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RECEIVED SEP 14 2023

September 12, 2023

Mr. J. Alan Frazier, P.E.  
Engineering Manager  
Chattanooga-Hamilton County Air Pollution Control Bureau  
6125 Preservation Drive  
Chattanooga, TN 37416-3740

*RE: Permit to Install – G2O Technologies, LLC*

Dear Mr. Frazier:

G2O Technologies, LLC (G2O) operates an aluminum-based component chemical products production facility (the Facility) located at 751 Pineville Road, Chattanooga, Hamilton County, Tennessee 37405. The Facility is a synthetic minor source with respect to the federal Title V Operating Permit Program. G2O operates under minor source certificates of operation (COO) No. 0080-30199999-02C and 0080-30300001-04C issued by the Chattanooga/Hamilton County Air Pollution Control Bureau (APCB). Permitted operations at the facility include two soda ash storage silos (Silo #2 & #3), and one liquid alum reactor.<sup>1</sup>

G2O is submitting this air permit application for the addition of two glass-lined reactors, one HCl storage tank, one natural gas fired boiler, and one cooling tower. Emissions from the two glass-lined reactors and the HCl storage tank will be routed to a wet scrubber at the facility, which is included as part of this application.

The Facility will remain a synthetic minor source following the addition of the equipment. This application includes the project description, emissions calculations methodology, detailed regulatory review, process flow diagram, and equipment specifications.

## **EMISSIONS CALCULATIONS**

Silos #2 & #3 are sources of particulate matter (PM). Emissions for the existing Silo #2 & #3 are based §4-41 Rule 26.11 (PM, RACT) and Rule 27.1 (PM, BACT) of the Chattanooga Air Pollution Control Ordinance (the Ordinance). An appropriate BACT limitation for the PM emissions from Silos #2 and #3 has been previously determined to be 0.010 gr/dscf, which is equal to ~0.09 lb/hr.

The liquid alum reactor is a source of PM and sulfuric acid. The reactor is subject to §4-41 Rule 26.10 (RACT) of the Ordinance. Rule 26.10 limits PM emissions to 0.250 gr/dscf, which is equal to 5.160 lbs/hr.

The proposed glass-lined reactors and HCl storage tank emissions will be tied into a wet scrubber and are sources of HCl and PM. It is anticipated that the PM emission and acid emissions will be

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<sup>1</sup> The two storage silos, Silo #2 and #3 are permitted under Certificate of Operation No. 0080-30300001-04C, and the liquid alum reactor is permitted under Certificate of Operation No. 0080-30199999-02C.

similar to the existing reactor and scrubber, so emissions were estimated based on historic stack testing results for the alum reactor.

The 11.7 MMBtu/hr natural gas boiler (Boiler #1) will be a source of criteria and HAP emissions from the combustion of natural gas. Emissions from Boiler #1 at the facility are calculated based on the heat input rating of the unit and emission factors from AP-42 Chapter 1.4, for Natural Gas Combustion. Annual potential emissions are calculated assuming 8,760 hours of operation per year.

The proposed cooling tower will be a source of PM emissions. The emissions from the cooling tower are based on the drift rate (%) for the cooling tower, maximum total dissolved solids, and the cooling tower circulating water flowrate (gal/hr). Annual emissions are calculated assuming 8,760 hours of operation per year.

Detailed emission calculations are provided in Appendix B. Table 1 contains the facility-wide potential emissions for the Chattanooga facility with the proposed changes.

**Table 1. Facility Wide Potential Emissions**

<b>Pollutants</b>	<b>Potential Emissions (tpy)</b>
PM	37.46
PM <sub>10</sub>	37.46
PM <sub>2.5</sub>	37.46
NO <sub>x</sub>	5.03
VOC	0.28
CO	4.23
SO <sub>2</sub>	0.03
CO <sub>2</sub> e	6,073
HCl	1.25E-01
Total HAP	0.32

## **REGULATORY APPLICABILITY**

This section documents the applicability determinations made for all Federal and State air quality regulations potentially applicable to the facility. The facility is subject to federal and local air regulatory programs. Federal permitting programs are discussed first, followed by Hamilton County's air permitting program. Federal permitting programs comprise requirements for construction of new sources or modification of existing sources (New Source Review) and for operation of major sources of air pollutants (Title V Air Operation Permit Program). NSR requires that construction of new emission sources or modifications to existing emission sources be evaluated when significant net emission increases result. Two distinct NSR permitting programs apply depending on whether the facility is located in an attainment or nonattainment area for a particular pollutant. Nonattainment NSR (NNSR) permitting is applicable for facilities located in nonattainment areas, while PSD permitting is applicable for facilities located in attainment areas.

The facility will be located in Hamilton County, which is designated by the EPA as “attainment” or “unclassifiable” with the National Ambient Air Quality Standards (NAAQS) for all criteria pollutants.<sup>2</sup> Therefore, the facility is not subject to NNSR permitting requirements for any criteria pollutants. Under PSD permitting rules, the major source threshold is 250 tpy unless the facility is listed specifically on the EPA list of 28. The facility is not one of the 28 named source categories; therefore, PSD major source applicability for the facility is triggered when the PTE of subject pollutants exceeds 250 tpy. Facility-wide potential emissions of all criteria pollutants are less than the major source thresholds. As shown in Appendix B, facility-wide potential emissions remain less than 250 tpy for all NSR pollutants. Therefore, the facility is classified as a minor source for PSD.

## **Federal Regulations**

This section outlines the federal applicability analysis. Both NSPS and NESHAP are evaluated.

### **New Source Performance Standards (NSPS)**

NSPS require new, modified, or reconstructed sources to control emissions to the level achievable by the best demonstrated technology as specified in the applicable provisions. Moreover, any source subject to an NSPS is also subject to the general provisions of Subpart A, except as noted. The only NSPS applicable to the new equipment is NSPS Dc. All other NSPS regulations were found to not apply.

#### ***NSPS Subpart Dc – Small Industrial-Commercial-Institutional Steam Generating Units***

NSPS Subpart Dc is applicable to each steam generating unit for which construction, modification, or reconstruction was commenced after June 9, 1989, and that has a maximum design heat input capacity of 100 MMBtu/hr or less, but greater than or equal to 10 MMBtu/hr. The proposed boiler is applicable to the regulation; however, the unit will only burn natural gas so only the following requirements are applicable:

- ▶ Commencement of construction notification (due 30 days after the start of construction)
- ▶ Start-up notification (due 15 days after start-up)
- ▶ Record fuel supplier certification and maintain fuel combustion records for the boiler

### **National Emission Standards for Hazardous Air Pollutants**

NESHAP are emission standards for HAP and are applicable to major and area sources of HAP. A HAP major source is defined as having potential emissions exceed 25 tpy for total HAP threshold and/or potential emissions exceed 10 tpy for any individual HAP. An area source is a source that is not a major source. Part 63 NESHAP allowable emission limits are established on the basis of a Maximum Achievable Control Technology (MACT) determination for a particular source category. NESHAP apply to sources in specifically regulated industrial source categories (CAA Section 112(d)) or on a case by case basis (Section 112(g)) for facilities not regulated as a specific industrial source type. The proposed facility will be considered an area source of HAP.

