

**BASIC APPLICATION FOR EQUIPMENT / AIR POLLUTION PERMIT
OR CERTIFICATE OF OPERATION**

FORM E001
03/2011

1. Name of Company Novonix Enterprise South, LLC (NES) 2. NAICS Code: 335991
(If corporation or LLC, name on file with Tennessee Secretary of State Corporate Records Division)
3. Company Official to Contact: Martin J Kasper 4. Phone No. 423.394.8530
5. Mailing Address: 353 Corporate Place Chattanooga TN 37419
Street or P.O. Box City State Zip Code
6. Physical Location
(If different from line 5) 8091 Ferdinand Piech Way Chattanooga TN 37416
Street City State Zip Code
7. Application for:
☒ Installation Permit ☐ Initial Certificate of Operation ☐ Renewal Certificate of Operation
Previous Installation Permit or Certificate of Operation No.: _____
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Mail completed form to:
CHATTANOOGA-HAMILTON COUNTY
AIR POLLUTION CONTROL BUREAU
2034 Hamilton Place Blvd., Suite 300
Chattanooga, TN 37421

Martin J Kasper

Name

Environmental Engineer

Title

8/4/25

Date

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**BASIC APPLICATION FOR EQUIPMENT / AIR POLLUTION PERMIT
OR CERTIFICATE OF OPERATION**

FORM E001
03/2011

1. Name of Company Novonix Enterprise South, LLC (NES)
(If corporation or LLC, name on file with Tennessee Secretary of State Corporate Records Division)
2. NAICS Code: 335991
3. Company Official to Contact: Martin J Kasper
4. Phone No. 423.394.8530
5. Mailing Address: 353 Corporate Place Chattanooga TN 37419
Street or P.O. Box City State Zip Code
6. Physical Location
(If different from line 5) 8091 Ferdinand Plech Way Chattanooga TN 37416
Street City State Zip Code
7. Application for:
☒ Installation Permit ☐ Initial Certificate of Operation ☐ Renewal Certificate of Operation
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AIR POLLUTION CONTROL BUREAU
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Environmental Engineer

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Martin J Kasper

Name

Environmental Engineer

Title

8/4/25

Date

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Chattanooga-Hamilton County
Air Pollution Control Bureau

**BASIC APPLICATION FOR EQUIPMENT / AIR POLLUTION PERMIT
OR CERTIFICATE OF OPERATION**

FORM E001
03/2011

1. Name of Company Novonix Enterprise South, LLC (NES)
(If corporation or LLC, name on file with Tennessee Secretary of State Corporate Records Division)
2. NAICS Code: 335991
3. Company Official to Contact: Martin J Kasper
4. Phone No. 423.394.8530
5. Mailing Address: 353 Corporate Place Chattanooga TN 37419
Street or P.O. Box City State Zip Code
6. Physical Location
(If different from line 5) 8091 Ferdinand Piech Way Chattanooga TN 37416
Street City State Zip Code
7. Application for:
☒ Installation Permit ☐ Initial Certificate of Operation ☐ Renewal Certificate of Operation
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AIR POLLUTION CONTROL BUREAU
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Chattanooga, TN 37421

Martin J Kasper

Name

Environmental Engineer

Title

8/4/25

Date

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Air Pollution Control Bureau

**BASIC APPLICATION FOR EQUIPMENT / AIR POLLUTION PERMIT
OR CERTIFICATE OF OPERATION**

FORM E001
03/2011

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6. Physical Location
(If different from line 5) 8091 Ferdinand Piech Way Chattanooga TN 37416
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- B. Increase, decrease, or alter emissions or emission points? ☐ Yes ☐ No
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Mall completed form to:
CHATTANOOGA-HAMILTON COUNTY
AIR POLLUTION CONTROL BUREAU
2034 Hamilton Place Blvd., Suite 300
Chattanooga, TN 37421

Martin J Kasper

Environmental Engineer

Name
Title

8/4/25

Date

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Chattanooga-Hamilton County
Air Pollution Control Bureau

**BASIC APPLICATION FOR EQUIPMENT / AIR POLLUTION PERMIT
OR CERTIFICATE OF OPERATION**

FORM E001
03/2011

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(If corporation or LLC, name on file with Tennessee Secretary of State Corporate Records Division)
2. NAICS Code: 335991
3. Company Official to Contact: Martin J Kasper
4. Phone No. 423.394.8530
5. Mailing Address: 353 Corporate Place Chattanooga TN 37419
Street or P.O. Box City State Zip Code
6. Physical Location
(If different from line 5) 8091 Ferdinand Piech Way Chattanooga TN 37416
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7. Application for:
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| ☐ Minor Pollution Source (Form E014)
<i>(Less than 1000 lbs/yr and less than 10 lbs/day total uncontrolled contaminant emissions)</i> | ☐ Previously Submitted | ☐ Attached |
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E010, E102, E108
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Electric Induction Crucible Furnace (G3a-Mk5) 55
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Mail completed form to:
CHATTANOOGA-HAMILTON COUNTY
AIR POLLUTION CONTROL BUREAU
2034 Hamilton Place Blvd., Suite 300
Chattanooga, TN 37421

This form must be completely filled out before it will be processed

Martin J Kasper

Environmental Engineer

8/4/25

Name

Title

Date

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AUG 07 2025

Chattanooga-Hamilton County
Air Pollution Control Bureau

**BASIC APPLICATION FOR EQUIPMENT / AIR POLLUTION PERMIT
OR CERTIFICATE OF OPERATION**

FORM E001
03/2011

1. Name of Company Novonix Enterprise South, LLC (NES)
(If corporation or LLC, name on file with Tennessee Secretary of State Corporate Records Division)
2. NAICS Code: 335991
3. Company Official to Contact: Martin J Kasper
4. Phone No. 423.394.8530
5. Mailing Address: 353 Corporate Place Chattanooga TN 37419
Street or P.O. Box City State Zip Code
6. Physical Location
(If different from line 5) 8091 Ferdinand Piech Way Chattanooga TN 37416
Street City State Zip Code
7. Application for:
☒ Installation Permit ☐ Initial Certificate of Operation ☐ Renewal Certificate of Operation
Previous Installation Permit or Certificate of Operation No.: _____
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Chattanooga-Hamilton County
Air Pollution Control Bureau

JS

INSTALLATION PERMIT CERTIFICATION:

I certify, based on information and belief formed after reasonable inquiry, that the statements and information in this Application for **Novonix Anode Materials, LLC** are true, accurate, and complete.

Novonix Enterprise South LLL (NES Facility)



Signature

2/4/2025

Date

Martin J Kasper

Printed Name

Environmental Engineer

Title

RECEIVED

FEB 02 2025

Chattanooga-Hamilton County
Air Pollution Control Bureau



INSTALLATION PERMIT APPLICATION

NOVONIX ENTERPRISE SOUTH FACILITY –

CHATTANOOGA, TN

JANUARY 2025

SUBMITTED BY:

NOVONIX

Novonix Enterprise South, LLC

Enterprise South Facility
8091 Ferdinand Piech Way
Chattanooga, TN 37341

SUBMITTED TO:



**Chattanooga-Hamilton County
Air Pollution Control Bureau**

2034 Hamilton Place Boulevard
Suite 300
Chattanooga, TN 37421



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1. INTRODUCTION

Novonix Enterprise South, LLC (Novonix) is planning to develop a new battery materials manufacturing facility called Enterprise South (Facility), which will be located at 8091 Ferdinand Piech Way, Chattanooga, Tennessee 37341 (Hamilton County). The Facility will not be subject to the Title V Operating Permit (TVOP) Program, in accordance with the terms and conditions of 40 Code of Federal Regulations (CFR) Part 70 as it will be a synthetic minor source and will not have the potential to emit (PTE) rate of 100 tons per year (tpy) or more of any regulated pollutant, dependent on emissions control devices. The Facility will not be considered major for New Source Review (NSR) permitting as the PTE of all regulated NSR pollutants is expected to be below the applicable thresholds, as detailed in Section 4.1.1. The Facility is submitting this Installation Permit Application (Application), pursuant to Chattanooga Air Pollution Control Ordinance Section 4-8(a), for the construction of the Facility. A description of operations to be authorized is provided in Section 2.3.

2. FACILITY OVERVIEW

This section of the Application includes information related to the Facility location, regulatory jurisdiction, and Facility process description. A description of the geographic and topographic setting of the Facility is also provided.

2.1 FACILITY LOCATION

The proposed Facility will be located in Chattanooga (Hamilton County), Tennessee. A U.S. Geological Survey (USGS) topographical map is shown in Figure 2-1, with the Facility location highlighted. The geographic coordinates for the Facility are:

- Universal Transverse Mercator (UTM) Easting: 669,472 meters (m)
- UTM Northing: 3,886,261 m
- UTM Zone: 16
- North American Datum (NAD): 1983
- Longitude (degrees, minutes, seconds): 85° 08' 25.94" W
- Latitude (degrees, minutes, seconds): 35° 06' 17.73" N

