.41 |
| VOC | 0.000705 | lb/HP-hr | AP-42 | 1.06 | 0.05 |
| $CO_2e$ | | | | 1,733 | 87 |
| $CO_2$ | 73.96 | kg/mmBtu | 40 CFR Part 98 | 1,712 | 86 |
| $CH_4$ | 6.0E-04 | kg/mmBtu | 40 CFR Part 98 | 0.01 | 0.0007 |
| $N_2O$ | 3.0E-03 | kg/mmBtu | 40 CFR Part 98 | 0.07 | 0.003 |
| Acetaldehyde | 2.52E-05 | lb/MMBtu | AP-42 | 2.65E-04 | 1.32E-05 |
| Acrolein | 7.88E-06 | lb/MMBtu | AP-42 | 8.27E-05 | 4.14E-06 |
| Benzene | 7.76E-04 | lb/MMBtu | AP-42 | 8.15E-03 | 4.07E-04 |
| Formaldehyde | 7.89E-05 | lb/MMBtu | AP-42 | 8.28E-04 | 4.14E-05 |
| Naphthalene | 1.30E-04 | lb/MMBtu | AP-42 | 1.37E-03 | 6.83E-05 |
| POM | 2.12E-04 | lb/MMBtu | AP-42 | 2.22E-03 | 1.11E-04 |
| Acenaphthene | 4.68E-06 | lb/MMBtu | AP-42 | | |
| Acenaphthylene | 9.23E-06 | lb/MMBtu | AP-42 | | |
| Anthracene | 1.23E-06 | lb/MMBtu | AP-42 | | |
| Benzo(a)anthracene | 6.22E-07 | lb/MMBtu | AP-42 | | |
| Benzo(a)pyrene | < 2.57E-07 | lb/MMBtu | AP-42 | | |
| Benzo(b)fluoranthene | 1.11E-06 | lb/MMBtu | AP-42 | | |
| Benzo(g,h,i)perylene | < 5.56E-07 | lb/MMBtu | AP-42 | | |
| Benzo(k)fluoranthene | < 2.18E-07 | lb/MMBtu | AP-42 | | |
| Chrysene | 1.53E-06 | lb/MMBtu | AP-42 | | |
| Dibenzo(a,h)anthracene | < 3.46E-07 | lb/MMBtu | AP-42 | | |
| Fluoranthene | 4.03E-06 | lb/MMBtu | AP-42 | | |
| Fluorene | 1.28E-05 | lb/MMBtu | AP-42 | | |
| Indeno(1,2,3-cd)pyrene | < 4.14E-07 | lb/MMBtu | AP-42 | | |
| Naphthalene | 1.30E-04 | lb/MMBtu | AP-42 | | |
| Phenanthrene | 4.08E-05 | lb/MMBtu | AP-42 | | |
| Pyrene | 3.71E-06 | lb/MMBtu | AP-42 | | |
| Toluene | 2.81E-04 | lb/MMBtu | AP-42 | 2.95E-03 | 1.48E-04 |
| Xylene | 1.93E-04 | lb/MMBtu | AP-42 | 2.03E-03 | 1.01E-04 |
| **TOTAL HAP** | | | | | 8.26E-04 |

NOTES:

1. AP-42 emission factors obtained from Fifth Edition AP-42, Chapter 3.4 (October 1996).

2. Calculated using the fuel oil sulfur content and the $SO_2$ calculation equation obtained from AP-42, Table 3.4-1.

3. GHG emission factors obtained from 40 CFR pt. 98 - Mandatory Greenhouse Gas Reporting, Table C-1 and C-2, reflecting the update effective January 1, 2014.

4. $CO_2e$ values correspond to the sum of the individual GHG emissions times the following global warming potentials (GWP) obtained from 40 CFR Part 98, Table A-1, reflecting the update effective January 1, 2014.

| Greenhouse Gas | GWP |
|---|---|
| $CO_2$ | 1 |
| $CH_4$ | 25 |
| $N_2O$ | 298 |

5. Naphthalene is an individual HAP, as well as being one of the compounds included in the individual HAP called polycyclic organic matter (POM). To avoid double counting, only the emissions included in POM are included in the calculation of total HAP.

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Hydrofluoric Acid Storage Tank**
**ES14, CD13, EP13**

Operating Hours: 8760 hr/yr

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| HF | 0.06 | lb/hr | Facility Design | 0.06 | 0.26 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Sulfuric Acid Storage Tank**
**IES16**

Operating Hours: 8,760 hr/yr

Uncontrolled

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $H_2SO_4$ | 0.0018 | lb/hr | Facility Design | 0.0018 | 0.008 |

NOTE:
1. The sulfuric acid storage tank is uncontrolled.
2. This source is classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**IES17: Diesel Storage Tank, 20,000 gal**

| Pollutant | PTE | |
|---|---|---|
| | lb/yr | tpy |
| VOC | 25.30 | 0.01 |

NOTE:
1. Calculated using TankESP software package utilizing the calculation methodology of EPA's Fifth Edition AP-42, Chapter 7.1 (6/20)
2. Assumed maximum throughput of 1,040,000 gal/yr (one turnover per week).
3. This source is classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**IES18: Diesel Storage Tank, 7,000 gal**

| Pollutant | PTE | |
|---|---|---|
| | lb/yr | tpy |
| VOC | 8.97 | 0.004 |

NOTE:
1. Calculated using TankESP software package utilizing the calculation methodology of EPA's Fifth Edition AP-42, Chapter 7.1 (6/20)
2. Assumed maximum throughput of 364,000 gal/yr (one turnover per week).
3. This source is classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**IES19: Kerosene Storage Tank, 8,000 gal**

| Pollutant | PTE | |
|---|---|---|
| | lb/yr | tpy |
| VOC | 5.88 | 0.003 |

NOTE:
1. Calculated using TankESP software package utilizing the calculation methodology of EPA's Fifth Edition AP-42, Chapter 7.1 (6/20)
2. Assumed maximum throughput of 100,000 gal/yr.
3. This source is eligible for exemption under 15A NCAC 2Q .0102(h)(5).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Concentrator Plant Truck Traffic**
**IES20**

Operating Hours: 8,760 hr/yr

| | | Vehicle Frequency | | Distance Traveled Per Truck | Vehicle Weight (W) | PM | | | | $PM_{10}$ | | | | $PM_{2.5}$ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Operation | Type | VPD | VPH | VMT | (tons) | Size Multiplier (k) | (sL)[1] ($g/m^2$) | Factor (lb/VMT) | Emissions (lb/hr) | Size Multiplier (k) | (sL)[1] ($g/m^2$) | Factor (lb/VMT) | Emissions (lb/hr) | Size Multiplier (k) | (sL)[1] ($g/m^2$) | Factor (lb/VMT) | Emissions (lb/hr) |
| Spodumene Concentrate Export | Empty | 42 | 1.75 | 0.262 | 10 | 0.011 | 1.1 | 0.1256 | 0.058 | 0.0022 | 1.1 | 0.0251 | 0.0115 | 0.00054 | 1.1 | 0.0062 | 0.0028 |
| | Full | 42 | 1.75 | 0.262 | 32 | 0.011 | 1.1 | 0.4114 | 0.189 | 0.0022 | 1.1 | 0.0823 | 0.0378 | 0.00054 | 1.1 | 0.0202 | 0.0093 |
| Residue Receipt | Empty | 64 | 2.67 | 0.262 | 10 | 0.011 | 1.1 | 0.1256 | 0.088 | 0.0022 | 1.1 | 0.0251 | 0.0176 | 0.00054 | 1.1 | 0.0062 | 0.0043 |
| | Full | 64 | 2.67 | 0.262 | 32 | 0.011 | 1.1 | 0.4114 | 0.288 | 0.0022 | 1.1 | 0.0823 | 0.0576 | 0.00054 | 1.1 | 0.0202 | 0.0141 |
| Quartz Export | Empty | 44 | 1.83 | 0.262 | 10 | 0.011 | 1.1 | 0.1256 | 0.060 | 0.0022 | 1.1 | 0.0251 | 0.0121 | 0.00054 | 1.1 | 0.0062 | 0.0030 |
| | Full | 44 | 1.83 | 0.262 | 32 | 0.011 | 1.1 | 0.4114 | 0.198 | 0.0022 | 1.1 | 0.0823 | 0.0396 | 0.00054 | 1.1 | 0.0202 | 0.0097 |
| Feldspar Export | Empty | 69 | 2.88 | 0.262 | 10 | 0.011 | 1.1 | 0.1256 | 0.095 | 0.0022 | 1.1 | 0.0251 | 0.0190 | 0.00054 | 1.1 | 0.0062 | 0.0047 |
| | Full | 69 | 2.88 | 0.262 | 32 | 0.011 | 1.1 | 0.4114 | 0.310 | 0.0022 | 1.1 | 0.0823 | 0.0621 | 0.00054 | 1.1 | 0.0202 | 0.0152 |
| Mica Export | Empty | 5 | 0.21 | 0.262 | 10 | 0.011 | 1.1 | 0.1256 | 0.007 | 0.0022 | 1.1 | 0.0251 | 0.0014 | 0.00054 | 1.1 | 0.0062 | 0.0003 |
| | Full | 5 | 0.21 | 0.262 | 32 | 0.011 | 1.1 | 0.4114 | 0.022 | 0.0022 | 1.1 | 0.0823 | 0.0045 | 0.00054 | 1.1 | 0.0202 | 0.0011 |
| All Other Materials | Empty | 2 | 0.08 | 0.262 | 10 | 0.011 | 1.1 | 0.1256 | 0.003 | 0.0022 | 1.1 | 0.0251 | 0.0005 | 0.00054 | 1.1 | 0.0062 | 0.0001 |
| | Full | 2 | 0.08 | 0.262 | 32 | 0.011 | 1.1 | 0.4114 | 0.009 | 0.0022 | 1.1 | 0.0823 | 0.0018 | 0.00054 | 1.1 | 0.0202 | 0.0004 |
| | | | | | | | | **Total (lb/hr)** | **1.33** | | | **Total (lb/hr)** | **0.27** | | | **Total (lb/hr)** | **0.07** |
| | | | | | | | | **Total (tpy)** | **5.81** | | | **Total (tpy)** | **1.16** | | | **Total (tpy)** | **0.29** |

Paved Roadways: $EPM10 = k (sL)^{0.91} (W)^{1.02}$

NOTES
1 Emission Factors obtained from Fifth Edition AP-42, Section 13.2.1 (Jan. 2011).
2 The vehicle weights represents the average (i.e., loaded and unloaded) weights of the vehicle traveling on a given road segment.
3 The silt loading value obtained from AP-42 Section 13.2.1, Table 13.2.1-3 and corresponds to the mean silt loading for corn wet mills.
4. The truck traffic is eligible for exemption under 15A NCAC 2Q .0102(h)(5).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Wind Erosion of Concentrate Surge Pile**
**IES21 (CL-1)**
**IES29 (CL-2)**

| | | |
|---|---|---|
| Pile Active: | 365 | days/year |
| Size of Pile: | 0.25 | acres (Facility Design) |
| Material Silt Content: | 1.9 | % |
| Number of Days with >= 0.01 of Precipitation: | 136 | Average for years 2014 - 2018 |
| Occurrence of Wind > 12 mph | 3.5 | % (Based on years 2014 - 2018) |

| Operation | Calculated Emission Factor lb/acre/day | Particle Size Multiplier | | | PTE lb/hr | | | PTE tpy | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ |
| Concentrate Pile | 0.49 | 1 | 0.5 | 0.075 | 0.005 | 0.003 | 0.0004 | 0.02 | 0.01 | 0.002 |

NOTES:

1. Emission factor calculated using Equation 4-9 from EPA's "Control of Open Fugitive Dust Sources", September 1988, accessed at https://nepis.epa.gov/Exe/ZyPDF.cgi/91010T54.PDF?Dockey=91010T54.PDF.
2. Material silt content obtained from Fifth Edition AP-42, Table 13.2.4 correesponding to crusher limestone.

3. Number of days with greater than or equal to 0.01 inches of precipitation was obtained from https://www.weatherwx.com/hazardoutlook/nc/cherryville.html.
4. The occurrence of wind speeds greater than 12 mph was calculated based on wind speed information contained in the meteorological data used in the dispersion modeling analysis.
5. The pile is classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Concentrate Pile Loader Operations**
**IES22 (CL-1)**
**IES30 (CL-2)**

The concentrate pile will be located near the feed hopper. As such, the loaders moving material from the pile to the hopper will operate in a stop and go mode and the travel distances will be as short as possible. While Fifth Edition AP-42, Chapter 13.2.2 does contain emission factors for equipment operating on unpaved roads, that methodology does not adequately account for short travel at low speeds or for equipment operating in stop and go mode. Based on this, the fugitive dust generated by loader movement is anticipated to be negligible and, therefore, is not quantified.

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Potential to Emit**
**Concentrate Pile Material Handling**
**IES23 (CL-1)**
**IES31 (CL-2)**

Operating Hours: 8,760 hr/yr

| Operation | Number of Operations | Throughput (Facility Design) | | Emission Factor (lb/ton) | | | PTE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | lb/hr | | | tpy | | |
| | | tonne/hr | ton/hr | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ |
| Drop into Hopper | 1 | 35 | 39 | 0.00014 | 0.000046 | 0.000013 | 0.005 | 0.002 | 0.0005 | 0.02 | 0.008 | 0.002 |
| Drop Onto Spodumene Conveyor * | 1 | | | 0.00002 | 0.000007 | 0.000002 | 0.0008 | 0.0003 | 0.00008 | 0.004 | 0.001 | 0.0003 |
| | | | | | | | | | Total | 0.03 | 0.009 | 0.003 |

NOTES:
1. Emission factors obtained from Fifth Edition AP-42, Chapter 11.19.2 (8/04).
2. Based on footnote n of Table 11.19.2-2 the emission factor for tertiary crushing was used for primary and secondary crushing.
3. The design of each conveyor transfer point (marked with a *) will include a hood over the head roller, enclosed chutes and skirting from the chute to the conveyor belt. To reflect this equipment design a particulate matter reduction of 85% for partial enclosure of the transfer point was applied to the emission factors based on information obtained from TCEQ's Rock Crushing Facility Emission Rate Calculation Worksheet, obtained from https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/emiss-calc-rock1.xlsx, accessed December 6, 2021)
4. Each operation is classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Spodumene Concentrate Conveying**
**ES15, CD14, EP14 (CL-1)**
**ES44, CD36, EP41 (CL-2)**

| | | |
|---|---|---|
| Airflow: | 250 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.004 | 0.02 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Spodumene Concentrate Surge Silo**
**ES16, CD15, EP15 (CL-1)**
**ES45, CD37, EP42 (CL-2)**

| | | |
|---|---|---|
| Airflow: | 1,150 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.02 | 0.09 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Spodumene Concentrate Conveyor to Calciner**
**ES17, CD16, EP16 (CL-1)**
**ES46, CD38, EP43 (CL-2)**

| | | |
|---|---|---|
| Airflow: | 250 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.004 | 0.02 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Calciner Rotary Kiln**
**ES18, CD17 and CD18, EP17 (CL-1)**
**ES47, CD39 and CD40, EP44 (CL-2)**

| | | |
|---|---|---|
| Maximum Concentrated Spodumene Input: | 37.5 | ton/hr (Facility Design) |
| Heat Input | 75.05 | MMBtu/hr (Facility Design) |
| Fuel Gas Heat Content: | 1,020 | Btu/ft$^3$ (Fifth Edition AP-42, Table 1.4-1, footnote a) |
| Exhaust Flow Rate: | 9,292 | dscfm (Facility Design) |
| Operating Hours: | 8,760 | hr/yr |
| Fuel: | Natural Gas | |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | | | | 4.56 | 20.0 |
| Process Generated | 4.0 | lb/hr | Facility Design | 4.0 | 17.5 |
| Fuel Combustion | 0.0075 | lb/MMBtu | AP-42 | 0.56 | 2.45 |
| $SO_2$ | 0.001 | lb/MMBtu | AP-42 | 0.04 | 0.19 |
| $NO_x$ | 21.68 | lb/hr | Facility Design | 21.68 | 95.0 |
| CO | 0.082 | lb/MMBtu | AP-42 | 6.18 | 27.1 |
| VOC | 0.0054 | lb/MMBtu | AP-42 | 0.40 | 1.77 |
| $CO_2e$ | | | | 8,788 | 38,492 |
| $CO_2$ | 53.06 | kg/MMBtu | 40 CFR Part 98 | 8,779 | 38,453 |
| $CH_4$ | 0.001 | kg/MMBtu | 40 CFR Part 98 | 0.17 | 0.72 |
| $N_2O$ | 0.0001 | kg/MMBtu | 40 CFR Part 98 | 0.017 | 0.072 |
| Lead | 4.902E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0002 |
| Arsenic | 1.96E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Benzene | 2.06E-06 | lb/MMBtu | AP-42 | 0.0002 | 0.0007 |
| Beryllium | < 1.18E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Cadmium | 1.08E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0004 |
| Chromium | 1.37E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0005 |
| Cobalt | 8.24E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Dichlorobenzene | 1.18E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0004 |
| Formaldehyde | 7.35E-05 | lb/MMBtu | AP-42 | 0.0055 | 0.0242 |
| Hexane | 1.76E-03 | lb/MMBtu | AP-42 | 0.1324 | 0.5801 |
| Manganese | 3.73E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Mercury | 2.55E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Naphthalene | 5.98E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0002 |
| Nickel | 2.06E-06 | lb/MMBtu | AP-42 | 0.0002 | 0.0007 |
| POM | 6.85E-07 | lb/MMBtu | Sum | 0.0001 | 0.0002 |
| 2-Methylnaphthalene | 2.35E-08 | lb/MMBtu | AP-42 | | |
| 3-Methylchloranthrene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| 7,12-Dimethylbenz(a)anthracene | < 1.57E-08 | lb/MMBtu | AP-42 | | |
| Acenaphthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Acenaphthylene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Anthracene | < 2.35E-09 | lb/MMBtu | AP-42 | | |
| Benz(a)anthracene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Benzo(a)pyrene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Benzo(b)fluoranthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Benzo(g,h,i)perylene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Benzo(k)fluoranthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Chrysene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Dibenzo(a,h)anthracene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Fluoranthene | 2.94E-09 | lb/MMBtu | AP-42 | | |
| Fluorene | 2.75E-09 | lb/MMBtu | AP-42 | | |
| Indeno(1,2,3-cd)pyrene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Naphthalene | 5.98E-07 | lb/MMBtu | AP-42 | | |
| Phenanthrene | 1.67E-08 | lb/MMBtu | AP-42 | | |
| Pyrene | 4.90E-09 | lb/MMBtu | AP-42 | | |
| Selenium | < 2.35E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Toluene | 3.33E-06 | lb/MMBtu | AP-42 | 0.0003 | 0.0011 |
| **TOTAL HAP** | | | | | 0.6086 |

NOTES:

1. AP-42 (Fifth Edition, July 1998) emission factors are for natural gas boilers <100 MMBtu/hr obtained from https://www3.epa.gov/ttn/chief/ap42/ch01/final/c01s04.pdf, accessed October 1, 2019.
2. The PM = $PM_{10}$ = $PM_{2.5}$ emission factor assumed to include filterable plus condensable particulate matter.
3. GHG emission factors and fuel heat content obtained from 40 CFR pt. 98 - Mandatory Greenhouse Gas Reporting, Table C-1 and C-2, reflecting the update effective January 1, 2014.
4. $CO_2e$ values correspond to the sum of the individual GHG emissions times the following global warming potentials (GWP) obtained from 40 CFR Part 98, Table A-1, reflecting the update effective January 1, 2014.

| Greenhouse Gas | GWP |
|---|---|
| $CO_2$ | 1 |
| $CH_4$ | 25 |
| $N_2O$ | 298 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Cooler Discharge Sweep Air**
**ES19, CD19, EP18 (CL-1)**
**ES48, CD41, EP45 (CL-2)**

| | | |
|---|---|---|
| Airflow: | 1,500 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.03 | 0.11 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Ball Mill Feed Bin**
**ES20, CD20, EP19 (CL-1)**
**ES49, CD42, EP46 (CL-2)**

| | | |
|---|---|---|
| Airflow: | 1,848 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.03 | 0.14 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Pressure Leaching**

**ES21, CD21, EP20 (CL-1, Train 1)**
**ES22, CD22, EP21 (CL-1, Train 2)**
**ES50, CD43, EP47 (CL-2, Train 1)**
**ES51, CD44, EP48 (CL-2, Train 2)**

Operating Hours: 8,760 hr/yr

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.18 | lb/hr | Facility Design | 0.18 | 0.79 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**LiOH Bagging Area Surge Bin/Transporter**

**ES23, CD23, EP22 (CL-1, Hopper No. 1)**
**ES24, CD24, EP23 (CL-1, Hopper No. 2)**
**ES52, CD45, EP49 (CL-2, Hopper No. 1)**
**ES53, CD46, EP50 (CL-2, Hopper No. 2)**

| | | |
|---|---|---|
| Airflow: | 90 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.002 | 0.007 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**LiOH Bagging Area Day Tank**

**ES25, CD25, EP24 (CL-1, Tank No. 1)**
**ES26, CD26, EP25 (CL-1, Tank No. 2)**
**ES27, CD27, EP26 (CL-1, Tank No. 3)**
**ES28, CD28, EP27 (CL-1, Tank No. 4)**
**ES54, CD47, EP51 (CL-2, Tank No. 1)**
**ES55, CD48, EP52 (CL-2, Tank No. 2)**
**ES56, CD49, EP53 (CL-2, Tank No. 3)**
**ES57, CD50, EP54 (CL-2, Tank No. 4)**

| | | |
|---|---|---|
| Airflow: | 90 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.002 | 0.007 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**LiOH Bagging Operation**
**ES29, CD29, EP28 (CL-1)**
**ES58, CD51, EP55 (CL-2)**

Operating Hours: 8,760 hr/yr

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.07 | lb/hr | Facility Design | 0.07 | 0.31 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**LiOH Bagging Area Vacuum**
**ES30, CD30, EP29 (CL-1)**
**ES59, CD52, EP56 (CL-2)**

| | | |
|---|---|---|
| Airflow: | 600 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.01 | 0.05 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Lime Receiving and Storage**
**ES31, CD31, EP30**

| | | |
|---|---|---|
| Airflow: | 2,850 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.05 | 0.21 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Phosphate Receiving and Storage**
**ES32, CD32, EP31 (CL-1)**
**ES60, CD53, EP57 (CL-2)**

| | | |
|---|---|---|
| Airflow: | 2,850 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.05 | 0.21 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Sodium Carbonate Receiving and Storage Silo**
**ES33, CD33, EP32**

| | | |
|---|---|---|
| Airflow: | 2,850 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| Pollutant | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.05 | 0.21 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Sodium Carbonate Receiving and Feeder Bin**
**ES34, CD34, EP33 (CL-1)**
**ES61, CD54, EP58 (CL-2)**

| | | |
|---|---|---|
| Airflow: | 2,850 | acfm |
| Operating Hours: | 8,760 | hr/yr |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.002 | gr/acf | BACT | 0.05 | 0.21 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**

**ES35, EP34 (CL-1, Boiler No. 1)**
**ES36, EP35 (CL-1, Boiler No. 2)**
**ES62, EP59 (CL-2, Boiler No. 1)**
**ES63, EP60 (CL-2, Boiler No. 2)**

| | | |
|---|---|---|
| | 1,019 | scfm (Facility Design) |
| Heat Input: | 61,164 | scf/hr |
| | 62.4 | MMBtu/hr (Calculated using gas flow and heat content values) |
| Fuel Gas Heat Content: | 1,020 | Btu/ft$^3$ (Fifth Edition AP-42, Table 1.4-1, footnote a) |
| Operating Hours: | 8,760 | hr/yr |
| Fuel: | Natural Gas | |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $PM/PM_{10}/PM_{2.5}$ | 0.005 | lb/MMBtu | BACT | 0.31 | 1.37 |
| $SO_2$ | 0.0006 | lb/MMBtu | AP-42 | 0.04 | 0.16 |
| $NO_x$ | 0.0146 | lb/MMBtu | Facility Design | 0.91 | 3.99 |
| CO | 0.082 | lb/MMBtu | AP-42 | 5.14 | 22.5 |
| VOC | 0.0054 | lb/MMBtu | AP-42 | 0.34 | 1.47 |
| $CO_2e$ | | | | 7,305 | 31,998 |
| $CO_2$ | 53.06 | kg/MMBtu | 40 CFR Part 98 | 7,298 | 31,965 |
| $CH_4$ | 0.001 | kg/MMBtu | 40 CFR Part 98 | 0.14 | 0.60 |
| $N_2O$ | 0.0001 | kg/MMBtu | 40 CFR Part 98 | 0.014 | 0.06 |
| Lead | 4.902E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Arsenic | 1.96E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Benzene | 2.06E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0006 |
| Beryllium | < 1.18E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Cadmium | 1.08E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0003 |
| Chromium | 1.37E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0004 |
| Cobalt | 8.24E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Dichlorobenzene | 1.18E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0003 |
| Formaldehyde | 7.35E-05 | lb/MMBtu | AP-42 | 0.0046 | 0.0201 |
| Hexane | 1.76E-03 | lb/MMBtu | AP-42 | 0.1101 | 0.4822 |
| Manganese | 3.73E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Mercury | 2.55E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Naphthalene | 5.98E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0002 |
| Nickel | 2.06E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0006 |
| POM | 6.85E-07 | lb/MMBtu | Sum | 0.0000 | 0.0002 |
| 2-Methylnaphthalene | 2.35E-08 | lb/MMBtu | AP-42 | | |
| 3-Methylchloranthrene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| 7,12-Dimethylbenz(a)anthracene | < 1.57E-08 | lb/MMBtu | AP-42 | | |
| Acenaphthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Acenaphthylene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Anthracene | < 2.35E-09 | lb/MMBtu | AP-42 | | |
| Benz(a)anthracene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Benzo(a)pyrene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Benzo(b)fluoranthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Benzo(g,h,i)perylene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Benzo(k)fluoranthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Chrysene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Dibenzo(a,h)anthracene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Fluoranthene | 2.94E-09 | lb/MMBtu | AP-42 | | |
| Fluorene | 2.75E-09 | lb/MMBtu | AP-42 | | |
| Indeno(1,2,3-cd)pyrene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Naphthalene | 5.98E-07 | lb/MMBtu | AP-42 | | |
| Phenanthrene | 1.67E-08 | lb/MMBtu | AP-42 | | |
| Pyrene | 4.90E-09 | lb/MMBtu | AP-42 | | |
| Selenium | < 2.35E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Toluene | 3.33E-06 | lb/MMBtu | AP-42 | 0.0002 | 0.0009 |
| **TOTAL HAP** | | | | | 0.5059 |

NOTES:
1. Obtained from AP-42 (Fifth Edition, July 1998,) emission factors are for natural gas boilers <100 MMBtu/hr.
2. The PM = $PM_{10}$ = $PM_{2.5}$ emission factor includes filterable plus condensable particulate matter.
3. The $NO_x$ emission factor was calculated based on a facility design of using low $NO_x$ burners with emissions of 14.9 lb/MMscf.
4. GHG emission factors obtained from 40 CFR pt. 98 - Mandatory Greenhouse Gas Reporting, Table C-1 and C-2, reflecting the update effective January 1, 2014.
5. $CO_2e$ values correspond to the sum of the individual GHG emissions times the following global warming potentials (GWP) obtained from 40 CFR Part 98, Table A-1, reflecting the update effective January 1, 2014.

| Greenhouse Gas | GWP |
|---|---|
| $CO_2$ | 1 |
| $CH_4$ | 25 |
| $N_2O$ | 298 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**ES37, EP36 (CL-1, Boiler No. 3)**
**ES64, EP61 (CL-2, Boiler No. 3)**

| | | |
|---|---|---|
| | 1,011 | scfm (Facility Design) |
| Heat Input: | 60,649 | scf/hr |
| | 61.9 | MMBtu/hr (Calculated using gas flow and heat content values) |
| Fuel Gas Heat Content: | 1,020 | Btu/ft$^3$ (Fifth Edition AP-42, Table 1.4-1, footnote a) |
| Operating Hours: | 8,760 | hr/yr |
| Fuel: | Natural Gas | |

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| PM/$PM_{10}$/$PM_{2.5}$ | 0.005 | lb/MMBtu | BACT | 0.31 | 1.35 |
| $SO_2$ | 0.0006 | lb/MMBtu | AP-42 | 0.04 | 0.16 |
| $NO_x$ | 0.0146 | lb/MMBtu | Facility Design | 0.90 | 3.96 |
| CO | 0.082 | lb/MMBtu | AP-42 | 5.09 | 22.3 |
| VOC | 0.0054 | lb/MMBtu | AP-42 | 0.33 | 1.46 |
| $CO_2$e | | | | 7,244 | 31,729 |
| $CO_2$ | 53.06 | kg/MMBtu | 40 CFR Part 98 | 7,236 | 31,696 |
| $CH_4$ | 0.001 | kg/MMBtu | 40 CFR Part 98 | 0.14 | 0.60 |
| $N_2O$ | 0.0001 | kg/MMBtu | 40 CFR Part 98 | 0.014 | 0.06 |
| Lead | 4.902E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Arsenic | 1.96E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Benzene | 2.06E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0006 |
| Beryllium | < 1.18E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Cadmium | 1.08E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0003 |
| Chromium | 1.37E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0004 |
| Cobalt | 8.24E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Dichlorobenzene | 1.18E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0003 |
| Formaldehyde | 7.35E-05 | lb/MMBtu | AP-42 | 0.0045 | 0.0199 |
| Hexane | 1.76E-03 | lb/MMBtu | AP-42 | 0.1092 | 0.4782 |
| Manganese | 3.73E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Mercury | 2.55E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0001 |
| Naphthalene | 5.98E-07 | lb/MMBtu | AP-42 | 0.0000 | 0.0002 |
| Nickel | 2.06E-06 | lb/MMBtu | AP-42 | 0.0001 | 0.0006 |
| POM | 6.85E-07 | lb/MMBtu | Sum | 0.0000 | 0.0002 |
| 2-Methylnaphthalene | 2.35E-08 | lb/MMBtu | AP-42 | | |
| 3-Methylchloranthrene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| 7,12-Dimethylbenz(a)anthracene | < 1.57E-08 | lb/MMBtu | AP-42 | | |
| Acenaphthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Acenaphthylene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Anthracene | < 2.35E-09 | lb/MMBtu | AP-42 | | |
| Benz(a)anthracene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Benzo(a)pyrene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Benzo(b)fluoranthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Benzo(g,h,i)perylene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Benzo(k)fluoranthene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Chrysene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Dibenzo(a,h)anthracene | < 1.18E-09 | lb/MMBtu | AP-42 | | |
| Fluoranthene | 2.94E-09 | lb/MMBtu | AP-42 | | |
| Fluorene | 2.75E-09 | lb/MMBtu | AP-42 | | |
| Indeno(1,2,3-cd)pyrene | < 1.76E-09 | lb/MMBtu | AP-42 | | |
| Naphthalene | 5.98E-07 | lb/MMBtu | AP-42 | | |
| Phenanthrene | 1.67E-08 | lb/MMBtu | AP-42 | | |
| Pyrene | 4.90E-09 | lb/MMBtu | AP-42 | | |
| Selenium | < 2.35E-08 | lb/MMBtu | AP-42 | 0.0000 | 0.0000 |
| Toluene | 3.33E-06 | lb/MMBtu | AP-42 | 0.0002 | 0.0009 |
| **TOTAL HAP** | | | | | 0.5017 |

NOTES:
1. Obtained from AP-42 (Fifth Edition, July 1998) emission factors are for natural gas boilers <100 MMBtu/hr.
2. The PM = $PM_{10}$ = $PM_{2.5}$ emission factor includes filterable plus condensable particulate matter.
3. The $NO_x$ emission factor was calculated based on a facility design of using low $NO_x$ burners with emissions of 14.9 lb/MMscf.
4. GHG emission factors obtained from 40 CFR pt. 98 - Mandatory Greenhouse Gas Reporting, Table C-1 and C-2, reflecting the update effective January 1, 2014.
5. $CO_2$e values correspond to the sum of the individual GHG emissions times the following global warming potentials (GWP) obtained from 40 CFR Part 98, Table A-1, reflecting the update effective January 1, 2014.

| Greenhouse Gas | GWP |
|---|---|
| $CO_2$ | 1 |
| $CH_4$ | 25 |
| $N_2O$ | 298 |

**Piedmont Lithium Carolinas, Inc**

**Carolina Lithium Project**

**Air Quality Construction Permit Application Modification**

**Potential to Emit**

**Fire Pump**

**ES40, EP39**

| | | |
|---|---|---|
| Engine Size | 363 | HP |
| Heat Input Rating: | 2.54 | MMBtu/hr (calculated using BSFC = 7000 Btu/HP-hr, per AP-42) |
| Diesel Sulfur Limit: | 0.0015 | percent (15 ppm sulfur diesel) |
| Non-Emergency Operating Hours: | 100 | hr/yr |

| Pollutant | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| | Number | Units | Source | lb/hr | tpy |
| PM | 0.0022 | lb/HP-hr | AP-42 | 0.80 | 0.04 |
| $PM_{10}$ | 0.0022 | lb/HP-hr | AP-42 | 0.80 | 0.04 |
| $PM_{2.5}$ | 0.0022 | lb/HP-hr | AP-42 | 0.80 | 0.04 |
| $SO_2$ | 0.0015 | lb/MMBtu | See Note 2 | 0.004 | 0.0002 |
| $NO_x$ | 0.031 | lb/HP-hr | AP-42 | 11.3 | 0.56 |
| CO | 0.0067 | lb/HP-hr | AP-42 | 2.42 | 0.12 |
| VOC | 0.00247 | lb/HP-hr | AP-42 | 0.90 | 0.04 |
| $CO_2e$ | | | | 419 | 21 |
| $CO_2$ | 73.96 | kg/mmBtu | 40 CFR Part 98 | 414 | 21 |
| $CH_4$ | 6.0E-04 | kg/mmBtu | 40 CFR Part 98 | 0.003 | 0.0002 |
| $N_2O$ | 3.0E-03 | kg/mmBtu | 40 CFR Part 98 | 0.02 | 0.0008 |
| Acetaldehyde | 7.67E-04 | lb/MMBtu | AP-42 | 1.95E-03 | 9.74E-05 |
| Acrolein | < 9.25E-05 | lb/MMBtu | AP-42 | 2.35E-04 | 1.18E-05 |
| Benzene | 9.33E-04 | lb/MMBtu | AP-42 | 2.37E-03 | 1.19E-04 |
| 1,3-Butadiene | < 3.91E-05 | lb/MMBtu | AP-42 | 9.94E-05 | 4.97E-06 |
| Formaldehyde | 1.18E-03 | lb/MMBtu | AP-42 | 3.00E-03 | 1.50E-04 |
| Naphthalene | 8.48E-05 | lb/MMBtu | AP-42 | 2.15E-04 | 1.08E-05 |
| POM | 1.68E-04 | lb/MMBtu | AP-42 | 4.27E-04 | 2.14E-05 |
| Acenaphthene | < 1.42E-06 | lb/MMBtu | AP-42 | | |
| Acenaphthylene | < 5.06E-06 | lb/MMBtu | AP-42 | | |
| Anthracene | 1.87E-06 | lb/MMBtu | AP-42 | | |
| Benzo(a)anthracene | 1.68E-06 | lb/MMBtu | AP-42 | | |
| Benzo(a)pyrene | < 1.88E-07 | lb/MMBtu | AP-42 | | |
| Benzo(b)fluoranthene | < 9.91E-08 | lb/MMBtu | AP-42 | | |
| Benzo(g,h,i)perylene | < 4.89E-07 | lb/MMBtu | AP-42 | | |
| Benzo(k)fluoranthene | < 1.55E-07 | lb/MMBtu | AP-42 | | |
| Chrysene | 3.53E-07 | lb/MMBtu | AP-42 | | |
| Dibenzo(a,h)anthracene | < 5.83E-07 | lb/MMBtu | AP-42 | | |
| Fluoranthene | 7.61E-06 | lb/MMBtu | AP-42 | | |
| Fluorene | 2.92E-05 | lb/MMBtu | AP-42 | | |
| Indeno(1,2,3-cd)pyrene | < 3.75E-07 | lb/MMBtu | AP-42 | | |
| Naphthalene | 8.48E-05 | lb/MMBtu | AP-42 | | |
| Phenanthrene | 2.94E-05 | lb/MMBtu | AP-42 | | |
| Pyrene | 4.78E-06 | lb/MMBtu | AP-42 | | |
| Toluene | 4.09E-04 | lb/MMBtu | AP-42 | 1.04E-03 | 5.20E-05 |
| Xylene | 2.85E-04 | lb/MMBtu | AP-42 | 7.24E-04 | 3.62E-05 |
| **TOTAL HAP** | | | | | 4.92E-04 |

NOTES:

1. AP-42 emission factors obtained from Fifth Edition AP-42, Chapter 3.3 (October 1996).

2. Calculated using the fuel oil sulfur content and the $SO_2$ calculation equation obtained from AP-42, Table 3.4-1.

3. GHG emission factors obtained from 40 CFR pt. 98 - Mandatory Greenhouse Gas Reporting, Table C-1 and C-2, reflecting the update effective January 1, 2014.