Besides Subpart A, for which applicability is determined if subject to a NESHAP, the only NESHAP that could potentially apply to the proposed units include NESHAP Q and JJJJJ. All other NESHAP regulations were found to not apply.

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<sup>2</sup> 40 CFR 81.310.

### ***NESHAP Subpart Q – Industrial Process Cooling Towers***

NESHAP Subpart Q establishes requirements for industrial process cooling towers that are operated with chromium-based water treatment chemicals and are either major sources or are integral parts of facilities that are major sources. The proposed cooling tower at the facility will not use chromium-based water treatment chemicals and is not a major source or a part of a major source as defined in §63.401. Therefore, the proposed facility is not subject to NESHAP Subpart Q.

### ***NESHAP Subpart JJJJJ – Area Source Boiler NESHAP***

Subpart JJJJJ applies to industrial, commercial, or institutional boilers that are located at an area source of HAPs. Per 40 CFR 63.11195, gas fired boilers are exempt from this subpart. The proposed boiler is natural gas fired. Therefore, the boiler will not be subject to NESHAP Subpart JJJJJ.

## **Hamilton County APCB Air Pollution Control Rules and Regulations**

The facility is permitted under the regulations contained in Chapter 4 of the Chattanooga City Code. APCB establishes regulations applicable at the emission unit level (source specific) and at the facility level (generally applicable). The following subsections provide further information on specific regulations pertinent to the facility and the proposed project.

### **§4-41 Rule 2-1 – NO<sub>x</sub> Emissions from Fuel Burning Equipment with Heat Input Greater than 250 MMBtu/hr**

This regulation limits NO<sub>x</sub> emissions from fuel-burning equipment with a design capacity of greater than 250 million British Thermal Units per hour (MMBtu/hr). The proposed boiler has a heat input of less than 250 MMBtu/hr. Therefore, this rule does not apply to the proposed boiler.

### **§4-41 Rule 2-4 – NO<sub>x</sub> Emissions from Any Source not Regulated by Other Rules**

This rule limits NO<sub>x</sub> emissions from all sources that are not regulated by Rule 2-1, 2-2, 2-3, 2-6, or 2-7. The boiler will be regulated by Rule 2-4 and will not have emissions for NO<sub>x</sub> in excess of 300 ppm.

### **§4-41 Rule 3-1 – General Facility Visible Emissions**

Rule 3-1 limits opacity from any air contaminant source to less than twenty percent (20%) for an aggregate of more than five (5) minutes in any one (1) hour or more than twenty (20) minutes in any 24-hour period. G2O will comply with this rule for all operations.

### **§4-41 Rule 4-8 – Installation Permit and Certificate of Operation**

Rule 4-8 establishes requirements for sources to submit an application for a certificate to install or operate unless otherwise exempted under Rule 4-56(c)(12). The proposed equipment is not exempt from receiving a certificate to install or operate.

### **§4-41 Rule 8-2 – PM Emissions from Fuel Burning Equipment**

Rule 8-2 of the Chattanooga City Code limits PM emissions from fuel burning equipment installed on or after January 1, 1973. Per Section 4-2, the definition of fuel burning equipment is as follows:

*Any equipment, device or contrivance used for the burning of any fuel, except refuse and all appurtenances thereto, including ducts, breechings, fly ash collecting equipment, fuel feeding equipment, ash removal equipment, combustion controls, stacks, chimneys, etc.,*

*used for indirect heating in which the material being heated is not contacted by and adds no substance to the products of combustion. Such equipment includes, but is not limited to, that used for heating water to boiling; raising steam or superheating steam; heating air as in warm air furnaces; furnishing process heat that is conducted through process vessel walls; and furnishing process heat indirectly through its transfer by fluids.*

The boiler does meet the definition of fuel burning equipment. Therefore, this rule does apply to the units.

**§4-41 Rule 10-1 – PM Emissions from Process Equipment**

Rule 10-1 establishes PM limits for process equipment that are not regulated by the fuel burning equipment rule (Rule 8). The two glass-lined reactors, HCl storage tank, and cooling tower will be subject and comply to this rule as the units will be installed after January 1, 1973.

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If you have any questions or comments about the information presented in this letter, please do not hesitate to reach out to Mr. Scott Davis at (423) 646-4550 or via email at [sdavis@usalco.com](mailto:sdavis@usalco.com).