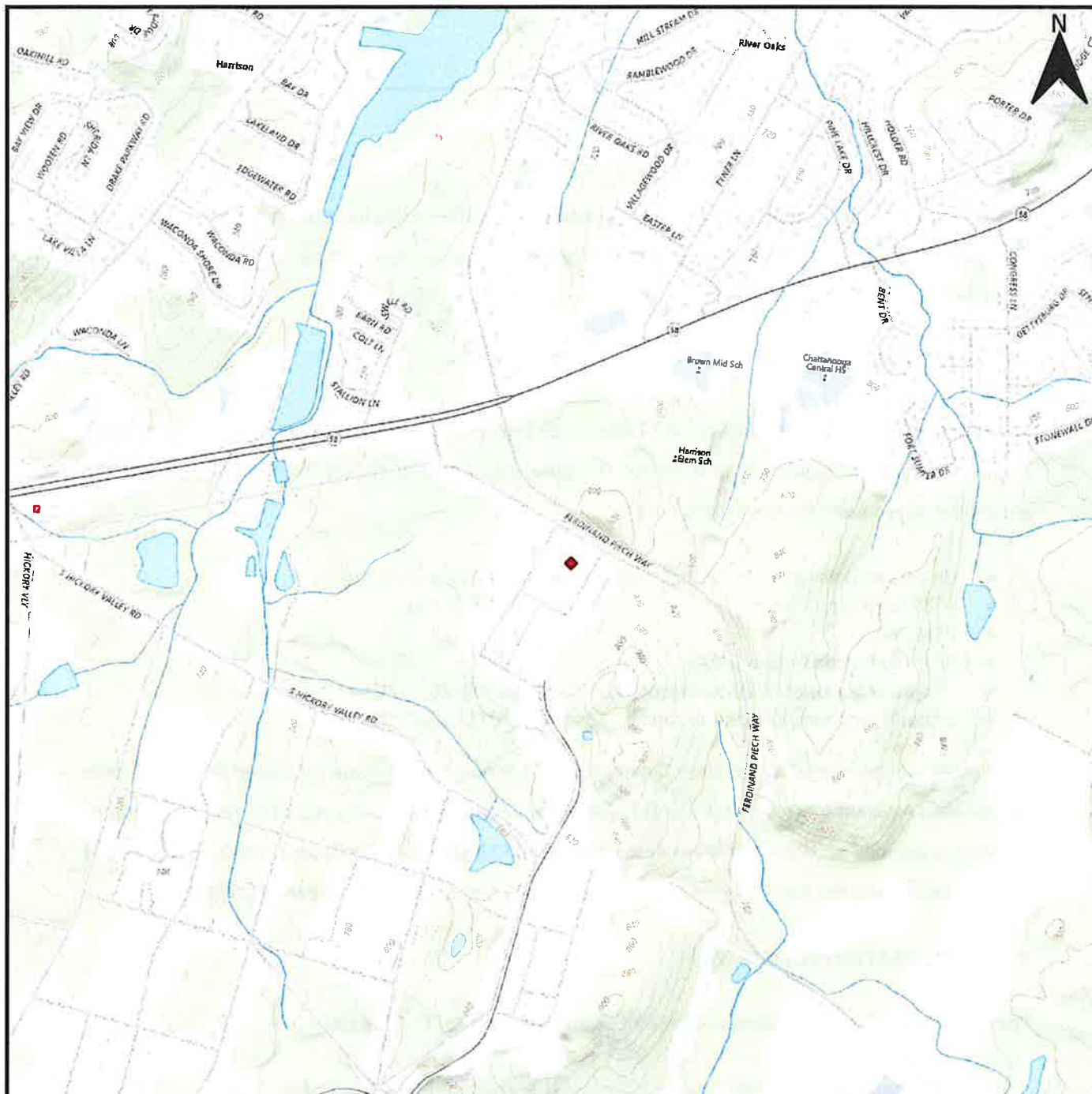
The Facility will be located in Hamilton County, which is in attainment or unclassifiable/attainment with the National Ambient Air Quality Standards (NAAQS) for all criteria pollutants except secondary standards for total suspended particulate (TSP) as designated at 40 CFR §81.343. The surrounding area is generally hilly or uneven with the Facility's planned elevation at 245 feet above mean sea level (amsl).

2.2 REGULATORY JURISDICTION

The Facility is under the jurisdiction of the following State and Federal agencies:

**Chattanooga-Hamilton County
Air Pollution Control Bureau**
2034 Hamilton Place Boulevard
Suite 300
Chattanooga, TN 37421

**U.S. Environmental Protection
Agency (U.S. EPA)**
Region 4
61 Forsyth Street, SW
Atlanta, GA 30303



Legend

- ◆ Facility Location

0 250 500 750 1,000 m



Figure 2-1
Facility Location Map

Novonix Anode Materials, LLC
Enterprise South Facility
Chattanooga, TN

PREPARED BY: P.R.

CHECKED BY: R.B.

DATE: January 2025

PROJECT NO.: 001325-0011.00



2.3 FACILITY PROCESS DESCRIPTION

The Facility will construct a process that receives feed material of petroleum coke (pet coke) and converts it to graphite as the final product to be used in the battery manufacturing industry. The pet coke will be processed through crushing, screening, grinding and shaping, agglomeration, calcining, graphitization, blending, and sieving after which it will be shipped and used for other industries. There will also be a “pitch” process that will be received by truck, undergo milling operations, and will be stored before entering the process at the agglomeration units. Each process will have further discussion below. A process flow diagram detailing Facility processes is provided in Figure 2-2. Novonix requests all Facility operations be authorized through the issuance of an Installation Permit, in accordance with Chattanooga Air Pollution Control Ordinance Section 4-8(a). A complete list of equipment to be installed at the Facility is provided in Table 2-1.

Table 2-1
Proposed New Equipment Summary

Installation Description	Emissions Sources	Control Device(s)
Electric Arc Furnaces	Furnaces 1-60	Baghouse, Iron Oxide Scrubber, and Regenerative Catalytic Oxidizer (only Furnaces 1-30)
Crusher Units	Primary Crushers 1 and 2, Secondary Crushers 1 and 2	Baghouse
Agglomerator Units	Agglomerators 1-6	Baghouse, Iron Oxide Scrubber, and Direct-fired Thermal Oxidizer
Calcliner Units	Calcliners 1-6	Baghouse, Iron Oxide Scrubber, and Direct-fired Thermal Oxidizer
Finishing	Sieving 1-15, Blending 1-3	Baghouse
Screening Units	Screeners 1 and 2	Baghouse
Grinding	Grinding Mills 1-6	Baghouse

Milling and Shaping	Milling and Shaping Combo Units 1-24	Baghouse
---------------------	---	----------

2.3.1 Raw Coke Processing

2.3.1.1 Crushing Operations

Pet coke is received as two types, calcined coke and green coke are received through railcar where it is unloaded and undergoes magnetic separation. The pet coke then is processed through the primary crusher and the secondary crushers, which are located indoors, to be crushed to the desired size. The material is then screened and recycled for material that is bigger than the allowable size. The feed hoppers, secondary crushers, screening equipment, and storage bins are all located indoors, and each unit is equipped with its own baghouse to control particulate matter (PM) emissions.

2.3.1.2 Screening Operations

The screening operations screen the size of the raw pet coke after it is crushed in the primary crushers. If the pet coke meets the required size, it passes through the screeners and enters the grinding and shaping mills. If it does not meet the size specifications, it is recycled back into the crushers to be crushed to the appropriate size to pass through the screeners. The screeners will be equipped with a baghouse to control the PM from the screening operations.

2.3.1.3 Grinding, Milling and Shaping Operations

Once the feed pet coke has been crushed and screened, the next step involves the grinding operation where the pet coke will be ground into a fine powder. After this, the material will enter the combined milling and shaping unit. The shaping operations will be conducted after the pet coke is crushed into a fine powder and shaped into the desired form based on customer specifications. The products of the milling and shaping unit will then be sent to storage for further processing inside the agglomerator. Additionally, the milling and shaping units produce a by-product of calcined coke fines which will be collected in 1000-kilogram (kg) bulk bags. These units will be installed with baghouse control devices to control the emissions of PM.

2.3.1.4 Agglomeration Operations

The agglomerator will take the pet coke from the milling and shaping mills operation and mix it at high temperatures with the pitch agglomerate. During the agglomeration process, the pitch is impregnated into the pet coke before it enters the calcining process. The emissions from the agglomerators will be routed to individual baghouses for PM control, individual iron oxide scrubbers for hazardous air pollutants (HAP) control, and then routed to a single direct-fired thermal oxidizer. The exhaust of each agglomerator will be combined with the exhaust from a calciner before entering the direct-fired thermal oxidizer.

2.3.1.5 Calcining Operations

The calcining operations will consist of electric rotary kilns at the Facility. The rotary kilns will receive pet coke, which may be impregnated with pitch depending on customer specifications, from the agglomerators. The purpose of the calcining process is to remove the volatile material from the pet coke which will transform the green coke into calcined coke. The calcined coke will then be cooled, sized, and stored before being graphitized through the electric induction furnaces. The emissions from the calciners will be routed through individual baghouses for PM control, individual iron oxide scrubbers for HAP control, and then routed to a direct-fired thermal oxidizer. The exhaust from the calciner will be combined with the agglomerator exhaust after passing through the scrubber, before entering the direct-fired thermal oxidizer.

2.3.1.6 Miscellaneous Raw Pet Coke Processing

The Facility will include miscellaneous raw pet coke processing that contains deagglomeration, magnetic separation, storage, and cooling of the raw or calcined pet coke prior to graphitization. The operations are needed dependent on the customers' specifications for the product. The operations will not have emissions that will need to be permitted as part of this Application.