4. $CO_2e$ values correspond to the sum of the individual GHG emissions times the following global warming potentials (GWP) obtained from 40 CFR Part 98, Table A-1, reflecting the update effective January 1, 2014.

| Greenhouse Gas | GWP |
|---|---|
| $CO_2$ | 1 |
| $CH_4$ | 25 |
| $N_2O$ | 298 |

5. Naphthalene is an individual HAP, as well as being one of the compounds included in the individual HAP called polycyclic organic matter (POM). To avoid double counting, only the emissions included in POM are included in the calculation of total HAP.

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Hydrochloric Acid Storage Tank (ES41, CL-1; ES67, CL-2)**
**Hydrochloric Acid Dilution Tank (ES42, CL-1; ES68, CL-2))**
**Sulfuric Acid Dilution Tank (ES43, CL-1; ES69, CL-2))**
**CD35, EP40 (CL-1)**
**CD55, EP64 (CL-2)**

Operating Hours: 8,760 hr/yr

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| HCl | | | Facility Design | 0.12 | 0.54 |
| Storage Tank | 0.124 | lb/hr | Facility Design | 0.12 | |
| Dilution Tank | 0.0001 | lb/hr | Facility Design | 0.0001 | |
| $H_2SO_4$ | 3.35E-07 | lb/hr | Facility Design | 3.35E-07 | 1.47E-06 |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Lithium Carbonate Reactor**
**IES24 (CL-1)**
**IES32 (CL-2)**

Operating Hours: 8,760 hr/yr

| | Emission Factor | | | PTE | |
|---|---|---|---|---|---|
| Pollutant | Number | Units | Source | lb/hr | tpy |
| $CO_2$ | 17 | lb/hr | Facility Design | 17 | 74 |

NOTE: Each lithium carbonate reactor is eligible to be classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Cooling Tower**
**IES25 (CL-1)**
**IES33 (CL-2)**

Assumptions:

Tower Type: Induced Draft Counter Flow

Tower Parameters

| | | |
|---|---|---|
| TDS | **1,970** | ppm (Facility Design) |
| Water Density: | **8.34** | lb/gal @ 90 °F (lower bound of cooling tower circulating water temperature) |
| Liquid Drift Loss: | **0.00001** | gal/gal (BACT - 0.001% drift) |
| | **0.0834** | lb/kgal (calculated) |

Cooling Water Flow

| | | |
|---|---|---|
| | **608.32** | $m^3$/hr (Facility design information) |
| | **160,718** | gal/hr (calculated based on 264.2 gal/$m^3$) |
| | **161** | (kgal/hr) |

| | | |
|---|---|---|
| Operation Hours: | **8,760** | hr/yr |

Emissions

| Pollutant | PTE | |
|---|---|---|
| | lb/hr | tpy |
| PM/PM10/PM2.5 | 0.0264 | 0.12 |

NOTES:
1. Assumed PM = $PM_{10}$ = $PM_{2.5}$.
2. PTE calculated by multiplying the drift loss by the cooling tower TDS.
3. Each cooling tower is eligible to be classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**7,000 gal Diesel Storage Tank**
**IES26 (CL-1)**
**IES34 (CL-2)**

| | PTE | |
|---|---|---|
| Pollutant | lb/yr | tpy |
| VOC | 3.71 | 0.002 |

NOTE:
1. Calculated using TankESP software package utilizing the calculation methodology of EPA's Fifth Edition AP-42, Chapter 7.1 (6/20)
2. Assumed maximum throughput of 10,000 gal/yr.
3. Each diesel tank is eligible to be classified as insignificant under 15A NCAC 2Q .0503(8).

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Truck Traffic**
**IES27 (CL-1)**
**IES35 (CL-2)**

Operating Hours: 8,760 hr/yr

| Operation | Type | Vehicle Frequency VPD | Vehicle Frequency VPH | Distance Traveled Per Truck VMT | Vehicle Weight (W) tons | PM Size Multiplier (k) | PM (sL)[1] g/m² | PM Factor lb/VMT | PM Emissions lb/hr | $PM_{10}$ Size Multiplier (k) | $PM_{10}$ (sL)[1] g/m² | $PM_{10}$ Factor lb/VMT | $PM_{10}$ Emissions lb/hr | $PM_{2.5}$ Size Multiplier (k) | $PM_{2.5}$ (sL)[1] g/m² | $PM_{2.5}$ Factor lb/VMT | $PM_{2.5}$ Emissions lb/hr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LiOH Product | Empty | 6 | 0.25 | 0.658 | 10 | 0.011 | 1.1 | 0.1256 | 0.02 | 0.0022 | 1.1 | 0.0251 | 0.004 | 0.00054 | 1.1 | 0.0062 | 0.0010 |
| | Full | 6 | 0.25 | 0.297 | 32 | 0.011 | 1.1 | 0.4114 | 0.03 | 0.0022 | 1.1 | 0.0823 | 0.006 | 0.00054 | 1.1 | 0.0202 | 0.0015 |
| All Other Materials | Empty | 18 | 0.75 | 0.658 | 10 | 0.011 | 1.1 | 0.1256 | 0.06 | 0.0022 | 1.1 | 0.0251 | 0.012 | 0.00054 | 1.1 | 0.0062 | 0.0030 |
| | Full | 18 | 0.75 | 0.297 | 30 | 0.011 | 1.1 | 0.3852 | 0.09 | 0.0022 | 1.1 | 0.0770 | 0.017 | 0.00054 | 1.1 | 0.0189 | 0.0042 |
| | | | | | | | | **Total (lb/hr)** | **0.20** | | | **Total (lb/hr)** | **0.04** | | | **Total (lb/hr)** | **0.01** |
| | | | | | | | | **Total (tpy)** | **0.87** | | | **Total (tpy)** | **0.17** | | | **Total (tpy)** | **0.04** |

Paved Roadways: $EPM10 = k\ (sL)^{0.91}\ (W)^{1.02}$

NOTES
1 Emission Factors obtained from Fifth Edition AP-42, Section 13.2.1 (Jan. 2011).
2 The vehicle weights represents the average (i.e., loaded and unloaded) weights of the vehicle traveling on a given road segment.
3 The silt loading value obtained from AP-42 Section 13.2.1, Table 13.2.1-3 and corresponds to the mean silt loading for corn wet mills.
4. The truck traffic is eligible to be classified as insignificant under 15A NCAC 2Q .0503(8).

**Modeled distances for truck traffic**

| | | | |
|---|---|---|---|
| **Chemical Plants** | | | |
| Western Plant Entrance | 685.4 meters | 2249 feet | Assume this segment is two-way traffic, half empty and half full |
| Incoming through Mid-Plant | 373.2 meters | 1224 feet | One-way traffic, full trucks |
| Empty Truck Return Loop | 478.1 meters | 1569 feet | One-way traffic, empty trucks |
| **Total distance** | **2222.1 meters** | **7290 feet** | Entrance back to exit |
| **Primary Concentrator Site** | | | |
| Single Truck Loop | 844.8 meters | 2772 feet | Made one single line volume segment from entrance back to exit (one-way traffic) |
| **Alternate Concentrator Site** | | | |
| Single Truck Loop | 694.3 meters | 2278 feet | Made one single line volume segment from entrance back to exit (one-way traffic) |

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application Modification**
**Potential to Emit**
**Component Leak Fugitives**
**IES28 (CL-1)**
**IES36 (CL-2)**

Operating Hours: 8,760 hr/yr

**Components in $CO_2$ Service**

| | | |
|---|---|---|
| Component Count | Valves | Flanges/Connectors |
| | 6 | 16 |
| Total Leak Emissions (lb/hr/component) | 0.0132 | 0.0040 |
| **Pollutant** | PTE | |
| | lb/hr | tpy |
| $CO_2e$ | 0.1 | 1 |
| $CO_2$ | 0.1 | 1 |

**Components in Natural Gas Service**

| | | |
|---|---|---|
| Component Count | Valves | Flanges/Connectors |
| | 4 | 12 |
| Total Leak Emissions (lb/hr/component) | 0.0132 | 0.0040 |
| **Pollutant** | PTE | |
| | lb/hr | tpy |
| $CO_2e$ | 3 | 11 |
| Methane | 0.10 | 0.44 |

NOTES:

[1] The emission factors used in these calculations were obtained from EPA's "Protocol for Equipment Leak Emission Estimates", EPA-453/R-95-017, November 1995 (accessed at https://www.epa.gov/sites/default/files/2020-09/documents/protocol_for_equipment_leak_emission_estimates.pdf).

[2] $CO_2e$ values correspond to the sum of the individual GHG emissions times the global warming potentials obtained from 40 CFR Part 98, Table A-1, reflecting the update effective January 1, 2014.

3. The component leak fugitives are eligible to be classified as insignificant under 15A NCAC 2Q .0503(8).

# Appendix B

## Modeled Source Parameters

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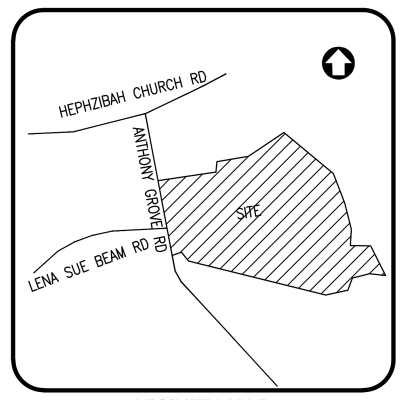



VICINITY MAP
(NOT TO SCALE)

## SITE DATA

TAX PARCEL NOs. 159118
ZONING CLASSIFICATION: R4
SITE ACREAGE 119.075 ACRES (GROSS TOTAL)
NUMBER OF TRACTS THIS MAP: 2

## GENERAL NOTES

1. IRON RODS AT ALL CORNERS UNLESS OTHERWISE NOTED.
2. ALL DISTANCES SHOWN ARE HORIZONTAL GROUND DISTANCES.
3. PURPOSE OF THIS MAP IS TO SUBDIVIDE PROPERTY AS SHOWN.
4. AT THE TIME OF THIS SURVEY, THERE WAS NO EVIDENCE OF SITE USED AS A LANDFILL, STUMP HOLES OR DEMOLITION SITE
5. UTILITY LOCATING SERVICE: NC ONE CALL 1-800-632-4949
6. AREA COMPUTED BY COORDINATE METHOD.
7. NO NCGS MONUMENT LIES WITHIN 2000' OF SUBJECT PROPERTY.
8. PROPERTY MAY BE SUBJECT TO RECORDED OR UNRECORDED RIGHTS-OF-WAY OR EASEMENTS NOT OBSERVED


EXEMPTION CERTIFICATE

I HEREBY CERTIFY THAT THIS SUBDIVISION OF LAND IS EXEMPT IN ACCORDANCE WITH CHAPTER 13.2A(1,2,3,4) OF THE GASTON COUNTY UNIFIED DEVELOPMENT ORDINANCE, AND MAY BE RECORDED WITH THE GASTON COUNTY REGISTER OF DEEDS OFFICE.

____________________ _______________
ADMINISTRATOR DATE

REVIEW OFFICER CERTIFICATE

STATE OF NORTH CAROLINA COUNTY OF GASTON
I,____________________ , REVIEW OFFICER OF GASTON COUNTY, CERTIFY THAT THE MAP OR PLAT TO WHICH THIS CERTIFICATION IS AFFIXED MEETS ALL STATUTORY REQUIREMENTS FOR RECORDING.

____________ ____________
REVIEW OFFICER DATE

REGISTER OF DEEDS

FILED FOR REGISTRATION ON ________DAY OF____________A.D., 20_______AT___O'CLOCK _____M., AND REGISTERED IN THE OFFICE OF REGISTER OF DEEDS, GASTON COUNTY, N.C.
IN BOOK_______PAGE_______

BY:____________________
ASSISTANT REGISTER OF DEEDS

NORTH CAROLINA
GASTON COUNTY
I , ________________, REGISTER OF DEEDS, IN AND FOR THE AFORESAID COUNTY AND STATE HEREBY CERTIFY THIS TO BE A TRUE COPY OF DOCUMENT WHICH IS RECORDED IN BOOK______________, PAGE________
WITNESS MY HAND AND SEAL OF OFFICE THIS__DAY OF __________,
20____.

REGISTER OF DEEDS
BY:________________________
ASSISTANT/DEPUTY

CORPORATE OWNER

KNOW ALL MEN BY THESE PRESENTS THAT ___________________ CERTIFIES THAT HE/SHE IS THE PRESIDENT OR VICE PRESIDENT OF COMMODORE HOMES, LLC AND THAT THIS CORPORATION AS THE OWNER OF THE PROPERTY SO INDICATED HEREON, AND THAT IT DOES HEREBY DEDICATED TO PUBLIC USE AS STREETS, ALLEYS, WALKS, PARKS, PLAYGROUNDS, OPEN SPACES, AND EASEMENTS FOREVER FOR ALL AREAS AS SHOWN OR INDICATED ON SAID PLAT.

THIS, THE _____DAY OF __________, YEAR_____

COMMODORE HOMES, LLC
(NAME OF CORPORATION)
(AFFIX CORPORATE SEAL)

________________________
(PRESIDENT OR VICE PRESIDENT)

NORTH CAROLINA
________ COUNTY

THIS DAY _________________PERSONALLY CAME BEFORE ME WHO BEING BY ME DULY SWORN, SAYS THAT HE IS THE (VICE) PRESIDENT OF _____________________ , AND THAT THE FOREGOING INSTRUMENT IN WRITING IS THE CORPORATE SEAL OF THE COMPANY AND THAT SAID WRITING WAS SIGNED AND SEALED BY HIM ON BEHALF OF THE CORPORATION. BY ITS AUTHORITY DULY GIVEN, AND HE ACKNOWLEDGED THE SAID WRITING TO BE THE ACT AND DEED OF THE CORPORATION.

WITNESS MY HAND AND NOTARIAL SEAL, THE ______DAY OF __________YEAR_____.

_________________________
NOTARY PUBLIC
MY COMMISSION EXPIRES: ______________

RETURN TO:
JAMES MAUNEY & ASSOCIATES, P.A.
423 BEATTY DR, SUITE E
BELMONT, NC 28012

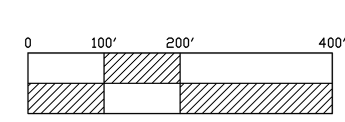
## LEGEND OF SYMBOLS AND ABBREVIATIONS

**TEXT:**

DB – DEED BOOK
EN – EXISTING NAIL
EIR – EXISTING IRON ROD
EN – EXISTING NAIL
NCGS – NORTH CAROLINA GEODETIC SURVEY
RR – RAILROAD
R/W – RIGHT-OF-WAY
SQ.FT. – SQUARE FEET

**LINE:**

PROPERTY LINE
PROPERTY LINE (NOT SURVEYED)
RIGHT-OF-WAY
RIGHT-OF-WAY (NOT SURVEYED)




SCALE IN FEET
1"= 200'

*FLOOD NOTE: BASED ON MAPS PREPARED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA), THIS PROPERTY* ***IS PARTLY*** *LOCATED IN A SPECIAL FLOOD HAZARD AREA. FLOOD INSURANCE RATE MAP NUMBER "3710360000J", EFFECTIVE DATE SEPTEMBER 28, 2007, FLOOD ZONE (S) "X AND AE"*

**I, James H. Mauney, Jr., certify that this plat was drawn under my supervision from an actual survey made under my supervision (description recorded in Book 5271, Page 6033; that the boundaries not surveyed are clearly indicated as shown of face of survey; that the ratio of precision as calculated is 1: 10,000+; that this plat was prepared in accordance with G.S. 47-30 as amended. Witness my original signature, registration number and seal this 23rd day of March, A.D., 2022.**

__________________________
**Professional Land Surveyor**
**Registration # L-3885**

**That the survey creates a subdivision of land within the area of a county or municipality that has an ordinance that regulates parcels of land.**

NORTH CAROLINA PROFESSIONAL LAND SURVEYOR
SEAL
L-3885
JAMES H. MAUNEY, JR.

REVISIONS

RECORD PLAT SHOWING
TRACTS 1, 2 AND 3
PIEDMONT LITHIUM CAROLINAS, INC.
968 WHITESIDES ROAD
CHERRYVILLE TOWNSHIP
GASTON COUNTY, NORTH CAROLINA

**JAMES MAUNEY & ASSOCIATES, P.A.**
**PROFESSIONAL SURVEYORS**
423 BEATTY DRIVE, SUITE E - BELMONT, NC 28012
TEL: 704-829-9623
LICENSE NO. C-2373

| CREW | DRAWN | REVISED | SCALE | DATE | JOB | FILE |
|---|---|---|---|---|---|---|
| MC | JM | | 1"=200' | 03/23/2022 | 8465 | F2254 |


C:\USERS\TLEMKE\DESKTOP\2022\08_AUGUST\09\ONEDRIVE_1_8-9-2022\18605-0000-SKT-GE-003-MODEL_MKD.DWG 09AUG22 9:40AM TLEMKE

| DRG No. | REFERENCES |
|---|---|
| - | - |

| REV | DATE | DESCRIPTION | DRAW | CHECK | DESIGN | TECH APP | PROJ APP |
|---|---|---|---|---|---|---|---|
| A | 06MAY22 | ISSUED FOR REVIEW | MBr | | | | |

PE STAMP/SEAL

PIEDMONT LITHIUM

PRIMERO
primero.ca | DESIGN | CONSTRUCT | OPERATE

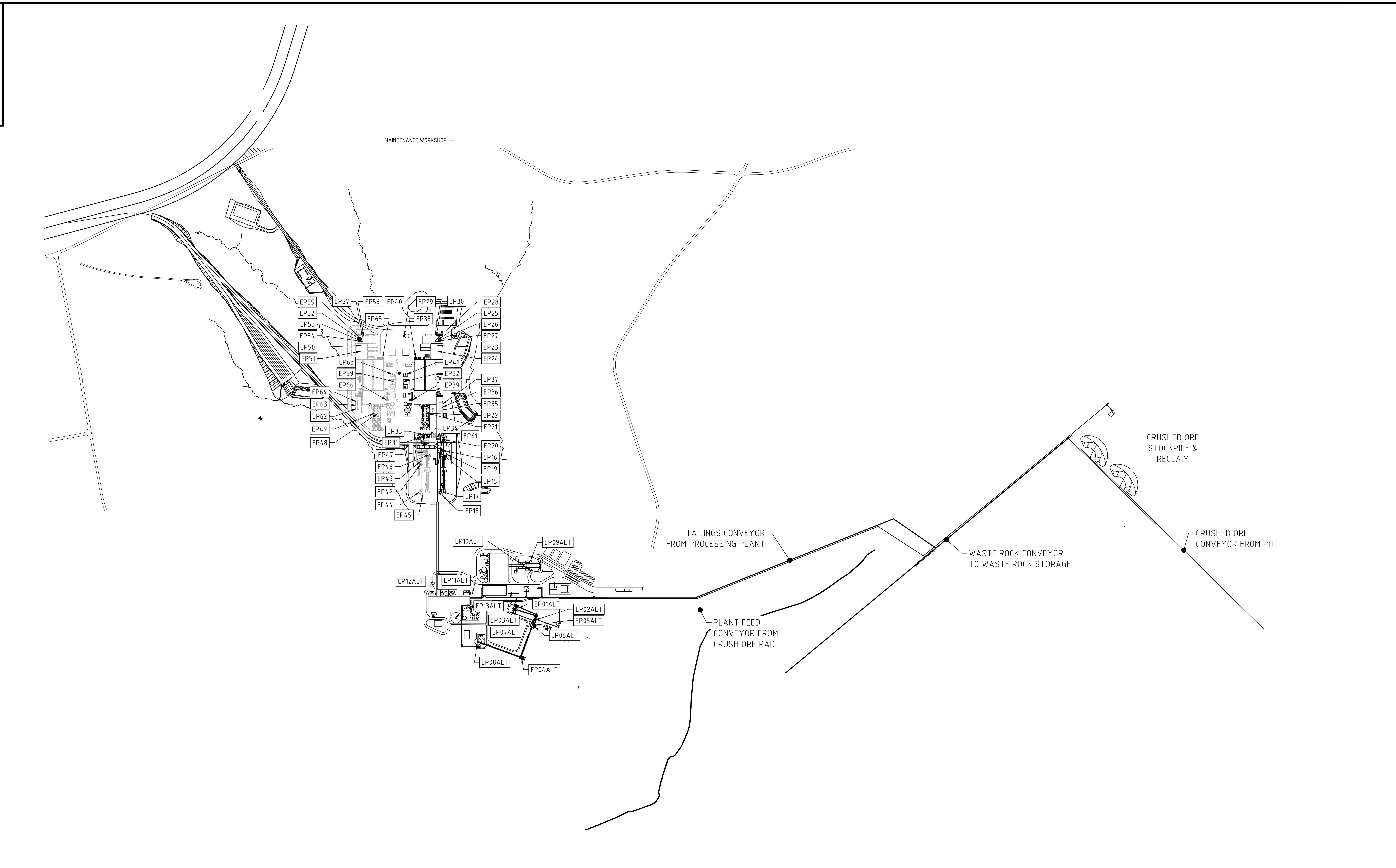


THIRD ANGLE

PROJECT: PIEDMONT LITHIUM CAROLINAS, INC.
CAROLINA LITHIUM PROJECT - DFS

TITLE: OVERALL
PIEDMONT INTEGRATED SITE
EMISSION POINT

| SHEET | SCALE | DRG No. | REVISION |
|---|---|---|---|
| ARCH D | 1" = 400' | 18605-0000-SKT-GE-003 | A |




| DRG No. | REFERENCES | REV | DATE | DESCRIPTION | DRAW | CHECK | DESIGN | TECH APP | PROJ APP |
|---|---|---|---|---|---|---|---|---|---|
| - | - | A | 09JUNE22 | ISSUED FOR INTERNAL REVIEW | NBa | LDu | LDu | | |

STAMP/SEAL

PIEDMONT LITHIUM

PRIMERO
primero.ca | DESIGN | CONSTRUCT | OPERATE

PROJECT: PIEDMONT LITHIUM CAROLINAS, INC.
CAROLINA LITHIUM PROJECT - DFS

TITLE: OVERALL - ALTERNATE CONCENTRATOR SITE EMISSION POINTS
SITE ARRANGEMENT
PLAN



THIRD ANGLE

| SHEET | SCALE | DRG No. | REVISION |
|---|---|---|---|
| ARCH D | 1" = 400' | 18605-0000-SKT-GE-004 | A |

C:\USERS\TLEMKE\DESKTOP\2022\08_AUGUST\09\ONEDRIVE_1_8-9-2022\18605-0000-SKT-GE-004-MODEL_MM_MKD.DWG 09AUG22 10:46AM TLEMKE

## PLC Gaston County Modeling Parameters

| AERMOD ID | Source Description | X1 | Y1 | Base Elevation |
|---|---|---|---|---|
| | | [m] | [m] | [m] |
| **Concentrator Plant (Alternate Location)** | | | | |
| EP01ALT | Ore Sorting Operations | 471171.12 | 3916434.16 | 268.88 |
| EP02ALT | Secondary Crusher Feed Bin | 471216.29 | 3916401.16 | 265.28 |
| EP03ALT | Secondary Crusher Discharge | 471215.05 | 3916395.73 | 265.45 |
| EP04ALT | Fine Ore Sizing Screen Discharge | 471183.89 | 3916294.04 | 271.31 |
| EP05ALT | Tertiary Crusher Feed Bin 1 | 471218.00 | 3916387.70 | 264.59 |
| EP06ALT | Tertiary Crusher Feed Bin 2 | 471216.87 | 3916385.08 | 264.6 |
| EP07ALT | Tertiary Crusher Nos. 1 & 2 | 471210.73 | 3916382.33 | 265.23 |
| EP08ALT | Fine Ore Bin | 471058.20 | 3916338.28 | 273.35 |
| EP09ALT | Quartz Dryer | 471203.13 | 3916571.60 | 260.52 |
| EP10ALT | Feldspar Dryer | 471203.93 | 3916541.78 | 263.46 |
| EP13ALT | Hydrofluoric Acid Storage Tank | 471151.72 | 3916480.86 | 268.26 |
| EP14ALT | Spodumene Concentrate Conveying | 471156.92 | 3916484.01 | 268.3 |
| **Concentrator Plant (Original Location)** | | | | |
| EP01 | Ore Sorting Operations | 472914.42 | 3916887.36 | 259.39 |
| EP02 | Secondary Crusher Feed Bin | 472967.43 | 3916930.95 | 261.01 |
| EP03 | Secondary Crusher Discharge | 472970.66 | 3916926.92 | 260.8 |
| EP04 | Fine Ore Sizing Screen Discharge | 473018.98 | 3916841.14 | 252.09 |
| EP05 | Tertiary Crusher Feed Bin 1 | 472972.81 | 3916912.65 | 259.83 |
| EP06 | Tertiary Crusher Feed Bin 2 | 472974.70 | 3916909.96 | 259.6 |
| EP07 | Tertiary Crusher Nos. 1 & 2 | 472981.86 | 3916911.25 | 259.46 |
| EP08 | Fine Ore Bin | 473132.91 | 3916909.18 | 258.18 |
| EP09 | Quartz Dryer | 472903.11 | 3917059.10 | 260.15 |
| EP10 | Feldspar Dryer | 472916.19 | 3917036.14 | 262.52 |
| EP13 | Hydrofluoric Acid Storage Tank | 472908.97 | 3916960.19 | 263.6 |
| EP14 | Spodumene Concentrate Conveying | 470943.74 | 3916868.60 | 257.98 |

## PLC Gaston County Modeling Parameters

| AERMOD ID | Source Description | X1 | Y1 | Base Elevation |
|---|---|---|---|---|
| | | [m] | [m] | [m] |
| **Carolina Lithium Chemical Conversion Plant 1** | | | | |
| EP15 | Spodumene Concentrate Surge Silo | 470943.29 | 3916877.28 | 257.89 |
| EP16 | Spodumene Concentrate Conveyor to Calciner | 470945.18 | 3916761.35 | 251.53 |
| EP17 | Calciner Rotary Kiln | 470949.64 | 3916750.57 | 250.92 |
| EP18 | Cooler Discharge Sweep Air | 470959.50 | 3916866.32 | 258.88 |
| EP19 | Ball Mill Feed Bin | 470950.14 | 3916907.88 | 257.71 |
| EP20 | Train 1 Pressure Leaching | 470929.26 | 3917014.03 | 255.68 |
| EP21 | Train 2 Pressure Leaching | 470929.47 | 3917009.66 | 255.7 |
| EP22 | LiOH Bagging Area Surge Bin/Transporter No. 1 | 470928.15 | 3917172.80 | 257.68 |
| EP23 | LiOH Bagging Area Surge Bin/Transporter No. 2 | 470927.12 | 3917156.06 | 257.33 |
| EP24 | LiOH Bagging Area Day Tank No. 1 | 470921.10 | 3917177.83 | 257.98 |
| EP25 | LiOH Bagging Area Day Tank No. 2 | 470921.10 | 3917177.83 | 257.98 |
| EP26 | LiOH Bagging Area Day Tank No. 3 | 470921.10 | 3917177.83 | 257.98 |
| EP27 | LiOH Bagging Area Day Tank No. 4 | 470921.10 | 3917177.83 | 257.98 |
| EP28 | LiOH Bagging Operation | 470919.88 | 3917196.00 | 258.55 |
| EP29 | LiOH Bagging Area Vacuum | 470923.66 | 3917195.37 | 258.51 |
| EP30 | Lime Receiving and Storage | 470890.57 | 3916913.53 | 253.44 |
| EP31 | Phosphate Receiving and Storage | 470839.02 | 3917069.51 | 257.15 |
| EP32 | Sodium Carbonate Receiving and Storage Silo | 470896.00 | 3916919.36 | 253.82 |
| EP33 | Sodium Carbonate Receiving and Feeder Bin | 470909.01 | 3916916.66 | 254.92 |
| EP34 | Boiler No. 1 | 470941.63 | 3916989.53 | 255.9 |
| EP35 | Boiler No. 2 | 470941.63 | 3916997.17 | 255.92 |
| EP36 | Boiler No. 3 | 470940.49 | 3917005.95 | 255.93 |
| EP40 | Hydrochloric Acid Storage Tank | 470839.89 | 3917089.56 | 258.13 |

## PLC Gaston County Modeling Parameters

| AERMOD ID | Source Description | X1 | Y1 | Base Elevation |
|---|---|---|---|---|
| | | [m] | [m] | [m] |
| **Carolina Lithium Chemical Conversion Plant 2** | | | | |
| EP41 | Spodumene Concentrate Conveying | 470887.69 | 3916836.40 | 253.62 |
| EP42 | Spodumene Concentrate Surge Silo | 470887.46 | 3916845.34 | 253.28 |
| EP43 | Spodumene Concentrate Conveyor to Calciner | 470889.04 | 3916760.23 | 250.95 |
| EP44 | Calciner Rotary Kiln | 470894.24 | 3916749.08 | 249.34 |
| EP45 | Cooler Discharge Sweep Air | 470913.78 | 3916866.02 | 255.77 |
| EP46 | Ball Mill Feed Bin | 470899.55 | 3916872.47 | 254.64 |
| EP47 | Train 1 Pressure Leaching | 470718.72 | 3917007.40 | 249.52 |
| EP48 | Train 2 Pressure Leaching | 470718.69 | 3917004.26 | 249.63 |
| EP49 | Bulk Bagging Prefill Hopper No. 1 | 470712.52 | 3917168.13 | 256.02 |
| EP50 | Bulk Bagging Prefill Hopper No. 2 | 470713.66 | 3917152.38 | 255.6 |
| EP51 | Bulk Bagging Day Tank No. 1 | 470717.88 | 3917173.92 | 255.68 |
| EP52 | Bulk Bagging Day Tank No. 2 | 470717.88 | 3917173.92 | 255.68 |
| EP53 | Bulk Bagging Day Tank No. 3 | 470717.88 | 3917173.92 | 255.68 |
| EP54 | Bulk Bagging Day Tank No. 4 | 470717.88 | 3917173.92 | 255.68 |
| EP55 | Bulk Bagging Operation | 470720.12 | 3917192.01 | 255.55 |
| EP56 | Bulk Bagging Area Vacuum | 470716.10 | 3917191.47 | 255.9 |
| EP57 | Phosphate Receiving and Storage | 470805.54 | 3917068.07 | 256.07 |
| EP58 | Sodium Carbonate Receiving and Feeder Bin | 470924.33 | 3916916.10 | 256.1 |
| EP59 | Boiler No. 1 | 470703.93 | 3916989.68 | 250.66 |
| EP60 | Boiler No. 2 | 470703.85 | 3916999.60 | 250.66 |
| EP61 | Boiler No. 3 | 470703.85 | 3917008.74 | 250.44 |
| EP64 | Hydrochloric Acid Storage Tank | 470803.72 | 3917088.36 | 256.21 |
| IES25 | Cooling Tower East | 470952.60 | 3916974.33 | 255.94 |
| IES33 | Cooling Tower West | 470796.26 | 3916956.63 | 251.31 |

## PLC Gaston County Modeling Parameters

| AERMOD ID | Source Description | Exit Parameters | | | | | |
|---|---|---|---|---|---|---|---|
| | | Height | Diameter | Exit Velocity | Exit Temp | Exhaust Flow | Release Type |
| | | [ft] | [ft] | [m/s] | [F] | ACFM | |
| **Concentrator Plant (Alternate Location)** | | | | | | | |
| EP01ALT | Ore Sorting Operations | 50 | 2 | 10.98 | ambient | 6,787 | VERTICAL |
| EP02ALT | Secondary Crusher Feed Bin | 20 | 2 | 4.85 | ambient | 3,000 | VERTICAL |
| EP03ALT | Secondary Crusher Discharge | 20 | 1 | 1.33 | ambient | 205 | VERTICAL |
| EP04ALT | Fine Ore Sizing Screen Discharge | 20 | 1 | 2.65 | ambient | 410 | VERTICAL |
| EP05ALT | Tertiary Crusher Feed Bin 1 | 50 | 2 | 4.85 | ambient | 3,000 | VERTICAL |
| EP06ALT | Tertiary Crusher Feed Bin 2 | 50 | 2 | 4.85 | ambient | 3,000 | VERTICAL |
| EP07ALT | Tertiary Crusher Nos. 1 & 2 | 20 | 2 | 0.48 | ambient | 295 | VERTICAL |
| EP08ALT | Fine Ore Bin | 95 | 2 | 3.23 | ambient | 2,000 | VERTICAL |
| EP09ALT | Quartz Dryer | 67 | 3 | 7.69 | 118 | 10,704 | VERTICAL |
| EP10ALT | Feldspar Dryer | 67 | 3 | 11.97 | 118 | 16,658 | VERTICAL |
| EP13ALT | Hydrofluoric Acid Storage Tank | 20 | 1 | 9.70 | 78.5 | 1,500 | VERTICAL |
| EP14ALT | Spodumene Concentrate Conveying | 60 | 2 | 0.40 | ambient | 250 | VERTICAL |
| **Concentrator Plant (Original Location)** | | | | | | | |
| EP01 | Ore Sorting Operations | 50 | 2 | 10.98 | ambient | 6,787 | VERTICAL |
| EP02 | Secondary Crusher Feed Bin | 20 | 2 | 4.85 | ambient | 3,000 | VERTICAL |
| EP03 | Secondary Crusher Discharge | 20 | 1 | 1.33 | ambient | 205 | VERTICAL |
| EP04 | Fine Ore Sizing Screen Discharge | 20 | 1 | 2.65 | ambient | 410 | VERTICAL |
| EP05 | Tertiary Crusher Feed Bin 1 | 50 | 2 | 4.85 | ambient | 3,000 | VERTICAL |
| EP06 | Tertiary Crusher Feed Bin 2 | 50 | 2 | 4.85 | ambient | 3,000 | VERTICAL |
| EP07 | Tertiary Crusher Nos. 1 & 2 | 20 | 2 | 0.48 | ambient | 295 | VERTICAL |
| EP08 | Fine Ore Bin | 95 | 2 | 3.23 | ambient | 2,000 | VERTICAL |
| EP09 | Quartz Dryer | 67 | 3 | 7.69 | 118 | 10,704 | VERTICAL |
| EP10 | Feldspar Dryer | 67 | 3 | 11.97 | 118 | 16,658 | VERTICAL |
| EP13 | Hydrofluoric Acid Storage Tank | 20 | 1 | 9.70 | 78.5 | 1,500 | VERTICAL |
| EP14 | Spodumene Concentrate Conveying | 60 | 2 | 0.40 | ambient | 250 | VERTICAL |