Sincerely,

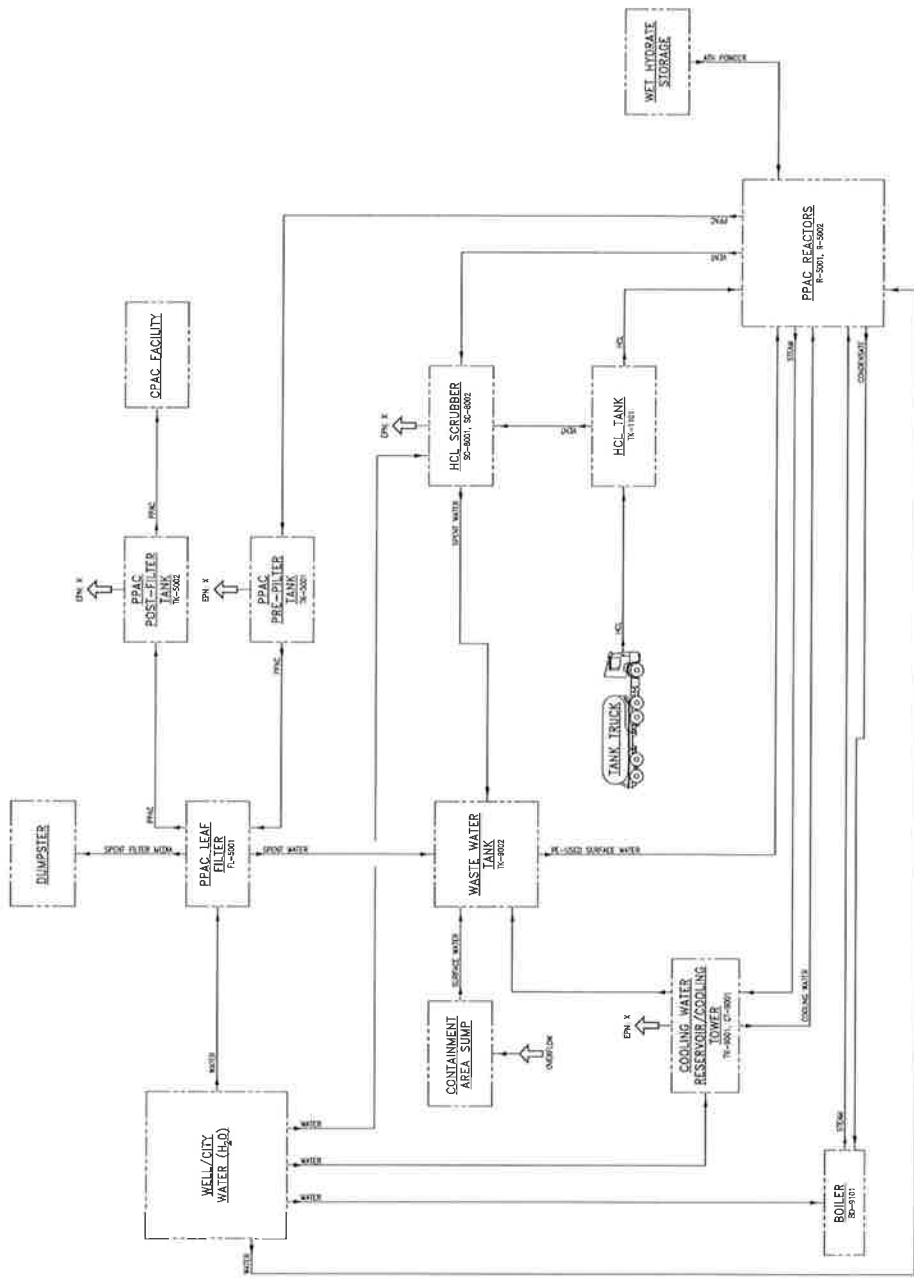
G2O Technologies, LLC



Scott Davis  
Plant Manager

Attachments

- cc: Mr. Chuck Clarke, USALCO, LLC
- Mr. Ian Smith, Trinity Consultants
- Mr. Tyler Wilcox, Trinity Consultants



PRELIMINARY  
ISSUED FOR REVIEW  
ONLY

CIVIL AND STRUCTURAL ENGINEERS INC.  
LAFAYETTE, LOUISIANA 70502  
STATE OF TEXAS FIRM # 8546



PROCESS FLOW DIAGRAM

DATE	BY	REV.
11 APR 21	21247-02-1000	△

NO.	DATE	DESCRIPTION
1	11 APR 21	ISSUED FOR CLARIFICATION

NO.	DATE	DESCRIPTION
1	11 APR 21	ISSUED FOR CLARIFICATION

NO.	DATE	DESCRIPTION
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NO.	DATE	DESCRIPTION
1	11 APR 21	ISSUED FOR CLARIFICATION

NO.	DATE	DESCRIPTION
1	11 APR 21	ISSUED FOR CLARIFICATION

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

FORM E001  
03/2011

1. Name of Company G2O Technologies, LLC  
*(If corporation or LLC, name on file with Tennessee Secretary of State Corporate Records Division)*
2. NAICS Code: 325998
3. Company Official to Contact: Scott Davis
4. Phone No. 423-267-1646
5. Mailing Address: 751 Pineville Road Chattanooga TN 37405  
*Street or P.O. Box City State Zip Code*
6. Physical Location  
(If different from line 5) 751 Pineville Road Chattanooga TN 37405  
*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.: \_\_\_\_\_

8. Type of equipment for which application is made:
- |   |   |  |
|---|---|--|
| <input checked="" type="checkbox"/> Process Equipment (Form E010 or Form E010A)   | <input type="checkbox"/> Previously Submitted | <input checked="" type="checkbox"/> Attached |
| <input type="checkbox"/> Fuel Burning Equipment (Form E011)   | <input type="checkbox"/> Previously Submitted | <input type="checkbox"/> Attached            |
| <input type="checkbox"/> Incineration Equipment (Form E012)   | <input type="checkbox"/> Previously Submitted | <input type="checkbox"/> Attached            |
| <input type="checkbox"/> Minor Pollution Source (Form E014)<br><i>(Less than 1000 lbs/yr and less than 10 lbs/day total uncontrolled contaminant emissions)</i> | <input type="checkbox"/> Previously Submitted | <input type="checkbox"/> Attached            |

The following forms are filed with this application:

Form E010 (HCL Storage Tank and Glass Lined Reactor #1&#2) & Form E103 (HCl Scrubber)

9. Equipment Name:  
Glass Lined Reactor #1, Glass Lined Reactor #2, and HCl Storage Tank controlled by a scrubber
10. If application is for a Certificate of Operation (Initial or Renewal), are there any changes since previous application in the equipment or operation which might:
- A. Increase, decrease, or alter process materials, fuel, refuse type, etc.?     Yes     No
- B. Increase, decrease, or alter emissions or emission points?     Yes     No
11. Process Weight, lb/hr, (Item 6 on Form E010), Incineration Rate, lb/hr, (Item 3C on Form E012), or Fuel Burning Rate, 1,000 Btu/hr, (Item 7C on Form E011): 3,125 lb/hr (HCl), 2,083 lb/hr (Hydrate), 2,083 lb/hr (Water) - Batch Process (1 batch/day, 24 hours/batch, 275 batches/yr)

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AIR POLLUTION  
CONTROL BUREAU

This is to certify that I am familiar with operations concerning this equipment and the information provided on this application is true and complete to the best of my knowledge:

Mail completed form to:  
CHATTANOOGA-HAMILTON COUNTY  
AIR POLLUTION CONTROL BUREAU  
6125 Preservation Drive, Suite 140  
Chattanooga, TN 37416-3638

Scott Davis SA  
Name  
Plant Manager  
Title  
9/13/2023  
Date

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

**PROCESS EQUIPMENT APPLICATION**

FORM E010  
07/2000

1. **Name of Company** (as shown on Line 1, Form E001): G2O Technologies, LLC
2. **Equipment Name** (as shown on Line 10, Form E001): Glass Lined Reactor #1 & #2, and HCl Storage Tank
3. **Installation Date:** TBD      4. **Type of Process:** Chemical Reaction
5. **Major Raw Materials Used:** Water, HCL, Hydrate

6. **Process Weight:** 3,125 (HCl), 2,083 (Hydrate), 2,083 (Water) - Batch Process      Pounds per hour  
 (1 batch/day, 24 hours/batch, 275 batches/yr)      +  
 This is the total weight of all materials introduced into the process.

**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: \_\_\_\_\_

**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%
SO <sub>x</sub>	
NO <sub>x</sub>	
CO	
Hydrocarbons	
Other: HCL	99%

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**Emissions Summary**

Enter the amount of each pollutant listed in pounds per hour.

Pollutant	Uncontrolled Emissions (File Form E106)	Actual Emissions (Stack Test Report)	Estimated Emissions (See Formula A)
Total Suspended Particulate	See Appendix B		
PM10			
Sulfur Oxides			
Nitrogen Oxides (as NO <sub>2</sub> )			
Other (specify)			

OR

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



10. **Environmental Impact**

Those emissions indicated in Item 9 may at times under normal operating conditions cause (check all that apply):

- Odors       Eye Irritations       Property Damage       Health Effects  
 Other nuisances outside of plant property       No environmental damage

11. **Emission Point Data**

Stack Height (emission point) above ground: 10 Ft.      Volume of gas discharged into atmosphere: 1,500 cfm  
Ground Elevation above sea level at stack base: TBD Ft.      Gas exit temperature: 180 °F  
Stack Diameter: 1 Ft.