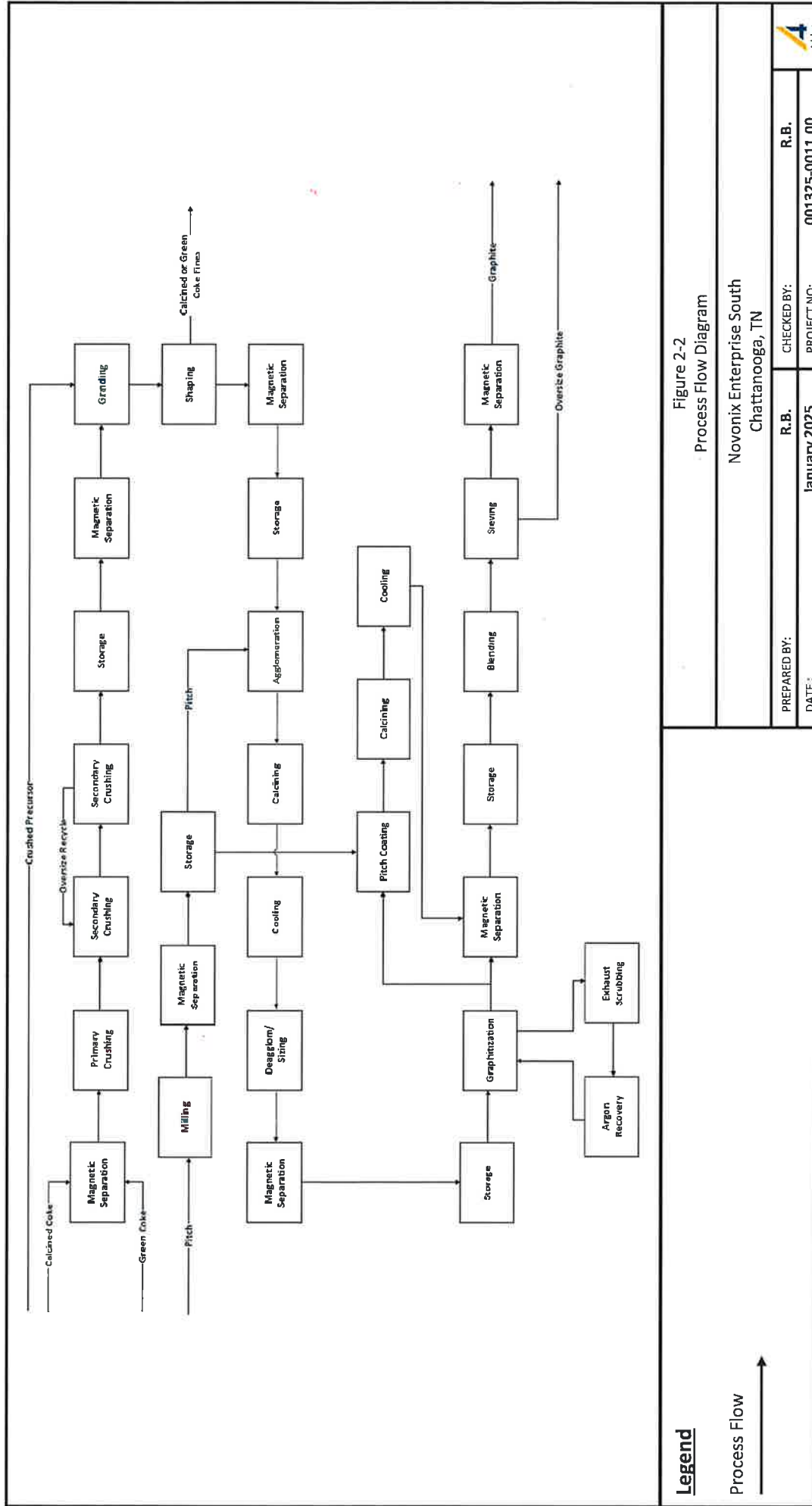
2.3.2 Graphitization Operations

The graphitization operations will consist of electric induction furnaces in an argon-rich environment. The calcined coke is loaded into the furnaces where it is heated to 3,000 °C (Celsius) to transform the calcined coke into graphite. The graphite will then be blended and sieved before being stored and shipped off-site. Each furnace will be installed with a baghouse control device to control the PM emissions. Furnace emissions will be directed to individual iron oxide scrubbers to control sulfur dioxide (SO₂), hydrogen

cyanide (HCN), and hydrogen sulfide (H₂S) emissions. Additionally, backup scrubbers will be installed for each furnace. Regenerative Catalytic Oxidizers (RCO) will be installed to control carbon monoxide (CO) emissions. To maintain emissions levels below major source thresholds, out of 60 furnaces, CO emissions from three lines, or 30 furnaces, will be controlled. Each RCO installed will control one line of furnaces (or 10 furnaces) resulting in a total of three RCOs. RCOs operate in the same manner as Regenerative Thermal Oxidizers (RTOs); however, they use a precious metal catalyst, such as platinum or palladium, rather than ceramic material in the packed bed. This enables CO destruction at approximately 800 degrees Fahrenheit (°F), which reduces the natural gas required and the overall size of the incinerator. RCOs are most effective for low-concentration waste streams that are consistent over time.

2.3.3 Finishing and Packaging Operations

Finishing operations will consist of blending, sieving, and magnetic separation before the final product is packaged and shipped to the customer. Each blending and sieving unit will be equipped with its own baghouse to control PM emissions.



3. FACILITY EMISSIONS

Detailed PTE calculations are provided in Appendix A. The proposed Facility will be a synthetic minor source as it will emit criteria pollutants including oxides of nitrogen (NO_x), CO, SO_2 , VOC, PM, PM less than 10 microns (PM_{10}), PM less than 2.5 microns ($\text{PM}_{2.5}$), lead (Pb) (from natural gas combustion only), and HAP. The Facility's PTE calculations were developed using vendor data, AP-42 emissions factors, site-specific stack test results, process throughput, and a maximum of 8,760 hours per year of operation.

3.1 STACK TEST RESULTS

Novonix utilizes emissions testing results for specific emissions units and pollutants. Two separate source tests were conducted: one for a furnace with a throughput of 40 kilograms per hour (kg/hr) and another for a calciner with a throughput of 10 kg/hr. The source test reports used for emissions calculations are included as Appendix C. NO_x , CO, total hydrocarbons (THC), HCN, and H_2S testing for the furnace was performed by Alliance Source Testing, LLC in March 2024. NO_x , SO_2 , CO, HCN, H_2S , and THC testing for the calciner was performed by Alliance Source Testing, LLC in August 2024. For this Application, VOC emissions were conservatively assumed equal to THC.

3.1.1 Furnace Scrubber Stack Test

Novonix is using source tests for the 40 kg/hr furnaces at an existing facility located in Chattanooga. The furnaces were operating at full capacity during the time of the source test. The test was conducted as investigative testing to determine the emissions rates of NO_x , CO, and THC at the exhaust of the electric induction furnaces. Testing was also performed to determine the emissions rates of HCN and H_2S from the inlet and outlet of the electric induction furnace's scrubber. The summary of the electric induction furnace is detailed below in Table 3-1 of this Application.

Table 3-1
40 kg/hr Furnace Source Test Results

Pollutant	Emissions Rate (lbs/hr)	Emissions Rate (lbs/ton pet coke)
NO _x	1.2E-05	2.83E-04
CO	0.27	6.12
THC	2.7E-03	0.06
HCN (inlet)	0.22	4.98
HCN (outlet)	9.7E-05	1.99E-03
H ₂ S (inlet)	0.086	1.95
H ₂ S (outlet)	2.1E-05	3.90E-04

3.1.2 Calciner Scrubber Stack Test

Novonix is using source tests for the calciners at a production rate of 10 kg/hr. The test was conducted as investigative testing at their pilot facility located in Chattanooga to determine the emissions rates of NO_x, SO₂, CO, and THC at the exhaust of the calciners after being routed through the scrubber. Testing was also performed to determine the emissions rates of HCN and H₂S from the inlet and outlet of the calciner's scrubber. These emissions rates are not representative of additional control provided by the thermal oxidizer. The summary of the calciner is detailed below in Table 3-2 of this Application.

Table 3-2
Calcliner Source Testing Results

Pollutant	Emissions Rate (lbs/hr)	Emissions Rate (lbs/ton pet coke)
NO _x	1.3E-04	9.07E-03
CO	0.037	3.63
SO ₂	8.4E-04	0.0907
THC	0.21	19.05
HCN (inlet)	0.014	1.26
HCN (outlet)	1.1E-05	9.90E-04
H ₂ S (inlet)	8.6E-04	0.0774
H ₂ S (outlet)	4.2E-07	3.78E-05

3.2 FACILITY-WIDE EMISSIONS LIMITS

The proposed Facility is expected to operate as a synthetic minor source with emissions controlled to remain below 100 tpy of all criteria pollutants and a combined 25 tpy for all HAP and 10 tpy for individual HAP. This is achieved with the use of emissions control devices. As a result, the Facility will not be considered a major source for NSR because emissions are less than 250 tpy for PM, VOC, NO_x, SO₂, CO, PM₁₀, PM_{2.5}, Pb, and H₂S. Additionally, the Facility will not be considered a major source of HAP, as its total HAP emissions will be below the major source threshold of 10 tpy for any single HAP or 25 tpy for total combined HAP.

Table 3-3
Facility-Wide Potential to Emit Summary
Novonix - Enterprise South Facility - Chattanooga, TN

Source	PM	PM _{2.5}	PM ₁₀	VOC	NO _x	CO	SO ₂	H ₂ S	Total HAP ^(a)
	Controlled Potential Emissions (tpy)								
Furnaces	0.50	0.50	0.50	1.44	0.38	72.69	70.81	9.04E-03	0.05
Grinding Mills	3.34	3.34	3.34	--	--	--	--	--	--
Milling and Shaping Mills	13.36	13.36	13.36	--	--	--	--	--	--
Agglomerators	0.17	0.17	0.17	6.06	0.26	1.05	2.20	1.31E-03	0.04
Calciners	0.18	0.18	0.18	6.06	0.39	1.15	2.20	1.31E-03	0.04
Crushers	1.76	1.76	1.76	--	--	--	--	--	--
Finishing	0.52	0.52	0.52	--	--	--	--	--	--
Screening	1.11	1.11	1.11	--	--	--	--	--	--
Facility Totals	20.95	20.95	20.95	13.56	1.03	74.89	75.21	0.01	0.12
TVOP Major Source Thresholds ^(b)	100	100	100	100	100	100	100	10 ^(c)	25
Below Thresholds?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

^(a) All individual HAP emissions are below 10 tpy.

^(b) All emissions are below the Title V major source thresholds.

^(c) Significant emissions threshold increase in accordance with PSD regulations.

3.2.1 Electric Induction Furnaces

The PTE of the electric induction furnaces was calculated by using the throughput of the proposed furnaces (80 kg/hr) and emissions factors from vendor data and stack tests. The maximum grain loading and airflow rate provided by the vendor of the baghouses were the basis for the PM, PM₁₀, and PM_{2.5} emissions factors. The stack test conducted in March 2024 was used to determine the emissions factors for NO_x, CO, VOC, HCN, and H₂S specific to 40 kg/hr furnaces. The emissions for the 80 kg/hr furnaces were calculated by applying the pound per ton (lb/ton) emissions factor for pet coke from the 40 kg/hr furnace to all furnaces, ensuring that the increase in emissions correlates directly with the throughput of pet coke processed. The emissions factor for SO₂ was determined using a material balance based on the maximum sulfur content in the raw pet coke and the molecular weights of sulfur and SO₂. The SO₂ emissions factors include control efficiency from the scrubbers which was demonstrated during testing. The Facility is proposing to install RCOs for a portion of the electric induction furnaces to reduce the emissions of CO from the selected furnaces with 98% control efficiency. For this Application, it is conservatively assumed that there is no control of VOCs from the RCOs. Novonix intends to install the RCOs on 30 of the 60 furnaces. The PTE of the RCOs resulting from natural gas combustion was calculated using AP-42 emissions factors for natural gas firing and the expected throughput of natural gas supplemented fuel, based on the proposed number of furnaces and the throughput of the direct-fired thermal oxidizer.