## PLC Gaston County Modeling Parameters

| AERMOD ID | Source Description | Exit Parameters | | | | | |
|---|---|---|---|---|---|---|---|
| | | Height | Diameter | Exit Velocity | Exit Temp | Exhaust Flow | Release Type |
| | | [ft] | [ft] | [m/s] | [F] | ACFM | |
| **Carolina Lithium Chemical Conversion Plant 1** | | | | | | | |
| EP15 | Spodumene Concentrate Surge Silo | 95 | 2 | 1.86 | ambient | 1,150 | VERTICAL |
| EP16 | Spodumene Concentrate Conveyor to Calciner | 80 | 2 | 0.40 | ambient | 250 | VERTICAL |
| EP17 | Calciner Rotary Kiln | 125 | 3 | 25.16 | 162.5 | 35,000 | VERTICAL |
| EP18 | Cooler Discharge Sweep Air | 40 | 2 | 2.43 | 150 | 1,500 | VERTICAL |
| EP19 | Ball Mill Feed Bin | 95 | 2 | 2.99 | 137.5 | 1,848 | VERTICAL |
| EP20 | Train 1 Pressure Leaching | 125 | 2 | 15.85 | 205 | 9,800 | VERTICAL |
| EP21 | Train 2 Pressure Leaching | 125 | 2 | 15.85 | 205 | 9,800 | VERTICAL |
| EP22 | LiOH Bagging Area Surge Bin/Transporter No. 1 | 125 | 1.5 | 0.001 | 110 | 90 | POINTCAP |
| EP23 | LiOH Bagging Area Surge Bin/Transporter No. 2 | 125 | 1.5 | 0.001 | 110 | 90 | POINTCAP |
| EP24 | LiOH Bagging Area Day Tank No. 1 | 125 | 1.5 | 0.001 | 110 | 90 | POINTCAP |
| EP25 | LiOH Bagging Area Day Tank No. 2 | 125 | 1.5 | 0.001 | 110 | 90 | POINTCAP |
| EP26 | LiOH Bagging Area Day Tank No. 3 | 125 | 1.5 | 0.001 | 110 | 90 | POINTCAP |
| EP27 | LiOH Bagging Area Day Tank No. 4 | 125 | 1.5 | 0.001 | 110 | 90 | POINTCAP |
| EP28 | LiOH Bagging Operation | 125 | 1.5 | 4.60 | 76 | 1,600 | VERTICAL |
| EP29 | LiOH Bagging Area Vacuum | 125 | 1.5 | 0.001 | 110 | 600 | POINTCAP |
| EP30 | Lime Receiving and Storage | 101 | 2 | 4.61 | ambient | 2,850 | VERTICAL |
| EP31 | Phosphate Receiving and Storage | 40 | 2 | 4.61 | ambient | 2,850 | VERTICAL |
| EP32 | Sodium Carbonate Receiving and Storage Silo | 110 | 2 | 4.61 | ambient | 2,850 | VERTICAL |
| EP33 | Sodium Carbonate Receiving and Feeder Bin | 110 | 2 | 4.61 | ambient | 2,850 | VERTICAL |
| EP34 | Boiler No. 1 | 50 | 3 | 25.00 | 287.33 | 34,786 | VERTICAL |
| EP35 | Boiler No. 2 | 50 | 3 | 25.00 | 287.33 | 34,786 | VERTICAL |
| EP36 | Boiler No. 3 | 50 | 3 | 25.00 | 287.33 | 34,786 | VERTICAL |
| EP40 | Hydrochloric Acid Storage Tank | 20 | 1 | 0.10 | 76.5 | 16 | VERTICAL |

## PLC Gaston County Modeling Parameters

| AERMOD ID | Source Description | Exit Parameters | | | | | |
|---|---|---|---|---|---|---|---|
| | | Height | Diameter | Exit Velocity | Exit Temp | Exhaust Flow | |
| | | [ft] | [ft] | [m/s] | [F] | ACFM | Release Type |
| **Carolina Lithium Chemical Conversion Plant 2** | | | | | | | |
| EP41 | Spodumene Concentrate Conveying | 60 | 2 | 0.40 | ambient | 250 | VERTICAL |
| EP42 | Spodumene Concentrate Surge Silo | 95 | 2 | 1.86 | ambient | 1,150 | VERTICAL |
| EP43 | Spodumene Concentrate Conveyor to Calciner | 80 | 2 | 0.40 | ambient | 250 | VERTICAL |
| EP44 | Calciner Rotary Kiln | 125 | 3 | 25.16 | 162.5 | 35,000 | VERTICAL |
| EP45 | Cooler Discharge Sweep Air | 40 | 2 | 2.43 | 150 | 1,500 | VERTICAL |
| EP46 | Ball Mill Feed Bin | 95 | 2 | 2.99 | 137.5 | 1,848 | VERTICAL |
| EP47 | Train 1 Pressure Leaching | 125 | 2 | 15.85 | 140 | 9,800 | VERTICAL |
| EP48 | Train 2 Pressure Leaching | 125 | 2 | 15.85 | 140 | 9,800 | VERTICAL |
| EP49 | Bulk Bagging Prefill Hopper No. 1 | 125 | 1.5 | 0.001 | 110 | 90 | POINTCAP |
| EP50 | Bulk Bagging Prefill Hopper No. 2 | 125 | 1.5 | 0.001 | 110 | 90 | POINTCAP |
| EP51 | Bulk Bagging Day Tank No. 1 | 125 | 1.5 | 0.001 | 110 | 90 | POINTCAP |
| EP52 | Bulk Bagging Day Tank No. 2 | 125 | 1.5 | 0.001 | 110 | 90 | POINTCAP |
| EP53 | Bulk Bagging Day Tank No. 3 | 125 | 1.5 | 0.001 | 110 | 90 | POINTCAP |
| EP54 | Bulk Bagging Day Tank No. 4 | 125 | 1.5 | 0.001 | 110 | 90 | POINTCAP |
| EP55 | Bulk Bagging Operation | 125 | 1.5 | 4.60 | 76 | 1,600 | VERTICAL |
| EP56 | Bulk Bagging Area Vacuum | 125 | 1.5 | 0.001 | 110 | 600 | POINTCAP |
| EP57 | Phosphate Receiving and Storage | 40 | 2 | 4.61 | ambient | 2,850 | VERTICAL |
| EP58 | Sodium Carbonate Receiving and Feeder Bin | 110 | 2 | 4.61 | ambient | 2,850 | VERTICAL |
| EP59 | Boiler No. 1 | 50 | 3 | 25.00 | 287.33 | 34,786 | VERTICAL |
| EP60 | Boiler No. 2 | 50 | 3 | 25.00 | 287.33 | 34,786 | VERTICAL |
| EP61 | Boiler No. 3 | 50 | 3 | 25.00 | 287.33 | 34,786 | VERTICAL |
| EP64 | Hydrochloric Acid Storage Tank | 20 | 1 | 0.10 | 76.5 | 16 | VERTICAL |
| IES25 | Cooling Tower East | 40 | 11.5 | 10.00 | ambient | 204,464 | VERTICAL |
| IES33 | Cooling Tower West | 40 | 11.5 | 10.00 | ambient | 204,464 | VERTICAL |

## PLC Gaston County Modeling Parameters

| AERMOD ID | Source Description | Emission Rates | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | PM10 | | PM2.5 | | NOx | | CO | |
| | | (g/s) | (lb/hr) | (g/s) | (lb/hr) | (g/s) | (lb/hr) | (g/s) | (lb/hr) |
| **Concentrator Plant (Alternate Location)** | | | | | | | | | |
| EP01ALT | Ore Sorting Operations | 0.015 | 0.116 | 0.015 | 0.116 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP02ALT | Secondary Crusher Feed Bin | 0.006 | 0.051 | 0.006 | 0.051 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP03ALT | Secondary Crusher Discharge | 0.000 | 0.004 | 0.000 | 0.004 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP04ALT | Fine Ore Sizing Screen Discharge | 0.001 | 0.007 | 0.001 | 0.007 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP05ALT | Tertiary Crusher Feed Bin 1 | 0.000 | 0.002 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP06ALT | Tertiary Crusher Feed Bin 2 | 0.000 | 0.002 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP07ALT | Tertiary Crusher Nos. 1 & 2 | 0.001 | 0.005 | 0.001 | 0.005 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP08ALT | Fine Ore Bin | 0.004 | 0.034 | 0.004 | 0.034 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP09ALT | Quartz Dryer | 0.016 | 0.130 | 0.016 | 0.130 | 0.118 | 0.936 | 0.198 | 1.572 |
| EP10ALT | Feldspar Dryer | 0.026 | 0.210 | 0.026 | 0.210 | 0.183 | 1.452 | 0.307 | 2.439 |
| EP13ALT | Hydrofluoric Acid Storage Tank | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP14ALT | Spodumene Concentrate Conveying | 0.001 | 0.004 | 0.001 | 0.004 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Concentrator Plant (Original Location)** | | | | | | | | | |
| EP01 | Ore Sorting Operations | 0.015 | 0.116 | 0.015 | 0.116 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP02 | Secondary Crusher Feed Bin | 0.006 | 0.051 | 0.006 | 0.051 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP03 | Secondary Crusher Discharge | 0.000 | 0.004 | 0.000 | 0.004 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP04 | Fine Ore Sizing Screen Discharge | 0.001 | 0.007 | 0.001 | 0.007 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP05 | Tertiary Crusher Feed Bin 1 | 0.000 | 0.002 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP06 | Tertiary Crusher Feed Bin 2 | 0.000 | 0.002 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP07 | Tertiary Crusher Nos. 1 & 2 | 0.001 | 0.005 | 0.001 | 0.005 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP08 | Fine Ore Bin | 0.004 | 0.034 | 0.004 | 0.034 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP09 | Quartz Dryer | 0.016 | 0.130 | 0.016 | 0.130 | 0.118 | 0.936 | 0.198 | 1.572 |
| EP10 | Feldspar Dryer | 0.026 | 0.210 | 0.026 | 0.210 | 0.183 | 1.452 | 0.307 | 2.439 |
| EP13 | Hydrofluoric Acid Storage Tank | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP14 | Spodumene Concentrate Conveying | 0.001 | 0.004 | 0.001 | 0.004 | 0.0 | 0.0 | 0.0 | 0.0 |

**PLC Gaston County Modeling Parameters**

| AERMOD ID | Source Description | Emission Rates | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | PM10 | | PM2.5 | | NOx | | CO | |
| | | (g/s) | (lb/hr) | (g/s) | (lb/hr) | (g/s) | (lb/hr) | (g/s) | (lb/hr) |
| **Carolina Lithium Chemical Conversion Plant 1** | | | | | | | | | |
| EP15 | Spodumene Concentrate Surge Silo | 0.002 | 0.020 | 0.002 | 0.020 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP16 | Spodumene Concentrate Conveyor to Calciner | 0.001 | 0.004 | 0.001 | 0.004 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP17 | Calciner Rotary Kiln | 0.574 | 4.559 | 0.574 | 4.559 | 2.732 | 21.680 | 0.779 | 6.181 |
| EP18 | Cooler Discharge Sweep Air | 0.003 | 0.026 | 0.003 | 0.026 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP19 | Ball Mill Feed Bin | 0.004 | 0.032 | 0.004 | 0.032 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP20 | Train 1 Pressure Leaching | 0.023 | 0.180 | 0.023 | 0.180 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP21 | Train 2 Pressure Leaching | 0.023 | 0.180 | 0.023 | 0.180 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP22 | LiOH Bagging Area Surge Bin/Transporter No. 1 | 0.000 | 0.002 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP23 | LiOH Bagging Area Surge Bin/Transporter No. 2 | 0.000 | 0.002 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP24 | LiOH Bagging Area Day Tank No. 1 | 0.000 | 0.002 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP25 | LiOH Bagging Area Day Tank No. 2 | 0.000 | 0.002 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP26 | LiOH Bagging Area Day Tank No. 3 | 0.000 | 0.002 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP27 | LiOH Bagging Area Day Tank No. 4 | 0.000 | 0.002 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP28 | LiOH Bagging Operation | 0.009 | 0.070 | 0.009 | 0.070 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP29 | LiOH Bagging Area Vacuum | 0.001 | 0.010 | 0.001 | 0.010 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP30 | Lime Receiving and Storage | 0.006 | 0.049 | 0.006 | 0.049 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP31 | Phosphate Receiving and Storage | 0.006 | 0.049 | 0.006 | 0.049 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP32 | Sodium Carbonate Receiving and Storage Silo | 0.006 | 0.049 | 0.006 | 0.049 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP33 | Sodium Carbonate Receiving and Feeder Bin | 0.006 | 0.049 | 0.006 | 0.049 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP34 | Boiler No. 1 | 0.039 | 0.312 | 0.039 | 0.312 | 0.115 | 0.911 | 0.647 | 5.138 |
| EP35 | Boiler No. 2 | 0.039 | 0.312 | 0.039 | 0.312 | 0.115 | 0.911 | 0.647 | 5.138 |
| EP36 | Boiler No. 3 | 0.039 | 0.309 | 0.039 | 0.309 | 0.114 | 0.904 | 0.642 | 5.095 |
| EP40 | Hydrochloric Acid Storage Tank | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

**PLC Gaston County Modeling Parameters**

| AERMOD ID | Source Description | Emission Rates | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | PM10 | | PM2.5 | | NOx | | CO | |
| | | (g/s) | (lb/hr) | (g/s) | (lb/hr) | (g/s) | (lb/hr) | (g/s) | (lb/hr) |
| **Carolina Lithium Chemical Conversion Plant 2** | | | | | | | | | |
| EP41 | Spodumene Concentrate Conveying | 0.001 | 0.004 | 0.001 | 0.004 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP42 | Spodumene Concentrate Surge Silo | 0.002 | 0.020 | 0.002 | 0.020 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP43 | Spodumene Concentrate Conveyor to Calciner | 0.001 | 0.004 | 0.001 | 0.004 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP44 | Calciner Rotary Kiln | 0.574 | 4.559 | 0.574 | 4.559 | 2.732 | 21.680 | 0.779 | 6.181 |
| EP45 | Cooler Discharge Sweep Air | 0.003 | 0.026 | 0.003 | 0.026 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP46 | Ball Mill Feed Bin | 0.004 | 0.032 | 0.004 | 0.032 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP47 | Train 1 Pressure Leaching | 0.023 | 0.180 | 0.023 | 0.180 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP48 | Train 2 Pressure Leaching | 0.023 | 0.180 | 0.023 | 0.180 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP49 | Bulk Bagging Prefill Hopper No. 1 | 0.000 | 0.002 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP50 | Bulk Bagging Prefill Hopper No. 2 | 0.000 | 0.002 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP51 | Bulk Bagging Day Tank No. 1 | 0.000 | 0.002 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP52 | Bulk Bagging Day Tank No. 2 | 0.000 | 0.002 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP53 | Bulk Bagging Day Tank No. 3 | 0.000 | 0.002 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP54 | Bulk Bagging Day Tank No. 4 | 0.000 | 0.002 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP55 | Bulk Bagging Operation | 0.009 | 0.070 | 0.009 | 0.070 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP56 | Bulk Bagging Area Vacuum | 0.001 | 0.010 | 0.001 | 0.010 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP57 | Phosphate Receiving and Storage | 0.006 | 0.049 | 0.006 | 0.049 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP58 | Sodium Carbonate Receiving and Feeder Bin | 0.006 | 0.049 | 0.006 | 0.049 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP59 | Boiler No. 1 | 0.039 | 0.312 | 0.039 | 0.312 | 0.115 | 0.911 | 0.647 | 5.138 |
| EP60 | Boiler No. 2 | 0.039 | 0.312 | 0.039 | 0.312 | 0.115 | 0.911 | 0.647 | 5.138 |
| EP61 | Boiler No. 3 | 0.039 | 0.309 | 0.039 | 0.309 | 0.114 | 0.904 | 0.642 | 5.095 |
| EP64 | Hydrochloric Acid Storage Tank | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| IES25 | Cooling Tower East | 0.003 | 0.026 | 0.003 | 0.026 | 0.0 | 0.0 | 0.0 | 0.0 |
| IES33 | Cooling Tower West | 0.003 | 0.026 | 0.003 | 0.026 | 0.0 | 0.0 | 0.0 | 0.0 |

**PLC Gaston County Modeling Parameters**

| Type | AERMOD ID | Source Description | X1 | Y1 | Base_Elev | Exit Parameters | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Release Height (from pit bottom) | | Length_X | Length_Y | Rotation_Angle | Pit_Volume | Pit depth |
| **OPENPIT Sources** | | **(For Year 7 Arrangement)** | [m] | [m] | [m] | [m] | [ft] | [m] | [m] | [deg] | [m^3] | [ft] |
| OPEN_PIT | EASTPIT | Location of East Pit | 473764.47 | 3914801.01 | 254.81 | 4 | 13.1 | 500 | 1500 | 20.51 | 68,580,000 | 300 |
| OPEN_PIT | SOUTHPIT | Location of South Pit | 473202.16 | 3915807.48 | 262.49 | 4 | 13.1 | 200 | 400 | 71.3 | 3,291,840 | 135 |
| OPEN_PIT | WESTPIT | Location of West Pit | 473247.67 | 3916250.96 | 247.12 | 4 | 13.1 | 450 | 1200 | 41.93 | 41,970,960 | 255 |

| Type | AERMOD ID | Source Description | X1 | Y1 | Base_Elev | Exit Parameters | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Release Height | | Length_X | Length_Y | Rotation_Angle |
| **AREA Sources** | | **(For Year 7 Arrangement)** | [m] | [m] | [m] | [m] | [ft] | [m] | [m] | [deg] |
| AREA | IES05F | Waste Pile Material Drops via Conveyor | 471984.50 | 3915834.55 | 259.45 | 12.192 | 40 | 575.00 | 630.00 | -28.86 |
| AREA | IES08 | Concentrator Plant - ROM Pile A | 472896.45 | 3916783.53 | 252.3 | 6.096 | 20 | 40.01 | 103.21 | -38.09 |
| AREA | IES09 | Concentrator Plant - ROM Pile B | 472807.44 | 3916865.46 | 260.6 | 6.096 | 20 | 40.01 | 103.21 | -38.09 |

| Type | AERMOD ID | Source Description | X1 | Y1 | Base_Elev | Exit Parameters | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Release Height | | Length_X | Length_Y | Rotation_Angle | SigmaY | SigmaZ |
| **VOLUME Sources** | | **(For Year 7 Arrangement)** | [m] | [m] | [m] | [m] | [ft] | [m] | [m] | [deg] | [m] | [m] |
| VOLUME | IES05D1 | Overland Ore Belt Conveyor Drop | 473274.62 | 3916411.81 | 244.68 | 6.096 | 20 | 3.658 | | | 0.851 | 3.658 |
| VOLUME | IES05D2 | Overland Ore Belt Conveyor Drop | 473351.55 | 3916390.09 | 252.09 | 6.096 | 20 | 3.658 | | | 0.851 | 3.658 |
| VOLUME | IES05D3 | WP Bypass Ore Belt Conveyor Drop | 473215.42 | 3916071.31 | 243.17 | 6.096 | 20 | 3.658 | | | 0.851 | 3.658 |
| VOLUME | IES05D4 | WP Bypass Ore Belt Conveyor Drop | 473472.95 | 3916028.97 | 235.91 | 6.096 | 20 | 3.658 | | | 0.851 | 3.658 |
| VOLUME | IES05D5 | Overland Ore Belt Conveyor Drop | 473895.38 | 3916227.17 | 247.79 | 6.096 | 20 | 3.658 | | | 0.851 | 3.658 |
| VOLUME | IES05E1 | Overland Waste Belt 1 Conveyor Drop | 474557.11 | 3916207.30 | 233.57 | 6.096 | 20 | 3.658 | | | 0.851 | 3.658 |
| VOLUME | IES05E2 | Overland Waste Belt 2 Conveyor Drop | 473353.06 | 3916393.18 | 252.17 | 6.096 | 20 | 3.658 | | | 0.851 | 3.658 |
| VOLUME | IES05E3 | Overland Waste Belt 3 Conveyor Drop | 473277.12 | 3916415.44 | 245.25 | 6.096 | 20 | 3.658 | | | 0.851 | 3.658 |
| VOLUME | IES05E4 | Overland Waste Belt 1 Conveyor Drop | 473897.88 | 3916237.66 | 246.81 | 6.096 | 20 | 3.658 | | | 0.851 | 3.658 |
| VOLUME | IES05E5 | WP Bypass Waste Belt Conveyor Drop | 473469.01 | 3916032.69 | 237.01 | 6.096 | 20 | 3.658 | | | 0.851 | 3.658 |
| VOLUME | IES05E6 | WP Bypass Waste Belt Conveyor Drop | 473211.55 | 3916068.71 | 241.96 | 6.096 | 20 | 3.658 | | | 0.851 | 3.658 |
| VOLUME | IES06 | Telestacker Ore Pile Drop 1 | 472813.56 | 3916855.80 | 259.74 | 6.096 | 20 | 3.658 | | | 0.851 | 3.658 |
| VOLUME | IES13A1 | Overland Ore Conveyor Drop (Alternate Concentrator Location) | 472716.27 | 3916947.67 | 261.67 | 6.096 | 20 | 3.658 | | | 0.851 | 3.658 |
| VOLUME | IES13A2 | Overland Ore Conveyor Drop (Alternate Concentrator Location) | 472311.04 | 3916606.15 | 257.69 | 6.096 | 20 | 3.658 | | | 0.851 | 3.658 |
| VOLUME | IES13A3 | Overland Ore Conveyor Drop (Alternate Concentrator Location) | 472180.60 | 3916686.60 | 260.04 | 6.096 | 20 | 3.658 | | | 0.851 | 3.658 |
| VOLUME | IES13A4 | Overland Ore Conveyor Drop (Alternate Concentrator Location) | 471675.12 | 3916478.73 | 243.62 | 6.096 | 20 | 3.658 | | | 0.851 | 3.658 |
| VOLUME | IES13A5 | Overland Ore Conveyor Drop (Alternate Concentrator Location) | 471383.97 | 3916468.91 | 258.05 | 6.096 | 20 | 3.658 | | | 0.851 | 3.658 |
| VOLUME | IES13A6 | Overland Ore Conveyor Drop (Alternate Concentrator Location) | 471293.27 | 3916467.59 | 259.66 | 6.096 | 20 | 3.658 | | | 0.851 | 3.658 |
| VOLUME | IES13A7 | Overland Ore Conveyor Drop (Alternate Concentrator Location) | 471288.58 | 3916391.47 | 260.4 | 6.096 | 20 | 3.658 | | | 0.851 | 3.658 |
| VOLUME | IES14A1 | Overland Waste Conveyor Drop (Alternate Concentrator Location) | 472344.94 | 3916629.64 | 252.35 | 6.096 | 20 | 3.658 | | | 0.851 | 3.658 |
| VOLUME | IES14A2 | Overland Waste Conveyor Drop (Alternate Concentrator Location) | 472224.26 | 3916708.23 | 261.41 | 6.096 | 20 | 3.658 | | | 0.851 | 3.658 |
| VOLUME | IES14A3 | Overland Waste Conveyor Drop (Alternate Concentrator Location) | 471673.79 | 3916474.54 | 244.09 | 6.096 | 20 | 3.658 | | | 0.851 | 3.658 |
| VOLUME | IES14A4 | Overland Waste Conveyor Drop (Alternate Concentrator Location) | 471167.41 | 3916466.14 | 268.55 | 6.096 | 20 | 3.658 | | | 0.851 | 3.658 |
| VOLUME | IES14A5 | Overland Waste Conveyor Drop (Alternate Concentrator Location) | 471383.75 | 3916470.92 | 257.98 | 6.096 | 20 | 3.658 | | | 0.851 | 3.658 |
| VOLUME | IES14B1 | Spodumene Conveyor Drop | 473004.95 | 3917052.74 | 264.18 | 6.096 | 20 | 3.658 | | | 0.851 | 3.658 |
| VOLUME | IES14B2 | Spodumene Conveyor Drop (Alternate Concentrator Location) | 471111.38 | 3916592.23 | 256.63 | 6.096 | 20 | 3.658 | | | 0.851 | 3.658 |
| VOLUME | IES23 | Concentrate Material Handling | 470938.17 | 3916730.82 | 248.87 | 6.096 | 20 | 3.658 | | | 0.851 | 3.658 |

**PLC Gaston County Modeling Parameters**

| Type | AERMOD ID | Source Description | Emission Rates | | | |
|---|---|---|---|---|---|---|
| | | | PM10 | | PM2.5 | |
| **OPENPIT Sources** | | **(For Year 7 Arrangement)** | (g/s-m2) | (lb/hr) | (g/s-m2) | (lb/hr) |
| OPEN_PIT | EASTPIT | Location of East Pit | 1.04E-07 | 0.62 | 4.54E-08 | 0.27 |
| OPEN_PIT | SOUTHPIT | Location of South Pit | 9.72E-07 | 0.62 | 1.42E-07 | 0.09 |
| OPEN_PIT | WESTPIT | Location of West Pit | 7.24E-07 | 3.10 | 1.47E-07 | 0.63 |

| Type | AERMOD ID | Source Description | Emission Rates | | | |
|---|---|---|---|---|---|---|
| | | | PM10 | | PM2.5 | |
| **AREA Sources** | | **(For Year 7 Arrangement)** | (g/s-m2) | (lb/hr) | (g/s-m2) | (lb/hr) |
| AREA | IES05F | Waste Pile Material Drops via Conveyor | 2.29E-07 | 0.66 | 9.45E-08 | 0.27 |
| AREA | IES08 | Concentrator Plant - ROM Pile A | 2.65E-07 | 0.009 | 1.83E-07 | 0.001 |
| AREA | IES09 | Concentrator Plant - ROM Pile B | 2.65E-07 | 0.009 | 1.83E-07 | 0.001 |

| Type | AERMOD ID | Source Description | Emission Rates | | | |
|---|---|---|---|---|---|---|
| | | | PM10 | | PM2.5 | |
| **VOLUME Sources** | | **(For Year 7 Arrangement)** | (g/s) | (lb/hr) | (g/s) | (lb/hr) |
| VOLUME | IES05D1 | Overland Ore Belt Conveyor Drop | 1.64E-04 | 1.30E-03 | 1.64E-04 | 1.30E-03 |
| VOLUME | IES05D2 | Overland Ore Belt Conveyor Drop | 1.64E-04 | 1.30E-03 | 1.64E-04 | 1.30E-03 |
| VOLUME | IES05D3 | WP Bypass Ore Belt Conveyor Drop | 1.64E-04 | 1.30E-03 | 1.64E-04 | 1.30E-03 |
| VOLUME | IES05D4 | WP Bypass Ore Belt Conveyor Drop | 1.64E-04 | 1.30E-03 | 1.64E-04 | 1.30E-03 |
| VOLUME | IES05D5 | Overland Ore Belt Conveyor Drop | 1.64E-04 | 1.30E-03 | 1.64E-04 | 1.30E-03 |
| VOLUME | IES05E1 | Overland Waste Belt 1 Conveyor Drop | 1.51E-03 | 1.20E-02 | 1.51E-03 | 1.20E-02 |
| VOLUME | IES05E2 | Overland Waste Belt 2 Conveyor Drop | 1.51E-03 | 1.20E-02 | 1.51E-03 | 1.20E-02 |
| VOLUME | IES05E3 | Overland Waste Belt 3 Conveyor Drop | 1.51E-03 | 1.20E-02 | 1.51E-03 | 1.20E-02 |
| VOLUME | IES05E4 | Overland Waste Belt 1 Conveyor Drop | 1.51E-03 | 1.20E-02 | 1.51E-03 | 1.20E-02 |
| VOLUME | IES05E5 | WP Bypass Waste Belt Conveyor Drop | 1.51E-03 | 1.20E-02 | 1.51E-03 | 1.20E-02 |
| VOLUME | IES05E6 | WP Bypass Waste Belt Conveyor Drop | 1.51E-03 | 1.20E-02 | 1.51E-03 | 1.20E-02 |
| VOLUME | IES06 | Telestacker Ore Pile Drop 1 | 1.08E-03 | 8.60E-03 | 1.08E-03 | 8.60E-03 |
| VOLUME | IES13A1 | Overland Ore Conveyor Drop (Alternate Concentrator Location) | 1.02E-04 | 8.12E-04 | 1.02E-04 | 8.12E-04 |
| VOLUME | IES13A2 | Overland Ore Conveyor Drop (Alternate Concentrator Location) | 1.02E-04 | 8.12E-04 | 1.02E-04 | 8.12E-04 |
| VOLUME | IES13A3 | Overland Ore Conveyor Drop (Alternate Concentrator Location) | 1.02E-04 | 8.12E-04 | 1.02E-04 | 8.12E-04 |
| VOLUME | IES13A4 | Overland Ore Conveyor Drop (Alternate Concentrator Location) | 1.02E-04 | 8.12E-04 | 1.02E-04 | 8.12E-04 |
| VOLUME | IES13A5 | Overland Ore Conveyor Drop (Alternate Concentrator Location) | 1.02E-04 | 8.12E-04 | 1.02E-04 | 8.12E-04 |
| VOLUME | IES13A6 | Overland Ore Conveyor Drop (Alternate Concentrator Location) | 1.02E-04 | 8.12E-04 | 1.02E-04 | 8.12E-04 |
| VOLUME | IES13A7 | Overland Ore Conveyor Drop (Alternate Concentrator Location) | 1.02E-04 | 8.12E-04 | 1.02E-04 | 8.12E-04 |
| VOLUME | IES14A1 | Overland Waste Conveyor Drop (Alternate Concentrator Location) | 7.05E-06 | 5.60E-05 | 7.05E-06 | 5.60E-05 |
| VOLUME | IES14A2 | Overland Waste Conveyor Drop (Alternate Concentrator Location) | 7.05E-06 | 5.60E-05 | 7.05E-06 | 5.60E-05 |
| VOLUME | IES14A3 | Overland Waste Conveyor Drop (Alternate Concentrator Location) | 7.05E-06 | 5.60E-05 | 7.05E-06 | 5.60E-05 |
| VOLUME | IES14A4 | Overland Waste Conveyor Drop (Alternate Concentrator Location) | 7.05E-06 | 5.60E-05 | 7.05E-06 | 5.60E-05 |
| VOLUME | IES14A5 | Overland Waste Conveyor Drop (Alternate Concentrator Location) | 7.05E-06 | 5.60E-05 | 7.05E-06 | 5.60E-05 |
| VOLUME | IES14B1 | Spodumene Conveyor Drop | 7.19E-05 | 5.71E-04 | 7.19E-05 | 5.71E-04 |
| VOLUME | IES14B2 | Spodumene Conveyor Drop (Alternate Concentrator Location) | 7.19E-05 | 5.71E-04 | 7.19E-05 | 5.71E-04 |
| VOLUME | IES23 | Concentrate Material Handling | 9.48E-06 | 7.52E-05 | 9.48E-06 | 7.52E-05 |

## PLC Gaston County Modeling Parameters

### Haul Road Segments - LINE VOLUME Sources

| | | |
|---|---|---|
| **Start Point** | | Line Source Represented by Adjacent Volume Sources |
| VOLUME | L0000001 | LINE VOLUME Source ID = SLINE1 |
| **End Point** | | DESCRSRC Haul Road - Western Plant Entrance |
| VOLUME | L0000042 | |
| | | Length of Side = 16.36 |
| | | Configuration = Adjacent |
| | | Emission Rate = 0.0025199576 |
| | | Vertical Dimension = 6.80 |
| | | SZINIT = 3.16 |
| | | Nodes = 6 |
| | | 470345.123, 3917677.697, 276.06, 3.40, 7.61 |
| | | 470632.637, 3917291.682, 264.55, 3.40, 7.61 |
| | | 470670.287, 3917255.034, 262.14, 3.40, 7.61 |
| | | 470716.976, 3917230.434, 256.36, 3.40, 7.61 |
| | | 470755.632, 3917219.390, 252.65, 3.40, 7.61 |
| | | 470814.103, 3917217.147, 260.32, 3.40, 7.61 |
| **Start Point** | | Line Source Represented by Adjacent Volume Sources |
| VOLUME | L0002234 | LINE VOLUME Source ID = SLINE2 |
| **End Point** | | DESCRSRC Haul Road - Incoming through Mid-Plant |
| VOLUME | L0002270 | |
| | | Length of Side = 10.00 |
| | | Configuration = Adjacent |
| | | Emission Rate = 0.0025199576 |
| | | Vertical Dimension = 6.80 |
| | | SZINIT = 3.16 |
| | | Nodes = 4 |
| | | 470820.353, 3917212.193, 260.56, 3.40, 4.65 |
| | | 470827.022, 3916927.802, 249.63, 3.40, 4.65 |
| | | 470862.318, 3916928.491, 250.93, 3.40, 4.65 |
| | | 470915.716, 3916929.043, 255.33, 3.40, 4.65 |
| **Start Point** | | Line Source Represented by Adjacent Volume Sources |
| VOLUME | L0002271 | LINE VOLUME Source ID = SLINE3 |
| **End Point** | | DESCRSRC Haul Road - Empty Truck Return Loop |
| VOLUME | L0002318 | |
| | | Length of Side = 10.00 |
| | | Configuration = Adjacent |
| | | Emission Rate = 0.0003779936 |
| | | Vertical Dimension = 6.80 |
| | | SZINIT = 3.16 |
| | | Nodes = 8 |
| | | 470927.396, 3916927.845, 256.15, 3.40, 4.65 |
| | | 470978.579, 3916927.537, 257.53, 3.40, 4.65 |
| | | 470978.271, 3916939.870, 256.91, 3.40, 4.65 |
| | | 470962.546, 3917020.346, 254.89, 3.40, 4.65 |
| | | 470960.945, 3917050.783, 254.59, 3.40, 4.65 |
| | | 470957.316, 3917212.854, 260.35, 3.40, 4.65 |
| | | 470944.126, 3917220.745, 260.61, 3.40, 4.65 |
| | | 470819.561, 3917219.470, 260.38, 3.40, 4.65 |

# PLC Gaston County Modeling Parameters

## Haul Road Segments - LINE VOLUME Sources

| | | |
|---|---|---|
| **Start Point** | | Line Source Represented by Adjacent Volume Sources |
| VOLUME | L0002319 | LINE VOLUME Source ID = SLINE4 |
| **End Point** | | DESCRSRC Concentrator Truck Traffic Loop (ALT) |
| VOLUME | L0002402 | |

Length of Side = 10.00
Configuration = Adjacent
Emission Rate = 0.0015245744
Vertical Dimension = 6.80
SZINIT = 3.16
Nodes = 11
471514.524, 3916497.846, 246.05, 3.40, 4.65
471379.313, 3916496.616, 257.60, 3.40, 4.65
471225.663, 3916588.806, 258.05, 3.40, 4.65
471164.203, 3916588.806, 260.05, 3.40, 4.65
471148.224, 3916572.827, 260.90, 3.40, 4.65
471149.453, 3916513.825, 267.47, 3.40, 4.65
471159.287, 3916506.450, 267.74, 3.40, 4.65
471231.809, 3916507.679, 261.43, 3.40, 4.65
471280.977, 3916537.180, 254.84, 3.40, 4.65
471375.625, 3916491.700, 258.18, 3.40, 4.65
471515.753, 3916489.241, 247.21, 3.40, 4.65

| | | |
|---|---|---|
| **Start Point** | | Line Source Represented by Adjacent Volume Sources |
| VOLUME | L0002403 | LINE VOLUME Source ID = SLINE5 |
| **End Point** | | DESCRSRC Concentrator Truck Traffic Loop |
| VOLUME | L0002471 | |

Length of Side = 10.00
Configuration = Adjacent
Emission Rate = 0.0015245744
Vertical Dimension = 6.80
SZINIT = 3.16
Nodes = 10
473129.338, 3917169.810, 268.89, 3.40, 4.65
472994.422, 3917088.211, 262.14, 3.40, 4.65
472915.606, 3917084.502, 256.59, 3.40, 4.65
472856.725, 3917048.339, 259.55, 3.40, 4.65
472858.116, 3917027.476, 261.10, 3.40, 4.65
472883.152, 3916985.286, 263.59, 3.40, 4.65
472900.769, 3916981.113, 264.19, 3.40, 4.65
472960.577, 3917019.130, 263.70, 3.40, 4.65
472985.150, 3917069.202, 262.95, 3.40, 4.65
473133.974, 3917159.146, 269.14, 3.40, 4.65