12. **Ave. Operating \* Time**

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

\* Batch process with one batch taking 24 hours with a maximum of 1 batch/day, and 275 batches/yr.

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.

Scott Davis SDD  
Company Official

Plant Manager  
Title

9/13/2023  
Date

CHATTANOOGA-HAMILTON COUNTY  
AIR POLLUTION CONTROL BUREAU  
6125 Preservation Drive, Suite 140  
Chattanooga, TN 37416-3740

**AIR POLLUTION CONTROL EQUIPMENT DATA  
WET SCRUBBING DEVICE**

FORM E103  
01/2001

1. **Name of Company:** G2O Technologies, LLC  
*As shown on Line 1 of Form E001*
2. **Equipment Name:** HCl Scrubber (Control for Glass Lined Reactor #1, Glass Lined Reactor #2, and HCl Storage Tank)  
*As shown on Line 9 of Form E001*

**Equipment Data:**

Manufacturer of Wet Scrubber: Indusco (Manufacturer Specification Sheets are located in Appendix D)

Model Number: \_\_\_\_\_ Cost of Wet Scrubber: \_\_\_\_\_

Date of Manufacture: \_\_\_\_\_ Date of Installation: TBD

Pre-cleaning Equipment:  No  Yes  
*If yes, what type (File appropriate form for control equipment)*

Volume of gas discharged from wet scrubber at dry standard conditions: 1,500 dscfm

4. **Pressure Drop Across Wet Scrubber:**

Stated by the manufacturer: \_\_\_\_\_ Inches of H<sub>2</sub>O

Measured (Actual): \_\_\_\_\_ Inches of H<sub>2</sub>O

5. **Inlet Properties:**

Inlet Gas Temperature: _____ °F	Inlet Area: _____ Ft <sup>2</sup>
Inlet Gas Pressure: _____ Inches of H <sub>2</sub> O	Gas Viscosity: _____ Lbs/ft-sec.
Inlet Gas Velocity: _____ Ft/sec.	Moisture in Gas Stream: _____ %
Inlet Gas Density: _____ Lbs/ft <sup>3</sup>	Dew Point of Gas Stream: _____ °F

6. **Wet Scrubber Components:**

<input type="checkbox"/> Flow Rate Instrumentation	<input type="checkbox"/> Inlet Gas Temperature Instrumentation	<input type="checkbox"/> Heat Exchanger
<input type="checkbox"/> Transmissometer	<input type="checkbox"/> Differential Pressure Instrumentation	<input type="checkbox"/> Gas Preheater

7. **Wet Scrubber Type:**

<input type="checkbox"/> Spray Chamber	<input type="checkbox"/> Mechanical Scrubber	<input type="checkbox"/> Venturi Scrubber
<input type="checkbox"/> Packed Tower	<input type="checkbox"/> Centrifugal Scrubber	<input type="checkbox"/> Cyclonic Scrubber
<input type="checkbox"/> Variable Pressure Drop Orifice Scrubber	<input type="checkbox"/> Orifice Type Scrubber	
<input type="checkbox"/> Wet Impingement Collector	<input type="checkbox"/> Wet Filter	

8. **Wet Scrubber Operation:**  Continuous  Intermittent

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9. **Description of Scrubber:**

Volume of Scrubber: \_\_\_\_\_ Ft<sup>3</sup> Construction Material: \_\_\_\_\_

Shape of Scrubber:  Rectangular  Cylindrical  Other (Describe): \_\_\_\_\_

Dimensions of Scrubber: Length: \_\_\_\_\_ Ft Width: \_\_\_\_\_ Ft Height: \_\_\_\_\_ Ft

AIR POLLUTION  
CONTROL BUREAU

10. **Scrubbing Media Data:**  
 Water     Chemical Agent (Specify): \_\_\_\_\_  
 Purpose for Chemical Agent:     Surface Reactant     Neutralizing Agent     Wetting Agent  
     Other (Specify): \_\_\_\_\_  
 Liquid Consumption Rate: \_\_\_\_\_ Gallons per 1000 cfm of gas    Liquid Inlet Pressure: \_\_\_\_\_ Psi  
 Inlet Liquid Temperature: \_\_\_\_\_ °F Maximum    \_\_\_\_\_ °F Minimum

11. **Technical Data:** (Answer only the questions applicable to your equipment.)  
 Direction of Spray (to gas flow):     Normal     Parallel     Tangential  
 Type of Spray Nozzle:     Hollow Cone     Full/Solid Cone     Atomizing  
 Describe Impingement Plates: \_\_\_\_\_  
 Number of Impingement Plates: \_\_\_\_\_    Number of Holes per Impingement Plate: \_\_\_\_\_  
 Area of Each Impingement Plate: \_\_\_\_\_    Ave. Area of Each Opening through Plate: \_\_\_\_\_  
 Type of Packing (Describe): \_\_\_\_\_  
 Type of Mist Eliminator (Describe): \_\_\_\_\_

12. **Particle Size Distribution in Microns ( $\mu$ ):**  
 Particle Type(s): **See Appendix D**  

Size	0-5 $\mu$	5-10 $\mu$	10-20 $\mu$	20-44 $\mu$	Greater than 44 $\mu$
Give % by Weight					

13. **Sludge Disposal Method:**  
 Automatic     Manual     Other (Describe): \_\_\_\_\_  
 How often are hoppers emptied?    Every \_\_\_\_\_ Hours  
 Is a water clarification and recycling system used with this equipment?     Yes     No  
 Site of sludge disposal: \_\_\_\_\_

14. **Particulate Control Efficiency:**  
 Manufacturer's stated efficiency: 99 %    Required Efficiency: \_\_\_\_\_ %  
 Operation Efficiency (Performance Testing): \_\_\_\_\_ %  

Size	0-5 $\mu$	5-10 $\mu$	10-20 $\mu$	20-44 $\mu$	Greater than 44 $\mu$
Give % by Weight					

15.