3.2.2 Calciners

The PTE of the calciners was calculated by using the throughput and emissions factors from vendor data and stack tests. The maximum grain loading and airflow rate provided by the vendor of the baghouses were the basis for the PM, PM₁₀, and PM_{2.5} emissions factors. The Facility is using a stack test conducted in August 2024 to determine the emissions factors for NO_x, SO₂, CO, THC, HCN, and H₂S specific to the calciners. Additionally, the VOC emissions factor was increased by 10% to account for the expected operating temperature being 10% higher than the conditions at the testing facility. A direct-fired thermal oxidizer will be installed to control VOC and CO. The PTE of the direct-fired thermal oxidizer as a result of natural gas combustion was calculated using AP-42 emissions factors for natural gas firing and the throughput provided by the manufacturer.

4. REGULATORY APPLICABILITY

The Facility has reviewed the Federal air quality regulations and Chattanooga Air Pollution Control Ordinances to evaluate their applicability to the Facility. A discussion of the applicable and potentially applicable regulations is provided below.

4.1 FEDERAL AIR QUALITY REGULATIONS

For the purpose of this Application, the applicable and potentially applicable Federal regulations that have been considered include:

- Major Nonattainment New Source Review (NNSR)/Prevention of Significant Deterioration (PSD)
- Standards of Performance for New Stationary Sources (NSPS)
- National Emission Standards for Hazardous Air Pollutants (NESHAP)/Maximum Achievable Control Technology (MACT) standards
- Compliance Assurance Monitoring (CAM)

A discussion of the applicability of the Federal air quality regulations listed above is provided in the following subsections.

4.1.1 Major NNSR/PSD

The Facility will be located in Hamilton County, which is classified as in attainment or unclassifiable for all regulated NAAQS pollutants except secondary standards for TSP; therefore, NNSR regulations do not apply to the Facility. The Facility will be classified as a minor NSR source because the potential emissions for criteria pollutants will be less than the 250 tpy threshold for unnamed sources for PSD applicability codified at 40 CFR § 52.21. Therefore, PSD is not applicable to the Facility.

4.1.2 NSPS

NSPS are codified at 40 CFR Part 60 and require new, modified, or reconstructed sources to control emissions to the level achievable by the best-demonstrated technology as specified in the applicable subparts. The proposed Facility is a battery materials manufacturing facility, not a lead acid battery manufacturing facility, and does not meet the applicability criteria NSPS Subpart KK. As such, the Facility does not meet the applicability criteria for any of the subparts codified in 40 CFR Part 60.

4.1.2.1 Subpart UUU – Standards for Performance for Calciners and Dryers in Mineral Industries

NSPS Subpart UUU sets provisions for calciners and dryers at mineral processing plants. The definition of a mineral processing plant per 40 CFR §60.731 is any facility that processes or produces one or more of the following minerals, or any mixtures in which more than 50 percent consists of these minerals or their combinations; alumina, ball clay, bentonite, diatomite, feldspar, fire clay, fuller's earth, gypsum, industrial sand, kaolin, lightweight aggregate, magnesium compounds, perlite, roofing granules, talc, titanium dioxide, and vermiculite. The Facility will not produce or process any of the minerals described above and therefore is not subject to Subpart UUU.

4.1.3 NESHAP/MACT

U.S. EPA has established NESHAP in 40 CFR Parts 61 and 63. NESHAP promulgated prior to the Clean Air Act Amendments (CAAA) of 1990, found in 40 CFR Part 61, apply to specific compounds emitted from particular processes. Pursuant to the CAAA of 1990, process-specific NESHAP are promulgated in 40 CFR Part 63, known as MACT standards. These standards apply to source categories identified as area sources or major sources of HAP. A major source of HAP is defined as a source with a facility-wide PTE of 10 tpy or more of any single HAP or 25 tpy or more of total HAP. The Facility will be classified as an area source because it will emit less than 25 tpy of total HAP and less than 10 tpy for any individual HAP, as demonstrated in the emissions calculations provided in Appendix A. Additionally, the Facility is not a lead acid battery manufacturing facility and, therefore, does not meet the applicability criteria for NESHAP Subpart P, which specifically applies to lead acid battery manufacturers. There are no applicable requirements from 40 CFR Parts 61 and 63 that apply to area source battery materials manufacturing facilities.

4.1.4 CAM

U.S. EPA's CAM rule is codified at 40 CFR Part 64. An emissions unit must satisfy all applicability requirements listed in 40 CFR §64.2 to be subject to CAM. The CAM rule applies to TVOP major sources and since the Facility will not be a major source, the Facility will not require a CAM plan.

4.2 CHATTANOOGA AIR POLLUTION CONTROL ORDINANCE

The Chattanooga Air Pollution Control Ordinance was established to achieve and maintain such levels of air quality that will protect human health and safety to the greatest degree practicable, prevent injury to plant and animal life and property, and foster the comfort and convenience of the people. The Facility will be subject to the Chattanooga Air Pollution Control Ordinance and has conducted an applicability analysis of the rules and sections (Sec) as part of this Application.

4.2.1 Chapter 4 Article I – General Provisions

Article I details general provisions for all owners and operators of air emissions sources. The Facility has done an applicability analysis of Article I below as part of this Application.

4.2.1.1 Section 4-8(a) Installation Permit

The Facility is subject to the requirements of the general provisions laid out in Chapter 4 Article I. The Facility is submitting this Application pursuant to Sec 4-8(a), which requires an installation permit request. The Facility has completed all required forms and has included all required information in accordance with Sec 4-8(a).

4.2.1.2 Section 4-8(a)(14) Installation Fees

The Facility will pay the required fee amount based on Sec 4-8(a)(14). The Facility will be proposing to install:

- 60 Electric Induction Furnaces
- Six Calciners
- Six Agglomerators
- Direct-fired Thermal Oxidizer
- Three Regenerative Catalytic Oxidizers
- Two Screening Units
- Six Grinding Mills
- 24 Milling and Shaping Combo Units
- Three Blending Units
- 15 Sieving Units

The fuel-burning equipment that will be on-site is the direct-fired thermal oxidizer, which will be utilized to combust process emissions by the agglomerators and calciners. The RCOs are also fuel-burning equipment used to control CO emissions from the electric induction furnaces. Additionally,

supplementary natural gas is introduced to enhance the combustion process. The Facility will calculate the fee amount based on the process weight of process equipment from Schedule 4-8-a-III and the fuel-burning rate of fuel-burning equipment from Schedule 4-8-a-I.

4.2.1.3 Section 4-10 Records

The Facility will keep records of all permits and certificates issued by the Chattanooga-Hamilton Air Pollution Control Board and have them available for inspection as requested unless information is confidential by nature then it is protected by Sec 4-19.

The Facility will also maintain and keep records relating to the operation of the source of emissions and/or emissions from the source as requested to do so by the director. The Facility will maintain the record for seven years unless Federal requirements provide for a shorter retention period.

4.2.1.4 Section 4-11 – General Requirements

Sec 4-11 outlines the reporting requirements for owners and operators in the following situations: when an air emissions source is permanently discontinued, when there are two emissions points for a single emissions source, when there is a combination of contaminants before emission, and when there is an inseparable combination of contaminants prior to emission. The Facility will not have any instances where there is more than one emissions point for a single emissions source. However, there will be instances where multiple contaminants are combined prior to being emitted. One case involves one agglomerator and one calciner that will have emissions combined after the iron oxide scrubbers and before the direct-fired thermal oxidizer. The second case involves up to 10 electric induction furnaces, whose emissions will be routed together after the iron oxide scrubbers to a single RCO. When applicable, the Facility will follow Sec 4-11(a) and notify the bureau within 30 days of the permanent shutdown of emissions sources.

4.2.2 Chapter 4, Article II – Rules, Regulations, Criteria, Standards

Article II of the Chattanooga Air Pollution Control Ordinance details rules, regulations, criteria, and requirements that owners and operators must comply with if they are subjected to such rules. Sec 4-41 contains the rules adopted by the Chattanooga-Hamilton Air Pollution Control Board and titled Chattanooga-Hamilton County Air Pollution Control Regulations. The Facility has determined below which rules they are or are not subject to and why.

4.2.2.1 Rule 2 – Regulations of Nitrogen Oxides

Sec 4-41, Rule 2 establishes limits on the amount of NO_x that can be emitted from the emissions sources. The Facility will comply with Rule 2.4 which states “no person shall cause, suffer, or allow or permit the emissions of NO_x in excess of 300 parts per million (ppm) from process equipment and fuel-burning equipment sources except fuel-burning equipment with a design-capacity greater than 250 Million British Thermal Units per hour (MMBtu/hr), nitric acid plants, Portland Cement Plants, or emergency generators.” Rule 2.4 applies to any source that does not fall under Rules 2.1 (fuel-burning equipment greater than 250 MMBtu/hr), 2.3, 2.6, and 2.7. The Facility will comply with Rule 2.4 with the following sources:

- Furnaces
- Agglomerators
- Calciners
- Direct-fired thermal oxidizer
- Regenerative Catalytic Oxidizers

The fuel-burning equipment that will be on-site is the direct-fired thermal oxidizer, which will be utilized to combust process emissions generated by the agglomerator and calciner. The RCOs are also fuel-burning equipment used to control CO emissions from the electric induction furnaces. Additionally, supplementary natural gas is introduced to enhance the combustion process.

4.2.2.2 Rule 3 – Visible Emissions Regulations

Rule 3 states the limits for opacity, the required frequency, and exceptions for allowing visible emissions greater than stated.

- Rule 3.1 states that no person shall cause, suffer, allow, or permit visible emissions from any air contaminant source with an opacity in excess of 20% for more than five minutes in any one hour or more than 20 minutes in any 24-hour period.
- Rule 3.2 states that allowance may be made for visible emissions in excess of that permitted which are necessary or unavoidable due to routine start-up and shutdown conditions provided that the owner or operator shall maintain a continuous, current log of all start-up and shutdown conditions showing a time at which such conditions began and ended.
- Rule 3.3 gives guidance, that when testing compliance with Rule 3.1, visible emissions should be evaluated in terms of equivalent opacity and expressed as percent opacity. This is applicable to

all sources that are subject to Rule 3.1. The way to determine visible emissions will be Method 9 as stated in Sec 4-3(c)(9) except the averaging period will be superseded by the 5-minute averaging period as stated in Rule 3.1.

- Rule 3.5 states that emissions sources subject to other limits in Rules 15, 16, 18, 26, and 27 shall comply with the visible emissions limitations set according to those rules or that section. Since the Facility is not subject to NSPS, NESHAP, PSD, Reasonable Achievable Control Technology, and additional visible emissions from Rule 27, the Facility will comply with the limits and standards of Rules 3.1, 3.2, 3.3, and 3.5 so that no other limits or provisions are given.

