December 18, 2021

SUPPORTING DOCUMENTATION

Application for Significant Amendment of Temporary Permit TP-0256

Prepared for:

SAINT-GOBAIN PERFORMANCE PLASTICS CORPORATION
701 Daniel Webster Highway
Merrimack, New Hampshire 03054

Prepared by:

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C.T. Male Project No: 16.6235

SUPPORTING DOCUMENTATION
APPLICATION FOR SIGNIFICANT AMENDMENT TO
NHDES TEMPORARY PERMIT TP-0256
SAINT-GOBAIN PERFORMANCE PLASTICS CORPORATION

TABLE OF CONTENTS

1.0 INTRODUCTION

C.T. Male Associates Engineering, Surveying, Architecture, Landscape Architecture & Geology, D.P.C. (C.T. Male) has prepared the attached application for a Significant Amendment of New Hampshire Department of Environmental Services (NHDES) Temporary Permit TP-0256 (including supporting documents) for the Saint-Gobain Performance Plastics Corporation (Saint-Gobain) facility located at 701 Daniel Webster Highway in Merrimack, Hillsborough County, New Hampshire (see Figure 1). The NHDES Facility Identification Number is 3301100165, and the facility currently operates under Temporary Permit TP-0256, which was issued on February 11, 2020, with a reissue date of August 5, 2021 and which expires on August 31, 2022. Copies of application forms pertaining to the permit Amendment are included in Attachment A.

The Saint-Gobain facility primarily manufactures polytetrafluoroethylene (PTFE) coated fiberglass and Kevlar® fabrics and PTFE films. The fabrics are manufactured for a variety of chemical and weather resistant applications. The facility also includes an antenna covering process. The antenna cover operations include manual application of adhesives to the fabric for bonding to other pieces of fabric or to metal frames.

In response to a determination by NHDES pursuant to NH Statute Chapter 125-C:10-e, *Requirements for Air Emissions of Perfluorinated Compounds Impacting Soil and Water*, Saint-Gobain installed a Regenerative Thermal Oxidizer (RTO) in 2021 intended to control PFC[1] and precursor emissions associated with the facility's coating operations.

In a Letter of Deficiency dated November 18, 2021, NHDES required Saint-Gobain to submit a permit application requesting a significant permit amendment pursuant to Env-A 612 regarding installation and operation of the RTO bypass stack no later than 45 days from the date of the letter. This Amendment is required to include:

- A process flow diagram for the currently installed air pollution capture and control equipment (included as Figures 2 and 3).

[1] - "Perfluorinated compounds" or "PFCs" as defined in RSA 125-C:10-e(I)(d) means the list of compounds identified in paragraph 1.1 of Environmental Protection Agency Document #: EPA/600/R-08/092 Method 537. "Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)", Version 1.1 (September 2009).

- The maximum number of bypass hours requested for any consecutive 12-month period (refer to Section 5).

2.0 PROCESS DESCRIPTION

During production of the coated fiberglass fabrics, the fiberglass cloth is coated with a PTFE dispersion, which includes an organic surfactant. The fiberglass cloth is passed through a coater dip pan filled with the aqueous PTFE resin emulsion and surfactant. The fabric is then passed through a heating tower where the coating is sintered onto the fabric. Each coating tower has dedicated multiple curing zones. Each tower is divided into three temperature zones that: remove water, volatilize the surfactant, and sinter the resin. The production of film products includes the same sequence of steps, however rather than a fiberglass cloth, the PTFE coating is temporarily applied to a reusable polyamide or stainless steel carrier belt. The film coating is then removed, and the carrier belts are reused. Under normal operations, the exhaust from all coating towers as well as smaller production (Chemsil, MTM, Step Press/Laminator and Heat Clean) is routed to the RTO control device. As shown in Figures 2 and 3, the ductwork associated with the RTO routes the exhaust for all of the existing process equipment, with the exception of the antenna fabrication process to provide control of PFC and precursor emissions associated with the facility's coating operations. The original emission points and associated exhaust equipment have been retired as part of the RTO installation project in 2021. A summary of the emission units which exhaust to the RTO is as follows:

Emission Unit ID	Device Name
EU01	Tower MA
EU02	Tower MB
EU03	Tower MC
EU04	Tower MR
EU05	Tower MD
EU06	Tower QX
EU07	20" SBC
EU08	20" Coater
EU12	Tower MG
EU13	Tower MP
EU15	Tower MQ
EU16	Tower MS
EU22	R&D Coater

Emission Unit ID	Device Name
EU23	Chemsil Coater
EU24	MTM
EU25	Step Press/Laminator
EU26	Heat Clean

3.0 AIR EMISSIONS

Extensive calculations were included in the previous temporary permit application regarding the installation and operation of the RTO with respect to PFCs and Hydrogen Fluoride (HF). This report only discusses the emissions for the contaminants of concern from operation of the bypass stack as detailed in the NHDES Letter of Deficiency, which include PFOA, PFOS and HF.

After the approval and installation of the RTO, Saint-Gobain was required to complete stack testing to assess post-control emissions for PFOA and PFOS. The stack test report describes the facility's operating conditions at the time of the testing. The operating conditions at the facility during the stack test were far beyond normal operating conditions and met the required operating conditions of Env-A 802.10. Since the RTO was installed for the purpose of controlling PFOA and PFOS, emission rates for these contaminants were measured at the inlet and outlet of the RTO in order to calculate destruction efficiencies. During the RTO permitting process, there was public comment about the potential for generation of HF due to the thermal destruction of PFCs. The analysis herein assumes that the HF emissions measured at the RTO outlet during the performance testing would be emitted through the bypass stack. This assumption is a conservative over-representation of HF emissions from the bypass stack, because the bypass does not thermally destroy any PFCs within the combustion chambers of the RTO. The stack test results for these emission calculations are presented in Attachment B.

4.0 DEPOSITION MODELING

Barr Engineering has prepared Air Deposition Modeling on behalf of Saint-Gobain to derive the maximum allowable number of bypass hours for any consecutive 12-month period which would be able to demonstrate compliance with NH Statute Chapter 125-C:10-e relative to PFOA and PFOS. A copy of the Air Dispersion and Deposition Modeling Summary prepared by Barr Engineering is included as Attachment C.

4.1 Compliance with RSA 125-C:10-e (PFOA & PFOS)

PFOA and PFOS emission rates for the bypass stack air deposition modeling were taken from the September 2021 stack testing emission rates at the RTO inlet because these would be the emission rates directly from the bypass stack outlet in the event of an RTO malfunction. A deposition modeling scenario was performed at both the maximum flowrate (57,500 SCFM as measured during the September 2021 stack testing) and expected average operating flowrate (50,000 SCFM). The contaminant emission rate on a mass per unit time basis was conservatively maintained at the 2021 stack test results for both flowrate scenarios, although under operations with reduced flow, the mass per unit time emission rate would be expected to be lower.

The deposition modeling provides a unit impact rate (UIR) for each modeled receptor, which describes the amount of deposition at that location. The maximum UIR from the entire modeled area is then used to calculate the maximum allowable annual emissions based on the maximum allowable concentration infiltrating to groundwater for each contaminant. The maximum annual hours at which the bypass stack can operate while not exceeding the maximum allowable annual emissions can then be calculated based on the ratio of the maximum allowable annual emissions to the annual emission rate from the 2021 stack testing. The table below details the key values in calculating the annual operating hours. For a full explanation of the calculations and additional intermediate steps, see Table 3 in Appendix C.

Contaminant	Maximum Concentration Infiltrating to Groundwater ($\mu g/m^3$)	Maximum Unit Impact Rate ($g/m^2/yr$ per g/s)	Maximum Annual Emission Rate (lb/yr)	Annual Emission Rate from 2021 Stack Tests (lb/yr)	Allowable Annual Operating Hours (hr)
Modeling Scenario at 70,000 CFM Bypass Stack Flowrate					
PFOA	<3.4	1.47	<0.085	0.18	4,145
PFOS	<4.4	1.47	<0.110	0.0024	8,760
Modeling Scenario at 50,000 CFM Bypass Stack Flowrate					
PFOA	<3.4	1.35	<0.093	0.18	4,509
PFOS	<4.4	1.35	<0.120	0.0024	8,760

As demonstrated by the air deposition modeling, the bypass could operate for a maximum of 4,145 hours per year without causing or contributing to an exceedance of groundwater or surface water quality standards.