<b>Fan Data:</b>	
Fan Location: <input checked="" type="checkbox"/> Clean air side (pull through) <input type="checkbox"/> Dirty air side (push through)	
Fan Design (Check one - A, B, or C):	
<b>Fan Type:</b>	<b>Blade Type:</b>
A. <input checked="" type="checkbox"/> Centrifugal (radial flow)	<input type="checkbox"/> Forward Curve <input checked="" type="checkbox"/> Backward Curve <input type="checkbox"/> Straight
B. <input type="checkbox"/> Axial-flow (propeller)	<input type="checkbox"/> Propeller <input type="checkbox"/> Tube Axial <input type="checkbox"/> Vane Axial
<b>Fan Properties:</b>	
Diameter: _____ Inches	Braking Horsepower: <u>5.45</u> BHP
Speed: <u>4,584</u> RPM	Inlet Area: <u>1.07</u> Ft <sup>2</sup>
Volume: <u>1,500</u> CFM @ STP	Outlet Area: <u>1.29</u> Ft <sup>2</sup>
Static Pressure: <u>11.94</u> Inches WC	Motor Horsepower: <u>7.5</u> HP
<input type="checkbox"/> Standard <input checked="" type="checkbox"/> Heavy Duty	Submitted copy of Manufacturer's Multirating Tables <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<b>Special Construction Materials:</b>	
<input type="checkbox"/> Bronze Alloys <input type="checkbox"/> Aluminum <input checked="" type="checkbox"/> Stainless Steel <input type="checkbox"/> Bisonite	
<input type="checkbox"/> Zinc Chromate Primer <input checked="" type="checkbox"/> Rubber, Phenolics, Vinyls, or Epoxy Coverings	
C. <input type="checkbox"/> Compressor	<input type="checkbox"/> Positive Displacement <input type="checkbox"/> Dynamic <input type="checkbox"/> 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  
 6125 Preservation Drive  
 Chattanooga, TN 37416

Company Official: Scott Davis JH De  
 Title: Plant Manager  
 Date: 9/13/2023

*Do not write below this line.*

\_\_\_\_\_ Engineer Approval      Permit Number: \_\_\_\_\_

Special Notations: \_\_\_\_\_  
 \_\_\_\_\_

# Section 1

## Design Conditions

One (1) INDUSCO Environmental Services Induced Draft Packed Bed Two-Stage HCl Scrubber System: Packed Column, Recycle Tank, Exhaust Stack, Recycle Pump, Fan, Instrumentation, Control Panel, Damper and Manufacturer Documentation Package.

The Scrubber System will be designed and manufactured to meet the following application conditions:

Design Condition	Value
Scrubber units	2
Vent gas rate, cfm	800 - 1500
HCl Removal with water	> 99.0%

## Section 2

### HCl Fume Scrubbers

**Tags: S-2-1, S-2-2**

Two (2) INDUSCO Environmental Services FRP Packed Column Scrubbers. Complete unit one piece construction. System is 21'-3" OAH, 20'-1" Air Outlet height, with 24" diameter packed bed tower, 4'-0" diameter x 4'-0" straight wall height recycle tank, and 1'-0" ID x 10'-0" H exhaust stack. Scrubber unit is fabricated of fiberglass reinforced plastic (FRP). Columns, tanks, and exhaust stacks to be constructed of DERAKANE 411 vinyl ester resin with interior Nexus veil corrosion barrier of at least 120 mils. Exterior to be UV protected with smooth gel coat finish. Units to include internal support rings/beams, FRP packing support plate, CPVC spray type liquid distributor with Teflon spray nozzles, polypropylene mesh pad demister assembly, polypropylene packing media (minimum 9'-0"), flanged air inlet, flanged air outlet, lifting and hold down lugs, all liquid connections are to be full face flanged nozzles ANSI-B 16.5 drilling standards (minimum 150 psi rated) with plate or conical gussets if less than 6" size, access manways (minimum two 20" manways per tower with FRP covers and one 20" manway for the sump basin).

**Literature Attached:**

Derakane 411 Data Sheet  
Resin Letter  
Nexus Polyester Surfacing Veil Datasheet  
Bete Nozzle Datasheet  
Packing Media Datasheet  
Demister Data and Cutsheet

POLLUTION ESTIMATION FORM

FORM E106  
01/2001

- 1. Name of Company: G2O Technologies, LLC  
*As shown on Line 1 of Form E001*
- 2. Equipment Name: Glass Lined Reactor #1, Glass Lined Reactor #2, and HCl Storage Tank controlled by a scrubber  
*As shown on Line 9 of Form E001*
- 3. Type of pollutant for which estimate is made: VOC

4. Pollution Emission Factor (PEF): See Appendix B  
*(Give value & units in lbs/ton, lbs/lb, lbs/gal, gr/ft<sup>3</sup>, etc.)*

Source of Emission Factor: See Appendix B

5. Uncontrolled Pollution Emission Rate:

See Appendix B      X      \_\_\_\_\_      =      \_\_\_\_\_  
*(PEF from Item 4)*      *(Give operating rate for this equipment and the appropriate units in either lbs/hr, tons/hr, gal/hr, or cfm)*      *(Give value & units)*

6. Uncontrolled Emission Rate: See Appendix B Pounds emitted per hour

*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 is processed.*

Mail to:  
CHATTANOOGA-HAMILTON COUNTY  
AIR POLLUTION CONTROL BUREAU  
6125 Preservation Drive  
Chattanooga, TN 37416

Company Official: Scott Davis SLD

Title: Plant Manager

Date: 9/13/2023

DO NOT WRITE BELOW THIS LINE

\_\_\_\_\_  
Engineer Approval

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This form corresponds to permit number: \_\_\_\_\_

Special Notations: \_\_\_\_\_

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**Table 1. Facility-Wide Potential Emissions**

Emission Unit	Pollutants (tpy)										
	PM	PM <sub>10</sub>	PM <sub>2.5</sub>	NO <sub>x</sub>	VOC	CO	SO <sub>2</sub>	CO <sub>2e</sub>	HCl	H <sub>2</sub> SO <sub>4</sub>	Total HAP
Silo #2 <sup>1</sup>	0.39	0.39	0.39	--	--	--	--	--	--	--	--
Silo #3 <sup>1</sup>	22.60	22.60	22.60	--	--	--	--	--	--	0.10	0.10
Liquid Alum Reactor <sup>2</sup>	14.08	14.08	14.08	--	--	--	--	--	0.13	--	0.13
HCl Scrubber (Glass Lined Reactor 1, HCl Storage Tank, Glass Lined Reactor 2)	0.38	0.38	0.38	5.03	0.28	4.23	0.03	6,073	--	--	9.50E-02
Boiler #1	1.32E-04	1.32E-04	1.32E-04	--	--	--	--	--	--	--	--
Cooling Tower	37.46	37.46	37.46	5.03	0.28	4.23	0.03	6,073	0.13	0.10	0.32
<b>Totals</b>	100	100	100	100	100	100	100	N/A	N/A	N/A	25
Title V Major Source Threshold	No	No	No	No	No	No	No	No	No	No	No
Title V Major Source?	250	250	250	250	250	250	250	N/A	N/A	N/A	N/A
PSD Major Source Threshold	No	No	No	No	No	No	No	No	No	No	No
PSD Major Source?											

1. Potential emissions for Silo #2 and Silo #3 are based on allowable emission limits in Certificate of Operation No. 0080-30300001-04C.

2. Potential emissions for the Alum Reactor are based on emission limits in Certificate of Operation No. 0080-30199999-02C.