4.2.2.3 Rule 10 – Process Emissions Regulations

Rule 10 establishes provisions and limitations for PM emissions that are emissions from the process equipment. The Facility will comply with the requirements of Rules 10.1 and 10.3 as all process equipment was built or installed on or after January 1, 1973. The Facility has detailed in Table 4-1 of this Application the maximum allowable particulate emissions and the PTE from units on an hourly basis. Processes that have a throughput of 60,000 lbs/hr or less must use the following equation to establish the Maximum Allowable Limit.

$$E = 3.59P^{0.62}$$

Where *E* is the Maximum Allowable emissions rate in lbs/hr, and *P* is the process weight throughput in tons/hr.

Processes that have a throughput of 60,000 lbs/hr or more must use the following equation to establish the Maximum Allowable Limit.

$$E = 55.0P^{0.11} - 40$$

Where *E* is the Maximum Allowable emissions rate in lbs/hr, and *P* is the process weight throughput in tons/hr.

Table 4-1 displays the process equipment's maximum allowable emissions rates in reference to the maximum hourly throughput weight and the hourly PTE as a comparison. All process equipment has an hourly PTE less than the maximum hourly allowable emissions rate.

Table 4-1
Process Emissions Standards

Emissions Source Description	Source ID	Individual Process Rate (tons/hr)	Individual Allowable Emissions Rate (lbs/hr)	Individual Potential to Emit (lbs/hr)
Furnaces	Furnaces 1-60	0.09	0.80	1.80E-03
Agglomerators	Agglomerators 1-6	0.82	3.13	0.06
Calciners	Calciners 1-6	0.82	3.17	0.02
Finishing	Sieving 1-15, Blending 1-3	1.39	4.41	1.32E-02
Screening	Screeners 1 and 2	34.61	41.22	0.13
Crusher Units	Primary and Secondary Crushers 1 and 2	8.18	13.21	1.61E-04
Grinding	Grinding Mills 1-6	1.29	4.20	0.13
Milling and Shaping	Milling and Shaping Combo Units 1-24	1.29	4.20	0.13

Rule 10.4 states that tests must be conducted to determine compliance with Rule 10 as provided in Sections 4-3, 4-8, and 4-11 of Article I. Testing for particulate emissions shall be determined by Method 5, 5A, 5B, 5D, 5E, 5F, 5G, 5H, 5I, or 17 as set forth in Title 40 CFR Part 60, Appendix A. Rule 10.7 states that irrespective of Table 2 of Rule 10, no person shall allow or permit the discharge of PM emissions from process equipment in excess of 0.25 grains per cubic foot (gr/ft^3) of stack gases corrected to 70 °F and one atmosphere (atm). Testing will be conducted on a piece of equipment that is representative to each of the units in Table 4-1 to ensure compliance with these standards.

4.2.2.4 Rule 12 – Regulation of Odors in the Ambient Air

Rule 12 regulates the odors of ambient air for any owner or operator of air emissions sources. The Facility will comply with rules outlined in Rule 12 but does not anticipate any noxious odors, fumes, dust, vapors, or gases that are offensive from the property boundary.

4.2.2.5 Rule 13 – Regulation of Sulfur Oxides

Rule 13 of Article of the Chattanooga Air Pollution Control Ordinance regulates the amount of SO₂ that can be emitted from process and fuel-burning equipment.

- Rule 13.1 states that no emissions of gas shall contain SO₂ in excess of 500 ppm, except for fuel-burning equipment. The emissions units that will comply with Rule 13.1 are:
 - Furnaces 1-60
 - Calciners 1-6
 - Agglomerators 1-6
- Rule 13.2 limits the amount of SO₂ from fuel-burning equipment to 4 pounds per Million British Thermal Units (lb/MMBtu) of fuel consumed. The emissions unit that will comply with Rule 13.2 as part of this Application is the Direct-fired Thermal Oxidizer.
- The only fuel-burning equipment that will be on-site is the direct-fired thermal oxidizer, which will be utilized to combust process emissions generated by the agglomerator and calciner. The Facility will comply with the limits stated here and will comply with the method of sampling and analyzing exhaust gases by Rule 13.3. All emissions units stated in this section will comply with the specified techniques promulgated by the board in Sec 4-3(c)(1), (2), and (6).

4.2.2.6 Rule 15 – New Source Performance Standards

The Facility will not be subject to the provisions of NSPS subparts as stated in Section 4.1.2 of this Application.

4.2.2.7 Rule 16 – Emissions Standards for Hazardous Air Pollutants Other Than Asbestos

The Facility will not be subject to the provisions of NESHAP subparts as stated in Section 4.1.3 of this Application.

4.2.2.8 Rule 18 – Prevention of Significant Deterioration of Air Quality

The Facility will not be a major source of PSD criteria pollutants as detailed in Section 4.1.1 of this Application.

4.2.2.9 Rule 25 – General Provisions and Applicability for Volatile Organic Compounds

Rule 25 establishes emissions standards for new and existing sources of VOC located within Hamilton County. The Facility's VOC emissions will have the PTE less than 100 tons per year as listed in Rule 25.3 and is not a source category listed;

- 25.7 (Petroleum Liquid Storage),
- 25.8 (Bulk gasoline plants),
- 25.9 (Bulk gasoline terminals),
- 25.10 (Gasoline dispensing facilities – stage 1 vapor recovery),
- 25.12 (Can coating),
- 25.13 (Coil coating),
- 25.14 (Fabric and vinyl coating),
- 25.15 (Metal Furniture Coating),
- 25.16 (Surface coating of large appliances),
- 25.17 (Magnet wire coating),
- 25.18 (Solvent Metal cleaning),
- 25.19 (Cutback asphalt),
- 25.21 (Surface coating of miscellaneous metal parts and products),
- 25.27 (Manufacture of synthesized pharmaceutical products).

Therefore, there are no limitations for VOC in Rule 25 that the Facility is to comply with as part of this Application.

4.2.2.10 Rule 27 – Particulate Matter Controls for New Sources and New Modifications After August 29, 1995

Rule 27.1 states that any new source or modification, alteration, or reconstruction that begins installation after August 29, 1995, and emits or potentially emits, 15 tpy or more of PM₁₀ emissions, or emits or can potentially emit 25 tpy or more of PM before control shall utilize "particulate matter best available control technology" as defined by Rule 27.2. The Facility is not proposing any emissions unit or source that will have PM₁₀ emissions of 15 tpy or more, nor does it have PM emissions of 25 tpy or more; therefore, Rule 27.2 is not applicable. Rules 27.3 and 27.4 are applicable to the Facility for this Application.

- Rule 27.3 requires new or modified sources that emit less than 15 tpy of PM₁₀ and less than 25 tpy of PM prior to control to achieve “reasonable and proper emission limitations” as defined in Rule 27.4. The Facility will emit less than 15 tpy of PM₁₀ and less than 25 tpy of PM from each emissions source.
- Rule 27.4 requires achievable emission limits based on control technology and costs. The Facility will use baghouses for applicable emissions sources as the technology available to control PM emissions.

4.2.3 Chapter 4, Article III – Part 70 Source Regulation and Permits

Article III of the Chattanooga Air Pollution Control Ordinance establishes provisions and rules for Part 70 sources. Part 70 sources, as defined in Sec 4-53, are any sources subject to the permitting requirements of this ordinance and as required in 40 CFR §§70.3(a) and 70.3(b), and as defined in Sec 4-54. Since the Facility will be a synthetic minor source, it does not meet the requirements established in Sec 4-54 for a major source and, therefore, is not subject to the full Part 70 requirements. However, the Facility will be subject to the provisions of Sec 4-54(e), which apply to synthetic minor sources and will fully comply with the requirements set forth in this section. Therefore, Article III is not applicable to this Application, except as outlined in Sec 4-54(e).

Table A-1
80 Kg Furnaces Potential to Emit
Noronik - Enterprise South Facility - Chattanooga, TN

Source	No. of Sources	Pollutant	Emissions Factor ^(a)	Unit	Emissions Factor Reference	Control Efficiency (%) ^(d)	Total Controlled Potential Emissions ^(e) lb/yr
Furnaces: 80 kg/hr (without RCO)	30	PM ₁₀ ^(a)	3.50E-03	g/dscf	Baghouse Vendor Data ^(a)	—	0.05
		PM _{2.5} ^(a)	3.50E-03	g/dscf	Baghouse Vendor Data ^(a)	—	0.05
		PM _{2.5-10} ^(a)	3.50E-03	g/dscf	Baghouse Vendor Data ^(a)	—	0.05
		SO ₂ ^(a)	39.96	lb/ton pet coke	Material Balance	92.36%	8.08
		CO ^(a)	6.12	lb/ton pet coke	Stack test conducted on 3/12/2024	—	16.20
		HCN	4.98	lb/ton pet coke	Stack test conducted on 3/12/2024	99.96%	5.28E-03
		H ₂ S	1.95	lb/ton pet coke	Stack test conducted on 3/12/2024	99.98%	1.03E-03
Furnaces: 80 kg/hr (with RCO)	30	NO _x ^(a)	2.83E-04	lb/ton pet coke	Stack test conducted on 3/12/2024	—	7.50E-04
		VOC ^(a)	0.06	lb/ton pet coke	Stack test conducted on 3/12/2024	—	0.16
		PM ₁₀ ^(a)	3.50E-03	g/dscf	Baghouse Vendor Data ^(a)	—	0.05
		PM _{2.5} ^(a)	3.50E-03	g/dscf	Baghouse Vendor Data ^(a)	—	0.05
		PM _{2.5-10} ^(a)	3.50E-03	g/dscf	Baghouse Vendor Data ^(a)	—	0.05
		SO ₂ ^(a)	39.96	lb/ton pet coke	Material Balance	92.36%	8.08
		CO ^(a)	6.12	lb/ton pet coke	Stack test conducted on 3/12/2024	98.00%	0.32
RCO	3	HCN	4.98	lb/ton pet coke	Stack test conducted on 3/12/2024	99.96%	5.28E-03
		H ₂ S	1.95	lb/ton pet coke	Stack test conducted on 3/12/2024	99.98%	1.03E-03
		NO _x	2.83E-04	lb/ton pet coke	Stack test conducted on 3/12/2024	—	7.50E-04
		VOC	0.06	lb/ton pet coke	Stack test conducted on 3/12/2024	—	0.16
		CO	84.00	lb/MMscf	AP-42, Table 1.4-1	—	0.07
		NO _x	100.00	lb/MMscf	AP-42, Table 1.4-1	—	0.09
		PM	7.60	lb/MMscf	AP-42, Table 1.4-2	—	6.51E-03
Leak	3	PM ₁₀	7.60	lb/MMscf	AP-42, Table 1.4-2	—	6.51E-03
		PM _{2.5}	7.60	lb/MMscf	AP-42, Table 1.4-2	—	6.51E-03
		SO ₂	0.60	lb/MMscf	AP-42, Table 1.4-2	—	5.14E-04
		VOC	5.50	lb/MMscf	AP-42, Table 1.4-2	—	4.71E-03
		Leak	5.00E-04	lb/MMscf	AP-42, Table 1.4-2	—	4.29E-07
		HCN	4.98	lb/ton pet coke	Stack test conducted on 3/12/2024	99.96%	5.28E-03
		H ₂ S	1.95	lb/ton pet coke	Stack test conducted on 3/12/2024	99.98%	1.03E-03