# Appendix C

## SIL Impact Radius Plots

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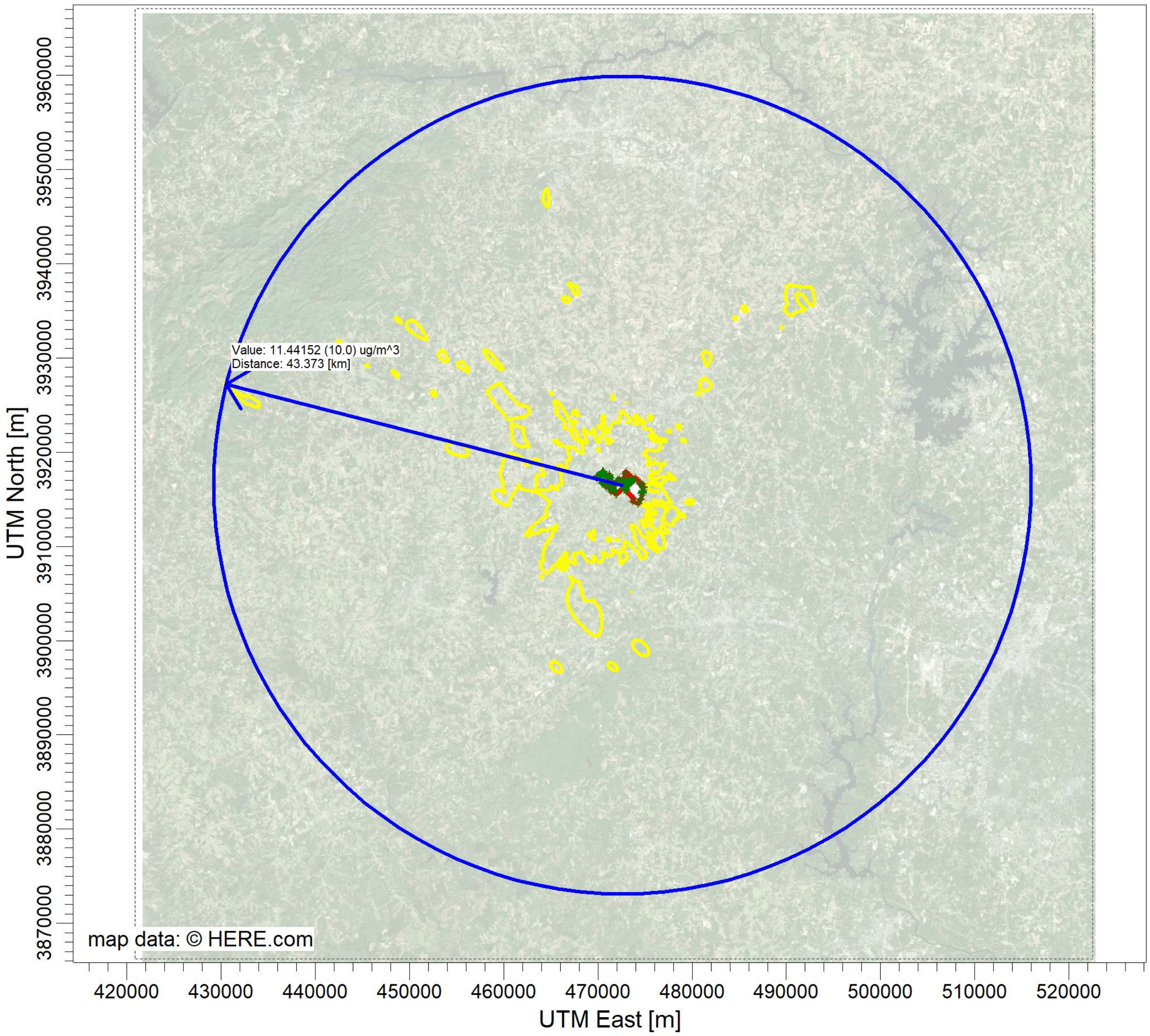
PROJECT TITLE:

**Piedmont Lithium - Carolina Lithium Integrated Site**
**SIL Radius: 1-HR NO2**




1-HR NO2 SIL RADIUS

ug/m^3

1.0   10.0

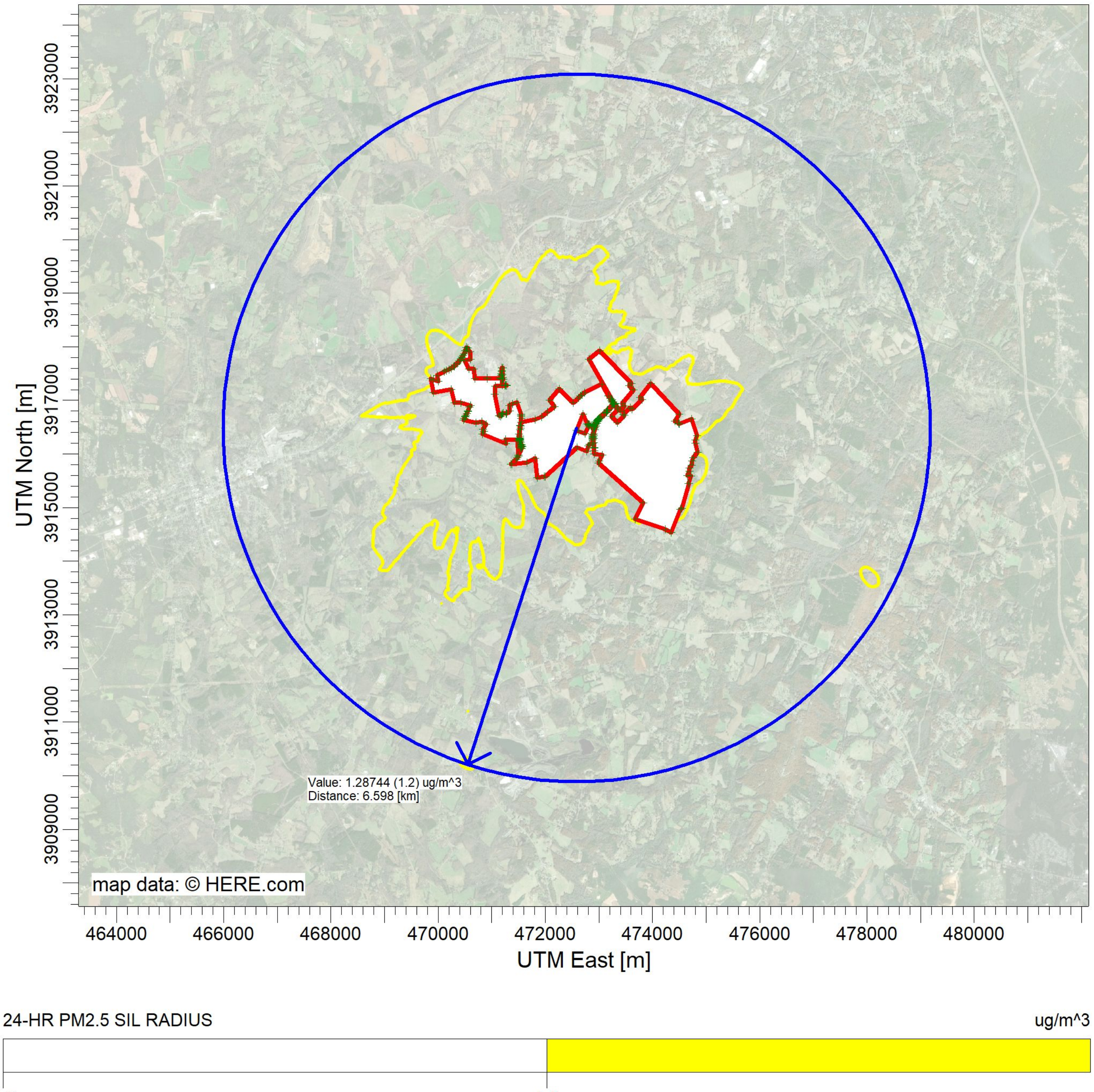
| COMMENTS: | | COMPANY NAME: | |
|---|---|---|---|
| 1-HR NO2 SIL = 10 ug/m3. | | **HDR Engineering, Inc.** | |
| | | MODELER: **Miranda Mair** | |
| | | SCALE: 1:716,176 (0 — 20 km) | |
| | | DATE: **8/17/2022** | PROJECT NO.: **10302238** |

AERMOD View - Lakes Environmental Software

C:\Projects\Piedmont Lithium\Piedmont\Piedmont.isc

PROJECT TITLE:

**Piedmont Lithium - Carolina Lithium Integrated Site**
**SIL Radius: 24-HR PM2.5**




COMMENTS:

24-HR PM2.5 SIL = 1.2 ug/m3.

COMPANY NAME:

**HDR Engineering, Inc.**

MODELER:

**Miranda Mair**

SCALE: 1:118,511

0 4 km

DATE:

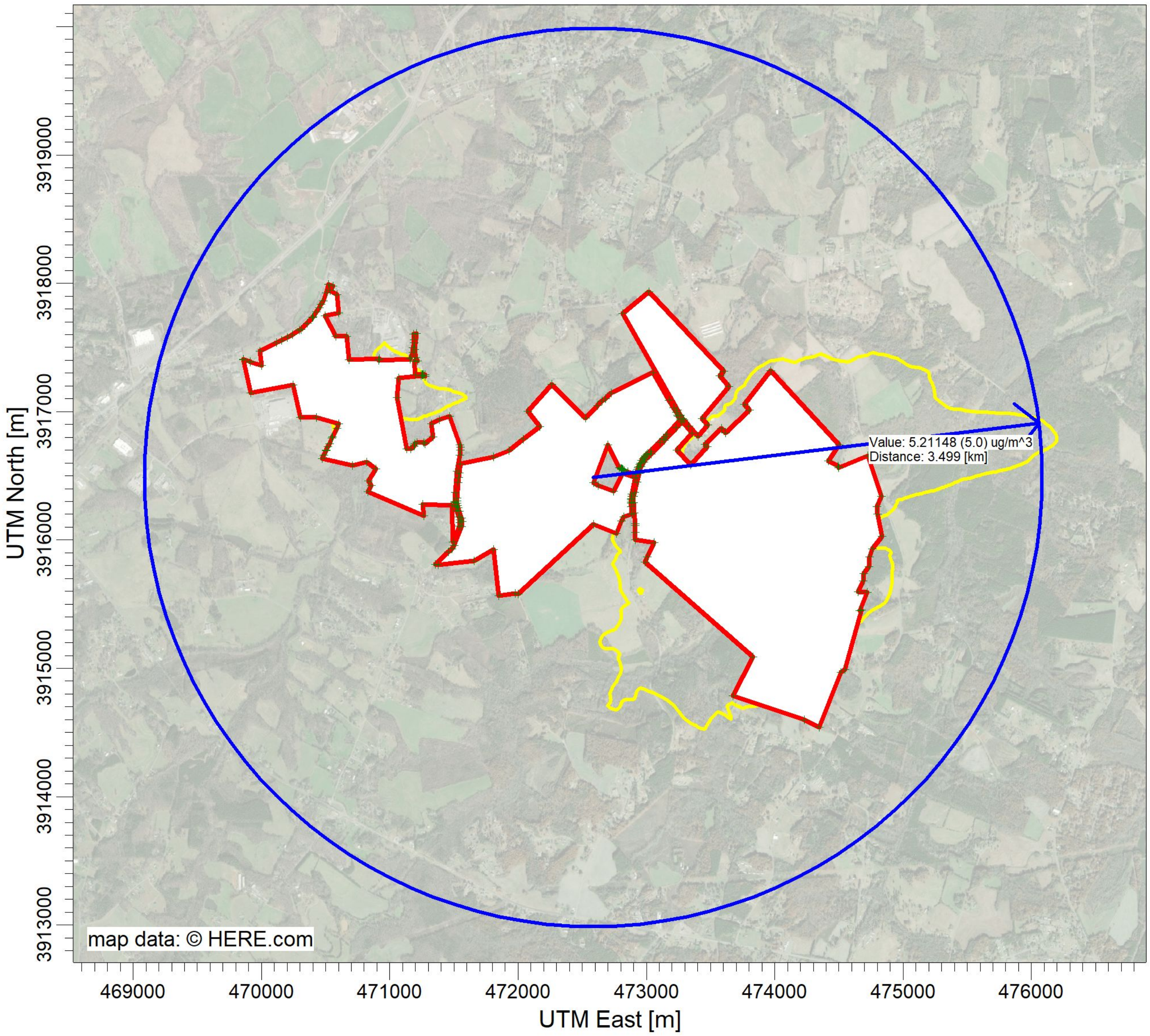
**8/17/2022**

PROJECT NO.:

**10302238**

PROJECT TITLE:

**Piedmont Lithium - Carolina Lithium Integrated Site**
**SIL Radius: 24-HR PM10**




24-HR PM10 SIL RADIUS

ug/m^3

1.00

5.00

| COMMENTS: | | COMPANY NAME: | |
|---|---|---|---|
| 24-HR PM10 SIL = 5 ug/m3. | | **HDR Engineering, Inc.** | |
| | | MODELER: **Miranda Mair** | |
| | | SCALE: 1:52,584 (0 – 2 km) | |
| | | DATE: **8/17/2022** | PROJECT NO.: **10302238** |

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# Appendix D

## Nearby Source Screening Workbook

## Piedmont Lithium Integrated Site

Nearby Emission Source Inventory
20D Screening Method based on Significant Impact Area (SIA)

**AERMOD Significant Impact Area (SIA) Model Results**

| PLC Location (UTM)[a] | | PLC SIAs | $PM_{2.5}$ SIA | $PM_{10}$ SIA | $NO_2$ SIA[b] | CO SIA |
|---|---|---|---|---|---|---|
| X (m) | Y (m) | | (km) | (km) | (km) | (km) |
| 472559.00 | 3916208.00 | | 6.3 | 3.6 | 25 | 0 |

| Nearby Facilities Identified for Modeling | $PM_{2.5}$ | $PM_{10}$ | $NO_2$ | CO[c] |
|---|---|---|---|---|
| | 0 | 0 | 4 | 0 |

**Notes:**

[a] Approximate center of integrated site. SIAs for short-term averaging periods are conservatively applied to annual averaging periods.

[b] Appendix D of the PSD Modeling Guidelines states for 1-hour NO2, the SIA can be the lesser of the SIL radius or 25 km.

[c] One facility was flagged by the 20D screening based on the proximitiy to PLC, but PLC does not exceed the CO SIL for 1hr or 8hr, so no need to model for cumulative impacts

From pgs 52-53 of the Guidance for PM2.5 Permit Modeling memo: "As discussed in more detail in the EPA's March 1, 2011, clarification memorandum regarding Appendix W modeling guidelines for the 1-hour NO2 NAAQS (U.S. EPA, 2011f), Section 8.2.3 of Appendix W emphasizes the importance of professional judgment in the identification of nearby and other sources to be included in the modeled emission inventory and establishes "a significant concentration gradient in the vicinity of the [proposed] source" as the main criterion for this selection. Appendix W also suggests that "the number of such [nearby] sources is expected to be small except in unusual situations." (Section 8.2.3.b). The EPA's March 1, 2011, guidance also includes a detailed discussion of the significant concentration gradient criterion included in Section 8.2.3.b of Appendix W, indicating that the significant concentration gradient criterion suggests that the emphasis on determining which nearby sources to include in the cumulative modeling analysis should focus on the area within about 10 kilometers of the project location in most cases. However, several application-specific factors should be considered when determining the appropriate inventory of nearby sources to include in the cumulative modeling analysis, including the potential influence of terrain characteristics on concentration gradients and the availability and adequacy of ambient monitoring data to account for background sources."

## Piedmont Lithium Integrated Site

Nearby Emission Source Inventory
20D Screening Method based on Significant Impact Area (SIA)

**Screened Emission Inventory Listings - CO**

| Sum of EMISSIONS (TONS) | | | | |
|---|---|---|---|---|
| **DISTANCE (KM)** | **PLANT NAME** | **Total** | **20 times Distance to PLC (KM)** | **CO PTE < 20D, Screen out of Model?** |
| 3.19 | Keystone Powdered Metal Company | 0.52 | 63.75 | YES |
| 4.37 | Tenowo, Inc. | 1.62 | 87.30 | YES |
| 8.22 | Modern Polymers, Inc. | 3.51 | 164.33 | YES |
| 9.78 | Livent USA Corp. | 19.67 | 195.61 | YES |
| 10.16 | McMurray Fabrics, Inc. - Lincolnton | 2.32 | 203.27 | YES |
| 10.99 | Hi Tex, Inc. DBA Crypton Fabrics | 1.71 | 219.78 | YES |
| 11.10 | Owens Corning - Gastonia Plant | 8.92 | 221.97 | YES |
| 11.39 | NC Municipal Power Agency No. 1 - Gastonia Prime Power Park | 2.51 | 227.83 | YES |
| 11.67 | Gaston County Landfill - Hardin Site | 109.70 | 233.31 | YES |
| 11.95 | Powder Coating Services, Inc. | 1.76 | 239.09 | YES |
| 12.27 | Gaston College | 1.13 | 245.40 | YES |
| 12.31 | Mann+Hummel Filtration Technology - Allen Plant | 4.41 | 246.26 | YES |
| 12.65 | Daimler Trucks North America - Gastonia Parts Plant | 2.46 | 252.94 | YES |
| 12.93 | Stabilus, Inc. | 0.88 | 258.60 | YES |
| 13.30 | The Timken Company, Lincolnton Bearing Plant | 9.03 | 265.95 | YES |
| 14.29 | Firestone Fibers and Textiles Company, Kings Mountain Plant | 1.86 | 285.77 | YES |
| 14.45 | Blachford RP Corporation - Kings Mountain Plant | 6.37 | 289.01 | YES |
| 14.94 | Firestone Fibers & Textiles Company, LLC - Gastonia Plant | 0.80 | 298.80 | YES |
| 15.54 | Cataler North America Corporation | 5.15 | 310.77 | YES |
| 15.63 | Blythe Construction, Inc. - Kings Mountain Plant | 4.80 | 312.58 | YES |
| 16.14 | ST Engineering LeeBoy, dba LeeBoy, Inc. | 0.61 | 322.89 | YES |
| 16.17 | Albemarle Kings Mountain Facility | 7.11 | 323.45 | YES |
| 16.52 | Imerys Mica Kings Mountain, Inc. - Battleground Plant | 0.38 | 330.45 | YES |
| 16.58 | LANXESS Solutions US Inc. | 1.83 | 331.54 | YES |
| 17.36 | Cleveland County Municipal Solid Waste Landfill | 0.01 | 347.24 | YES |
| 17.71 | Case Farms, LLC - Feed Mill | 0.03 | 354.21 | YES |
| 17.90 | Ethan Allen Operations, Inc. - Maiden Division | 1.87 | 358.09 | YES |
| 17.93 | Kings Mountain Energy Center | 12.33 | 358.52 | YES |
| 18.06 | Bimbo Bakeries USA, Inc. - Gastonia | 1.12 | 361.27 | YES |
| 18.10 | CaroMont Regional Medical Center | 7.94 | 362.09 | YES |
| 18.22 | Apple Inc. | 5.41 | 364.48 | YES |
| 18.29 | South Fork Industries, Inc. - Maiden Plant | 13.14 | 365.83 | YES |
| 18.52 | Imerys Mica Kings Mountain, Inc.- Moss Plant | 1.43 | 370.37 | YES |
| 18.86 | Lubrizol Advanced Materials, Inc. | 4.02 | 377.30 | YES |
| 18.98 | Asphalt Paving of Shelby, Inc. | 9.62 | 379.62 | YES |
| 19.51 | Woodgrain, Inc. - dba Natures by Woodgrain | 1.29 | 390.24 | YES |
| 19.53 | Blackburn Sanitary Landfill | 85.99 | 390.66 | YES |
| 21.46 | General Shale Brick, Inc. - Kings Mountain Facility | 11.24 | 429.22 | YES |
| 21.87 | Mannington Mills, Inc. - Pharr Yarns Complex 46 | 4.51 | 437.38 | YES |
| 21.89 | Eaton Corporation Transmission Division | 1.98 | 437.87 | YES |
| 22.07 | Glatfelter Mt. Holly, LLC | 13.16 | 441.43 | YES |
| 22.12 | Valley Proteins, Inc. - Gastonia Division | 0.43 | 442.40 | YES |
| 22.20 | Cleveland County Generating Facility | 27.19 | 444.09 | YES |
| 22.51 | CVG Acquisition, LLC - Kings Mountain Plant | 1.09 | 450.16 | YES |
| 22.52 | Atrium Health Cleveland | 4.31 | 450.45 | YES |
| 22.85 | Coats HP, Inc. | 0.51 | 457.04 | YES |
| 23.28 | Midstate Contractors, Inc. | 7.56 | 465.55 | YES |
| 24.17 | Duke Energy Corporation LCTS | 12.01 | 483.46 | YES |
| 24.79 | Flowers Baking Co. of Newton, LLC | 2.71 | 495.75 | YES |
| 25.79 | Wayne Farms, LLC - Newton Feedmill | 0.75 | 515.88 | YES |
| 25.90 | CNA Holdings, LLC - Shelby | 5.47 | 517.91 | YES |
| 25.92 | Ellis Lumber Company, Inc. | 0.30 | 518.35 | YES |
| 26.11 | Blythe Construction, Inc., Plant No. 8 | 12.13 | 522.29 | YES |

## Piedmont Lithium Integrated Site

Nearby Emission Source Inventory
20D Screening Method based on Significant Impact Area (SIA)

**Screened Emission Inventory Listings - CO**

| Sum of EMISSIONS (TONS) | | | | |
|---|---|---|---|---|
| **DISTANCE (KM)** | **PLANT NAME** | **Total** | **20 times Distance to PLC (KM)** | **CO PTE < 20D, Screen out of Model?** |
| 26.71 | Newton Sanitary Landfill | 13.80 | 534.16 | YES |
| 27.18 | Curtiss-Wright | 0.16 | 543.62 | YES |
| 27.34 | Wireway/Husky Corporation | 0.09 | 546.80 | YES |
| 27.40 | International Paper Company - Newton Container Plant | 1.69 | 548.01 | YES |
| 27.57 | Spartan Dyers, Inc., Sterling Division | 2.83 | 551.50 | YES |
| 27.58 | Turbotec Products, Inc. | 0.80 | 551.67 | YES |
| 27.61 | American & Efird LLC - Plants 05 & 15 | 8.00 | 552.27 | YES |
| 27.68 | Daimler Trucks North America, LLC - Mt. Holly Plant | 3.25 | 553.64 | YES |
| 27.74 | Clariant Corporation | 8.30 | 554.88 | YES |
| 27.82 | Bassett Upholstery Division | 4.98 | 556.44 | YES |
| 27.97 | Gold Bond Building Products, LLC - Mt. Holly | 25.98 | 559.33 | YES |
| 28.26 | Carolina Solvents, Inc. | 0.01 | 565.26 | YES |
| 28.37 | Clearwater Paper Shelby, LLC | 250.05 | 567.31 | YES |
| 28.54 | Universal Furniture - Conover | 0.84 | 570.74 | YES |
| 28.62 | Armacell Engineered Foams | 5.08 | 572.34 | YES |
| 28.78 | Tradewinds International, Inc. | 6.86 | 575.61 | YES |
| 28.99 | Conover Lumber Company, Inc. | 1.40 | 579.79 | YES |
| 29.28 | Terra-Mulch Products, LLC | 6.95 | 585.56 | YES |
| 29.42 | Hickory Printing Solutions, LLC | 0.05 | 588.41 | YES |
| 29.48 | Catawba Valley Medical Center - Main Campus | 3.79 | 589.70 | YES |
| 29.54 | Maymead Materials, Inc. - Hickory Plant | 6.72 | 590.72 | YES |
| 29.55 | Carpenter Company Conover | 0.30 | 590.95 | YES |
| 29.91 | KSM Castings USA, Inc. | 0.21 | 598.27 | YES |
| 29.92 | Electric Glass Fiber America, LLC | 56.08 | 598.39 | YES |
| 29.96 | Vanguard Furniture Company, Inc. | 0.37 | 599.24 | YES |
| 29.99 | TSG Finishing, LLC - Conover Plant | 0.55 | 599.81 | YES |
| 30.45 | Ramsey Finishing - Hickory | 0.09 | 608.99 | YES |
| 30.59 | TSG Finishing, LLC - Combeau Industries | 0.42 | 611.89 | YES |
| 30.73 | J. T. Russell & Sons, Inc. - Conover Plant | 9.78 | 614.56 | YES |
| 30.82 | Hickory Springs Manufacturing Co. - Hickory Metals Complex | 2.58 | 616.33 | YES |
| 30.98 | Synthetics Finishing Longview | 3.02 | 619.68 | YES |
| 31.03 | Sherrill Furniture Company, Inc. | 0.13 | 620.61 | YES |
| 31.05 | Sherrill Furniture Company, Inc., CTH-Sherrill Occasional | 0.06 | 621.09 | YES |
| 31.08 | Appalachian Hardwood Flooring | 3.89 | 621.52 | YES |
| 31.27 | Prysmian Cables and Systems USA, LLC | 3.00 | 625.33 | YES |
| 31.32 | HWS Company Inc. dba Hickory White | 14.33 | 626.49 | YES |
| 31.41 | Airlite Plastics Company dba Airlite Nonwovens | 0.27 | 628.17 | YES |
| 31.44 | Traditions Woodcarvings and Frames, Inc. | 0.04 | 628.71 | YES |
| 31.44 | Shurtape Technologies - Hickory/Highland Plant | 8.41 | 628.82 | YES |
| 31.45 | Hickory Chair, LLC | 8.81 | 629.08 | YES |
| 31.51 | Sonoco Hickory, Inc. - Hickory Plant | 0.99 | 630.21 | YES |
| 31.73 | Century Furniture - Plant No. 3 | 0.31 | 634.53 | YES |
| 31.82 | Unifour Finishers, Inc. | 0.37 | 636.35 | YES |
| 31.87 | Century Furniture - Plant No. 1 | 19.59 | 637.41 | YES |
| 31.97 | Duke Energy Carolinas, LLC - Allen Steam Station | 290.88 | 639.39 | YES |
| 32.20 | Baker Interiors Furniture Company | 3.98 | 644.03 | YES |
| 32.33 | W.M. Cramer Lumber Company | 2.94 | 646.65 | YES |
| 32.46 | Century Furniture - Plant No. 2 | 0.16 | 649.28 | YES |
| 32.50 | HNI Corporation | 0.15 | 650.10 | YES |
| 32.79 | Ramsey's Finishing, Inc. | 0.03 | 655.73 | YES |
| 33.39 | Commscope, Inc. - Claremont Operations | 0.53 | 667.72 | YES |
| 33.96 | CommScope, Inc. - Catawba Plant | 0.03 | 679.15 | YES |
| 35.64 | Duke Energy Carolinas, LLC - Marshall Steam Station | 2045.99 | 712.90 | NO |

**Piedmont Lithium Integrated Site**

Nearby Emission Source Inventory
20D Screening Method based on Significant Impact Area (SIA)

**Screened Emission Inventory Listings - CO**

| Sum of EMISSIONS (TONS) | | | | |
|---|---|---|---|---|
| **DISTANCE (KM)** | **PLANT NAME** | **Total** | **20 times Distance to PLC (KM)** | **CO PTE < 20D, Screen out of Model?** |
| 37.39 | Valdese Weavers, LLC - Plant No. 1 | 3.78 | 747.89 | YES |
| 37.72 | Statesville Brick Company | 14.55 | 754.42 | YES |
| 38.44 | Hancock & Moore, LLC dba Hancock & Moore Plant 3 | 0.08 | 768.74 | YES |
| 39.45 | Bimbo Bakeries USA, Inc. - Valdese | 3.07 | 788.91 | YES |
| 40.05 | Granite Hardwoods, Inc. | 11.82 | 800.99 | YES |
| 40.09 | Valdese Weavers, LLC - Lovelady Road Plant | 1.90 | 801.73 | YES |
| 40.14 | Kleen-tech, Inc. | 0.58 | 802.80 | YES |
| 40.15 | Kellex Corporation, Inc. - Valdese Manufacturing | 2.02 | 802.97 | YES |
| 40.39 | Associated Hardwood Products, Inc. | 19.83 | 807.77 | YES |
| 40.89 | Saft America Inc. | 0.37 | 817.75 | YES |
| 41.01 | Pregis Innovative Packaging Inc. | 0.97 | 820.11 | YES |
| 41.78 | Transcontinental Gas Pipe Line Company, LLC - Station 150 | 192.59 | 835.58 | YES |
| 41.94 | Triumph Insulation Systems, LLC | 0.07 | 838.84 | YES |
| 43.86 | Richard Abernathy Grading and Septic, Inc. - Monbo Road | 0.44 | 877.28 | YES |
| 43.88 | Mack Molding Company | 0.01 | 877.52 | YES |
| 43.95 | Sealed Air Corporation - Hudson | 1.76 | 879.07 | YES |
| 44.15 | J & M Woodworking Plant 2 | 0.02 | 883.03 | YES |
| 44.19 | Duke Energy Carolinas, LLC - Cliffside Steam Station | 183.44 | 883.74 | YES |
| 44.61 | Abercrombie Textiles, LLC - Jacquard Weaving Plant | 0.22 | 892.20 | YES |
| 45.49 | Broughton Hospital | 4.52 | 909.86 | YES |
| 45.80 | Shurtape Technologies, Inc. - Plant No. 24 | 1.75 | 915.93 | YES |
| 45.99 | Seiren North America, LLC | 6.48 | 919.74 | YES |
| 46.14 | Kincaid Furniture Company, Inc. - Plant 1 | 0.01 | 922.76 | YES |
| 46.24 | Vanguard Furniture Company, Inc. - Morganton | 4.31 | 924.74 | YES |
| 46.73 | Maymead Materials, Inc. - Morganton Plant | 13.18 | 934.55 | YES |
| 47.13 | Keystone Powdered Metal Company - Troutman plant | 1.40 | 942.52 | YES |
| 47.26 | Andale, Inc. | 0.64 | 945.24 | YES |
| 47.36 | Lenoir Mirror Company, Plants 1 & 3 | 0.11 | 947.18 | YES |
| 47.39 | Ralph Rogers and Company - Henrietta Plant | 10.62 | 947.79 | YES |
| 47.52 | Quality Hardwoods, LLC | 7.26 | 950.33 | YES |
| 47.74 | Fairfield Chair Plant No. 2 | 6.37 | 954.89 | YES |
| 47.94 | Troutman Chair Company, LLC | 0.24 | 958.78 | YES |
| 48.11 | Neptco, Incorporated | 2.36 | 962.18 | YES |
| 48.24 | BestCo, Inc. | 3.81 | 964.72 | YES |
| 48.26 | NGK Ceramics USA, Inc. | 6.65 | 965.25 | YES |
| 48.33 | Maymead Materials, Inc. - Statesville Plant | 11.56 | 966.61 | YES |
| 48.34 | G & M Milling Company, Inc. | 0.03 | 966.88 | YES |
| 48.77 | Hancock & Moore, LLC dba Hancock & Moore Plant 2 | 1.14 | 975.44 | YES |
| 49.00 | Teijin Automotive Technologies NC Composites, LLC - Lenoir | 1.04 | 980.00 | YES |
| 49.13 | SDFC, LLC | 3.37 | 982.64 | YES |
| 49.19 | SGL Carbon, LLC | 87.06 | 983.75 | YES |
| 49.39 | Kewaunee Scientific Equipment Corporation | 2.69 | 987.85 | YES |
| 49.60 | Pratt (Jet Corr), Inc. | 5.62 | 992.08 | YES |
| 49.65 | 3A Composites USA, Inc. | 2.22 | 993.00 | YES |

**Piedmont Lithium Integrated Site**

Nearby Emission Source Inventory

20D Screening Method based on Significant Impact Area (SIA)