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# G2O Technologies LLC

## Current Liquid Alum Reactor

Product: Polyaluminum Sulfate

Batch charge:

61,600 lb hydrated alumina

110,000 lb H<sub>2</sub>SO<sub>4</sub>

8 hr/batch

98% particulate control

95% H<sub>2</sub>SO<sub>4</sub> control

emissions for 3 hr/batch during charging

## 2 Proposed Glass Lined Reactors

Product: Polyaluminum Chloride

Batch charge:

25,000 lb hydrated alumina

37,500 lb HCl

24 hr/batch

99%+ particulate control

99% HCl control

emissions during charging, reactor sealed afterwards

## Particulate Matter (PM) Emissions:

Liquid alum reactor tested at 2.774 lb/hr (after control)

Each proposed reactor:

$$2.774 \frac{\text{lb PM}}{\text{hr}} \cdot 3 \frac{\text{hr}}{\text{batch}} \cdot \frac{1-0.99}{1-0.98} \cdot \frac{25,000 \text{ lb}}{61,600 \text{ lb}}$$

= 1.68872 lb PM/batch for each reactor (after control)

(Proposed BACT limit: 2.0 lb PM/batch for each reactor)

$$1.68872 \frac{\text{lb PM}}{\text{batch} \cdot \text{reactor}} \cdot 2 \text{ reactors} \cdot 1 \frac{\text{batch}}{\text{day}} \cdot 365 \frac{\text{days}}{\text{yr}}$$

$$\cdot \frac{1 \text{ ton}}{2,000 \text{ lb}} = \underline{0.616 \text{ ton PM/yr potential (after control)}}$$



HCl Emissions:

Liquid alum reactor tested at 0.023 lb H<sub>2</sub>SO<sub>4</sub>/hr (after control)

Each proposed reactor:

$$0.023 \frac{\text{lb H}_2\text{SO}_4}{\text{hr}} \cdot 3 \frac{\text{hr}}{\text{batch}} \cdot \frac{1-0.99}{1-0.95} \cdot \frac{37,500 \text{ lb HCl}}{110,000 \text{ lb H}_2\text{SO}_4}$$

= 0.0047045 lb HCl/batch for each reactor (after control)

(Proposed reasonable and proper limit:

0.01 lb HCl/batch for each reactor)

$$0.0047045 \frac{\text{lb HCl}}{\text{batch} \cdot \text{reactor}} \cdot 2 \text{ reactors} \cdot 1 \frac{\text{batch}}{\text{day}} \cdot 365 \frac{\text{days}}{\text{yr}}$$

$\cdot \frac{1 \text{ ton}}{2,000 \text{ lb}} = \underline{0.0017 \text{ ton HCl/yr potential (after control)}}$

HCl Storage Tank - HCl Emissions:

As calculated by Trinity Consultants using

AP-42 equations: 0.01137 ton HCl/yr potential  
(after control)

Total HCl Emissions: 0.0017  
+ 0.01137

0.013 ton HCl/yr

JLD  
9/15/23

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

FORM E001  
03/2011

1. Name of Company G2O Technologies, LLC  
*(If corporation or LLC, name on file with Tennessee Secretary of State Corporate Records Division)*
2. NAICS Code: 325998
3. Company Official to Contact: Scott Davis
4. Phone No. 423-267-1646
5. Mailing Address: 751 Pineville Road Chattanooga TN 37405  
*Street or P.O. Box City State Zip Code*
6. Physical Location  
(If different from line 5) 751 Pineville Road Chattanooga TN 37405  
*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.: \_\_\_\_\_

8. Type of equipment for which application is made:
- |   |   |  |
|---|---|--|
| <input type="checkbox"/> Process Equipment (Form E010 or Form E010A)  | <input type="checkbox"/> Previously Submitted | <input type="checkbox"/> Attached            |
| <input checked="" type="checkbox"/> Fuel Burning Equipment (Form E011)  | <input type="checkbox"/> Previously Submitted | <input checked="" type="checkbox"/> Attached |
| <input type="checkbox"/> Incineration Equipment (Form E012)   | <input type="checkbox"/> Previously Submitted | <input type="checkbox"/> Attached            |
| <input type="checkbox"/> Minor Pollution Source (Form E014)<br><i>(Less than 1000 lbs/yr and less than 10 lbs/day total uncontrolled contaminant emissions)</i> | <input type="checkbox"/> Previously Submitted | <input type="checkbox"/> Attached            |

The following forms are filed with this application:

Form E011 (Boiler #1)

9. Equipment Name:  
Boiler #1 - 11.7 MMBtu/hr

10. If application is for a Certificate of Operation (Initial or Renewal), are there any changes since previous application in the equipment or operation which might:

- A. Increase, decrease, or alter process materials, fuel, refuse type, etc.?     Yes     No
- B. Increase, decrease, or alter emissions or emission points?     Yes     No

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11. Process Weight, lb/hr, (Item 6 on Form E010), Incineration Rate, lb/hr, (Item 3C on Form E012), or Fuel Burning Rate, 1,000 Btu/hr, (Item 7C on Form E011): Boiler #1 (11.7 MMBtu/hr)

This is to certify that I am familiar with operations concerning this equipment and the information provided on this application is true and complete to the best of my knowledge:

Mail completed form to:  
CHATTANOOGA-HAMILTON COUNTY  
AIR POLLUTION CONTROL BUREAU  
6125 Preservation Drive, Suite 140  
Chattanooga, TN 37416-3638

Scott Davis [Signature]  
Name  
Plant Manager  
Title  
9/13/2023  
Date

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

**FUEL BURNING EQUIPMENT APPLICATION**

*A separate form must be filed for each stack or emission point.*

FORM E011

01/2001

1. **Name of Company:** G2O Technologies, LLC  
*As shown on Line 1 of Form E001*
  
2. **Equipment Name:** Boiler #1  
*As shown on Line 9 of Form E001*
  
3. **Stack Designation:** B01  
*If there is more than one stack at this location, provide a written or numeric designation to identify each stack.*

4. **Control Equipment Data:**

- |   |  |
|---|--|
| <input checked="" type="checkbox"/> Emissions Uncontrolled      | <input type="checkbox"/> Electrostatic Precipitator (File Form E104) |
| <input type="checkbox"/> Baghouse (File Form E102)              | <input type="checkbox"/> Inertial Separators (File Form E105)        |
| <input type="checkbox"/> Wet Collecting Device (File Form E103) | <input type="checkbox"/> Other (Specify):                            |

5. **Control Equipment Efficiency:**

*Enter the control equipment efficiency for each pollutant emitted by this equipment as determined on the appropriate Form E102, E103, E104, E105, E107, or enter zeros if "A" is checked in Item 4.*

	Pollutant	% Efficiency
	Particulates	
	PM <sub>10</sub>	
	SO <sub>x</sub>	
	NO <sub>x</sub>	
	CO	
	VOC	
Other:		