^(a) Potential Emissions are calculated under the following parameters:

Parameter	Value	Unit
Operating hours/year	8,760	hr/yr
Top/Grounds Connection	2,000	lb/ton
Grain/In Connection	7,000	g/lb
Throughput (pet coke)	80	kg/hr
Throughput (pet coke)	176.60	lb/hr
Catalytic Oxidizer NG Usage	4.76	scfm
kg/Lb Conversion	0.45	kg/lb

^(b) Emissions factors are based on stack testing conducted on 40 kg/hr furnaces at a sister facility.

^(c) Control Efficiency Calculation

Pollutant	Inlet Concentration (lb/hr)	Outlet Concentration (lb/hr)	Control Efficiency (%)
SO ₂	0.011	8.40E-04	92.36%
HCN	0.22	9.70E-05	99.96%
H ₂ S	0.085	2.10E-05	99.98%

^(d) PM emissions factors are for controlled emissions and calculated using the baghouse maximum grain loading and maximum air flow rate: (emissions factor) * (flow rate) / (grains per pound) * 60.
CO, NO_x, and VOC emission factors are based on measurements taken after the iron oxide scrubbers, therefore they are controlled emissions factors.

^(e) Baghouse Vendor Data

Source	Vendor Young Industries	Model Number HWFE-9	Grain Loading 3.50E-03	Grain Loading Units g/dscf	Flow Rate 60.00	Flow Rate Units dscfm
AI						

$$SO_2(G) + O_2(G) \rightarrow SO_2(G)$$

^(f) SO₂ Emission Factor Calculation

Area Subject to In pet coke	MMW (lb/lb)	MMW SO ₂ 24.056	SO ₂ (lb/lb pet coke) 0.03598	SO ₂ (lb/ton pet coke) 29.95
1%	21.065			

^(g) Control efficiency based on the RCO. The control efficiency of the RCOs was assumed based on the minimum control efficiency typically achieved by RCOs within the industry.

Table A-2
Grinding Mill Potential to Emit
Novonix – Enterprise South Facility - Chattanooga, TN

Source	No. of Sources	Pollutant	Emissions Factors ^(b)	Units	Emissions Factor Reference ^(c)	Control Efficiency (%)	Total Controlled Potential Emissions ^(a)	
							lb/hr	tpy
Grinding Mills	6	PM	3.50E-03	gr/dscf	Baghouse Vendor Data	—	0.76	3.34
		PM ₁₀	3.50E-03	gr/dscf	Baghouse Vendor Data	—	0.76	3.34
		PM _{2.5}	3.50E-03	gr/dscf	Baghouse Vendor Data	—	0.76	3.34

^(a) Potential Emissions are calculated under the following parameters:

Parameter	Value	Unit
Operating Hours	8,760	hr/yr
Conversion	2,000	lb/ton
Grains/Pounds Conversion	7,000	grain/lb

^(b) PM emissions factors are for controlled emissions and calculated using the baghouse maximum grain loading and maximum air flow rate: (emissions factor) * (flow rate)/(grains per pound) * 60

^(c) Baghouse Vendor Data

Source	Vendor	Model Number	Grain Loading	Grain Loading Units	Flow Rate
ALL	Nueman and Esser Process (NEA) Technology	CF 3200	3.50E-03	gr/dscf	4,238

Table A-3
Milling and Shaping Mill Potential to Emit
Novonix - Enterprise South Facility - Chattanooga, TN

Source	No. of Sources	Pollutant	Emissions Factors ^(d)	Units	Emissions Factor Reference ^(b)	Control Efficiency (%)	Total Controlled Potential Emissions ^(a) lb/hr	tpy
Milling and Shaping Mill Combo	24	PM	3.50E-03	gr/dscf	Baghouse Vendor Data	---	3.05	13.36
		PM ₁₀	3.50E-03	gr/dscf	Baghouse Vendor Data	---	3.05	13.36
		PM _{2.5}	3.50E-03	gr/dscf	Baghouse Vendor Data	---	3.05	13.36

^(a) Potential Emissions are calculated under the following parameters:

Parameter	Value	Unit
Operating Hours	8,760	hr/yr
Conversion	2,000	lb/ton
Grains/Pounds Conversion	7,000	grain/lb

^(b) Baghouse Vendor Data

Source	Vendor	Model Number	Grain Loading	Grain Loading Units	Flow Rate
ALL	Nueman and Esser Process (NEA) Technology	CF 3200	3.50E-03	gr/dscf	4,238

^(d) PM emissions factors are for controlled emissions and calculated using the baghouse maximum grain loading and maximum air flow rate: (emissions factor) * (flow rate)/(grains per pound) * 60

Table A-4
Agglomerators Potential to Emit
Novonik - Enterprise South Facility - Chattanooga, TN

Source	No. of Sources	Pollutant	Emissions Factor ^(d)	Unit	Emissions Factor Reference ^(e)	Control Efficiency (%)	Total Controlled Potential Emissions ^(f)
Agglomerator ^(b)	6	CO ^(d)	3.63	lb/ton pet coke	Conservatively assumed equal to Calcliner emissions.	99.00%	0.24
		H ₂ S ^(d)	0.09	lb/ton pet coke	Conservatively assumed equal to Calcliner emissions.	99.95%	2.99E-04
		HCl ^(d)	1.27	lb/ton pet coke	Conservatively assumed equal to Calcliner emissions.	99.90%	8.37E-03
		PM	3.50E-03	gr/dscf	Baghouse Vendor Data ⁽ⁱ⁾	—	0.04
		PM ₁₀	3.50E-03	gr/dscf	Baghouse Vendor Data ⁽ⁱ⁾	—	0.04
		PM _{2.5}	3.50E-03	gr/dscf	Baghouse Vendor Data ⁽ⁱ⁾	—	0.04
		NO _x	9.07E-03	lb/ton pet coke	Conservatively assumed equal to Calcliner emissions.	—	0.06
		SO ₂ ^(d)	1.00	lb/ton pet coke	Conservatively assumed equal to Calcliner emissions.	92.36%	0.50
		VOC ^(d)	20.96	lb/ton pet coke	Conservatively assumed equal to Calcliner emissions.	99.00%	1.38
							6.06

^(b) Potential Emissions are calculated under the following parameters:

Parameter	Value	Unit
Operating Hours	8,760	hr/yr
Conversion	2,000	lb/ton
Throughput (pet coke)	2,200	lb/hr
Grain/Pounds Conversion	7,000	gr/lb/lb
Kg/Lb Conversion	0.45	kg/lb

^(c) Baghouse Vendor Data

Source	Vendor	Model Number	Grain Loading	Grain Loading Units	Flow Rate	Flow Rates Units
Agglomerators	The Young Industries	VC 24-1336	3.50E-03	gr/dscf	220	dscfm

^(d) PM emissions factors are for controlled emissions and calculated using the baghouse maximum grain loading and maximum air flow rate. (Emissions factor) * (flow rate) / (grains per pound) * 60. NO_x emissions factors are also for controlled emissions.

^(e) Control efficiency based on the direct-fired thermal oxidizer.

^(f) Control efficiency based on the iron oxide scrubber testing 8/13/24.

^(g) Conservative estimate that PM=PM₁₀=PM_{2.5}

^(h) SO₂ Control Efficiency Calculation, based on 8/13/24 testing at a throughput of 103 lb/hr

Inlet Concentration (lb/hr)	Outlet Concentration (lb/hr)	Control Efficiency (%)
0.011	8.40E-04	92.36%

⁽ⁱ⁾ Emissions from the agglomerators are needed to a direct-fired thermal oxidizer. Emissions from the direct-fired thermal oxidizer supplemental fuel combustions are accounted for in the calciner's emissions.

Table A-5
Caldriers Potential to Emit
Novonix - Enterprise South Facility - Chattanooga, TN

Source	No. of Sources	Pollutant	Emissions Factor ^(d)	Unit	Emissions Factor Reference ^(a)	Control Efficiency (%)	Total Controlled Potential Emissions ^(a) lb/hr	Total Controlled Potential Emissions ^(a) tpy
Caldrier	6	CO ^(d)	3.63	lb/ton pet coke	Stack Test conducted on 8/13/24	99.00%	0.24	1.05
		H ₂ S ^(d)	0.09	lb/ton pet coke	Stack Test conducted on 8/13/24	99.95%	2.99E-04	1.31E-03
		HCN ^(d)	1.27	lb/ton pet coke	Stack Test conducted on 8/13/24	99.90%	8.37E-03	0.04
		PM	3.50E-03	g/dscf	Baghouse Vendor Data ^(f)	--	0.04	0.17
		PM ₁₀	3.50E-03	g/dscf	Baghouse Vendor Data ^(f)	--	0.04	0.17
		PM _{2.5}	3.50E-03	g/dscf	Baghouse Vendor Data ^(f)	--	0.04	0.17
Thermal Oxidizer	1	NO _x	9.07E-03	lb/ton pet coke	Stack Test conducted on 8/13/24	--	0.06	0.26
		SO ₂ ^(d)	1.00	lb/ton pet coke	Stack Test conducted on 8/13/24	92.36%	0.50	2.20
		VOC ^(d)	20.96	lb/ton pet coke	Stack Test conducted on 8/13/24	99.00%	1.38	6.06
		CO	84.00	lb/MMscf	AP-42, Table 1.4-1	--	0.02	0.11
		NO _x	100.00	lb/MMscf	AP-42, Table 1.4-1	--	0.03	0.13
		PM	7.60	lb/MMscf	AP-42, Table 1.4-2	--	2.17E-03	9.51E-03
		PM ₁₀	7.60	lb/MMscf	AP-42, Table 1.4-2	--	2.17E-03	9.51E-03
		PM _{2.5}	7.60	lb/MMscf	AP-42, Table 1.4-2	--	2.17E-03	9.51E-03
		SO ₂	0.60	lb/MMscf	AP-42, Table 1.4-2	--	1.71E-04	7.51E-04
		VOC	5.50	lb/MMscf	AP-42, Table 1.4-2	--	1.57E-03	6.88E-03
		Lead	5.00E-04	lb/MMscf	AP-42, Table 1.4-2	--	1.43E-07	6.26E-07