**Screened Emission Inventory Listings - $NO_2$**

| Sum of EMISSIONS (TONS) | | | | | | | |
|---|---|---|---|---|---|---|---|
| DISTANCE (KM) | PLANT NAME | Total | 20 times Distance to PLC (KM) | NOx PTE < 20D, Screen out of Model? | 2 times Distance to PLC (KM) | NOx PTE < 2D, Screen out of Model? |
| 3.19 | Keystone Powdered Metal Company | 0.62 | 63.75 | YES | 6.37 | YES |
| 4.37 | Tenowo, Inc. | 1.93 | 87.30 | YES | 8.73 | YES |
| 8.22 | Modern Polymers, Inc. | 4.18 | 164.33 | YES | 16.43 | YES |
| 9.78 | Livent USA Corp. | 17.07 | 195.61 | YES | 19.56 | YES |
| 10.16 | McMurray Fabrics, Inc. - Lincolnton | 2.78 | 203.27 | YES | 20.33 | YES |
| 10.99 | Hi Tex, Inc. DBA Crypton Fabrics | 2.04 | 219.78 | YES | 21.98 | YES |
| 11.10 | Owens Corning - Gastonia Plant | 10.86 | 221.97 | YES | 22.20 | YES |
| 11.39 | NC Municipal Power Agency No. 1 - Gastonia Prime Power Park | 2.25 | 227.83 | YES | 22.78 | YES |
| 11.67 | Gaston County Landfill - Hardin Site | 34.40 | 233.31 | YES | 23.33 | NO |
| 11.95 | Powder Coating Services, Inc. | 2.09 | 239.09 | YES | 23.91 | YES |
| 12.27 | Gaston College | 1.35 | 245.40 | YES | 24.54 | YES |
| 12.31 | Mann+Hummel Filtration Technology - Allen Plant | 5.24 | 246.26 | YES | 24.63 | YES |
| 12.65 | Daimler Trucks North America - Gastonia Parts Plant | 3.34 | 252.94 | YES | 25.29 | YES |
| 12.93 | Stabilus, Inc. | 1.11 | 258.60 | YES | 25.86 | YES |
| 13.30 | The Timken Company, Lincolnton Bearing Plant | 10.84 | 265.95 | YES | 26.59 | YES |
| 14.29 | Firestone Fibers and Textiles Company, Kings Mountain Plant | 36.75 | 285.77 | YES | 28.58 | NO |
| 14.45 | Blachford RP Corporation - Kings Mountain Plant | 7.60 | 289.01 | YES | 28.90 | YES |
| 14.94 | Firestone Fibers & Textiles Company, LLC - Gastonia Plant | 14.10 | 298.80 | YES | 29.88 | YES |
| 15.54 | Cataler North America Corporation | 25.43 | 310.77 | YES | 31.08 | YES |
| 15.63 | Blythe Construction, Inc. - Kings Mountain Plant | 1.70 | 312.58 | YES | 31.26 | YES |
| 16.14 | ST Engineering LeeBoy, dba LeeBoy, Inc. | 0.72 | 322.89 | YES | 32.29 | YES |
| 16.17 | Albemarle Kings Mountain Facility | 8.46 | 323.45 | YES | 32.35 | YES |
| 16.52 | Imerys Mica Kings Mountain, Inc. - Battleground Plant | 0.46 | 330.45 | YES | 33.05 | YES |
| 16.58 | LANXESS Solutions US Inc. | 2.18 | 331.54 | YES | 33.15 | YES |
| 17.36 | Cleveland County Municipal Solid Waste Landfill | 0.06 | 347.24 | YES | 34.72 | YES |
| 17.71 | Case Farms, LLC - Feed Mill | 0.04 | 354.21 | YES | 35.42 | YES |
| 17.90 | Ethan Allen Operations, Inc. - Maiden Division | 1.53 | 358.09 | YES | 35.81 | YES |
| 17.93 | Kings Mountain Energy Center | 61.50 | 358.52 | YES | 35.85 | NO |
| 18.06 | Bimbo Bakeries USA, Inc. - Gastonia | 1.34 | 361.27 | YES | 36.13 | YES |
| 18.10 | CaroMont Regional Medical Center | 14.17 | 362.09 | YES | 36.21 | YES |
| 18.22 | Apple Inc. | 6.67 | 364.48 | YES | 36.45 | YES |
| 18.29 | South Fork Industries, Inc. - Maiden Plant | 15.64 | 365.83 | YES | 36.58 | YES |
| 18.52 | Imerys Mica Kings Mountain, Inc.- Moss Plant | 1.71 | 370.37 | YES | 37.04 | YES |
| 18.86 | Lubrizol Advanced Materials, Inc. | 5.60 | 377.30 | YES | 37.73 | YES |
| 18.98 | Asphalt Paving of Shelby, Inc. | 2.16 | 379.62 | YES | 37.96 | YES |
| 19.51 | Woodgrain, Inc. - dba Natures by Woodgrain | 0.17 | 390.24 | YES | 39.02 | YES |
| 19.53 | Blackburn Sanitary Landfill | 31.59 | 390.66 | YES | 39.07 | YES |
| 21.46 | General Shale Brick, Inc. - Kings Mountain Facility | 3.28 | 429.22 | YES | 42.92 | YES |
| 21.87 | Mannington Mills, Inc. - Pharr Yarns Complex 46 | 5.37 | 437.38 | YES | 43.74 | YES |
| 21.89 | Eaton Corporation Transmission Division | 2.36 | 437.87 | YES | 43.79 | YES |
| 22.07 | Glatfelter Mt. Holly, LLC | 15.67 | 441.43 | YES | 44.14 | YES |
| 22.12 | Valley Proteins, Inc. - Gastonia Division | 0.55 | 442.40 | YES | 44.24 | YES |
| 22.20 | Cleveland County Generating Facility | 90.50 | 444.09 | YES | 44.41 | NO |
| 22.51 | CVG Acquisition, LLC - Kings Mountain Plant | 1.30 | 450.16 | YES | 45.02 | YES |
| 22.52 | Atrium Health Cleveland | 6.02 | 450.45 | YES | 45.04 | YES |
| 22.85 | Coats HP, Inc. | 0.61 | 457.04 | YES | 45.70 | YES |
| 23.28 | Midstate Contractors, Inc. | 1.48 | 465.55 | YES | 46.55 | YES |
| 24.17 | Duke Energy Corporation LCTS | 26.34 | 483.46 | YES | 48.35 | YES |
| 24.79 | Flowers Baking Co. of Newton, LLC | 3.23 | 495.75 | YES | 49.57 | YES |
| 25.79 | Wayne Farms, LLC - Newton Feedmill | 0.89 | 515.88 | YES | 51.59 | YES |
| 25.90 | CNA Holdings, LLC - Shelby | 6.52 | 517.91 | YES | 51.79 | YES |
| 25.92 | Ellis Lumber Company, Inc. | 0.36 | 518.35 | YES | 51.83 | YES |
| 26.11 | Blythe Construction, Inc., Plant No. 8 | 2.54 | 522.29 | YES | 52.23 | YES |
| 26.71 | Newton Sanitary Landfill | 0.74 | 534.16 | YES | 53.42 | YES |
| 27.18 | Curtiss-Wright | 0.20 | 543.62 | YES | 54.36 | YES |
| 27.34 | Wireway/Husky Corporation | 0.17 | 546.80 | YES | 54.68 | YES |
| 27.40 | International Paper Company - Newton Container Plant | 2.01 | 548.01 | YES | 54.80 | YES |
| 27.57 | Spartan Dyers, Inc., Sterling Division | 3.37 | 551.50 | YES | 55.15 | YES |
| 27.58 | Turbotec Products, Inc. | 0.70 | 551.67 | YES | 55.17 | YES |
| 27.61 | American & Efird LLC - Plants 05 & 15 | 9.51 | 552.27 | YES | 55.23 | YES |
| 27.68 | Daimler Trucks North America, LLC - Mt. Holly Plant | 3.42 | 553.64 | YES | 55.36 | YES |
| 27.74 | Clariant Corporation | 10.08 | 554.88 | YES | 55.49 | YES |
| 27.82 | Bassett Upholstery Division | 4.11 | 556.44 | YES | 55.64 | YES |
| 27.97 | Gold Bond Building Products, LLC - Mt. Holly | 15.70 | 559.33 | YES | 55.93 | YES |
| 28.26 | Carolina Solvents, Inc. | 0.03 | 565.26 | YES | 56.53 | YES |
| 28.37 | Clearwater Paper Shelby, LLC | 86.07 | 567.31 | YES | 56.73 | NO |
| 28.54 | Universal Furniture - Conover | 0.68 | 570.74 | YES | 57.07 | YES |
| 28.62 | Armacell Engineered Foams | 6.17 | 572.34 | YES | 57.23 | YES |
| 28.78 | Tradewinds International, Inc. | 5.66 | 575.61 | YES | 57.56 | YES |
| 28.99 | Conover Lumber Company, Inc. | 1.15 | 579.79 | YES | 57.98 | YES |
| 29.28 | Terra-Mulch Products, LLC | 8.28 | 585.56 | YES | 58.56 | YES |
| 29.42 | Hickory Printing Solutions, LLC | 0.06 | 588.41 | YES | 58.84 | YES |

**Piedmont Lithium Integrated Site**

Nearby Emission Source Inventory
20D Screening Method based on Significant Impact Area (SIA)

**Screened Emission Inventory Listings - $NO_2$**

| Sum of EMISSIONS (TONS) | | | | | | |
|---|---|---|---|---|---|---|
| **DISTANCE (KM)** | **PLANT NAME** | **Total** | **20 times Distance to PLC (KM)** | **NOx PTE < 20D, Screen out of Model?** | **2 times Distance to PLC (KM)** | **NOx PTE < 2D, Screen out of Model?** |
| 29.48 | Catawba Valley Medical Center - Main Campus | 4.84 | 589.70 | YES | 58.97 | YES |
| 29.54 | Maymead Materials, Inc. - Hickory Plant | 1.68 | 590.72 | YES | 59.07 | YES |
| 29.55 | Carpenter Company Conover | 0.42 | 590.95 | YES | 59.10 | YES |
| 29.91 | KSM Castings USA, Inc. | 0.24 | 598.27 | YES | 59.83 | YES |
| 29.92 | Electric Glass Fiber America, LLC | 150.35 | 598.39 | YES | 59.84 | NO |
| 29.96 | Vanguard Furniture Company, Inc. | 0.44 | 599.24 | YES | 59.92 | YES |
| 29.99 | TSG Finishing, LLC - Conover Plant | 0.66 | 599.81 | YES | 59.98 | YES |
| 30.45 | Ramsey Finishing - Hickory | 0.11 | 608.99 | YES | 60.90 | YES |
| 30.59 | TSG Finishing, LLC - Combeau Industries | 0.50 | 611.89 | YES | 61.19 | YES |
| 30.73 | J. T. Russell & Sons, Inc. - Conover Plant | 2.81 | 614.56 | YES | 61.46 | YES |
| 30.82 | Hickory Springs Manufacturing Co. - Hickory Metals Complex | 3.08 | 616.33 | YES | 61.63 | YES |
| 30.98 | Synthetics Finishing Longview | 3.60 | 619.68 | YES | 61.97 | YES |
| 31.03 | Sherrill Furniture Company, Inc. | 0.16 | 620.61 | YES | 62.06 | YES |
| 31.05 | Sherrill Furniture Company, Inc., CTH-Sherrill Occasional | 0.07 | 621.09 | YES | 62.11 | YES |
| 31.08 | Appalachian Hardwood Flooring | 3.19 | 621.52 | YES | 62.15 | YES |
| 31.27 | Prysmian Cables and Systems USA, LLC | 272.04 | 625.33 | YES | 62.53 | NO |
| 31.32 | HWS Company Inc. dba Hickory White | 14.09 | 626.49 | YES | 62.65 | YES |
| 31.41 | Airlite Plastics Company dba Airlite Nonwovens | 0.32 | 628.17 | YES | 62.82 | YES |
| 31.44 | Traditions Woodcarvings and Frames, Inc. | 0.05 | 628.71 | YES | 62.87 | YES |
| 31.44 | Shurtape Technologies - Hickory/Highland Plant | 10.01 | 628.82 | YES | 62.88 | YES |
| 31.45 | Hickory Chair, LLC | 7.37 | 629.08 | YES | 62.91 | YES |
| 31.51 | Sonoco Hickory, Inc. - Hickory Plant | 1.01 | 630.21 | YES | 63.02 | YES |
| 31.73 | Century Furniture - Plant No. 3 | 0.37 | 634.53 | YES | 63.45 | YES |
| 31.82 | Unifour Finishers, Inc. | 0.45 | 636.35 | YES | 63.64 | YES |
| 31.87 | Century Furniture - Plant No. 1 | 16.11 | 637.41 | YES | 63.74 | YES |
| 31.97 | Duke Energy Carolinas, LLC - Allen Steam Station | 1026.64 | 639.39 | NO | 63.94 | NO |
| 32.20 | Baker Interiors Furniture Company | 3.40 | 644.03 | YES | 64.40 | YES |
| 32.33 | W.M. Cramer Lumber Company | 2.40 | 646.65 | YES | 64.66 | YES |
| 32.46 | Century Furniture - Plant No. 2 | 0.19 | 649.28 | YES | 64.93 | YES |
| 32.50 | HNI Corporation | 0.17 | 650.10 | YES | 65.01 | YES |
| 32.79 | Ramsey's Finishing, Inc. | 0.04 | 655.73 | YES | 65.57 | YES |
| 33.39 | Commscope, Inc. - Claremont Operations | 0.64 | 667.72 | YES | 66.77 | YES |
| 33.96 | CommScope, Inc. - Catawba Plant | 0.05 | 679.15 | YES | 67.92 | YES |
| 35.64 | Duke Energy Carolinas, LLC - Marshall Steam Station | 5991.98 | 712.90 | NO | 71.29 | NO |
| 37.39 | Valdese Weavers, LLC - Plant No. 1 | 4.62 | 747.89 | YES | 74.79 | YES |
| 37.72 | Statesville Brick Company | 9.13 | 754.42 | YES | 75.44 | YES |
| 38.44 | Hancock & Moore, LLC dba Hancock & Moore Plant 3 | 0.10 | 768.74 | YES | 76.87 | YES |
| 39.45 | Bimbo Bakeries USA, Inc. - Valdese | 3.64 | 788.91 | YES | 78.89 | YES |
| 40.05 | Granite Hardwoods, Inc. | 9.72 | 800.99 | YES | 80.10 | YES |
| 40.09 | Valdese Weavers, LLC - Lovelady Road Plant | 2.26 | 801.73 | YES | 80.17 | YES |
| 40.14 | Kleen-tech, Inc. | 0.70 | 802.80 | YES | 80.28 | YES |
| 40.15 | Kellex Corporation, Inc. - Valdese Manufacturing | 1.65 | 802.97 | YES | 80.30 | YES |
| 40.39 | Associated Hardwood Products, Inc. | 16.19 | 807.77 | YES | 80.78 | YES |
| 40.89 | Saft America Inc. | 0.44 | 817.75 | YES | 81.78 | YES |
| 41.01 | Pregis Innovative Packaging Inc. | 1.61 | 820.11 | YES | 82.01 | YES |
| 41.78 | Transcontinental Gas Pipe Line Company, LLC - Station 150 | 227.97 | 835.58 | YES | 83.56 | NO |
| 41.94 | Triumph Insulation Systems, LLC | 0.43 | 838.84 | YES | 83.88 | YES |
| 43.86 | Richard Abernathy Grading and Septic, Inc. - Monbo Road | 0.68 | 877.28 | YES | 87.73 | YES |
| 43.88 | Mack Molding Company | 0.03 | 877.52 | YES | 87.75 | YES |
| 43.95 | Sealed Air Corporation - Hudson | 2.51 | 879.07 | YES | 87.91 | YES |
| 44.15 | J & M Woodworking Plant 2 | 0.02 | 883.03 | YES | 88.30 | YES |
| 44.19 | Duke Energy Carolinas, LLC - Cliffside Steam Station | 2074.49 | 883.74 | NO | 88.37 | NO |
| 44.61 | Abercrombie Textiles, LLC - Jacquard Weaving Plant | 0.26 | 892.20 | YES | 89.22 | YES |
| 45.49 | Broughton Hospital | 7.05 | 909.86 | YES | 90.99 | YES |
| 45.80 | Shurtape Technologies, Inc. - Plant No. 24 | 2.09 | 915.93 | YES | 91.59 | YES |
| 45.99 | Seiren North America, LLC | 7.73 | 919.74 | YES | 91.97 | YES |
| 46.24 | Vanguard Furniture Company, Inc. - Morganton | 3.74 | 924.74 | YES | 92.47 | YES |
| 46.73 | Maymead Materials, Inc. - Morganton Plant | 5.44 | 934.55 | YES | 93.45 | YES |
| 47.13 | Keystone Powdered Metal Company - Troutman plant | 1.76 | 942.52 | YES | 94.25 | YES |
| 47.26 | Andale, Inc. | 7.14 | 945.24 | YES | 94.52 | YES |
| 47.36 | Lenoir Mirror Company, Plants 1 & 3 | 0.45 | 947.18 | YES | 94.72 | YES |
| 47.39 | Ralph Rogers and Company - Henrietta Plant | 4.92 | 947.79 | YES | 94.78 | YES |
| 47.52 | Quality Hardwoods, LLC | 5.93 | 950.33 | YES | 95.03 | YES |
| 47.74 | Fairfield Chair Plant No. 2 | 5.20 | 954.89 | YES | 95.49 | YES |
| 47.94 | Troutman Chair Company, LLC | 0.20 | 958.78 | YES | 95.88 | YES |
| 48.11 | Neptco, Incorporated | 2.81 | 962.18 | YES | 96.22 | YES |
| 48.24 | BestCo, Inc. | 4.53 | 964.72 | YES | 96.47 | YES |
| 48.26 | NGK Ceramics USA, Inc. | 13.36 | 965.25 | YES | 96.53 | YES |
| 48.33 | Maymead Materials, Inc. - Statesville Plant | 2.86 | 966.61 | YES | 96.66 | YES |
| 48.34 | G & M Milling Company, Inc. | 0.12 | 966.88 | YES | 96.69 | YES |
| 48.77 | Hancock & Moore, LLC dba Hancock & Moore Plant 2 | 0.93 | 975.44 | YES | 97.54 | YES |
| 49.00 | Teijin Automotive Technologies NC Composites, LLC - Lenoir | 1.24 | 980.00 | YES | 98.00 | YES |

**Piedmont Lithium Integrated Site**

Nearby Emission Source Inventory
20D Screening Method based on Significant Impact Area (SIA)

**Screened Emission Inventory Listings - $NO_2$**

| Sum of EMISSIONS (TONS) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **DISTANCE (KM)** | **PLANT NAME** | **Total** | **20 times Distance to PLC (KM)** | **NOx PTE < 20D, Screen out of Model?** | **2 times Distance to PLC (KM)** | **NOx PTE < 2D, Screen out of Model?** |
| 49.13 | SDFC, LLC | 4.03 | 982.64 | YES | 98.26 | YES |
| 49.19 | SGL Carbon, LLC | 4.90 | 983.75 | YES | 98.37 | YES |
| 49.39 | Kewaunee Scientific Equipment Corporation | 3.20 | 987.85 | YES | 98.79 | YES |
| 49.60 | Kincaid Furn. Co., Inc., Alexvale Upholstery Div., Plant #21 | 0.02 | 991.97 | YES | 99.20 | YES |
| 49.60 | Pratt (Jet Corr), Inc. | 6.71 | 992.08 | YES | 99.21 | YES |
| 49.65 | 3A Composites USA, Inc. | 2.64 | 993.00 | YES | 99.30 | YES |

## Piedmont Lithium Integrated Site

Nearby Emission Source Inventory
20D Screening Method based on Significant Impact Area (SIA)

**Screened Emission Inventory Listings - $PM_{10}$**

| Sum of EMISSIONS (TONS) | | | | |
|---|---|---|---|---|
| **DISTANCE (KM)** | **PLANT NAME** | **Total** | **20 times Distance to PLC (KM)** | **PM10 PTE < 20D, Screen out of Model?** |
| 3.19 | Keystone Powdered Metal Company | 0.06 | 63.75 | YES |
| 4.17 | Martin Marietta Materials, Inc. - Bessemer City Quarry | 0.08 | 83.33 | YES |
| 4.37 | Tenowo, Inc. | 0.02 | 87.30 | YES |
| 8.22 | Modern Polymers, Inc. | 0.32 | 164.33 | YES |
| 9.78 | Livent USA Corp. | 13.51 | 195.61 | YES |
| 10.16 | McMurray Fabrics, Inc. - Lincolnton | 0.57 | 203.27 | YES |
| 10.99 | Hi Tex, Inc. DBA Crypton Fabrics | 0.01 | 219.78 | YES |
| 11.10 | Owens Corning - Gastonia Plant | 13.71 | 221.97 | YES |
| 11.39 | NC Municipal Power Agency No. 1 - Gastonia Prime Power Park | 0.06 | 227.83 | YES |
| 11.67 | Gaston County Landfill - Hardin Site | 6.60 | 233.31 | YES |
| 11.95 | Powder Coating Services, Inc. | 0.16 | 239.09 | YES |
| 12.27 | Gaston College | 0.10 | 245.40 | YES |
| 12.31 | Mann+Hummel Filtration Technology - Allen Plant | 0.40 | 246.26 | YES |
| 12.44 | Imerys Mica Kings Mountain, Inc. - Patterson | 0.03 | 248.73 | YES |
| 12.65 | Daimler Trucks North America - Gastonia Parts Plant | 0.29 | 252.94 | YES |
| 12.93 | Stabilus, Inc. | 0.03 | 258.60 | YES |
| 13.30 | The Timken Company, Lincolnton Bearing Plant | 6.90 | 265.95 | YES |
| 14.29 | Firestone Fibers and Textiles Company, Kings Mountain Plant | 0.51 | 285.77 | YES |
| 14.45 | Blachford RP Corporation - Kings Mountain Plant | 0.14 | 289.01 | YES |
| 14.94 | Firestone Fibers & Textiles Company, LLC - Gastonia Plant | 0.45 | 298.80 | YES |
| 15.44 | Martin Marietta Materials, Inc. - Kings Mountain Quarry | 1.05 | 308.84 | YES |
| 15.54 | Cataler North America Corporation | 0.52 | 310.77 | YES |
| 15.63 | Blythe Construction, Inc. - Kings Mountain Plant | 0.97 | 312.58 | YES |
| 15.77 | American Woodmark Corporation | 1.74 | 315.50 | YES |
| 16.14 | ST Engineering LeeBoy, dba LeeBoy, Inc. | 0.05 | 322.89 | YES |
| 16.17 | Albemarle Kings Mountain Facility | 3.63 | 323.45 | YES |
| 16.52 | Imerys Mica Kings Mountain, Inc. - Battleground Plant | 0.98 | 330.45 | YES |
| 16.58 | LANXESS Solutions US Inc. | 0.50 | 331.54 | YES |
| 17.71 | Case Farms, LLC - Feed Mill | 27.76 | 354.21 | YES |
| 17.90 | Ethan Allen Operations, Inc. - Maiden Division | 5.71 | 358.09 | YES |
| 17.93 | Kings Mountain Energy Center | 0.64 | 358.52 | YES |
| 18.06 | Bimbo Bakeries USA, Inc. - Gastonia | 0.15 | 361.27 | YES |
| 18.10 | CaroMont Regional Medical Center | 0.74 | 362.09 | YES |
| 18.22 | Apple Inc. | 0.37 | 364.48 | YES |
| 18.29 | South Fork Industries, Inc. - Maiden Plant | 1.17 | 365.83 | YES |
| 18.52 | Imerys Mica Kings Mountain, Inc.- Moss Plant | 0.31 | 370.37 | YES |
| 18.62 | Martin Marietta Materials, Inc. - Maiden Quarry | 0.06 | 372.36 | YES |
| 18.86 | Lubrizol Advanced Materials, Inc. | 0.38 | 377.30 | YES |
| 18.98 | Asphalt Paving of Shelby, Inc. | 2.79 | 379.62 | YES |
| 19.51 | Woodgrain, Inc. - dba Natures by Woodgrain | 0.98 | 390.24 | YES |
| 19.53 | Blackburn Sanitary Landfill | 2.09 | 390.66 | YES |
| 20.50 | Kings Mountain International, Inc. | 0.17 | 410.01 | YES |
| 20.84 | McCreary Modern - Maiden Frame Plant | 0.05 | 416.87 | YES |
| 21.46 | General Shale Brick, Inc. - Kings Mountain Facility | 11.06 | 429.22 | YES |
| 21.83 | Metal Recycling Services, LLC - Gastonia | 1.47 | 436.60 | YES |
| 21.87 | Mannington Mills, Inc. - Pharr Yarns Complex 46 | 23.90 | 437.38 | YES |
| 21.89 | Eaton Corporation Transmission Division | 0.20 | 437.87 | YES |
| 21.91 | International Cushioning Company, LLC - Hickory | 0.31 | 438.11 | YES |
| 22.07 | Glatfelter Mt. Holly, LLC | 43.74 | 441.43 | YES |
| 22.12 | Valley Proteins, Inc. - Gastonia Division | 0.01 | 442.40 | YES |
| 22.20 | Cleveland County Generating Facility | 25.23 | 444.09 | YES |
| 22.51 | CVG Acquisition, LLC - Kings Mountain Plant | 0.01 | 450.16 | YES |
| 22.52 | Atrium Health Cleveland | 0.32 | 450.45 | YES |
| 22.85 | Coats HP, Inc. | 0.04 | 457.04 | YES |
| 23.28 | Midstate Contractors, Inc. | 1.84 | 465.55 | YES |

**Piedmont Lithium Integrated Site**

Nearby Emission Source Inventory
20D Screening Method based on Significant Impact Area (SIA)

**Screened Emission Inventory Listings - $PM_{10}$**

| Sum of EMISSIONS (TONS) | | | | |
|---|---|---|---|---|
| **DISTANCE (KM)** | **PLANT NAME** | **Total** | **20 times Distance to PLC (KM)** | **PM10 PTE < 20D, Screen out of Model?** |
| 24.17 | Duke Energy Corporation LCTS | 2.32 | 483.46 | YES |
| 24.79 | Flowers Baking Co. of Newton, LLC | 0.42 | 495.75 | YES |
| 25.68 | B. V. Hedrick Gravel and Sand Company, Lake Norman Quarry | 1.56 | 513.50 | YES |
| 25.75 | Renwood Mills, LLC - Flour Mill | 1.42 | 514.93 | YES |
| 25.79 | Wayne Farms, LLC - Newton Feedmill | 0.75 | 515.88 | YES |
| 25.90 | CNA Holdings, LLC - Shelby | 0.76 | 517.91 | YES |
| 25.92 | Ellis Lumber Company, Inc. | 0.03 | 518.35 | YES |
| 25.99 | Martin Marietta Materials, Inc. - Denver Quarry | 0.52 | 519.83 | YES |
| 26.11 | Blythe Construction, Inc., Plant No. 8 | 2.19 | 522.29 | YES |
| 26.71 | Newton Sanitary Landfill | 0.31 | 534.16 | YES |
| 27.18 | Curtiss-Wright | 0.10 | 543.62 | YES |
| 27.34 | Wireway/Husky Corporation | 0.68 | 546.80 | YES |
| 27.40 | International Paper Company - Newton Container Plant | 1.09 | 548.01 | YES |
| 27.57 | Spartan Dyers, Inc., Sterling Division | 0.26 | 551.50 | YES |
| 27.58 | Turbotec Products, Inc. | 0.10 | 551.67 | YES |
| 27.61 | American & Efird LLC - Plants 05 & 15 | 0.03 | 552.27 | YES |
| 27.68 | Daimler Trucks North America, LLC - Mt. Holly Plant | 1.75 | 553.64 | YES |
| 27.74 | Clariant Corporation | 1.28 | 554.88 | YES |
| 27.82 | Bassett Upholstery Division | 2.82 | 556.44 | YES |
| 27.84 | Lee Roys Frame Company, Inc. | 2.85 | 556.79 | YES |
| 27.97 | Gold Bond Building Products, LLC - Mt. Holly | 44.04 | 559.33 | YES |
| 27.99 | Rudisill Frame Shop, Inc. | 0.47 | 559.89 | YES |
| 28.37 | Clearwater Paper Shelby, LLC | 22.07 | 567.31 | YES |
| 28.54 | Universal Furniture - Conover | 0.16 | 570.74 | YES |
| 28.62 | Armacell Engineered Foams | 0.93 | 572.34 | YES |
| 28.78 | Tradewinds International, Inc. | 3.37 | 575.61 | YES |
| 28.99 | Conover Lumber Company, Inc. | 0.67 | 579.79 | YES |
| 29.11 | Corning Optical Communications, LLC - HMTC | 1.23 | 582.13 | YES |
| 29.28 | Terra-Mulch Products, LLC | 9.93 | 585.56 | YES |
| 29.30 | Martin Marietta Materials, Inc. - Hickory Quarry | 1.58 | 586.03 | YES |
| 29.48 | Catawba Valley Medical Center - Main Campus | 0.26 | 589.70 | YES |
| 29.54 | Maymead Materials, Inc. - Hickory Plant | 1.16 | 590.72 | YES |
| 29.55 | Carpenter Company Conover | 0.01 | 590.95 | YES |
| 29.91 | KSM Castings USA, Inc. | 0.23 | 598.27 | YES |
| 29.92 | Electric Glass Fiber America, LLC | 59.63 | 598.39 | YES |
| 29.96 | Vanguard Furniture Company, Inc. | 0.28 | 599.24 | YES |
| 30.05 | Wesley Hall Incorporated | 0.12 | 601.00 | YES |
| 30.45 | Ramsey Finishing - Hickory | 0.03 | 608.99 | YES |
| 30.46 | McCrorie Group, LLC - Cranford Woodcarving | 0.01 | 609.13 | YES |
| 30.47 | Snyder Paper Corporation | 1.99 | 609.36 | YES |
| 30.59 | TSG Finishing, LLC - Combeau Industries | 0.04 | 611.89 | YES |
| 30.73 | J. T. Russell & Sons, Inc. - Conover Plant | 2.42 | 614.56 | YES |
| 30.82 | Hickory Springs Manufacturing Co. - Hickory Metals Complex | 0.01 | 616.33 | YES |
| 30.98 | Synthetics Finishing Longview | 0.27 | 619.68 | YES |
| 31.03 | Sherrill Furniture Company, Inc. | 0.16 | 620.61 | YES |
| 31.05 | Sherrill Furniture Company, Inc., CTH-Sherrill Occasional | 0.09 | 621.09 | YES |
| 31.08 | Appalachian Hardwood Flooring | 1.98 | 621.52 | YES |
| 31.27 | Prysmian Cables and Systems USA, LLC | 10.88 | 625.33 | YES |
| 31.27 | Kontane Logistics, Inc. | 6.54 | 625.43 | YES |
| 31.32 | HWS Company Inc. dba Hickory White | 5.83 | 626.49 | YES |
| 31.39 | Certainteed Vinyl Operations | 7.07 | 627.80 | YES |
| 31.41 | Airlite Plastics Company dba Airlite Nonwovens | 14.00 | 628.17 | YES |
| 31.44 | Traditions Woodcarvings and Frames, Inc. | 0.01 | 628.71 | YES |
| 31.44 | Shurtape Technologies - Hickory/Highland Plant | 3.55 | 628.82 | YES |
| 31.45 | Hickory Chair, LLC | 5.39 | 629.08 | YES |

## Piedmont Lithium Integrated Site

Nearby Emission Source Inventory
20D Screening Method based on Significant Impact Area (SIA)

**Screened Emission Inventory Listings - $PM_{10}$**

| Sum of EMISSIONS (TONS) | | | | |
|---|---|---|---|---|
| **DISTANCE (KM)** | **PLANT NAME** | **Total** | **20 times Distance to PLC (KM)** | **PM10 PTE < 20D, Screen out of Model?** |
| 31.66 | Colt Recycling, Southeast LLC | 0.83 | 633.20 | YES |
| 31.73 | Century Furniture - Plant No. 3 | 0.29 | 634.53 | YES |
| 31.87 | Century Furniture - Plant No. 1 | 14.71 | 637.41 | YES |
| 31.97 | Duke Energy Carolinas, LLC - Allen Steam Station | 62.24 | 639.39 | YES |
| 32.20 | Baker Interiors Furniture Company | 2.33 | 644.03 | YES |
| 32.26 | Smith Setzer & Sons, Inc. | 0.50 | 645.24 | YES |
| 32.33 | W.M. Cramer Lumber Company | 0.84 | 646.65 | YES |
| 32.46 | Century Furniture - Plant No. 2 | 0.12 | 649.28 | YES |
| 32.50 | HNI Corporation | 0.03 | 650.10 | YES |
| 32.79 | Ramsey's Finishing, Inc. | 1.97 | 655.73 | YES |
| 33.39 | Commscope, Inc. - Claremont Operations | 0.12 | 667.72 | YES |
| 34.21 | SpartaCraft, Inc. | 0.66 | 684.30 | YES |
| 35.64 | Duke Energy Carolinas, LLC - Marshall Steam Station | 237.14 | 712.90 | YES |
| 37.39 | Valdese Weavers, LLC - Plant No. 1 | 0.35 | 747.89 | YES |
| 37.72 | Statesville Brick Company | 13.28 | 754.42 | YES |
| 38.44 | Hancock & Moore, LLC dba Hancock & Moore Plant 3 | 8.44 | 768.74 | YES |
| 39.45 | Bimbo Bakeries USA, Inc. - Valdese | 3.51 | 788.91 | YES |
| 40.05 | Granite Hardwoods, Inc. | 5.58 | 800.99 | YES |
| 40.09 | Valdese Weavers, LLC - Lovelady Road Plant | 5.14 | 801.73 | YES |
| 40.15 | Kellex Corporation, Inc. - Valdese Manufacturing | 1.76 | 802.97 | YES |
| 40.39 | Associated Hardwood Products, Inc. | 9.68 | 807.77 | YES |
| 41.01 | Pregis Innovative Packaging Inc. | 0.18 | 820.11 | YES |
| 41.24 | Milliken & Company - Golden Valley Plant | 1.72 | 824.71 | YES |
| 41.78 | Transcontinental Gas Pipe Line Company, LLC - Station 150 | 13.94 | 835.58 | YES |
| 41.90 | Harris Manufacturing, Inc. | 0.07 | 837.91 | YES |
| 41.94 | Triumph Insulation Systems, LLC | 0.02 | 838.84 | YES |
| 42.07 | Autumn House, Inc. | 0.01 | 841.41 | YES |
| 43.46 | RPM Wood Finishes Group, Inc. | 1.99 | 869.12 | YES |
| 43.86 | Richard Abernathy Grading and Septic, Inc. - Monbo Road | 0.19 | 877.28 | YES |
| 43.88 | Mack Molding Company | 1.91 | 877.52 | YES |
| 43.95 | Sealed Air Corporation - Hudson | 0.01 | 879.07 | YES |
| 44.15 | J & M Woodworking Plant 2 | 0.04 | 883.03 | YES |
| 44.19 | Duke Energy Carolinas, LLC - Cliffside Steam Station | 240.95 | 883.74 | YES |
| 44.61 | Abercrombie Textiles, LLC - Jacquard Weaving Plant | 0.01 | 892.20 | YES |
| 45.49 | Broughton Hospital | 0.31 | 909.86 | YES |
| 45.79 | Liburdi Turbine Services, LLC | 0.02 | 915.81 | YES |
| 45.80 | Shurtape Technologies, Inc. - Plant No. 24 | 0.01 | 915.93 | YES |
| 45.99 | Seiren North America, LLC | 12.36 | 919.74 | YES |
| 46.14 | Kincaid Furniture Company, Inc. - Plant 1 | 0.01 | 922.76 | YES |
| 46.24 | Vanguard Furniture Company, Inc. - Morganton | 2.40 | 924.74 | YES |
| 46.73 | Maymead Materials, Inc. - Morganton Plant | 1.16 | 934.55 | YES |
| 47.04 | Vulcan Construction Materials, LLC - Morganton Quarry | 0.32 | 940.80 | YES |
| 47.13 | Keystone Powdered Metal Company - Troutman plant | 0.13 | 942.52 | YES |
| 47.22 | Pine Mountain Finishing, Inc. | 0.02 | 944.33 | YES |
| 47.26 | Andale, Inc. | 0.05 | 945.24 | YES |
| 47.36 | Lenoir Mirror Company, Plants 1 & 3 | 0.10 | 947.18 | YES |
| 47.39 | Ralph Rogers and Company - Henrietta Plant | 2.80 | 947.79 | YES |
| 47.52 | Quality Hardwoods, LLC | 3.47 | 950.33 | YES |
| 47.74 | Fairfield Chair Plant No. 2 | 4.22 | 954.89 | YES |
| 47.94 | Troutman Chair Company, LLC | 1.36 | 958.78 | YES |
| 48.04 | Bay State Milling Company | 3.14 | 960.74 | YES |
| 48.11 | Neptco, Incorporated | 0.01 | 962.18 | YES |
| 48.24 | BestCo, Inc. | 0.34 | 964.72 | YES |
| 48.26 | NGK Ceramics USA, Inc. | 4.12 | 965.25 | YES |
| 48.33 | Maymead Materials, Inc. - Statesville Plant | 2.18 | 966.61 | YES |

**Piedmont Lithium Integrated Site**

Nearby Emission Source Inventory

20D Screening Method based on Significant Impact Area (SIA)

**Screened Emission Inventory Listings - $PM_{10}$**

| Sum of EMISSIONS (TONS) | | | | |
|---|---|---|---|---|
| **DISTANCE (KM)** | **PLANT NAME** | **Total** | **20 times Distance to PLC (KM)** | **PM10 PTE < 20D, Screen out of Model?** |
| 48.34 | G & M Milling Company, Inc. | 0.99 | 966.88 | YES |
| 48.50 | Shurtape Technologies, LLC - Stony Point Plant | 0.01 | 970.04 | YES |
| 48.69 | Bakers Waste Equipment, Inc. | 8.16 | 973.80 | YES |
| 48.77 | Hancock & Moore, LLC dba Hancock & Moore Plant 2 | 11.74 | 975.44 | YES |
| 49.00 | Teijin Automotive Technologies NC Composites, LLC - Lenoir | 0.81 | 980.00 | YES |
| 49.13 | SDFC, LLC | 0.28 | 982.64 | YES |
| 49.19 | SGL Carbon, LLC | 65.88 | 983.75 | YES |
| 49.39 | Kewaunee Scientific Equipment Corporation | 0.88 | 987.85 | YES |
| 49.60 | Pratt (Jet Corr), Inc. | 0.05 | 992.08 | YES |
| 49.65 | 3A Composites USA, Inc. | 0.01 | 993.00 | YES |
| 49.67 | Piedmont Composites and Tooling, LLC | 0.19 | 993.40 | YES |
| 49.69 | Mid-Atlantic Wood Products | 0.01 | 993.75 | YES |
| 49.70 | Martin Marietta Materials, Inc. - Caldwell Quarry | 0.10 | 994.06 | YES |
| 49.79 | Sonoco Products Company - Forest City Plant | 0.13 | 995.78 | YES |

# Appendix E

## Preapplication Forms

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# NCDAQ NSR PREAPPLICATION FORM

| | |
|---|---|
| **Facility Name** | Carolina Lithium |
| **Date of Pre-App Meeting** | June 13, 2022 |
| **Facility Location (County / Lat. % Long in degrees)** | Gaston County/Latitude: 36.388847, Longitude: -81.302154 |
| **Greenfield of Modification** | Greenfield |

**Project Description**: Mining, crushing and conveyance of spodumene ore and waste rock; processing of ore to increase lithium concentration, feldspar and quartz drying, and dry material conveying; conveyance of concentrate, calcining of concentrate, conversion of calcined concentrate into lithium hydroxide, bagging of product. Other operations include wind erosion of storage piles, truck traffic, diesel emergency engines and liquid storage tanks.