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6. **Emissions Estimation:**

*File Form E110 for each fuel used*

	<i>Fuel No.1</i>	<i>Fuel No.2</i>	<i>Fuel No.3</i>
--	------------------	------------------	------------------

Particulate Matter (Form E110, Item 6)	Uncontrolled	Lbs/hr	Lbs/hr	Lbs/hr	Lbs/hr
	Actual <sup>1</sup>	Lbs/hr	Lbs/hr	Lbs/hr	Lbs/hr
	Estimated <sup>2</sup>	Lbs/hr	Lbs/hr	Lbs/hr	Lbs/hr
SO <sub>x</sub> (Form E110, Item 7)	Uncontrolled	Lbs/hr	Lbs/hr	Lbs/hr	Lbs/hr
	Actual <sup>1</sup>	Lbs/hr	Lbs/hr	Lbs/hr	Lbs/hr
	Estimated <sup>2</sup>	Lbs/hr	Lbs/hr	Lbs/hr	Lbs/hr
PM <sub>10</sub>	Uncontrolled	Lbs/hr	Lbs/hr	Lbs/hr	Lbs/hr
	Actual <sup>1</sup>	Lbs/hr	Lbs/hr	Lbs/hr	Lbs/hr
	Estimated <sup>2</sup>	Lbs/hr	Lbs/hr	Lbs/hr	Lbs/hr
NO <sub>x</sub> (Form E110, Item 9E)	Uncontrolled	ppm	ppm	ppm	ppm
	Actual <sup>1</sup>	ppm	ppm	ppm	ppm
	Estimated <sup>2</sup>	ppm	ppm	ppm	ppm
Other Air Contaminants (Specify)	Uncontrolled	Lbs/hr	Lbs/hr	Lbs/hr	Lbs/hr
	Actual <sup>1</sup>	Lbs/hr	Lbs/hr	Lbs/hr	Lbs/hr
	Estimated <sup>2</sup>	Lbs/hr	Lbs/hr	Lbs/hr	Lbs/hr

1. *Submit stack test report with full details.*
2. *Estimate the emissions using the formula below*

$$\text{Estimated Emissions (lbs/hr, ppm)} = \frac{100\% - \text{Control Efficiency (\%)}}{100\%} \times \text{Uncontrolled Emissions}$$

Company Name: **G2O Technologies, LLC**

Equipment Name: **B01**

7. Equipment Data:

Manufacturer of Equipment: \_\_\_\_\_ Date of Installation: \_\_\_\_\_  
 Date of Manufacture: \_\_\_\_\_

Boiler No.	Fuel Type	Rated Capacity 10 <sup>6</sup> BTU/hr. Input	Type of Firing	Fuel Consumption		Percent Content		Heating Content of Fuel	(% Excess Air
				Ave.	Max.	Annual	Sulfur		
B01	Primary: Natural	11.7	Direct			100.62 MMCF	< 0.5%	1,020 Btu/CF	
	Normal Operating Fuel(s)								
	Standby: Fuel(s) used in emergency only								
	Primary: Natural								
	Normal Operating Fuel(s)								
	Standby: Fuel(s) used in emergency only								

- a. If more than one boiler per stack, list a separate code number to represent each individual boiler.
- b. List all fuels used.
- c. Give rated or maximum input capacity, whichever is greater.
- d. Specify the type of firing for each fuel used.
- e. Indicate consumption of each fuel used in tons/hr, gal/hr, or ft<sup>3</sup>/hr.
- f. Indicate annual consumption of each fuel used in tons/yr, gal/yr, or ft<sup>3</sup>/yr.
- g. The average sulfur and ash content of each fuel must be included – This information may be obtained from the fuel supplier.
- h. Indicate the heating content of each fuel in BTU/ton, BTU/gal, or BTU/ft<sup>3</sup> – This information may be obtained from the fuel supplier.

Space Heating	Process Heating	Other (Describe)
		100% - hot water generation for process heating

Percent (%) of Load Used

8. Emissions Impact:

Those emissions indicated in Item 6 that at times under normal operating conditions cause (check one or more):

- Odors
- Eye Irritations
- Property Damage
- Health Effects
- Other nuisances outside of plant property
- No environmental damage

9. Emission Point Data:

Stack Height (emission point) above ground:	TBD	Ft
Ground Elevation above sea level at stack base:	TBD	Ft
Stack Diameter:	TBD	Ft
Volume of gas discharged into atmosphere:	TBD	Cfm
Gas exit temperature:	TBD	°F

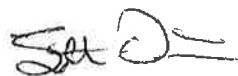
10. Average Equipment Operating Time:

Daily:	12	Hours
Weekly:	7	Days
Yearly:	52	Weeks

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  
6125 Preservation Drive  
Chattanooga, TN 37416

Company Official

Scott Davis 

Title

PLANT MANAGER

Date

9/13/03

Do not write below this line

Engineer Approval

Lbs/hr Allowable particulate emissions

Lbs/10<sup>6</sup> BTU allowable SO<sub>x</sub> emissions

ppm allowable NO<sub>x</sub> emissions

UTM Coordinate of Company: EW

NS

This form corresponds to permit number:

Special Notations:

**POLLUTION ESTIMATION FORM**  
(Fuel Burning Equipment)

FORM E110  
01/2002

1. Name of Company: G2O Technologies, LLC  
*(As shown on Line 1 of Form E001)*
2. Equipment Name: B01  
*(As shown on Line 10 of Form E001)*
3. Percent excess air used in fuel burning (make allowances for leaks around doors and other openings): \_\_\_\_\_
4. Type of Fuel (file Form E110 for each fuel used): Natural Gas

5. Source of Emission Factors: EPA AP-42, Section 1.4

6. Uncontrolled Particulate Emission Rate: See Appendix B of application

Particulate Emission Factor: \_\_\_\_\_  
(lbs/ton; lbs/10<sup>3</sup> gal; lbs/10<sup>6</sup> ft<sup>3</sup>)

\_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_ Lbs/hr  
 Maximum Fuel Consumption Rate      Particulate Emission      Uncontrolled Particulate Emission  
 (tons/hr; gal/hr; ft<sup>3</sup>/hr)                      Factor                      Rate

7. Uncontrolled Sulfur Oxide (SO<sub>x</sub>) Emission Rate: See Appendix B of application

SO<sub>x</sub> Emission Factor: \_\_\_\_\_  
Lbs/ton; lbs/10<sup>3</sup> gal; lbs/10<sup>6</sup> ft<sup>3</sup>

\_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_ Lbs/hr  
 Maximum Fuel Consumption Rate      SO<sub>x</sub> Emission Factor      Uncontrolled SO<sub>x</sub> Emission Rate  
 (tons/hr; gal/hr; ft<sup>3</sup>/hr)