4.2 Compliance with Env-A 1400 (RTAP)

Air dispersion modeling was also performed to address the RTAP compounds HF and APFO from the bypass stack, although not specifically required by the NHDES Letter of Deficiency. APFO emissions were estimated from the PFOA 2021 stack emissions using a ratio of the compounds' molecular weights. The HF emission rates were taken from the 2021 stack testing rates measured at the RTO outlet as a conservative approach since HF emission rates were not measured at the RTO inlet during the 2021 stack testing. HF emissions at the outlet are assumed to be higher than at the inlet due to the expected thermal conversion of PFCs to HF.

The results from the air dispersion modeling found that the concentrations were well below the RTAP AAL for both HF and APFO, as shown in the table below. Therefore, the RTO bypass annual operating hours discussed in Section 4.1 would comply with the Env-A 1400 24-hour and Annual AAL. For a full explanation of the calculations, see Table 4 in Appendix C.

Contaminant	Maximum 24-hr Concentration (µg/m³)	24-hr AAL (µg/m³)	% of 24-hr AAL	Maximum Annual Concentration (µg/m³)	Annual AAL (µg/m³)	% of Annual AAL
Modeling Scenario at 70,000 CFM Bypass Stack Flowrate						
HF	0.061	1.5	4.1%	0.0092	0.98	0.94%
APFO	1.4E-05	0.05	0.0%	2.1E-06	0.024	0.0%
Modeling Scenario at 50,000 CFM Bypass Stack Flowrate						
HF	0.061	1.5	4.1%	0.0091	0.98	0.93%
APFO	1.4E-05	0.05	0.0%	2.1E-06	0.024	0.0%

5.0 DISCUSSION AND REQUESTED PERMIT CONDITION

Based on the results of the air dispersion and deposition modeling, operation of the bypass stack for a maximum of 4,145 hours for any consecutive 12-month period would be in compliance with RSA 125-C:10-e for PFOA and PFOS and would demonstrate compliance with Env-A 1400 relative to APFO and HF. The bypass stack and RTO do not operate at the same time, and as such the bypass stack was modeled independently from the RTO. Calculations in Attachment B evaluate the emissions of PFOA and PFOS and compare against the annual permit limits of each contaminant to demonstrate permit compliance.

Saint-Gobain has monitored RTO operations since start-up as required by their permit and are requesting a maximum of 175 hours (2%) downtime of the RTO per year. The requested hours are 2% as compared to the allowable ±47% as demonstrated in the air deposition modeling to remain in compliance.

The bypass monitoring requirements contained herein are suggested to be similar in nature to those included in 40 CFR Part 60 Subpart RRR as an industry standard for control device bypass operations. 40 CFR Part 60 Subpart RRR is Standards of Performance for Volatile Organic Compound Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Reactor Processes, a regulation not specifically applicable to Saint-Gobain's operations but representative of a similar regulatory program. The flow indicator installed at the entrance to the bypass line provides a record of exhaust stream flow being routed to the RTO at least once every 15 minutes, analogous to the requirements of 40 CFR Part 60.703(a)(2). Saint-Gobain will track and monitor each bypass event as described in its response to the New Hampshire DES Letter of Deficiency and the RTO Compliance Plan, P-EHS-018.