| Pollutant | Emission Rate (tpy) | Emission Estimate Basis | Applicant Proposed BACT |
|---|---|---|---|
| **CO** | 1,328 (1,119 fugitive) | AP-42 | None, good combustion control |
| **NOx** | 512 (284 fugitive) | AP-42, vendor guarantees | None, low NOx burners |
| **VOC** | 13.9 | AP-42 | Not applicable |
| **PM-10 / PM2.5** | 131/105 | AP-42, vendor guarantees | None, enclosed conveyor transfers, fabric filters, wet scrubbers |
| **SO2** | 34.9 | AP-42 | Not applicable |
| **H2SO4** | 0.008 | AP-42 | Not applicable |
| **Lead** | 0.0012 | AP-42 | Not applicable |
| **GHG ($CO_2$e)** | 300,547 | 40 CFR Part 98, Design | Good combustion control |

| Class I Area | Distance to Class I (miles/km) | Class I Area | Distance to Class I (miles/km) |
|---|---|---|---|
| Swanquarter | 69 km | Great Smokey Mountains NP | 157 km |
| Linville Gorge | 115 km | | |

| Name | Representing | Phone | E-mail |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

| | DAQ Modeler | FLM Contact | Communication | Date | FLM Interested |
|---|---|---|---|---|---|
| National Park Service | | | | | |
| Forest Service | | | | | |

# NCDAQ NSR PREAPPLICATION FORM

| | |
|---|---|
| **Facility Name** | Carolina Lithium |
| **Date of Pre-App Meeting** | June 13, 2022 (Emissions updated August 11, 2022 to reflect calculation refinement) |
| **Facility Location (County / Lat. % Long in degrees)** | Gaston County/Latitude: 36.388847, Longitude: -81.302154 |
| **Greenfield of Modification** | Greenfield |

**Project Description**: Mining, crushing and conveyance of spodumene ore and waste rock; processing of ore to increase lithium concentration, feldspar and quartz drying, and dry material conveying; conveyance of concentrate, calcining of concentrate, conversion of calcined concentrate into lithium hydroxide, bagging of product. Other operations include wind erosion of storage piles, truck traffic, diesel emergency engines and liquid storage tanks.

| Pollutant | Emission Rate (tpy) | Emission Estimate Basis | Applicant Proposed BACT |
|---|---|---|---|
| **CO** | 1,328 (1,119 fugitive) | AP-42 | None, good combustion control |
| **NOx** | 514 (284 fugitive) | AP-42, vendor guarantees | None, low NOx burners |
| **VOC** | 13.9 | AP-42 | Not applicable |
| **PM-10 / PM2.5** | 93.5/65.7 | AP-42, vendor guarantees | Minimization, shrouded conveyor transfers, fabric filters, wet scrubbers |
| **SO2** | 34.9 | AP-42 | Not applicable |
| **H2SO4** | 0.008 | AP-42 | Not applicable |
| **Lead** | 0.0012 | AP-42 | Not applicable |
| **GHG ($CO_2e$)** | 300,547 | 40 CFR Part 98, Design | Good combustion control |

| Class I Area | Distance to Class I (miles/km) | Class I Area | Distance to Class I (miles/km) |
|---|---|---|---|
| Linville Gorge | 69 km | Great Smokey Mountains NP | 157 km |
| Slick Rock | 115 km | | |

| Name | Representing | Phone | E-mail |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

| | DAQ Modeler | FLM Contact | Communication | Date | FLM Interested |
|---|---|---|---|---|---|
| National Park Service | | | | | |
| Forest Service | | | | | |

# Attachment 2

## Nearby Source Parameters and

## Supplement Project TSP, HF and HCL Emissions

**PLC Gaston County Modeling Parameters**

| AERMOD ID | Source Description | Emission Rates | | | | | |
|---|---|---|---|---|---|---|---|
| | | TSP | | HF | | HCl | |
| | | (g/s) | (lb/hr) | (g/s) | (lb/hr) | (g/s) | (lb/hr) |
| **Concentrator Plant (Alternate Location)** | | | | | | | |
| EP01ALT | Ore Sorting Operations | 0.015 | 0.116 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP02ALT | Secondary Crusher Feed Bin | 0.006 | 0.051 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP03ALT | Secondary Crusher Discharge | 0.000 | 0.004 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP04ALT | Fine Ore Sizing Screen Discharge | 0.001 | 0.007 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP05ALT | Tertiary Crusher Feed Bin 1 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP06ALT | Tertiary Crusher Feed Bin 2 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP07ALT | Tertiary Crusher Nos. 1 & 2 | 0.001 | 0.005 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP08ALT | Fine Ore Bin | 0.004 | 0.034 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP09ALT | Quartz Dryer | 0.016 | 0.130 | 0.08316 | 0.660 | 0.0 | 0.0 |
| EP10ALT | Feldspar Dryer | 0.026 | 0.210 | 0.25074 | 1.990 | 0.0 | 0.0 |
| EP13ALT | Hydrofluoric Acid Storage Tank | 0.0 | 0.0 | 0.00756 | 0.060 | 0.0 | 0.0 |
| EP14ALT | Spodumene Concentrate Conveying | 0.001 | 0.004 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Concentrator Plant (Original Location)** | | | | | | | |
| EP01 | Ore Sorting Operations | 0.015 | 0.116 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP02 | Secondary Crusher Feed Bin | 0.006 | 0.051 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP03 | Secondary Crusher Discharge | 0.000 | 0.004 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP04 | Fine Ore Sizing Screen Discharge | 0.001 | 0.007 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP05 | Tertiary Crusher Feed Bin 1 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP06 | Tertiary Crusher Feed Bin 2 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP07 | Tertiary Crusher Nos. 1 & 2 | 0.001 | 0.005 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP08 | Fine Ore Bin | 0.004 | 0.034 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP09 | Quartz Dryer | 0.016 | 0.130 | 0.08316 | 0.660 | 0.0 | 0.0 |
| EP10 | Feldspar Dryer | 0.026 | 0.210 | 0.25074 | 1.990 | 0.0 | 0.0 |
| EP13 | Hydrofluoric Acid Storage Tank | 0.0 | 0.0 | 0.00756 | 0.060 | 0.0 | 0.0 |
| EP14 | Spodumene Concentrate Conveying | 0.001 | 0.004 | 0.0 | 0.0 | 0.0 | 0.0 |

**PLC Gaston County Modeling Parameters**

| AERMOD ID | Source Description | Emission Rates | | | | | |
|---|---|---|---|---|---|---|---|
| | | TSP | | HF | | HCl | |
| | | (g/s) | (lb/hr) | (g/s) | (lb/hr) | (g/s) | (lb/hr) |
| **Carolina Lithium Chemical Conversion Plant 1** | | | | | | | |
| EP15 | Spodumene Concentrate Surge Silo | 0.002 | 0.020 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP16 | Spodumene Concentrate Conveyor to Calciner | 0.001 | 0.004 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP17 | Calciner Rotary Kiln | 0.574 | 4.559 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP18 | Cooler Discharge Sweep Air | 0.003 | 0.026 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP19 | Ball Mill Feed Bin | 0.004 | 0.032 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP20 | Train 1 Pressure Leaching | 0.023 | 0.180 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP21 | Train 2 Pressure Leaching | 0.023 | 0.180 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP22 | LiOH Bagging Area Surge Bin/Transporter No. 1 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP23 | LiOH Bagging Area Surge Bin/Transporter No. 2 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP24 | LiOH Bagging Area Day Tank No. 1 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP25 | LiOH Bagging Area Day Tank No. 2 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP26 | LiOH Bagging Area Day Tank No. 3 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP27 | LiOH Bagging Area Day Tank No. 4 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP28 | LiOH Bagging Operation | 0.009 | 0.070 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP29 | LiOH Bagging Area Vacuum | 0.001 | 0.010 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP30 | Lime Receiving and Storage | 0.006 | 0.049 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP31 | Phosphate Receiving and Storage | 0.006 | 0.049 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP32 | Sodium Carbonate Receiving and Storage Silo | 0.006 | 0.049 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP33 | Sodium Carbonate Receiving and Feeder Bin | 0.006 | 0.049 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP34 | Boiler No. 1 | 0.039 | 0.312 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP35 | Boiler No. 2 | 0.039 | 0.312 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP36 | Boiler No. 3 | 0.039 | 0.309 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP40 | Hydrochloric Acid Storage Tank | 0.0 | 0.0 | 0.0 | 0.0 | 0.01564 | 0.124 |
| **Carolina Lithium Chemical Conversion Plant 2** | | | | | | | |
| EP41 | Spodumene Concentrate Conveying | 0.001 | 0.004 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP42 | Spodumene Concentrate Surge Silo | 0.002 | 0.020 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP43 | Spodumene Concentrate Conveyor to Calciner | 0.001 | 0.004 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP44 | Calciner Rotary Kiln | 0.574 | 4.559 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP45 | Cooler Discharge Sweep Air | 0.003 | 0.026 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP46 | Ball Mill Feed Bin | 0.004 | 0.032 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP47 | Train 1 Pressure Leaching | 0.023 | 0.180 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP48 | Train 2 Pressure Leaching | 0.023 | 0.180 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP49 | Bulk Bagging Prefill Hopper No. 1 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP50 | Bulk Bagging Prefill Hopper No. 2 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP51 | Bulk Bagging Day Tank No. 1 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP52 | Bulk Bagging Day Tank No. 2 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP53 | Bulk Bagging Day Tank No. 3 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP54 | Bulk Bagging Day Tank No. 4 | 0.000 | 0.002 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP55 | Bulk Bagging Operation | 0.009 | 0.070 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP56 | Bulk Bagging Area Vacuum | 0.001 | 0.010 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP57 | Phosphate Receiving and Storage | 0.006 | 0.049 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP58 | Sodium Carbonate Receiving and Feeder Bin | 0.006 | 0.049 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP59 | Boiler No. 1 | 0.039 | 0.312 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP60 | Boiler No. 2 | 0.039 | 0.312 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP61 | Boiler No. 3 | 0.039 | 0.309 | 0.0 | 0.0 | 0.0 | 0.0 |
| EP64 | Hydrochloric Acid Storage Tank | 0.0 | 0.0 | 0.0 | 0.0 | 0.016 | 0.124 |
| IES25 | Cooling Tower East | 0.003 | 0.026 | 0.0 | 0.0 | 0.0 | 0.0 |
| IES33 | Cooling Tower West | 0.003 | 0.026 | 0.0 | 0.0 | 0.0 | 0.0 |

**PLC Gaston County Modeling Parameters**

| AERMOD ID | Source Description | Inventory Description | X1 [m] | Y1 [m] | Base Elevation [m] |
|---|---|---|---|---|---|
| **Nearby Sources (NO2 NAAQS)** | | | | | |
| GCL01 | Gaston County Landfill - Hardin Site | ES-2 Exhaust | 484318.80 | 3916159.71 | 239 |
| GCL02 | Gaston County Landfill - Hardin Site | ES-3 exhaust | 484318.80 | 3916159.71 | 239 |
| GCL03 | Gaston County Landfill - Hardin Site | 10 inch flare | 484318.80 | 3916159.71 | 239 |
| GCL04 | Gaston County Landfill - Hardin Site | 4 inch flare | 484318.80 | 3916159.71 | 239 |
| GCL05 | Gaston County Landfill - Hardin Site | ES-4 exhaust | 484318.80 | 3916159.71 | 239 |
| FKM01 | Firestone Fibers and Textiles Company, Kings Mountain Plant | Boiler stack | 470900.91 | 3898732.93 | 271 |
| FKM02 | Firestone Fibers and Textiles Company, Kings Mountain Plant | REGENERATIVE THERMAL | 470900.91 | 3898732.93 | 271 |
| FKM03 | Firestone Fibers and Textiles Company, Kings Mountain Plant | VD recovery exhaust | 470900.91 | 3898732.93 | 271 |
| KME01 | Kings Mountain Energy Center | | 467201.03 | 3895121.87 | 252 |
| KME02 | Kings Mountain Energy Center | | 467201.03 | 3895121.87 | 252 |
| KME03 | Kings Mountain Energy Center | | 467201.03 | 3895121.87 | 252 |
| CCG01 | Cleveland County Generating Facility | | 462058.05 | 3892040.58 | 237 |
| CCG02 | Cleveland County Generating Facility | | 462058.05 | 3892040.58 | 237 |
| CCG03 | Cleveland County Generating Facility | | 462058.05 | 3892040.58 | 237 |
| CCG04 | Cleveland County Generating Facility | | 462058.05 | 3892040.58 | 237 |
| CCG05 | Cleveland County Generating Facility | | 462058.05 | 3892040.58 | 237 |

**PLC Gaston County Modeling Parameters**

| AERMOD ID | Source Description | Height | | Diameter | | Exit Velocity | Exit Temp | | Exhaust Flow | Release Type |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Exit Parameters | | | | | | | | |
| | | [m] | [ft] | [m] | [ft] | [m/s] | [F] | [K] | ACFM | |
| **Nearby Sources (NO2 NAAQS)** | | | | | | | | | | |
| GCL01 | Gaston County Landfill - Hardin Site | 10.668 | 35 | 0.3492 | 1.15 | 0.001 | 762.7 | 679.09 | 10,616 | POINTCAP |
| GCL02 | Gaston County Landfill - Hardin Site | 10.668 | 35 | 0.3492 | 1.15 | 0.001 | 735 | 663.71 | 10,166 | POINTCAP |
| GCL03 | Gaston County Landfill - Hardin Site | 7.62 | 25 | 0.2540 | 0.83 | 18.26 | 500 | 533.15 | 1,960 | VERTICAL |
| GCL04 | Gaston County Landfill - Hardin Site | 7.62 | 25 | 0.1016 | 0.33 | 18.28 | 500 | 533.15 | 314 | VERTICAL |
| GCL05 | Gaston County Landfill - Hardin Site | 10.668 | 35 | 0.3492 | 1.15 | 0.001 | 729.7 | 660.76 | 10,203 | POINTCAP |
| FKM01 | Firestone Fibers and Textiles Company, Kings Mountain Plant | 3.048 | 10 | 0.3048 | 1.00 | 0.06 | 72 | 295.37 | 9 | VERTICAL |
| FKM02 | Firestone Fibers and Textiles Company, Kings Mountain Plant | 10.668 | 35 | 1.2192 | 4.00 | 13.57 | 495 | 530.37 | 33,552 | VERTICAL |
| FKM03 | Firestone Fibers and Textiles Company, Kings Mountain Plant | 26.2128 | 86 | 0.3353 | 1.10 | 22.90 | 100 | 310.93 | 4,283 | VERTICAL |
| KME01 | Kings Mountain Energy Center | 54.864 | 180 | 7.0104 | 23.00 | 13.49 | 170 | 349.82 | 1,103,337 | VERTICAL |
| KME02 | Kings Mountain Energy Center | 7.62 | 25 | 0.3658 | 1.20 | 48.64 | 884 | 746.48 | 10,828 | VERTICAL |
| KME03 | Kings Mountain Energy Center | 6.096 | 20 | 0.3048 | 1.00 | 9.06 | 961 | 789.26 | 1,400 | VERTICAL |
| CCG01 | Cleveland County Generating Facility | 18.288 | 60 | 7.9553 | 26.10 | 24.08 | 1111 | 872.59 | 2,536,000 | VERTICAL |
| CCG02 | Cleveland County Generating Facility | 6.096 | 20 | 0.3658 | 1.20 | 0.06 | 300 | 422.04 | 14 | VERTICAL |
| CCG03 | Cleveland County Generating Facility | 18.288 | 60 | 7.9553 | 26.10 | 24.08 | 1111 | 872.59 | 2,536,000 | VERTICAL |
| CCG04 | Cleveland County Generating Facility | 18.288 | 60 | 7.9553 | 26.10 | 24.08 | 1111 | 872.59 | 2,536,000 | VERTICAL |
| CCG05 | Cleveland County Generating Facility | 18.288 | 60 | 7.9553 | 26.10 | 24.08 | 1111 | 872.59 | 2,536,000 | VERTICAL |

**PLC Gaston County Modeling Parameters**

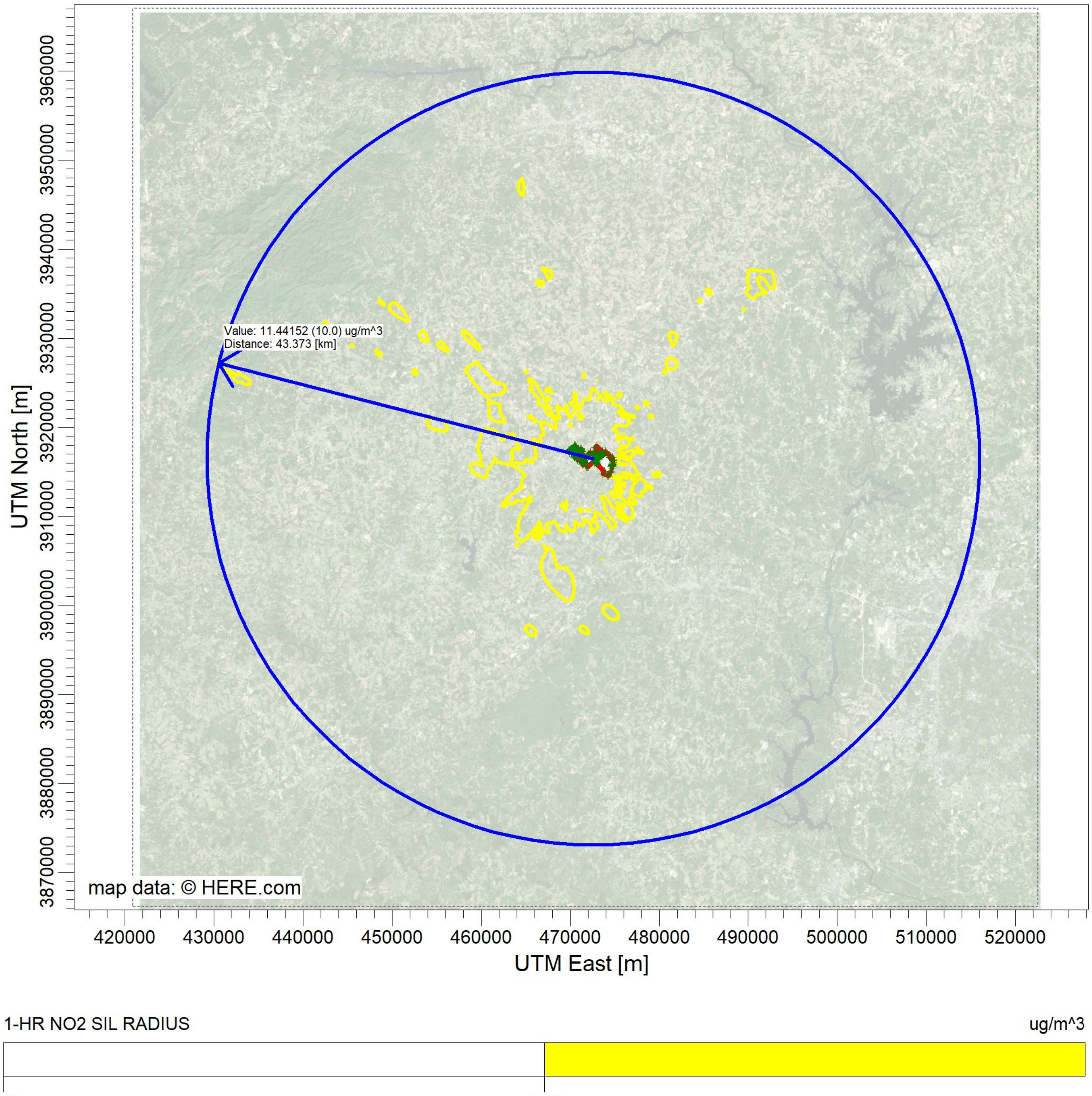
| AERMOD ID | Source Description | Emission Rates NOx (g/s) | Emission Rates NOx (lb/hr) |
|---|---|---|---|
| **Nearby Sources (NO2 NAAQS)** | | | |
| GCL01 | Gaston County Landfill - Hardin Site | 0.331 | 2.624 |
| GCL02 | Gaston County Landfill - Hardin Site | 0.321 | 2.547 |
| GCL03 | Gaston County Landfill - Hardin Site | 0.006 | 0.051 |
| GCL04 | Gaston County Landfill - Hardin Site | 0.006 | 0.051 |
| GCL05 | Gaston County Landfill - Hardin Site | 0.321 | 2.547 |
| FKM01 | Firestone Fibers and Textiles Company, Kings Mountain Plant | 0.015 | 0.116 |
| FKM02 | Firestone Fibers and Textiles Company, Kings Mountain Plant | 0.961 | 7.625 |
| FKM03 | Firestone Fibers and Textiles Company, Kings Mountain Plant | 0.082 | 0.649 |
| KME01 | Kings Mountain Energy Center | 1.767 | 14.027 |
| KME02 | Kings Mountain Energy Center | 0.001 | 0.009 |
| KME03 | Kings Mountain Energy Center | 0.001 | 0.005 |
| CCG01 | Cleveland County Generating Facility | 0.306 | 2.432 |
| CCG02 | Cleveland County Generating Facility | 0.000 | 0.002 |
| CCG03 | Cleveland County Generating Facility | 0.759 | 6.027 |
| CCG04 | Cleveland County Generating Facility | 0.688 | 5.461 |
| CCG05 | Cleveland County Generating Facility | 0.849 | 6.740 |

# Attachment 3

## Final SIL and Cumulative Impact Result Plots

PROJECT TITLE:

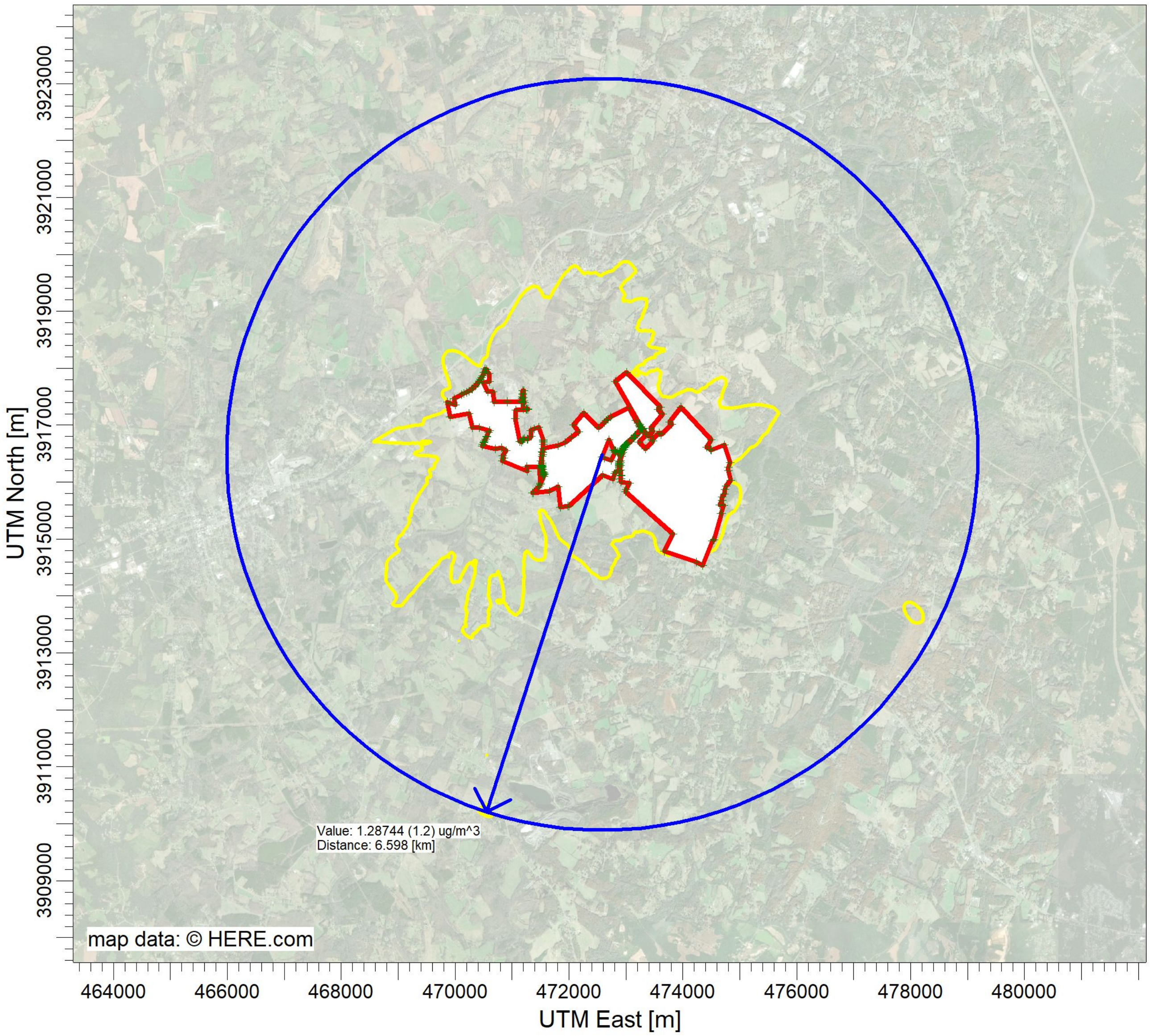
**Piedmont Lithium - Carolina Lithium Integrated Site**
**SIL Radius: 1-HR NO2**




| COMMENTS: | | COMPANY NAME: | |
|---|---|---|---|
| 1-HR NO2 SIL = 10 ug/m3. | | **HDR Engineering, Inc.** | |
| | | MODELER: **Miranda Mair** | |
| | | SCALE: 1:716,176 0 — 20 km | |
| | | DATE: **8/17/2022** | PROJECT NO.: **10302238** |

PROJECT TITLE:

**Piedmont Lithium - Carolina Lithium Integrated Site**
**SIL Radius: 24-HR PM2.5**




24-HR PM2.5 SIL RADIUS — ug/m^3

1.0 — 1.2

| COMMENTS: | | COMPANY NAME: | |
|---|---|---|---|
| 24-HR PM2.5 SIL = 1.2 ug/m3. | | **HDR Engineering, Inc.** | |
| | | MODELER: **Miranda Mair** | |
| | | SCALE: 1:118,511 (0 – 4 km) | |
| | | DATE: **8/17/2022** | PROJECT NO.: **10302238** |

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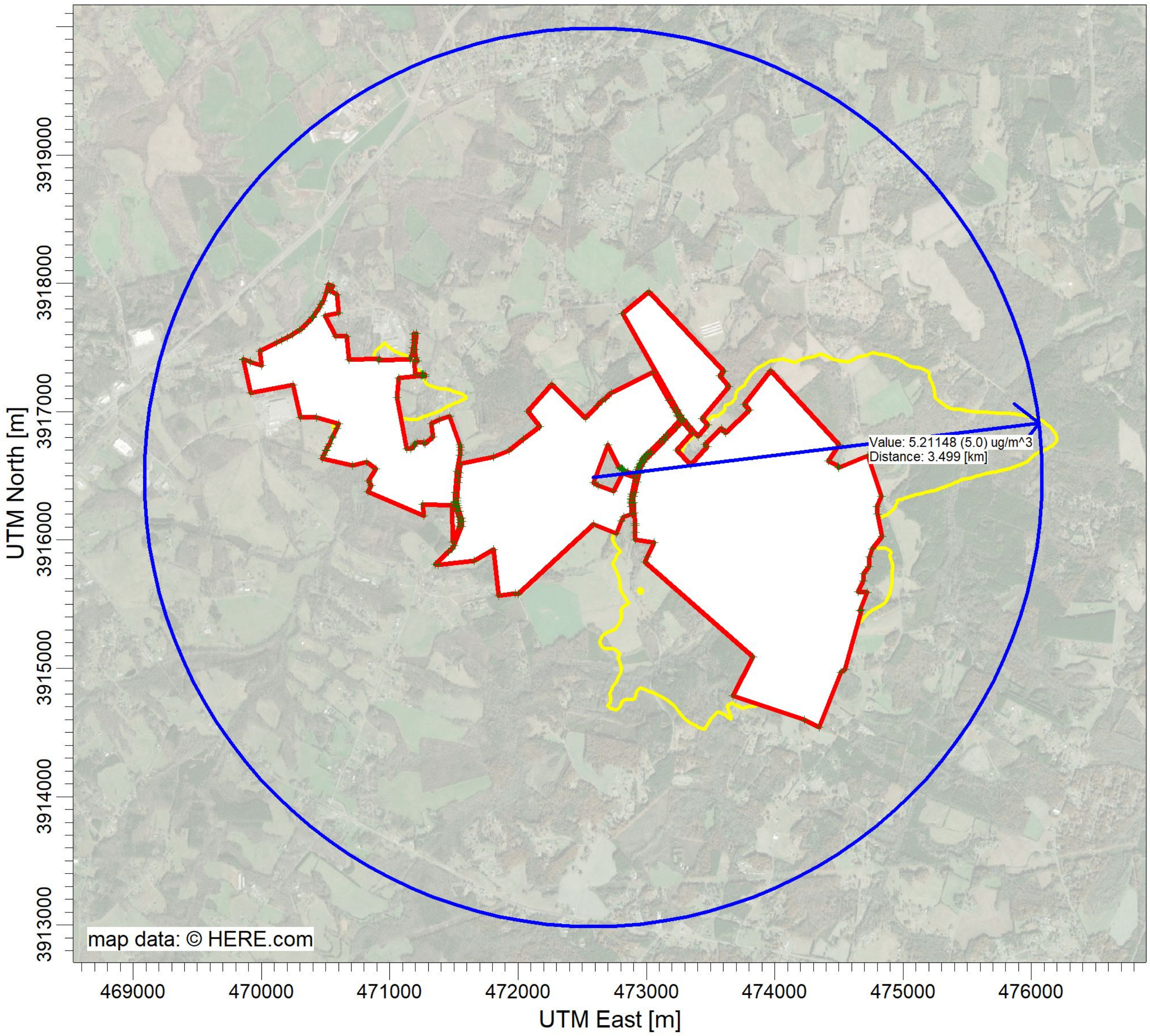
PROJECT TITLE:

**Piedmont Lithium - Carolina Lithium Integrated Site**
**SIL Radius: 24-HR PM10**




24-HR PM10 SIL RADIUS

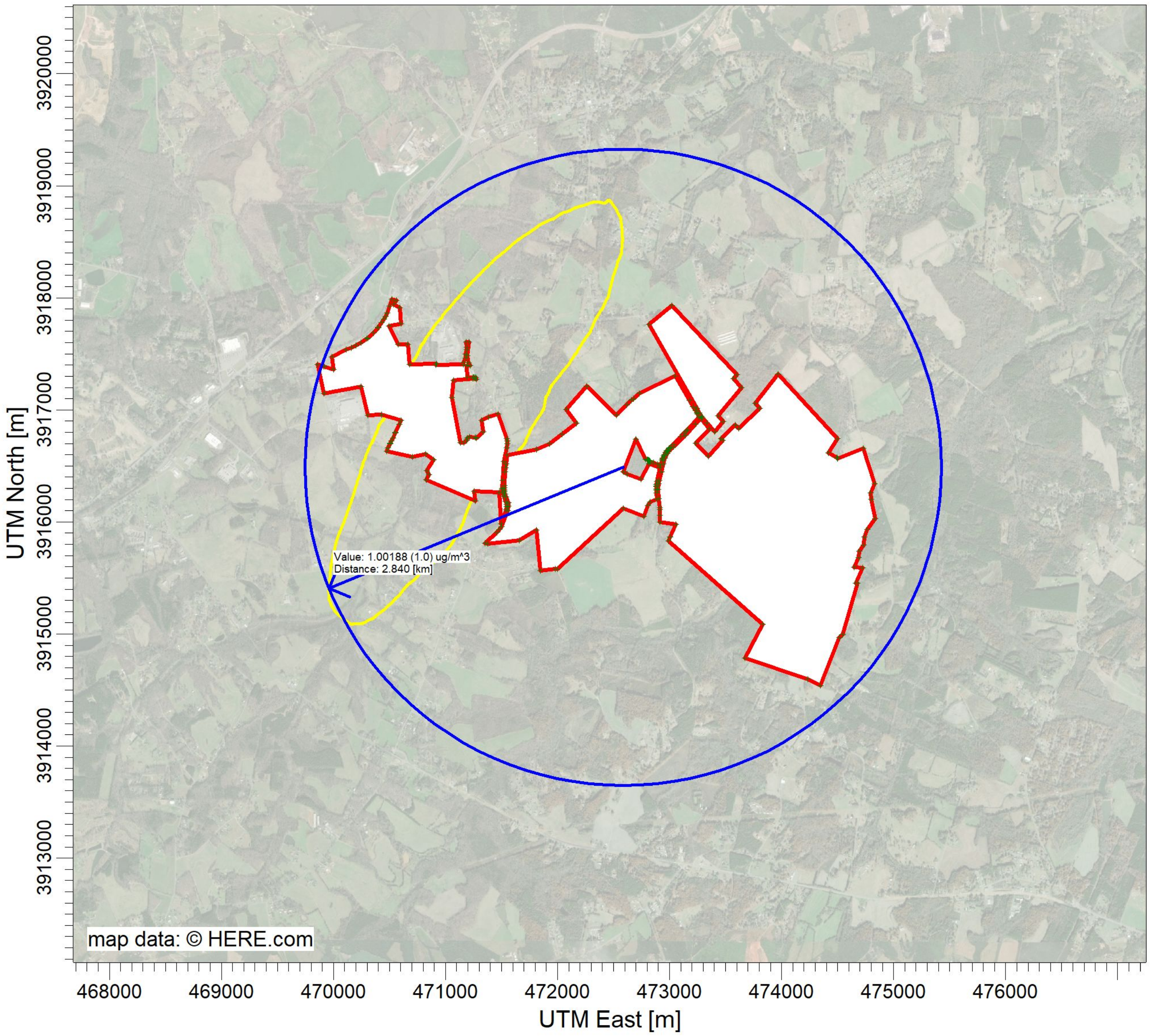
ug/m^3

1.00 | 5.00

| COMMENTS: | | COMPANY NAME: | |
|---|---|---|---|
| 24-HR PM10 SIL = 5 ug/m3. | | **HDR Engineering, Inc.** | |
| | | MODELER: **Miranda Mair** | |
| | | SCALE: 1:52,584 (0 – 2 km) | |
| | | DATE: **8/17/2022** | PROJECT NO.: **10302238** |

PROJECT TITLE:

**Piedmont Lithium - Carolina Lithium Integrated Site**
**SIL Radius: Annual NO2**




ANNUAL NO2 SIL RADIUS

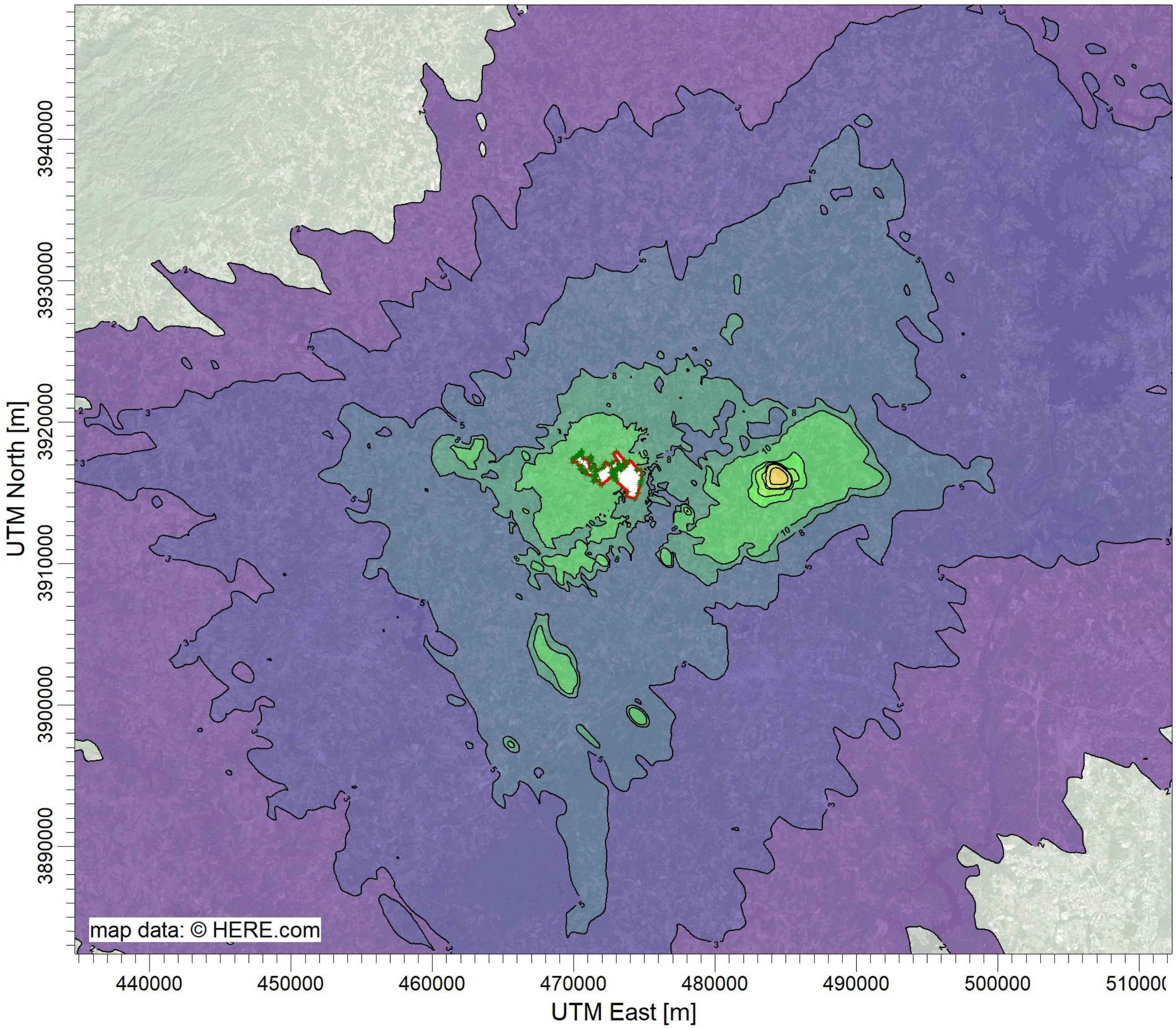
ug/m^3

0.50 | 1.00

| | | | |
|---|---|---|---|
| COMMENTS: Annual NO2 SIL = 1 ug/m3. | | COMPANY NAME: **HDR Engineering, Inc.** | |
| | | MODELER: **Miranda Mair** | |
| | | SCALE: 1:60,230 0 — 2 km | |
| | | DATE: **8/31/2022** | PROJECT NO.: **10302238** |

PROJECT TITLE:

**Piedmont Lithium - Carolina Lithium Integrated Site**
**NAAQS Result: 1-HR NO2**




PLOT FILE OF 8TH-HIGHEST MAX DAILY 1-HR VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: TOTAL ug/m^3

Max: 393 [ug/m^3] at (484559.00, 3916208.00)

2 3 5 8 10 30 50 80 100 188

| COMMENTS: | | COMPANY NAME: | |
|---|---|---|---|
| High-8th-High, Primary Concentrator Location | | **HDR Engineering, Inc.** | |
| | | MODELER: **Miranda Mair** | |
| | **Concentration** | SCALE: 1:488,114 <br> 0 10 km | |
| | **393 ug/m^3** | DATE: **8/31/2022** | PROJECT NO.: **10302238** |

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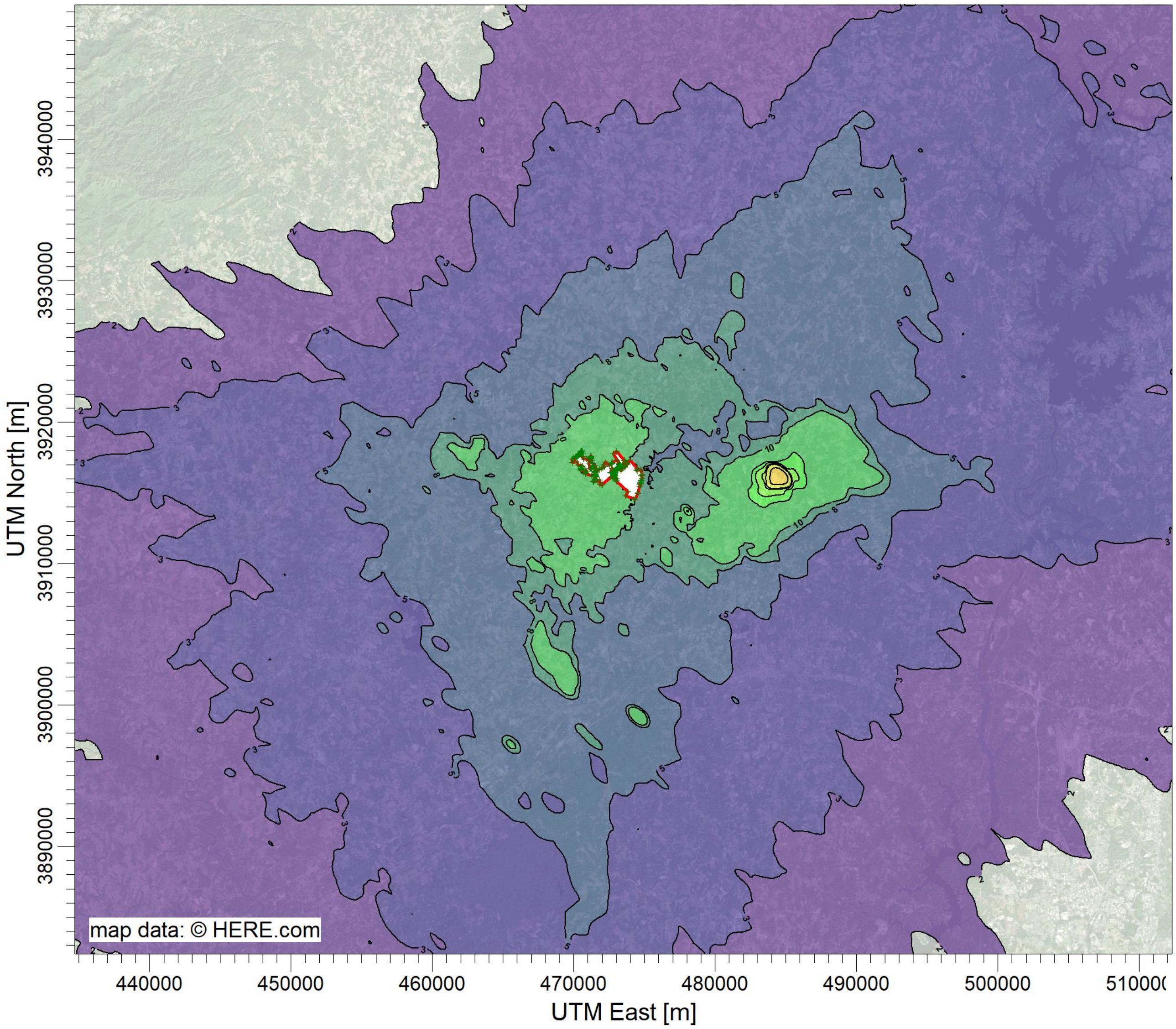
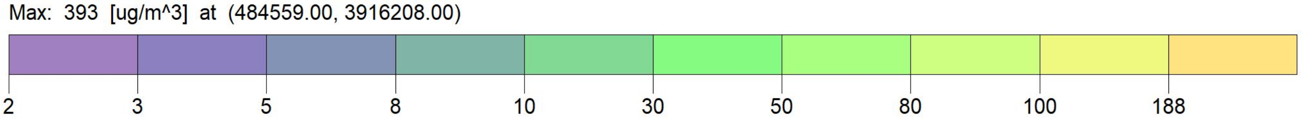
PROJECT TITLE:

**Piedmont Lithium - Carolina Lithium Integrated Site**
**NAAQS Result: 1-HR NO2**




PLOT FILE OF 8TH-HIGHEST MAX DAILY 1-HR VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: TOTALALT ug/m^3

Max: 393 [ug/m^3] at (484559.00, 3916208.00)




| COMMENTS: | | COMPANY NAME: | |
|---|---|---|---|
| High-8th-High, Alternate Concentrator Location | | **HDR Engineering, Inc.** | |
| | | MODELER: **Miranda Mair** | |
| | **Concentration** | SCALE: 1:488,114 0 10 km | |
| | **393 ug/m^3** | DATE: **8/31/2022** | PROJECT NO.: **10302238** |

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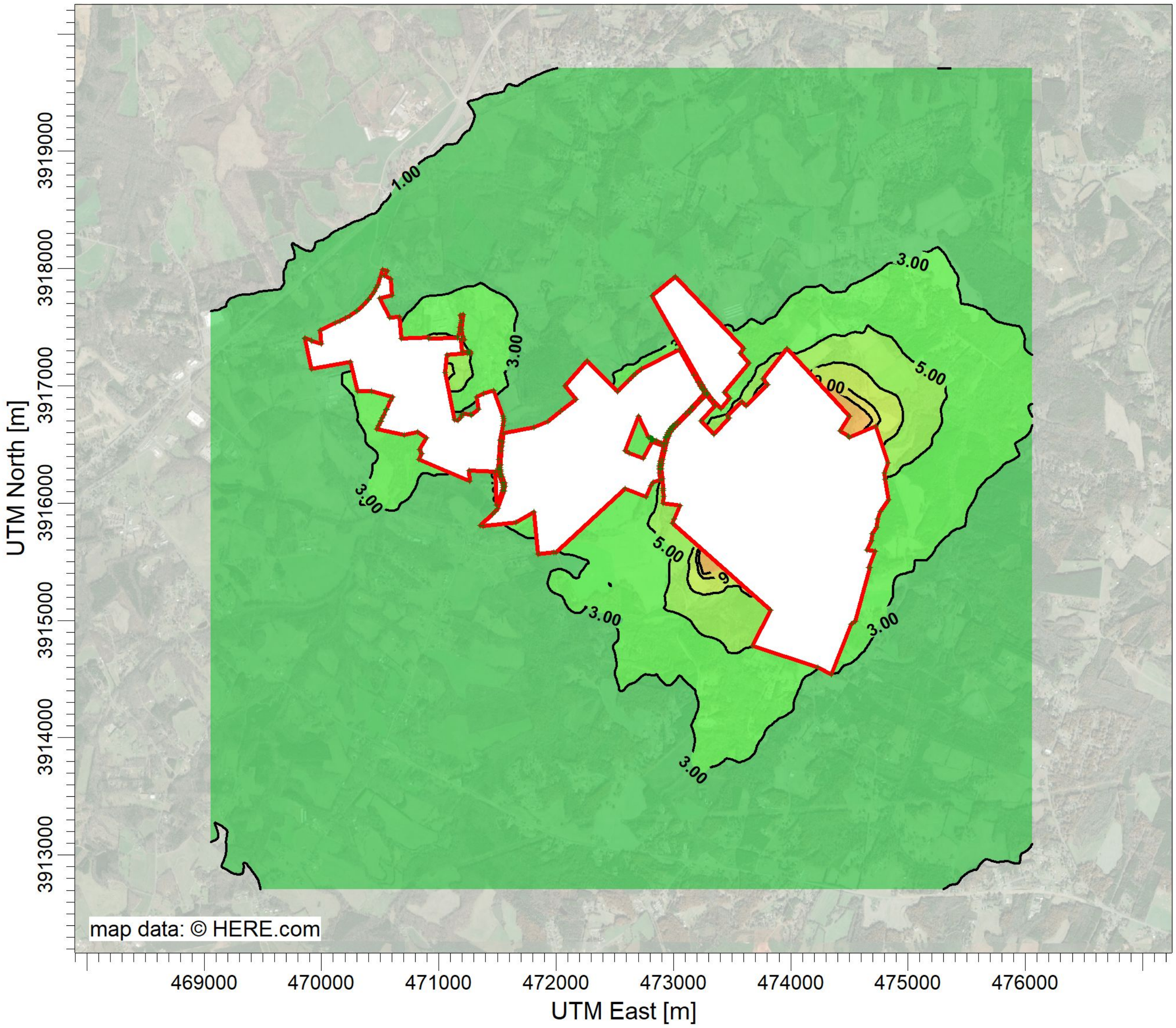
PROJECT TITLE:

**Piedmont Lithium - Carolina Lithium Integrated Site**
**NAAQS Result: 24-HR PM10**




PLOT FILE OF HIGH 6TH HIGH 24-HR VALUES FOR SOURCE GROUP: TOTAL — ug/m^3

Max: 23.62 [ug/m^3] at (473132.18, 3917167.58)

1.00 | 3.00 | 5.00 | 7.00 | 9.00 | 10.00 | 20.00

| COMMENTS: | | COMPANY NAME: | |
|---|---|---|---|
| High-6th-High, Primary Concentrator Location | | **HDR Engineering, Inc.** | |
| | | MODELER: **Miranda Mair** | HDR |
| | **Concentration** | SCALE: 1:58,817 (0 — 2 km) | |
| | **23.62 ug/m^3** | DATE: **8/31/2022** | PROJECT NO.: **10302238** |

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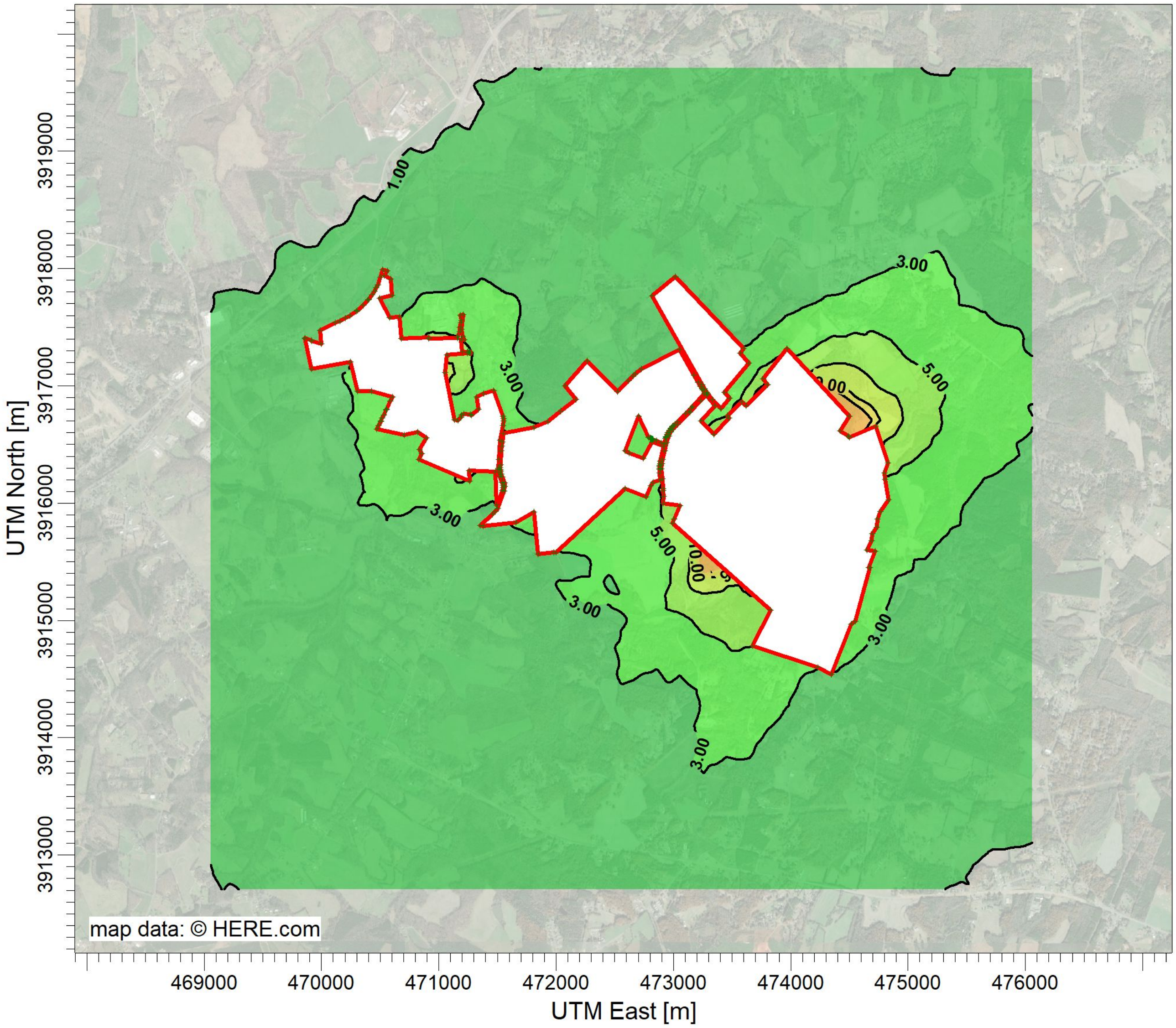
PROJECT TITLE:

**Piedmont Lithium - Carolina Lithium Integrated Site**
**NAAQS Result: 24-HR PM10**




PLOT FILE OF HIGH 6TH HIGH 24-HR VALUES FOR SOURCE GROUP: TOTALALT

ug/m^3

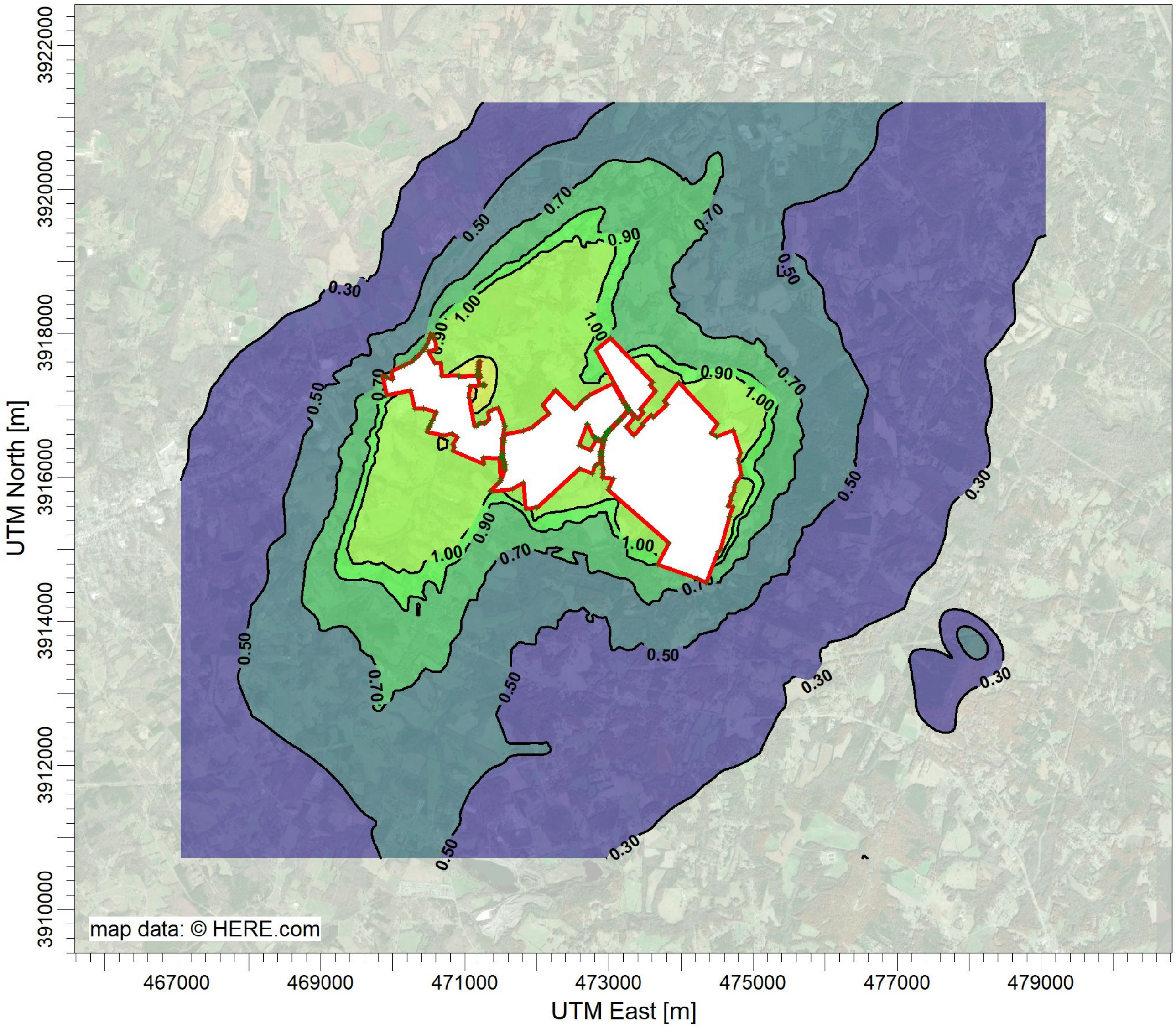
Max: 14.68 [ug/m^3] at (473306.15, 3915549.30)

1.00 3.00 5.00 7.00 9.00 10.00 20.00

| | | | |
|---|---|---|---|
| COMMENTS:<br>High-6th-High, Alternate Concentrator Location | 125 | COMPANY NAME:<br>**HDR Engineering, Inc.** | |
| | 5922 | MODELER:<br>**Miranda Mair** | HDR |
| | Concentration | SCALE: 1:58,817<br>0 — 2 km | |
| | 14.68 ug/m^3 | DATE:<br>**8/31/2022** | PROJECT NO.:<br>**10302238** |

PROJECT TITLE:

**Piedmont Lithium - Carolina Lithium Integrated Site**
**NAAQS Result: 24-HR PM2.5**




PLOT FILE OF 8TH-HIGHEST MAX DAILY 24-HR VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: TOTAL ug/m^3

Max: 7.19 [ug/m^3] at (471057.92, 3917133.90)

0.30 0.50 0.70 0.90 1.00 3.00 5.00 7.00

COMMENTS:

High-8th-High, Primary Concentrator Location

COMPANY NAME:

**HDR Engineering, Inc.**

MODELER:

**Miranda Mair**

**Concentration**

SCALE: 1:95,781

0 3 km

**7.19 ug/m^3**

DATE:

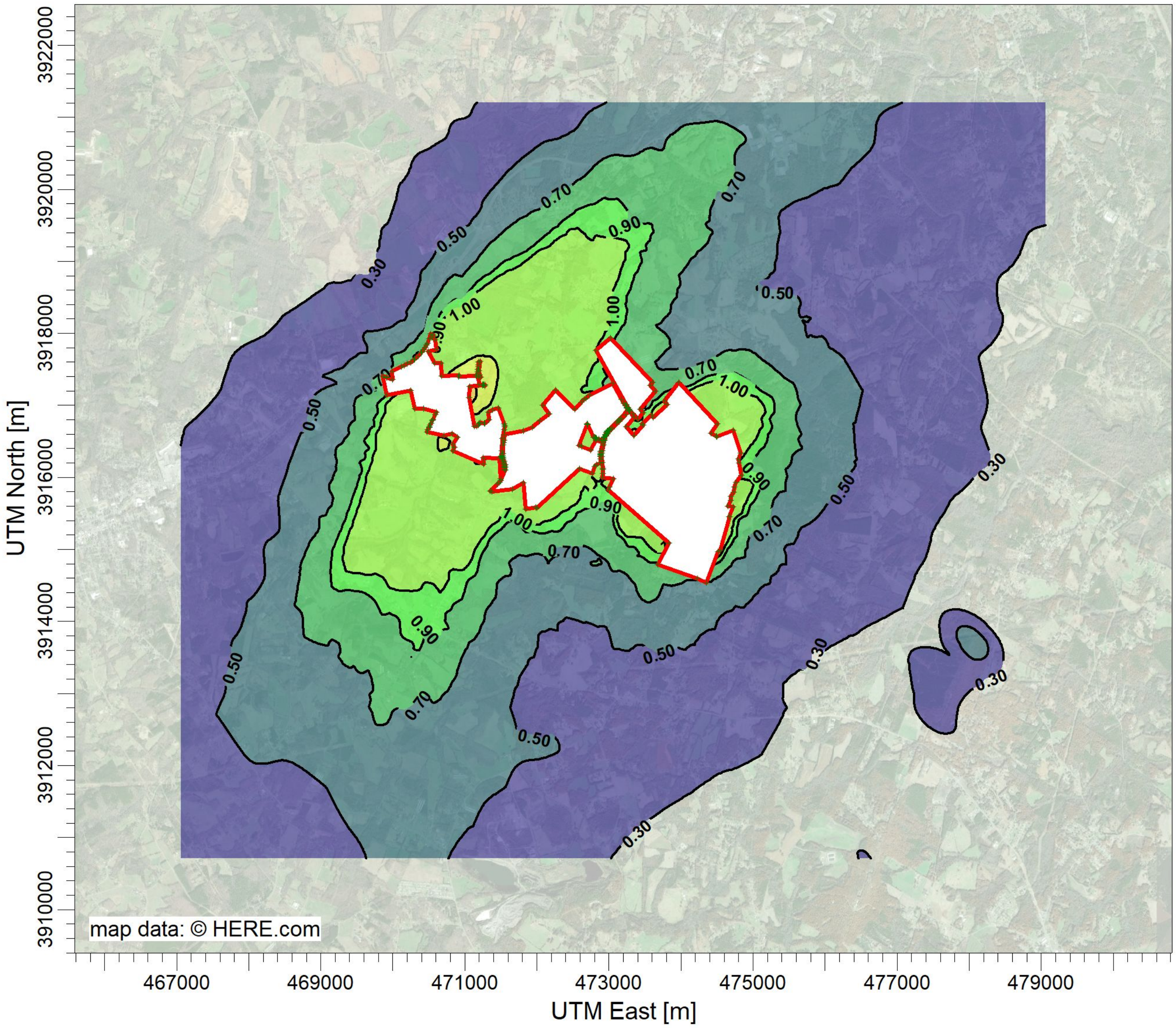
**8/31/2022**

PROJECT NO.:

**10302238**

PROJECT TITLE:

**Piedmont Lithium - Carolina Lithium Integrated Site**
**NAAQS Result: 24-HR PM2.5**




PLOT FILE OF 8TH-HIGHEST MAX DAILY 24-HR VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: TOTALALT ug/m^3

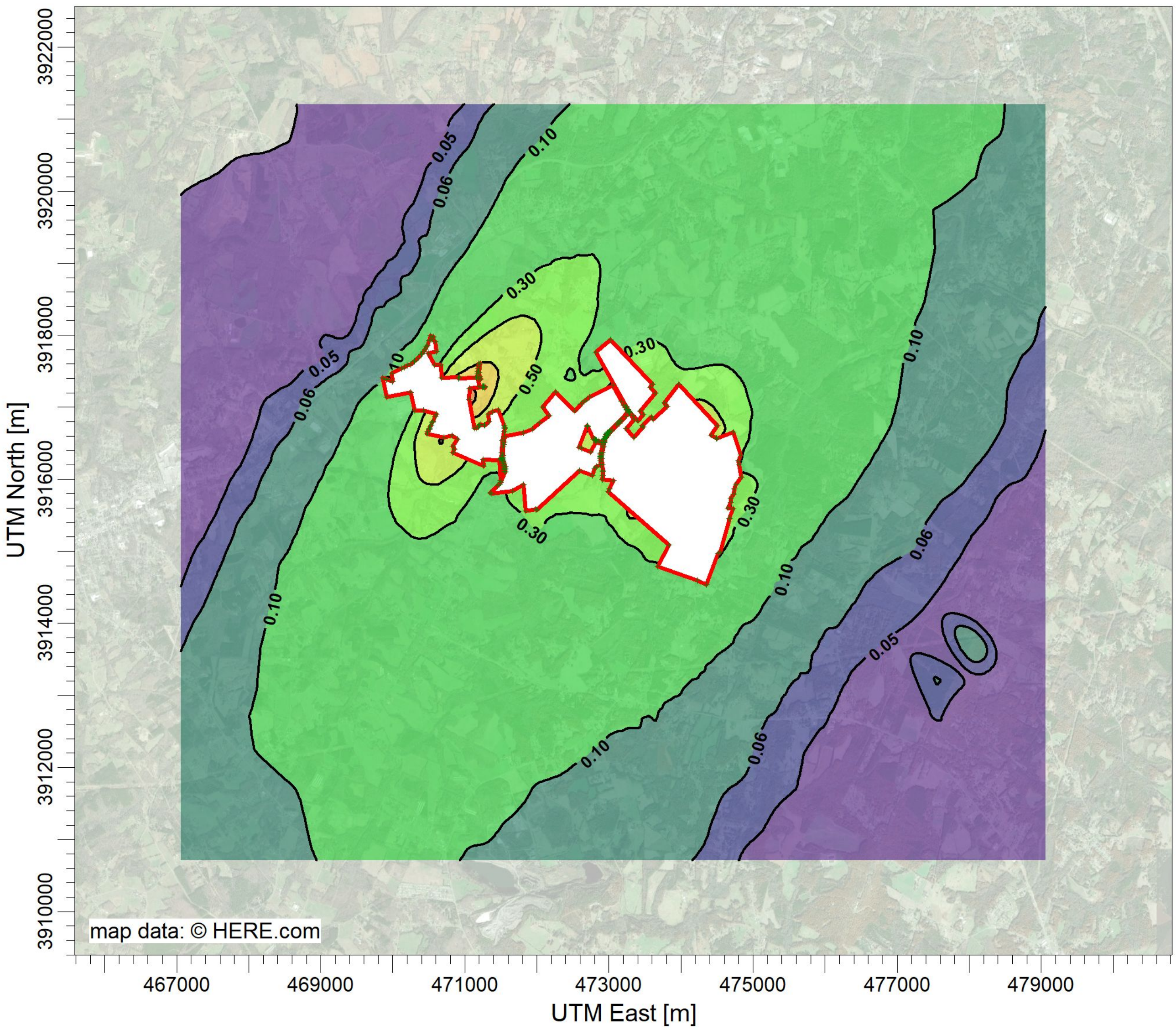
Max: 7.21 [ug/m^3] at (471057.92, 3917133.90)

0.30 | 0.50 | 0.70 | 0.90 | 1.00 | 3.00 | 5.00 | 7.00

| COMMENTS: | | COMPANY NAME: | |
|---|---|---|---|
| High-8th-High, Alternate Concentrator Location | | **HDR Engineering, Inc.** | |
| | | MODELER: **Miranda Mair** | |
| | **Concentration** | SCALE: 1:95,781 0 3 km | |
| | **7.21 ug/m^3** | DATE: **8/31/2022** | PROJECT NO.: **10302238** |

PROJECT TITLE:

**Piedmont Lithium - Carolina Lithium Integrated Site**
**NAAQS Result: Annual PM2.5**




PLOT FILE OF ANNUAL VALUES AVERAGED ACROSS 5 YEARS FOR SOURCE GROUP: TOTAL ug/m^3

Max: 2.91 [ug/m^3] at (471057.92, 3917133.90)

0.02 | 0.05 | 0.06 | 0.10 | 0.30 | 0.50 | 1.00 | 2.00

| | | | |
|---|---|---|---|
| COMMENTS: Primary Concentrator Location | | COMPANY NAME: **HDR Engineering, Inc.** | |
| | | MODELER: **Miranda Mair** | |
| | **Concentration** | SCALE: 1:95,781 (0 — 3 km) | |
| | **2.91 ug/m^3** | DATE: **8/31/2022** | PROJECT NO.: **10302238** |

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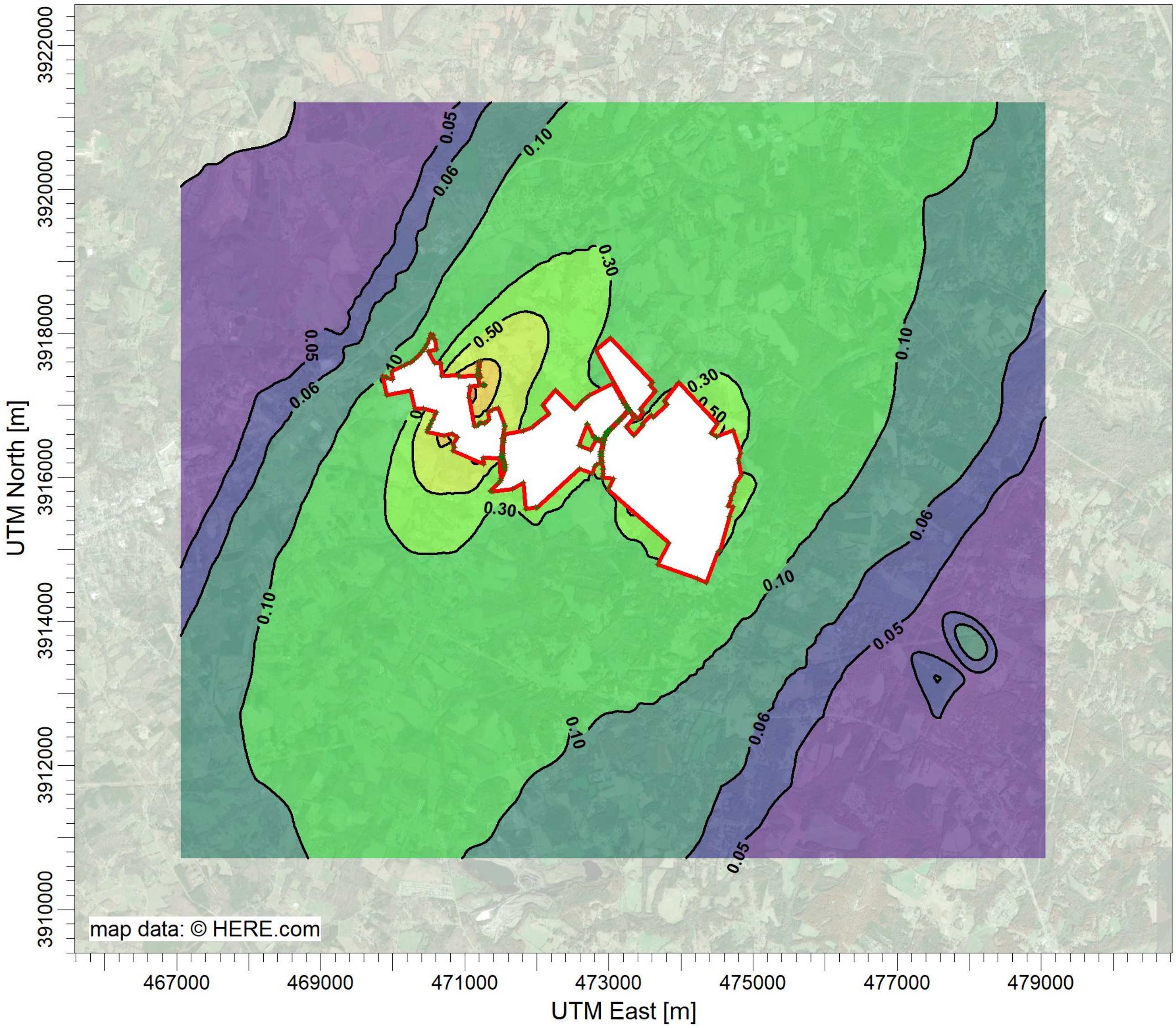
PROJECT TITLE:

**Piedmont Lithium - Carolina Lithium Integrated Site**
**NAAQS Result: Annual PM2.5**




PLOT FILE OF ANNUAL VALUES AVERAGED ACROSS 5 YEARS FOR SOURCE GROUP: TOTALALT ug/m^3

Max: 2.94 [ug/m^3] at (471057.92, 3917133.90)

0.02 0.05 0.06 0.10 0.30 0.50 1.00 2.00

COMMENTS:

Alternate Concentrator Location

COMPANY NAME:

**HDR Engineering, Inc.**

MODELER:

**Miranda Mair**

**Concentration**

SCALE: 1:95,781

0 3 km

**2.94 ug/m^3**

DATE:

**8/31/2022**

PROJECT NO.:

**10302238**

AERMOD View - Lakes Environmental Software

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# Attachment 4

## MERP Analysis Workbook

**Piedmont Lithium Carolinas, Inc**
**Carolina Lithium Project**
**Air Quality Construction Permit Application**
**Modeled Emission Rates of Precursors (MERP) Analysis**

| Project PTE (tpy) | |
|---|---|
| VOC | 13.9 |
| NOx | 514 |
| SO2 | 34.9 |

| Hypothetical Site Information[a] | | | | | | | | Calculated PLC Integrated Site Impact (ppb) | Cumulative PLC Integrated Site Impact (ppb)[b] |
|---|---|---|---|---|---|---|---|---|---|
| State | County | Metric | Precursor | Emissions (tpy) | Stack Height (m) | MERP | Concentration (ppb) | | |
| North Carolina | Lincoln | 8-hr Ozone | NOx | 500 | 10 | 261 | 1.92 | 1.97 | 1.98 |
| North Carolina | Lincoln | 8-hr Ozone | NOx | 500 | 90 | 267 | 1.88 | 1.93 | |
| North Carolina | Lincoln | 8-hr Ozone | NOx | 1000 | 90 | 285 | 3.50 | 1.80 | |
| North Carolina | Lincoln | 8-hr Ozone | VOC | 500 | 10 | 5,390 | 0.09 | 0.003 | |

| Hypothetical Site Information[a] | | | | | | | | Calculated PLC Integrated Site Impact (μg/m³) | Cumulative PLC Integrated Site Impact (μg/m³)[c] |
|---|---|---|---|---|---|---|---|---|---|
| State | County | Metric | Precursor | Emissions (tpy) | Stack Height (m) | MERP | Concentration (μg/m³) | | |
| North Carolina | Lincoln | Daily PM2.5 | NOx | 500 | 10 | 10,121 | 0.06 | 0.06 | 0.08 |
| North Carolina | Lincoln | Daily PM2.5 | NOx | 500 | 90 | 13,726 | 0.04 | 0.04 | |
| North Carolina | Lincoln | Daily PM2.5 | NOx | 1000 | 90 | 13,729 | 0.09 | 0.04 | |
| North Carolina | Lincoln | Daily PM2.5 | SO2 | 500 | 10 | 2,549 | 0.24 | 0.02 | |
| North Carolina | Lincoln | Daily PM2.5 | SO2 | 500 | 90 | 4,506 | 0.13 | 0.01 | |
| North Carolina | Lincoln | Daily PM2.5 | SO2 | 1000 | 90 | 5,156 | 0.23 | 0.01 | |

| Hypothetical Site Information[a] | | | | | | | | Calculated PLC Integrated Site Impact (μg/m³) | Cumulative PLC Integrated Site Impact (μg/m³)[c] |
|---|---|---|---|---|---|---|---|---|---|
| State | County | Metric | Precursor | Emissions (tpy) | Stack Height (m) | MERP | Concentration (μg/m³) | | |
| North Carolina | Lincoln | Annual PM2.5 | NOx | 500 | 10 | 21,538 | 0.005 | 0.005 | 0.005 |
| North Carolina | Lincoln | Annual PM2.5 | NOx | 500 | 90 | 63,658 | 0.002 | 0.002 | |
| North Carolina | Lincoln | Annual PM2.5 | NOx | 1000 | 90 | 66,300 | 0.003 | 0.002 | |
| North Carolina | Lincoln | Annual PM2.5 | SO2 | 500 | 10 | 16,255 | 0.006 | 0.000 | |
| North Carolina | Lincoln | Annual PM2.5 | SO2 | 500 | 90 | 24,237 | 0.004 | 0.000 | |
| North Carolina | Lincoln | Annual PM2.5 | SO2 | 1000 | 90 | 25,433 | 0.008 | 0.000 | |

[a] Refined hypothetical modeling results for the nearst site, obtained from EPA's SCRAM (https://www.epa.gov/scram/merps-view-qlik), accessed 8/18/2022.
[b] Sum of the maximum $NO_x$ impact plus the VOC impact.
[c] Sum of the maximum $NO_x$ impact plus the maximum $SO_2$ impact.