8. Uncontrolled Hydrocarbon (HC) Emission Rate: See Appendix B of application

HC Emission Factor: \_\_\_\_\_  
Lbs/ton; lbs/10<sup>3</sup> gal; lbs/10<sup>6</sup> ft<sup>3</sup>

\_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_ Lbs/hr  
 Maximum Fuel Consumption Rate      HC Emission Factor      Uncontrolled HC Emission Rate  
 (tons/hr; gal/hr; ft<sup>3</sup>/hr)

9. Uncontrolled Nitrogen Oxides (NO<sub>x</sub>) Emission Rate: See Appendix B of application

A. NO<sub>x</sub> Emission Factor: \_\_\_\_\_  
Lbs/ton; lbs/10<sup>3</sup> gal; lbs/10<sup>6</sup> ft<sup>3</sup>

B. \_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_ Lbs/hr  
 Maximum Fuel Consumption Rate      NO<sub>x</sub> Emission Factor      Uncontrolled NO<sub>x</sub> Emission Rate  
 (tons/hr; gal/hr; ft<sup>3</sup>/hr)

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10. NO<sub>x</sub> Emission Rate in PPM by Volume at STP: (combined - five hot water boilers)

Cubic feet per hour (CFH) of Exhaust Gases at 15% Excess Air:

A. 
$$\frac{V}{\text{See Table A}} \times \frac{11.7}{\text{Maximum Fuel Consumption Rate } 10^6 \text{ BTU/hr}} = \frac{131,040}{\text{Exhaust Rate}} \text{ CFH}$$

B. 
$$\frac{1.15}{\text{Uncontrolled NO}_x \text{ (Item 9B)}} \text{ Lbs/hr} \div \frac{131,040}{\text{CFH of Exhaust Gas (Item 10A)}} = \frac{8.77 \times 10^{-6}}{\text{Lb/ft}^3 \text{ NO}_x}$$

C. 
$$\text{PPM} = (8.37 \times 10^6) \times \frac{8.77 \times 10^{-6}}{\text{Lb/ft}^3 \text{ NO}_x \text{ (Item 10B)}} = \frac{73.4}{\text{PPM at STP and 15\% Excess Air (NO}_x \text{ calculated as NO}_x)}$$

Table A	
Fuel	V
Bituminous Coal	11700
Fuel Oil	11400
Natural Gas	11200
Wood	12800

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**  
 6125 Preservation Drive  
 Chattanooga, TN 37416

Scott Davis JHD  
 Company Official

Plant Manager  
 Title

9/13/2023  
 Date

*Do Not Write Below This Line*

\_\_\_\_\_ Engineer Approval

This form corresponds to permit number: \_\_\_\_\_

Special Notations: \_\_\_\_\_  
 \_\_\_\_\_

**Table 2. Calculation Inputs - Boiler**

<b>Emission Units Information</b>	<b>Value</b>	<b>Units</b>
Maximum Heat Input Value <sup>1</sup>	11.7	MMBtu/hr
Natural Gas Heating Value Potential Operation	1,020 8,760	MMBtu/MMscf hr/yr

**Table 3. Criteria Pollutant and GHG Emissions - Boiler**

<b>Pollutant</b>	<b>Emission Factor<sup>2</sup> (lb/MMscf)</b>	<b>Potential Emissions</b>	
		<b>(lb/hr)</b>	<b>(tpy)</b>
NO <sub>x</sub>	100.00	1.15	5.03
CO	84.00	0.96	4.23
VOC	5.50	0.06	0.28
PM	7.60	0.09	0.38
PM <sub>10</sub> <sup>3</sup>	7.60	0.09	0.38
PM <sub>2.5</sub> <sup>3</sup>	7.60	0.09	0.38
SO <sub>2</sub>	0.60	6.89E-03	0.03
CO <sub>2</sub>	120,000	1,378	6,037
CH <sub>4</sub>	2.30	0.03	0.12
N <sub>2</sub> O	2.20	0.0	0.11
CO <sub>2</sub> e <sup>4</sup>	120,713	1,387	6,073

1. Maximum heat input rating based on manufacturer specifications.
2. Emission factors from AP-42 Chapter 1.4, Table 1.4-1 and Table 1.4-2 for Natural Gas Combustion.
3. PM<sub>10</sub> and PM<sub>2.5</sub> conservatively assumed to be equal to total PM emissions.
4. GWPs: CO<sub>2</sub> = 1, N<sub>2</sub>O = 298, CH<sub>4</sub> = 25, per 40 CFR 98 Subpart A (rule effective January 1, 2014).

**Table 4. HAP Emissions - Boiler**

Pollutant	Emission Factors <sup>1</sup> (lb/MMscf)	Potential Emissions	
		(lb/hr)	(tpy)
Benzene	2.10E-03	2.41E-05	1.06E-04
Formaldehyde	7.50E-02	8.61E-04	3.77E-03
Naphthalene	6.10E-04	7.01E-06	3.07E-05
Toluene	3.40E-03	3.91E-05	1.71E-04
Acenaphthene	1.80E-06	2.07E-08	9.06E-08
Acenaphthylene	1.80E-06	2.07E-08	9.06E-08
Anthracene	2.40E-06	2.76E-08	1.21E-07
Benz(a)anthracene	1.80E-06	2.07E-08	9.06E-08
Benzo(b,k)fluoranthene	1.80E-06	2.07E-08	9.06E-08
Chrysene	1.80E-06	2.07E-08	9.06E-08
Indeno(1,2,3-cd)pyrene	1.80E-06	2.07E-08	9.06E-08
Phenanthrene	1.70E-05	1.95E-07	8.55E-07
Pyrene	5.00E-06	5.74E-08	2.52E-07
Arsenic	2.00E-04	2.30E-06	1.01E-05
Beryllium	1.20E-05	1.38E-07	6.04E-07
Cadmium	1.10E-03	1.26E-05	5.53E-05
Chromium	1.40E-03	1.61E-05	7.04E-05
Cobalt	8.40E-05	9.65E-07	4.23E-06
Lead	5.00E-04	5.74E-06	2.52E-05
Manganese	3.80E-04	4.36E-06	1.91E-05
Mercury	2.60E-04	2.99E-06	1.31E-05
Nickel	2.10E-03	2.41E-05	1.06E-04
Selenium	2.40E-05	2.76E-07	1.21E-06
2-Methylnaphthalene	2.40E-05	2.76E-07	1.21E-06
3-Methylchloranthrene	1.80E-06	2.07E-08	9.06E-08
7,12-Dimethylbenz(a)anthracene	1.60E-05	1.84E-07	8.05E-07
Benzo(a)pyrene	1.20E-06	1.38E-08	6.04E-08
Dichlorobenzene	1.20E-03	1.38E-05	6.04E-05
Hexane	1.8	2.07E-02	9.06E-02
<b>Total HAP</b>		<b>2.17E-02</b>	<b>9.50E-02</b>

1. HAP emission factors from AP-42 Chapter 1.4, Table 1.4-3 and 1.4-4 for Natural Gas Combustion.