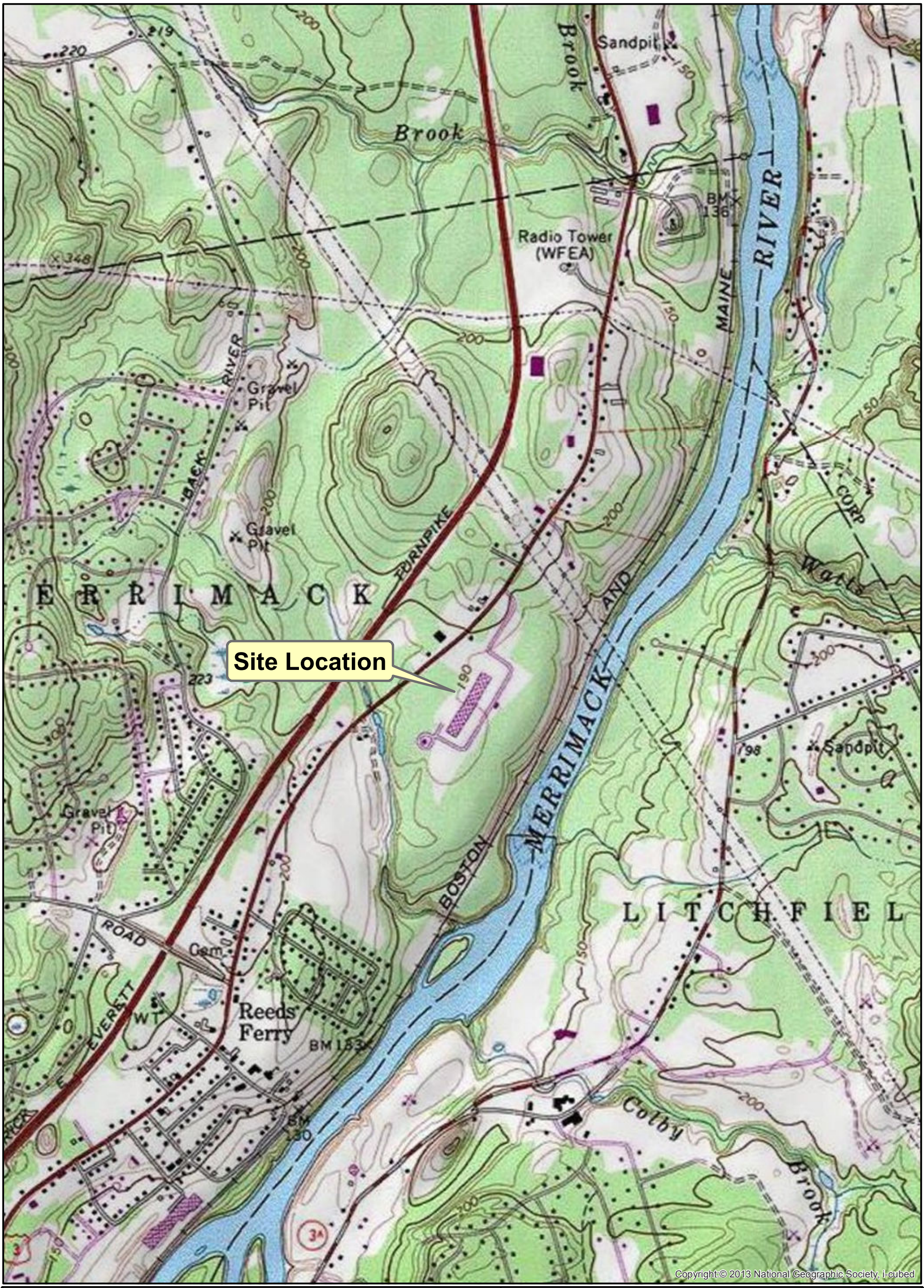
As such, Saint-Gobain requests the following permit condition within an amended TP-256 with monitoring and reporting as discussed above:

> The permittee will bypass the regenerative thermal oxidizer when manufacturing activities EU01-EU08, EU12, EU13, EU15, EU16 and EU22-EU26 are in operation only during unexpected shutdown of the RTO as confirmed through alarms associated with the RTO, and only until the manufacturing activities can come to a safe stop. Each period of bypass use shall be documented by the permittee

including the date, start time of use, duration of use, and records of which Emission Units are in operation during bypass usage. Manufacturing activities will not re-start until the RTO meets compliance with the operating conditions in Table 5, Item 5. The facility will be limited on an annual basis to 175 hours (2%) downtime.

Figure 1

Site Location Map (Topographic Map)



N
W E
S

0 500 1,000 2,000 Feet

1 inch = 1,000 feet

Site Location Map
701 Daniel Webster Highway

Town of Merrimack **Hillsborough County, New Hampshire**

Project Number: 16.6126
Data Source: USGS
Projection: NH State Plane NAD 83 (ft.)
Date: March 3, 2016
File: MerrimackSiteUSGS11x17.mxd
GIS: CHay

Map Note: The locations and features depicted on this map are approximate and do not represent a field survey.