# Attachment 5

## Air Toxics Evaluation

**Piedmont Lithium**
**Air Quality Construction Permit Application**
**Air Toxics Evaluation**

| | | Emissions (lb/hr) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Concentrator Plant | | | | CL-1 | | | CL-2 | | | | | | | | |
| | | Quartz Dryer | Feldspar Dryer | HF Storage Tank | Sulfuric Acid Tank | Hydrochloric Acid Storage Tank | Hydrochloric Acid Dilution Tank | Sulfuric Acid Dilution Tank | Hydrochloric Acid Storage Tank | Hydrochloric Acid Dilution Tank | Sulfuric Acid Dilution Tank | Total Site Emissions | | TPER | | Trigger Modeling? | |
| **Air Toxic** | **CAS Number** | **EP09** | **EP10** | **EP13** | **IES16** | **EP40** | | | **EP64** | | | lb/hr | lb/day | lb/hr | lb/day | lb/hr | lb/day |
| HCl | 7647-01-0 | | | | | 0.54 | | | 0.54 | | | 1.09 | | 0.18 | | YES | |
| HF | 7664-39-3 | 0.66 | 1.99 | 0.06 | | | | | | | | 2.71 | 65.0 | 0.63 | 0.064 | YES | YES |
| $H_2SO_4$ | 7664-93-9 | | | | 1.80E-03 | | | 1.47E-06 | | | 1.47E-06 | 0.002 | 0.04 | 0.025 | 0.25 | NO | NO |

## Primary Location

| | | Modeled Impacts | | | | AAL ($mg/m^3$) | | Modeled Compliance? | |
|---|---|---|---|---|---|---|---|---|---|
| | | $\mu g/m^3$ | | $mg/m^3$ | | | | | |
| **Air Toxic** | **CAS Number** | **24-hour** | **1-hour** | **24-hour** | **1-hour** | **24-hour** | **1-hour** | **24-hour** | **1-hour** |
| HCl | 7647-01-0 | | **98.1** | | 0.098 | | **0.7** | | YES |
| HF | 7664-39-3 | 13.6 | 44.9 | 0.014 | 0.045 | 0.03 | 0.25 | YES | YES |

## Alternate Location

| | | Modeled Impacts | | | | AAL ($mg/m^3$) | | Modeled Compliance? | |
|---|---|---|---|---|---|---|---|---|---|
| | | $\mu g/m^3$ | | $mg/m^3$ | | | | | |
| **Air Toxic** | **CAS Number** | **24-hour** | **1-hour** | **24-hour** | **1-hour** | **24-hour** | **1-hour** | **24-hour** | **1-hour** |
| HCl | 7647-01-0 | | **98.1** | | 0.098 | | **0.7** | | YES |
| HF | 7664-39-3 | 8.1 | 30.3 | 0.008 | 0.030 | 0.03 | 0.25 | YES | YES |

NOTES:

1. The boilers, calciner rotary kiln, quartz dryer, and feldspar dryer are fuel combusting sources that burn natural gas, with an aggregate heat input capacity that is less than 450 MMBtu/hr, are the only sources of benzene emissions at the facility (except for emergency engines), and emit only combustion-related air toxics (with the exception of HF emission from the quartz and feldspar dryers, which is evaluated). Therefore, the combustion-related emissions from these sources are exempt from NCDEQ's air toxics provisions, per 15A NCAC02Q .0702(a)(25).
2. Each of the emergency engines is an affected source under 40 CFR Part 63, Subpart ZZZZ. Therefore, each of these sources is exempt from NCDEQ's air toxics provisions, per 15A NCAC02Q. 0702(a)(27)(B).

# APPENDIX C

Additional Impacts Analysis

# Additional Impacts Analysis

## 1 Overview

15A NCAC 02D.0530 incorporates by reference the federal PSD regulations at 40 CFR §51.166 regarding Additional Impacts Analyses for PSD permits. Under the referenced PSD rule clause, Carolina Lithium must assess potential impacts of the Project's emissions on visibility, soils, and vegetation, and the air quality impacts from growth associated with the Project. Specifically, 40 CFR §51.166(o) requires:

1. An analysis of the impairment to visibility, soils, and vegetation that would occur because of the new source…and general commercial, residential, industrial, and other growth associated with the new source…The applicant need not provide an analysis of the impact on vegetation having no significant commercial or recreational value.
2. An analysis of the air quality impact projected for the area because of general commercial, residential, industrial, and other growth associated with the source….

The discussions in the following subsections indicate the Project is not expected to produce any adverse impacts with respect to the above criteria. The Project will use clean gaseous and liquid fuels with very low levels of sulfur and will apply stringent BACT requirements to all emission sources. Combined with a large property area surrounding the Project, these factors will result in air quality impacts below the NAAQS set to protect human health and the environment.

The Project will emit PM, $PM_{10}$, $PM_{2.5}$, $NO_x$, and CO at greater than the PSD significant net emissions increase thresholds, and these pollutants are, therefore, considered in this section of the application. EPA's guidance document titled "PSD & Title V Permitting Guidance for GHG" (accessed at https://www.epa.gov/sites/default/files/2015-08/documents/ghgguid.pdf) directs that the Additional Impacts Analyses requirements do not apply to the emissions of GHGs from the Project.

## 2 Visibility

The potential for impairment to visibility is considered here with respect to two types of geographic areas: Class I Areas and Non-Class I Areas.

Class I Areas, which are national parks exceeding 6,000 acres, designated wilderness areas, and national memorial parks above 5,000 acres, require special protection of visibility to maintain or attain pristine visual range and be free from perceptible anthropogenic visibility impairment. The Class I Area nearest to the Project location is the Linville Gorge, located approximately 69 km to the north northwest of the Project. Following the June 13, 2022 PSD pre-application meeting between Carolina Lithium and the Department the NCDAQ NSR Preapplication Form was submitted. The originally submitted form is attached, along with an updated version of the form, and each includes a complete list of the nearby Class I areas. Please note that the original form erroneously indicated that Swanquarter was the nearest Class I area. During preparation of the PSD permit application Carolina Lithium identified this error (Swanquarter is located much farther away on the east coastline of North Carolina). The updated form corrects this error, as well as updating pollutant emission rates to reflect the results of the BACT analysis.

Carolina Lithium has not received any feedback regarding the Federal Land Manager review of the NCDAQ NSR Preapplication Form that was submitted and based on this, assumes that no detailed analysis of Class I area impacts is required.

In Non-Class I Areas, one consideration is evaluating any potentially adverse visibility impacts on safe transportation, such as interference with airport approaches and departures or with roadways. Examples of potentially adverse visibility impacts on such activities may include steam plumes from cooling towers during normal operation that could obscure a pilot's view of a runway or a driver's view of a roadway.

Another consideration for some Non-Class I Areas is potential effects in sensitive areas, such as national scenic areas or scenic vistas. There are no such areas near the location of the Project, and furthermore, given the types of fuels (natural gas and ultra-low sulfur diesel fuel) to be combusted by the Project, emitted plumes should rarely, if ever, be visible after they cross the Project property lines.

## 2.1 Class I Areas

The FLMs responsible for protecting Class I area resources have developed guidance for assessing potential impacts to AQRVs (accessed at https://irma.nps.gov/DataStore/DownloadFile/568936). This guidance provides a screening method to determine whether the impact on AQRVs is potentially significant, thereby requiring dispersion and/or deposition modeling and related assessment. This guidance states:

> ". . . the Agencies will consider a source locating greater than 50 km from a Class I area to have negligible impacts with respect to Class I AQRVs if its total $SO_2$, $NO_x$, $PM_{10}$, and $H_2SO_4$ annual emissions (in tons per year, based on 24-hour maximum allowable emissions), divided by the distance (in km) from the Class I area (Q/D) is 10 or less. The Agencies would not request any further Class I AQRV impact analyses from such sources."

The Project has total emissions for $SO_2$, $NO_x$, $PM_{10}$, and $H_2SO_4$ of 34.9 + 514 + 93.5 + 0.008 (respectively) = 643 TPY. Given the distance to the nearest Class I area is 69 km, the emissions/distance (Q/D) value is 643/69 = 9.3. Because this value is less than 10, no further analysis of AQRVs is needed per the cited FLM guidance.

## 2.2 Non-Class I Areas – Pollutant Plumes

With respect to visibility impacts from pollutants outside of the Class I areas, the greatest potential for impairment is typically very near a facility. Federal and state rules impose limitations on the opacity of pollutant plumes just as they are exiting the stacks [see Attachment 5 (Regulatory Analysis)]. Applicable opacity limitations will be in the issued PSD and Title V permits and will prevent pollutants, such as PM or $NO_x$, from causing local impairment to visibility near the Project.

2.3 Non-Class I Areas – Cooling Tower Plumes

Steam plumes from cooling towers are not regulated under federal or local opacity rules. During the operation, the Project would have two wet cooling towers containing an estimated three cells each, that would likely have visible steam plumes in cool weather. The air leaving the tower is warm and filled with moisture; on a cold, humid day, water drops in the air can condense and create a visible plume. However, given the local climate, which is usually warm with low humidity, the steam plumes would seldom, if ever, be visible beyond the Project's property lines, even in cool conditions. Therefore, these steam plumes or other smaller plumes from steam venting are not expected to cause any impairment to visibility on local roadways.

2.4 Non-Class I Areas – Airport

The nearest airport is the private Northbrook International Ultraport, located south of Flay, North Carolina, approximately 15 kilometers northwest of the Project. Moisture plumes from the facility in cool weather would be visible only within or very near the Project's property lines, and therefore would not impair visibility of flight approaches or departures at any nearby airports.

2.5 Non-Class I Areas – Growth Associated with New Source

40 CFR §51.166(o) requires assessment of visibility impairment from growth associated with a new source. As described in the growth analysis in Section 3 below, the emissions resulting from the anticipated industrial (other than the direct Project emissions), commercial, and residential growth are expected to be minimal, and therefore any impairment of visibility from such growth is also expected to be minimal.

## 3 Soils and Vegetation Impacts

Of the directly-emitted pollutants triggering PSD major source requirements for the Project, $NO_x$ compounds are documented to have potential effects on vegetation and soils due to nitrate deposition, $NO_x$ effects and $O_3$ effects as described in the following subsections. $NO_x$ is typically emitted from combustion sources primarily as NO, with a lesser amount of $NO_2$, and very small amounts of $N_2O$.

Ozone, which can result from $NO_x$ and VOC emissions reacting in the atmosphere in the presence of sunlight, can also adversely affect vegetation.

3.1 Soils Impacts Analysis

The potential impacts of the Project's emissions on soils could include the following:

1. Acidic deposition of nitrates, either as dry deposition or wet (during precipitation) deposition, leading to a decrease in soil pH, and
2. Nitrogen accumulation over time enriching soil, thus potentially changing the mixture of plant communities that dominate the local ecosystem.

Regarding the potential effects of acidic deposition on the local soils, it is dependent, in part, upon the current pH of the soils and the amount of deposition that occurs. Based on information obtained from the Soil Ph NC – Data Basin website (accessed at https://databasin.org/maps/ce543067cef74e78b9f3dee51eb2cb20/), the soils near the Project and vicinity are generally alkaline, with pH in the range of 5.0 to 5.6. Based on this level of alkalinity, the relatively small amounts of nitrogen/nitrate deposition expected from the Project would not change soil acidity (pH) to any measurable degree.

Furthermore, the dispersion modeling results for annual average $NO_2$, as shown in the Air Quality Analysis, indicate that the Project's SIL area only extends approximately 2.8 km from the center of the Project area. The annual $NO_2$ SIL of 1 $\mu g/m^3$ is only 1% of the annual average $NO_2$ NAAQS. The Project impact represents a very small footprint of long-term (i.e., annual average) $NO_2$ concentrations above the SIL and at only 6% of the NAAQS. Since NAAQS are intended to protect against effects on human health and welfare (including adverse effects on crops, animals, water quality, structure corrosion, etc.), long-term nitrogen deposition from the Project emissions will not reach a level of significance. This lack of impact also exists within the full extent of the SIL area and would not have a measurable effect on the environment. The potential small additional nitrogen deposition that would be provided to the soil profile by the Project operation is likely to be slightly beneficial to the soil conditions by providing more fertilizer for plant growth.

## 3.2 Vegetation Impacts Analysis

According to EPA's Integrated Science Assessment (2022) covering $NO_x$ effects (accessed at l https://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=349473), most research on direct phytotoxic effects (decreasing photosynthesis, foliar injury) on plants by $NO_x$ dates from 1993 with little research having been done more recently on effects of $NO_2$ below the NAAQS levels. The 1993 Air Quality Criteria Document (AQCD) for $NO_x$ concluded that concentrations of $NO_x$ compounds in the atmosphere are rarely high enough to have phytotoxic effects. The current 1-hour average $NO_2$ NAAQS is far more stringent than the annual $NO_2$ NAAQS, which was the only $NO_2$ NAAQS at the time EPA's research was completed. Since 1993, $NO_x$ emission controls have dramatically reduced emissions from virtually all sectors of stationary and mobile sources of $NO_x$, and the concentrations of $NO_2$ in the United States have dropped substantially since the earlier studies. Thus, it is even more unlikely there would be observable damage at present levels of $NO_2$, even in more polluted areas than those already meeting the current NAAQS for $NO_2$. As the Project maximum $NO_2$ impact will be very near its fence line and only 6% of the longstanding annual average $NO_2$ NAAQS of 100 $\mu g/m^3$, based on EPA's data, the Project's emissions would not have any measurable effects on either natural or planted vegetation.

According to EPA's latest ozone Integrated Science Assessment (accessed at https://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=348522), studies indicate slight foliar injury and slight biomass reduction for ozone levels at and significantly below the current NAAQS of 70 ppb. However, effects on vegetation observed at levels below 70 ppb have generally been slight with typically single digit percentage decreases in biomass production. The amount of vegetative damage observed increases as ozone increases to levels well above the NAAQS. For example, 8-hour concentrations of ozone in the 60 to 120 ppb range have been shown to cause increasing foliar injury as ozone levels increase within that range.

Based on the MERP analysis of ozone presented in Appendix C of the Air Quality Analysis, the Project could increase ozone by up to approximately 2 ppb at the maximum impact location. Given the very slight maximum potential increase in ozone relative to the 70 ppb NAAQS, the Project's effects on vegetation due to the predicted increase in ozone production from Project emissions would be too small to discern.

## 4 Air Quality Impact of Associated Growth

Elements of the growth analysis include: 1) a projection of the associated industrial, commercial, and residential growth that would occur due to the construction and operation of the source, and 2) an estimate of the air emissions generated by the associated growth. As discussed below, for PSD air permit application purposes, the Project is anticipated to have limited associated growth.

Residential Associated Growth and Impacts: Construction of the Project will use a temporary workforce, who will include existing residents of the area as well as skilled laborers and other specialized trades who follow large capital projects in the United States. Given the temporary nature of the construction work, most of the construction workforce would likely only relocate temporarily to the area, though some of these workers may become permanent residents.

Ongoing operations and maintenance of the facility is expected to be accomplished with a permanent workforce of approximately 428 employees and additional contractors, some already residing in the area, and some expected to move to the area near the Project. This permanent workforce is well below 1% of the latest estimated population of 222,000 total residents of (US Census Bureau 2020).

Given the minimal associated residential growth, both during the construction phase and during operations, associated residential growth would not be expected to have any measurable impact on air quality.

Commercial and Industrial Associated Growth and Impacts: There are currently no known specific additional industrial or commercial ventures that would be directly created by the Project. Operating facilities of similar size to the Project typically attract other commercial businesses that provide services to employees and visitors as well as industrial businesses that supply goods and services directly related to Project operations and maintenance. Therefore, some additional induced growth is possible to support Project employee, operations, and maintenance needs, but such growth is not readily quantifiable and significant emission increases are not expected to be generated due to any Project-associated growth.

## 5 Additional Impacts Summary

In sum, the associated growth from the Project's construction, operations, and maintenance would not cause a significant incremental increase of emissions in the area. Therefore, the air quality impacts of the modest residential and commercial/industrial growth associated with the Project will be insignificant.

This Additional Impacts Analyses supports the following conclusions:

- The Project emissions would not have observable effects on visibility in Class I Areas or in Non-Class I Areas nearer the facility location.
- Deposition of nitrogen compounds from Project emissions would be too small to affect soil acidity or to measurably affect soil nitrogen profiles.
- Concentrations of nitrogen oxides due to the Project emissions would be too low to cause observable or measurable effects on vegetation.
- Incremental concentrations of ozone due to Project emissions would be too small to cause an observable change in vegetative biomass production or an observable increase in foliar injury.
- Growth associated with the Project would be small in relation to the current level of commercial and residential development in the area and is not expected to cause substantial air pollutant emissions. Therefore, additional growth attributed to the Project would have minimal air quality and associated impacts.

# ATTACHMENT 6

Zoning Consistency Determinations

# Zoning Consistency Determination

| | |
|---|---|
| Facility Name | Piedmont Lithium Carolinas, Inc. – Carolina Lithium |
| Facility Street Address | Hephzibah Church Road |
| Facility City | Bessemer City, NC 28016 |
| Description of Process | Lithium Mine, Concentrator Plant, Lithium Hydroxide Conversation Plant |
| SIC/NAICS Code | 2819/ 325180/212290 |
| Facility Contact | Monique Parker |
| Phone Number | 980-701-9935 |
| Mailing Address | 42 E Catawba Street |
| Mailing City, State Zip | Belmont, NC 28012 |

Based on the information given above:

- [x] I have received a copy of the air permit application (draft or final) AND...
- [ ] There are no applicable zoning ordinances for this facility at this time
- [ ] The proposed operation IS consistent with applicable zoning ordinances
- [x] The proposed operation IS NOT consistent with applicable zoning ordinances (please include a copy of the rules in the package sent to the air quality office)
- [ ] The determination is pending further information and can not be made at this time
- [ ] Other:

| | |
|---|---|
| Agency | Gaston County Building & Development |
| Name of Designated Official | Joseph Brian Sciba |
| Title of Designated Official | Director of Building & Development |
| Signature | [signature] |
| Date | 8-25-22 |

**Building and Development Services Department**
***BUILDING INSPECTIONS***
*Mailing Address: P.O. Box 1578, Gastonia, NC 28053*
*Street Address: 128 West Main Avenue, Gastonia, NC 28052*
*Phone: (704) 866-3155 Fax: (704) 866-3966*

To: Monique Parker 8/30/22
VP- Safety, Environment, and Health
Piedmont Lithium

Ref: Title V Air Permit Application

Mrs. Parker

Gaston County has revied your application for the Title V air permit. In reviewing your application, we have determined that the proposed mining project does not currently meet Gaston County zoning regulations. The area for the proposed mine is mainly zoned R-1 (residential). To meet County standards the proposed site will have to be rezoned to I-3 (Industrial) and obtain a special use permit. Gaston County has also supplied you with the current zoning regulations that encompasses everything that is involve in the rezoning process for this proposed project.

Respectfully
Joseph Brian Sciba
*Joseph Brian Sciba*
Director of Building and Development Service
Gaston County

## SECTION 8.3.18 INDUSTRIAL HEAVY EQUIPMENT BULK STORAGE YARD

A. Storage of equipment shall comply with all federal, state, and local regulations and ordinances appropriate to this storage.

B. A minimum setback of one hundred (100) feet shall be maintained from any stream, creek, river, lake or other water way.

C. Bulk storage of any chemicals, solvates, fluids, petroleum products, other liquids or hazardous materials used in the operation of said equipment stored on an individual site shall be prohibited.

D. Retail and wholesale operations are not allowed.

## SECTION 8.3.19 ABATTOIR CLASS 1

A. No portion of the operation activities shall be located closer than one hundred (100) feet from any exterior lot line, and one hundred-fifty (150) feet to any residential structure (not located on subject parcel), except, totally enclosed indoor facilities shall adhere to the underlying zoning district setback requirements.

B. The facility shall be placed on a parcel of land consisting of at least five (5) acres.

C. The use shall not be permitted to locate adjacent or contiguous to any existing place of worship, day care or school.

## SECTION 8.3.20 BUS CHARTER SERVICE

A. If part of the service is to allow passengers to board the buses at the facility, a Special Use Permit shall be required.

B. If part of the service is to allow passengers to board the buses at the facility, an additional one (1) space per two (2) passengers (based on the total average occupancy of each bus contracted for each trip) shall be required in addition to the parking spaces required per Table 10.5-1 Section 1.15.

## SECTION 8.3.21 MINING AND QUARRYING

Definitions

1. Mining. The breaking of the surface soil in order to facilitate or accomplish the extraction or removal of minerals, ores, or other solid matter; any activity or process constituting all or part of a process for the extraction or removal of minerals, metals, ores, soils, and other solid matter from their original location; and the preparation, washing, cleaning, or other treatment of minerals, metals, ores, or other solid matter so as to make them suitable for commercial, industrial, or construction use.

2. Hard Mining. Mining activity where extraction or removal includes explosives.

3. Soft Mining. Mining activity where the extraction or removal does not include blasting or explosives.

4. NCDEQ. North Carolina Department of Environmental Quality

5. Exclusions and Exemptions. Mining does not include any of the following activities:

   a. Excavation or grading when conducted for bona fide agricultural or residential purposes.

   b. Use of explosives for on-site construction of roads, buildings, or site preparation for construction activities unrelated to mining.

   c. Removal of overburden and mining of ores or mineral solids to determine the location, quantity, or quality of any natural deposits, provided that no ores or minerals removed during exploratory excavation are sold or processed for sale.

   d. Excavation or grading where all of the following apply: 1) The excavation or grading is conducted to provide soil or other unconsolidated material to be used without further processing for an off-site construction project for which an erosion and sedimentation control plan has been approved in accordance with Article 4 of Chapter 113A of the N.C. General Statutes; or 2) the excavation or grading does not involve blasting, the removal of material from rivers or streams, the disposal of off-site waste on the affected land, or the surface disposal of groundwater beyond the affected land.

6. Quarrying. Excavations involving open pits for the extraction of stone, slate, marble, aggregate, lithium, metals, or other minerals or ores from the earth.

7. Resource Extraction. The removal of any naturally occurring substance from the land, and not otherwise covered by the definition of mining and quarrying. Such substances include, but not limited to, petroleum in any form, natural gas, or other gaseous substance. Such substances do not include timber or surface or subsurface water.

8. Accessory Use. Uses associated with the operation of a mining or quarrying facility that are accessory to the primary function, shall be allowed inside the mining and quarrying boundary as established by the associated state mining permit. Examples include, but are not limited to, asphalt plants, concrete plants, and chemical processing facilities.

Development Standards

A. Fencing: Mining and quarrying facilities shall have a security fence surrounding the area of operations identified in the NCDEQ mining permit. The security fence shall be chain link, of nine (9)-gauge steel or heavier, erected a minimum of seven (7) feet in height, including three (3) strands of barbed wire at the top.

B. Access: Access points shall be gated when there mine or quarry is not in operation. Gate height and construction materials shall be equal to or greater than that of security fencing.

C. Setbacks: The perimeter of any mine or quarry pits shall be at least five hundred (500) feet from any occupied structure that is (a) outside the mining or quarrying facility boundary, and (b) not owned or leased by the mining company. Internal roads used for mining equipment and operating mobile mining equipment shall be at least three hundred (300) feet from an occupied structure.

   The following shall not be considered mining equipment subject to the setbacks listed above and instead would be subject to any general (I-3) zoning requirements:

   1. Erosion and sediment control features
   2. Light vehicle road (for non-mining equipment)
   3. Berms, walls, and fences needed to comply with this Ordinance
   4. Electrical power substations
   5. Water and sewer pumps and substations

6. Utilities and utility easements
7. Fully enclosed processing facilities
8. Any ancillary facilities, including offices, warehouses, workshops, guard stations, scale houses, and similar structures used in connection with the mining or quarrying operations

D. Lighting: Lighting, including temporary or portable lighting, shall be full-cutoff fixtures, designed so that no more than half (1/2) a foot candle will stray onto adjoining properties not owned or leased by the mining company.

E. Noise Mitigation: The owner shall submit a noise mitigation plan for Board approval as part of the rezoning process or as part of the Special Use Permit process, if a rezoning is not required. The noise mitigation plan shall include barriers no less than twelve (12) feet in height consisting of landscaped berms or highway-style noise barriers erected between the pit and any occupied dwelling not owned or leased by the mining company that is within one thousand (1,000) feet of the pit. Landscaped berms shall be seeded and stabilized with grasses native to the region. Construction of such barriers or berms will not be required within any wetland, floodplain, stream or other jurisdictional feature that shall in no way limit otherwise permissible mining operations.

F. Landscaping: If highway-style noise barriers are chosen as a noise mitigation strategy around the mining or quarrying pits as permitted under this Section, then such noise barriers shall be shielded either by (a) natural and existing vegetation at least forty (40) feet in width, or (b) two (2) rows of evergreens of a variety expected to reach twenty five (25) feet in height at maturity and no less than eight (8) feet in height at time of planting.

Operations

A. Mining Permit: The owner shall provide Gaston County with a copy of within thirty (3) days of issuance.

B. Blasting: No blasting shall be conducted until one (1) hour after sunrise or within one (1) hour of sunset. No blasting shall occur on the following days: Sundays, Christmas, Good Friday, New Year's Day, Memorial Day, Labor Day, Veteran's Day, Thanksgiving, and the Fourth of July.

C. Dust Suppression: The owner shall submit a dust mitigation plan for Board approval as part of the rezoning process or as part of the Special Use Permit process if rezoning is not required.

D. Hours of Operation: Trucks transporting aggregate, ores, minerals, metals or other finished products other than asphalt shall not make deliveries between the hours of 10:00 PM and 6:00 AM.

Approval

A. Zoning District: Mining and quarrying shall be allowed only in the (I-3) Exclusive Industrial zoning district.

B. Special Use Permit: Mining and quarrying uses shall be permitted by Special Use Permit pursuant to Unified Development Ordinance (UDO) Section 5.11, with the exception that such Special Use Permits shall be considered and issued by the Board of Commissioners. If rezoning is required to establish an (I-3) zoning district, then an application for a Special Use Permit shall only be filed and accepted after approval of the rezoning of the property.

C. Planning Board: Prior to mining and quarrying Special Use Permit applications being heard by the Board of Commissioners, the application shall be submitted for recommendation to the Gaston County Planning Board. The Planning Board shall recommend to the Board of Commissioners that the Special Use Permit be approved, denied, or approved with conditions. If the Planning Board fails to provide a recommendation to the Board of Commissioners within thirty (30) days after the public meeting, the application shall be calendared for a public hearing before the Board of Commissioners without a Planning Board recommendation.

D. Accessory Uses: Applicants may incorporate all accessory uses within the same Special Use Permit for a mining and/or quarrying operation.

E. Traffic Impact Analysis: A Traffic Impact Analysis shall be conducted consistent with the requirements in Section 9.26 of this Ordinance.

F. Public Information Meetings: Applicants requesting a Special Use Permit for a mine shall conduct no less than two (2) Public Information Meetings (PIMS) prior to the public hearing before the Board of Commissioners in accordance with the following requirements:

Once the complete application has been submitted to the Administrator and fees paid prior to the public hearing on the Special Use Permit, two (2) Public Information Meetings (PIMs) shall be scheduled and held. Such meetings shall occur prior to any recommendation by the Planning Board and approval by the Board of Commissioners. The PIM is designed to provide a framework for creating a shared vision with the community involvement directed by the applicant in accordance with the following requirements:

1. It is recommended that the first PIM last two (2) to four (4) hours, depending on the location and size of the proposed development. A minimum of one (1) hour should be scheduled during normal business hours to allow service providers and other public agencies (such as public works officials, NCDOT, NCDENR, QNRC, etc) to participate as needed and to allow for citizens to drop in at a convenient time throughout that period. It is recommended (but not mandated) that this portion of the PIM take place at the proposed development site.

2. A second one (1) hour PIM should be scheduled at a conveniently located meeting site agreed upon by the applicant and the Administrator.

3. A PIM may last for different amounts of time, depending on the size and location of the proposed development, and the number of parties involved and/or attending the meeting.

G. Notice of the Public Information Meetings: A public notice shall be sent by the applicant to a newspaper having general circulation in the county not less than ten (10) days and not more than twenty five (25) days prior to the date of the PIM>

A notice shall be sent by first class mail by the applicant to the same list as required by NCDEQ for the state mining permit.

The applicant shall furnish the County with a list of the mailing labels that depict the names and addresses of the owners of all properties that were notified as part of this process. Such notice shall be sent not less than ten (10) days prior to the date of the PIM. The notification shall contain information regarding the PIM time and location(s), as well as a general description of the proposal and site plan.

The applicant shall provide to the County proof of the paper notice and mailings.

A PIM notification sign shall be posted by the County in a conspicuous place at the property not less than ten (10) days prior to the PIM. The sign shall indicate date, time, and location(s) of the PIMs. In lieu of any or all of this information to be contained on this posted notice, the notice may give a phone number where interested parties may call during normal business hours to get further information regarding the PIM.

H. Administrator Approval: The Administrator shall have up to seven (7) days following any revision of the application to make comments. If the Administrator forwards no comments to the applicant by the end of any such seven (7) day period, the application shall be submitted to the Planning Board for their review without any further comment.

Enforcement

A. Blasting Violations: Blasting on prohibited days or during prohibited hours shall result in a fine of one thousand ($1,000) dollars for the first offense, twenty five hundred ($2,500) dollars for the second offense, five thousand ($5,000) dollars for the third offense, and ten thousand ($10,000) per fine for each succeeding offense.

B. Other Violations: Any violations of these regulations related to blasting or other development standards or operating requirements may result in the suspension of the Special Use Permit in the discretion of the County Manager or the Manager's designee. If a suspension is enacted, a special meeting of the Board of Commissioners must be scheduled within ten (10) business days to consider revocation of the Special Use Permit.

C. Other State or Federal Permits: Special Use Permits shall be revoked if the underlying Federal or State mining permit has been revoked. Proof that the State, Federal or local permit has been reissued or reinstated shall be provided to the Gaston County Zoning Administrator prior to the Special Use Permit being reinstated and the operations resuming.

## SECTION 8.4 CIVIC / INSTITUTIONAL TYPE USES

### SECTION 8.4.1 AIRPORTS; AIRSTRIP / FREIGHT AND FLYING SERVICE

A. All uses shall meet the standards and requirements imposed by the Federal Aviation Administration and all other federal, state, or local agencies having jurisdiction.

B. The lot containing the use shall not be located within three hundred (300) feet of an existing residential structure.

# Zoning Consistency Determination

| | |
|---|---|
| Facility Name | Piedmont Lithium Carolinas, Inc. – Carolina Lithium |
| Facility Street Address | Hephzibah Church Road |
| Facility City | Bessemer City, NC 28016 |
| Description of Process | Lithium Mine, Concentrator Plant, Lithium Hydroxide Conversation Plant |
| SIC/NAICS Code | 2819/ 325180/212290 |
| Facility Contact | Monique Parker |
| Phone Number | 980-701-9935 |
| Mailing Address | 42 E Catawba Street |
| Mailing City, State Zip | Belmont, NC 28012 |

Based on the information given above:

- [x] I have received a copy of the air permit application (draft or final) AND...

- [ ] There are no applicable zoning ordinances for this facility at this time
- [ ] The proposed operation IS consistent with applicable zoning ordinances
- [x] The proposed operation IS NOT consistent with applicable zoning ordinances (please include a copy of the rules in the package sent to the air quality office)
- [ ] The determination is pending further information and can not be made at this time
- [x] Other:

Due to subject properties spanning various zoning districts, this intended use is not allowable in all the needed Parcels.

| | |
|---|---|
| Agency | City of Cherryville |
| Name of Designated Official | Alex Blackburn Alex Blackburn |
| Title of Designated Official | Planning / Zoning Director |
| Signature | Alex Blackburn |
| Date | August 18, 2022 |