^(a) Potential Emissions are calculated under the following parameters:

Parameter	Value	Unit
Operating Hours	8,760	hr/yr
Ton/Pounds Conversion	2,000	lb/ton
Throughput (pet coke)	2,200	lb/hr
Grains/Pounds Conversion	7,000	grain/lb
Thermal Oxidizer NG Usage	4.76	scfm
Kg/Lb Conversion	0.45	kg/lb

^(b) Baghouse Vendor Data

Source	Vendor	Model Number	Grain Loading	Grain Loading Units	Flow Rate	Flow Rates Units
Caldriers	The Young Industries	VC 24-15-36	3.50E-03	g/dscf	220	dscfm

^(c) PM emissions factors are for controlled emissions and calculated using the baghouse maximum grain loading and maximum air flow rate: (emissions factor) * (flow rate) / (grains per pound) * 60. NO_x emissions factors are also for controlled emissions.

^(d) Control efficiency based on the direct-fired thermal oxidizer.

^(e) Control efficiency based on the iron oxide scrubber testing 8/13/24.

^(f) Conservative estimate that PM₁₀=PM_{2.5}=PM_{2.5}

^(g) SO₂ Control Efficiency Calculation, based on 8/13/24 testing at a throughput of 10 kg/hr

Inlet Concentration (lb/hr)	Outlet Concentration (lb/hr)	Control Efficiency (%)
0.011	8.40E-04	92.36%

Table A-6
Crushers Potential to Emit
Novonix - Enterprise South Facility - Chattanooga, TN

Source	No. of Sources	Pollutant	Emissions Factors ^(d)	Unit	Emissions Factor Reference ^(b)	Control Efficiency (%)	Total Controlled Potential Emissions ^(a)
Primary and Secondary Crushers	4	PM	3.50E-03	gr/dscf	Baghouse Vendor Data	—	lb/hr
		PM ₁₀	3.50E-03	gr/dscf	Baghouse Vendor Data	—	0.40
		PM _{2.5}	3.50E-03	gr/dscf	Baghouse Vendor Data	—	0.40

^(a) Potential Emissions are calculated under the following parameters:

Parameter	Value	Unit
Operating hours	8,760	hours/year
Ton/Pound Conversion	2,000	lb/ton
Grain/Pounds Conversion	7,000	grain/lb

^(b) Baghouse Vendor Data

Source	Vendor	Model Number	Grain Loading	Grain Loading Units	Flow Rate	Flow Rates Units
Primary and Secondary Crushers	The Young Industries	VC 72-52-68	3.50E-03	gr/dscf	3.345	dscfm

^(d) PM emissions factors are for controlled emissions and calculated using the baghouse maximum grain loading and maximum air flow rate: (emissions factor) * (flow rate) / (grains per pound) * 60

Table A-7
Finishing Operations Potential to Emit
Novonix - Enterprise South Facility - Chattanooga, TN

Source	No. of Sources	Pollutant	Emissions Factors ^(d)	Units	Emissions Factor Reference ^(b)	Control Efficiency (%)	Total Controlled Potential Emissions ^(a)
Sieving	15	PM	3.50E-03	gr/dscf	Baghouse Vendor Data	--	lb/hr
		PM ₁₀	3.50E-03	gr/dscf	Baghouse Vendor Data	--	tpy
		PM _{2.5}	3.50E-03	gr/dscf	Baghouse Vendor Data	--	0.43
Blending	3	PM	3.50E-03	gr/dscf	Baghouse Vendor Data	--	0.43
		PM ₁₀	3.50E-03	gr/dscf	Baghouse Vendor Data	--	0.09
		PM _{2.5}	3.50E-03	gr/dscf	Baghouse Vendor Data	--	0.09

^(a) Potential Emissions are calculated under the following parameters:

Parameter	Value	Unit
Operating Hours	8,760	hr/yr
Conversion	2,000	lb/ton
Grains/Pounds Conversion	7,000	grain/lb

^(b) Baghouse Vendor Data

Source	Vendor	Model Number	Grain Loading	Grain Loading Units	Flow Rate	Flow Rates Units
ALL	The Young Industries	VC 24-12-36	3.50E-03	gr/dscf	220	dscfm

^(d) PM emissions factors are for controlled emissions and calculated using the baghouse maximum grain loading and maximum air flow rate: (emissions factor) * (flow rate) / (grains per pound) * 60

Table A-8
Screeners Potential to Emit
Novonik - Enterprise South Facility - Chattanooga, TN

Source	No. of Sources	Pollutant	Emissions Factor	Unit	Emissions Factor Reference ^{(b)(6)}	Control Efficiency (%)	Total Controlled Potential Emissions	
Screener	2	PM	3.50E-03	gr/dscf	Baghouse Vendor Data	—	lb/hr	tpy
		PM ₁₀	3.50E-03	gr/dscf	Baghouse Vendor Data	—	0.25	1.11
		PM _{2.5}	3.50E-03	gr/dscf	Baghouse Vendor Data	—	0.25	1.11

^(a) Potential Emissions are calculated under the following parameters:

Parameter	Value	Unit
Operating Hours	8,750	hr/yr
Conversion	2,000	lb/ton
Throughput (net coke)	1,640	lb/hr
Grains/Pounds Conversion	7,000	grain/lb

^(b) Baghouse Vendor Data

Source	Vendor	Model Number	Grain Loading	Grain Loading Units	Flow Rate	Flow Rates Units
ALL	The Young Industries	VC 96-76-82	3.50E-03	gr/dscf	4.229	dscfm

^(c) PM emissions factors are for controlled emissions and calculated using the baghouse maximum grain loading and maximum air flow rate: (emissions factor) * (flow rate) / (grains per pound) * 60

PROCESS EQUIPMENT APPLICATION

FORM E010
07/2000

1. **Name of Company** (as shown on Line 1, Form E001): Novonix Enterprise South, LLC (NES)
2. **Equipment Name** (as shown on Line 10, Form E001): Electric Induction Crucible Furnaces (G3a-Mk5) 1-3060
3. **Installation Date:** 1/1/26 4. **Type of Process:** Furnace processing graphite
5. **Major Raw Materials Used:** Calcined Petroleum Coke, Argon, and Nitrogen Gas
6. **Process Weight:** 176 per furnace Pounds per hour
This is the total weight of all materials introduced into the process.

7. **Control Equipment**

- ☐ Emissions Uncontrolled ☒ Baghouse (File Form E102)
- ☐ Wet Collecting Device (File Form E103) ☐ Inertial Separators (File Form E105)
- ☐ Electrostatic Precipitator (File Form E104) ☒ Other – Specify: Dry Iron Oxide Scrubber, Regenerative Catalytic Oxidizer

8. **Control Efficiency**

Enter the control efficiency for each pollutant emitted by this equipment (for appropriate Forms E102, E103, E104, E105, E107, or enter zeros if the emissions are uncontrolled as noted in Item 7.

Pollutant	% Efficiency
Particulates	99.90
SO _x	92.36
NO _x	N/A
CO	98.00
VOC	N/A
Other: HCN, H2S	99.95, 99.98

9. **Emissions Summary**

Enter the amount of each pollutant listed in pounds per hour. See attached Table A-1. All values are per furnace.

Pollutant	Uncontrolled Emissions (File Form E106)	Actual Emissions (Stack Test Report)	Estimated Emissions (See Formula A)
Total Suspended Particulate			0.07 0.00018
PM10			0.07 0.000088
Sulfur Oxides			10.78 0.165
Nitrogen Oxides (as NO ₂)			1.00E-03 0.000025
VOC			0.22 0.0053
HCN			7.04E-03 0.00019
H2S			1.38E-03 0.000043
CO			0.43 0.011

Formula A: Estimated Emissions = $\frac{(100\% - \text{Control Efficiency (\%)})}{100\%}$ X Uncontrolled Emissions

10.

☐ Odors ☐ Eye Irritations ☐ Property Damage ☐ Health Effects

☐ Other nuisances outside of plant property ☒ No environmental damage

11.

Stack Height (emission point) above ground:	<u>20</u>	Ft.	Volume of gas discharged into atmosphere:	<u>216</u>	cfm
Ground Elevation above sea level at stack base:	<u>657</u>	Ft.	Gas exit temperature:	<u>ambient</u>	°F
Stack Diameter:	<u>0.25</u>	Ft.			

12.

Daily: 24 hours Weekly: 7 Days Yearly: 52 Weeks

2

AIR POLLUTION CONTROL EQUIPMENT DATA - BAGHOUSE

FORM E102
01/2001

1. **Name of Company:** Novonix Enterprise South, LLC (NES)
As shown on Line 1 of Form E001

2. **Name of Equipment:** Electric Induction Crucible Furnaces (G3a-Mk5) 1-3060
As shown on Line 9 of Form E001

3. **Equipment Data:**

Manufacturer of Baghouse: The Young Industries

Model Number: HW36-9 Cost of Baghouse: _____

Date of Manufacture: _____ Date of Installation: 1/1/26

Pre-cleaning Equipment ☒ No ☐ Yes _____
If yes, what type (File appropriate form for control equipment)

Volume of gas discharged from baghouse at dry standard conditions: 60 dscfm

Total cloth area of baghouse: 122 ft²

Air to cloth ratio: 1.50:1 $\frac{\text{Ft}}{\text{Min}}$ (Divide volume of gas discharged by total cloth area)

4. **Pressure Drop Across Baghouse:**

Stated by manufacturer: 2-4 Inches of H₂O

Measured (actual): _____ Inches of H₂O

Calculated: _____ X _____ = _____ Inches of H₂O
(K Factor) Air to cloth ratio in ft/min

The recommended pressure drop range in inches of H₂O is 1.5 (minimum) to 8.0 (maximum).

If the measured or calculated pressure drop falls outside the recommended range, contact the Chattanooga-Hamilton County Air Pollution Control Bureau.

5. **Filter Data:**

Type of fabric filters used in baghouse: spun found 16 oz polyester ePTFE felt

Operating temperature: 0-120 °F 100 °F 225 °F
Manufacturer's Recommended Normal Maximum

If the maximum operating temperature exceeds the recommended operating temperature, contact the Chattanooga-Hamilton County Air Pollution Control Bureau.

6. **Baghouse Components:**
Check all that apply.

☐ Flow rate instrumentation ☐ Inlet gas temperature instrumentation ☐ Evaporative Cooler

☐ Dew point indicator ☒ Differential pressure instrumentation ☒ Other (Describe)
High Pressure Gauge; Pulse Timer; Solenoid valves, Diaphragm valves

☐ Heat Exchanger ☐ Transmissometer

7. **Baghouse Operation:**

☒ Continuous ☐ Intermittent

12. **Control Efficiency:**

Manufacturer's Stated Efficiency: 95.00-99.90 %

Required Efficiency: _____ %

Operational Efficiency (performance testing): _____ %

Size	0-5 μ	5-10 μ	10-20 μ	20-44 μ	Greater than 44 μ
% by weight					

13. **Fan Data:** No fan: air flow is from pressurized argon/nitrogen

Fan Location: ☐ Clean air side (pull through) ☒ Dirty air side (push through)

Fan Design (check one - A, B, or C):

Fan Type:	Blade Type:
A. ☐ Centrifugal (radial flow)	☐ Forward Curve ☐ Backward Curve ☐ Straight
B. ☐ Axial-flow (propeller)	☐ Propeller ☐ Tube Axial ☐ Vane Axial

Fan Properties:

Diameter: N/A Inches Braking Horsepower: N/A BHP

Speed: N/A RPM Inlet Area: N/A Ft²

Volume: 30.00 Cfm @ STP Outlet Area: N/A Ft²

Static Pressure: 4.00 Inches WC Motor Horsepower: N/A HP

☐ Standard ☐ Heavy Duty Submitted copy of Manufacturer's Multirating Tables ☐ Yes ☐ No

Special Construction Materials:

☐ Bronze Alloys ☐ Aluminum ☐ Stainless Steel ☐ Bisonite

☐ Zinc Chromate Primer ☐ Rubber, Phenolics, Vinyls, or Epoxy Covering

C. ☐ Compressor ☐ Positive Displacement ☐ Dynamic ☐ Reciprocating

*This is to certify that I am familiar with the operations concerning this equipment and that the information provided on this application is true and complete to the best of my knowledge. **This form must be completely filled out before it will be processed.***

Mail to:
CHATTANOOGA-HAMILTON
COUNTY AIR POLLUTION
CONTROL BUREAU
2034 Hamilton Place Blvd., Suite 300
Chattanooga, TN 37421

Company Official: See signature page.
Signature

Title: Environmental Engineer

Date: 2/4/25

Do not write below this line.

Engineer Approval Permit Number: _____

Special Notations: _____

ADSORBER SYSTEM APPLICATION

(This form must be accompanied by Form E001, E010, E011, E012, E013 or E104 if not already submitted for this equipment.)

FORM E108
07/2001

1. Name of Company: Novonix Enterprise South, LLC (NES)
(As shown on Line 1 of Form E001)
2. Name of Equipment: Electric Induction Crucible Furnaces (G3a-Mk5) 1-3060
(As shown on Line 9 of Form E001)
3. Control Equipment Name: Iron oxide sulfur trap dry scrubber (one active scrubber per furnace)

4. Control Equipment Data: Pollutant data provided pertains to individual scrubber

A. Equipment Data:

Name of Manufacturer: King Industries (sulfur trap vessel), Chemical Products Industries (adsorbent material)

Model Number: A16-XXXMEC-XXXX Cost of Equipment: \$32,000

Date of Manufacture: _____ Date of Installation: 1/1/26

B. Pollutant Data:

List of contaminants to be removed and the corresponding concentrations.

Pollutant	Concentration (ppm at Standard Conditions)
H ₂ S	935 ppmvd
HCN	3.013 ppmvd
SO ₂	281.5 ppmvd

C. Carrier Gas Data:

a. The carrier gas is: ☐ Air ☒ Other (specify): inert gas

b. Vapor concentration: ☐ Above Upper Explosive Limit ☐ Within Lower and Upper Explosive Limits*
☐ Below Lower Explosive Limit ☐ Not Flammable

c. Gas Stream Conditions: Temperature: ambient °F Pressure: _____ Inches Hg
Moisture Content: _____ %

** If within the lower and upper explosive limits, explosion proof pumps, fans, etc. should be considered.*

D. Emissions data determined by: ☒ Stack Test (submit report) ☐ Calculation (submit copy)

5. Process Data:

A. Volume of gas to be treated: 36 CFM @ STP

B. Velocity of gas to be treated: _____ FPM @ STP

C. Duct diameter: _____ Ft

D. Process Operation: ☒ Continuous ☐ Intermittent ☐ Periodic

E. Operating Time: Daily: 24 Hours/day
Weekly: 7 Days/week
Yearly: 52 Weeks/year

6. Adsorption System Data:

A. The system is: ☐ Regenerative ☒ Non-regenerative ☒ Single Pass
☐ Multi Pass ☐ Thin Bed ☐ Thick Bed

B. Adsorbent data:
☐ Activated Carbon – mesh size: _____
☐ Hydrous Oxides (Specify): _____ - mesh size: _____
☐ Metallics (Specify): _____ - mesh size: _____
☒ Other (Specify): _____ - mesh size: Iron oxide

C. If adsorbent is to be chemically impregnated to act as a catalyst or chemisorbent, give details:

7. Adsorbent System Variables:

A. Bed Depth: 48 Inches Bed Area: 4.75 Ft²
B. Packing Density: 53 Lbs/ft³
C. Total Charge per System: 973 Lbs
D. Temperature of Adsorbent: ambient °F *All adsorption reactions are exothermic – give maximum working temperature.*
E. Pressure Drop through Bed: _____ Inches Water _____ Inches Hg
F. Capacity of Adsorbent: _____ *In weight capacity/weight adsorbent at working temperature and air contaminant concentration.*
G. Estimated Life of Adsorbent to Breakthrough: 672 hours *Submit supporting data from manufacturer.*
H. Air Flow Rate through Bed: 36 CFM

8. Regenerative Systems: N/A

A. Number of Adsorbers in System: _____
B. Time required for Regeneration Cycle: _____
C. If steam is used to regenerate, indicate the steam ratio to solvent: _____
D. Capacity of Working Charge: _____
E. List all equipment to be used for recovery system: _____

9. Control Efficiency:

Specify Pollutant	Efficiency %
H ₂ S	99.98
HCN	99.96
SO ₂	92.36

10. Drawings of all equipment should be submitted with each application.

This is to certify that I am familiar with the operations concerning this equipment and that the information provided on this application is true and correct to the best of my knowledge. This form must be completely filled out before it will be acceptable.

Mail to:
CHATTANOOGA-HAMILTON COUNTY
AIR POLLUTION CONTROL BUREAU
2034 Hamilton Place Blvd. Suite 300
Chattanooga, TN 37421

Company Official: See signature page.
Signature
Title: Environmental Engineer
Date: 2/4/25

DO NOT WRITE BELOW THIS LINE

Engineer Approval

This form corresponds to permit number: _____

AFTERBURNER APPLICATION
(THERMAL AND CATALYTIC)

FORM E109
07/2001

1. Name of Company: Novonix Enterprise South, LLC (NES)
(As shown on Line 1, Form E001)
2. Name of Equipment: Electric Induction Crucible Furnaces (G3a-Mk5) 1-3060
(As shown on Line 10, Form E001)

3. Equipment Data:

Name of Manufacturer:	<u>TBD (catalytic oxidizer)</u>	Model Number:	<u>TBD</u>
Date of Manufacture:	<u>2025</u>	Date of Installation:	<u>1/1/26</u>

4. Emissions Data: **See attached Table A-1.**

A. Air Contaminant | Concentration (ppm or percent by volume at standard conditions)

B. Inlet Gas Properties:

	Maximum	Minimum	Average	
Temperature:				°F
Pressure				In. H ₂ O
Moisture:				%
Gas Volume:			340	Ft ³
Gas Velocity in Duct:				Ft/min.

C. This data was determined by: ☐ Source Test (Submit report) ☐ Estimation (File Form E106)
☒ Other (Specify): Manufacturer's Specifications

5. Afterburner Data:

A. ☒ Thermal Afterburner

a. Check All That Apply: ☒ Gas-fired ☐ Oil-Fired ☐ Nozzle-Mixing Premixing
☐ Multi-port ☐ Mixing Plate ☐ Other (Specify):

b. Operating Parameters:

	Maximum	Minimum	Average	
Operating Temperature:				°F
Retention Time:		1		Sec
Gas Exit Temperature:				°F

c. Heat Recovery Unit: ☐ Yes ☒ No
If yes, what type?

B. ☒ Catalytic Afterburner

a. Describe Catalyst and Substrate: TBD

b. Estimated Catalyst Life: TBD Hrs

3 regenerative catalytic oxidizers (1 per 20 furnaces) Page 1 of 2

6. Afterburner Efficiency:

A. Stated by Manufacturer: >99.00 %

B. Estimated (Attach Calc.): _____ %

C. Actual (Source Test-attach report): _____ %

7. Instrumentation Data:

Describe temperature sensory devices and their operating parameters:

N/A

8. Auxiliary Fuel Data:

A. Type of Auxiliary Fuel: Natural Gas

B. Auxiliary Fuel Usage: Maximum 642.83 Minimum 40.17 Average _____ Ft³/hr or gal/hr

9. **Submit drawings of all equipment with each application.**

*This is to certify that I am familiar with the operations concerning this equipment and that the information provided on this application is true and complete to the best of my knowledge. **This form must be completely filled out before it will be acceptable.***

Mail to:
CHATTANOOGA-HAMILTON COUNTY
AIR POLLUTION CONTROL BUREAU
.....
Chattanooga, TN

Company Official: See signature page.

Title: Environmental Engineer

Date: 2/4/25

DO NOT WRITE BELOW THIS LINE

_____ Engineer Approval This form corresponds to Permit Number: _____

Special Notations: _____