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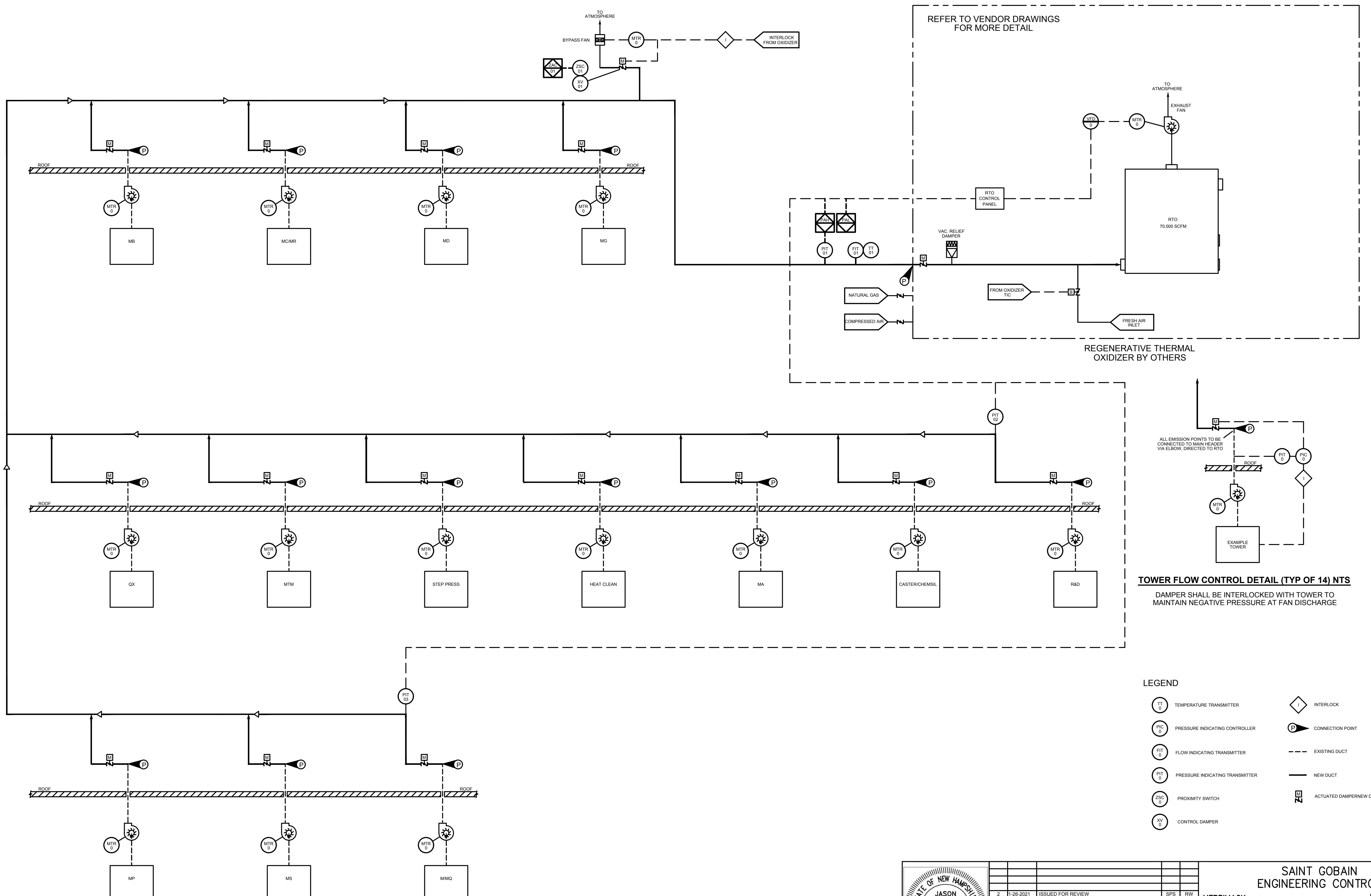
FOUNDED IN 1910

Figure 2

Process & Instrumentation Diagram



STATE OF NEW HAMPSHIRE – JASON P. HNATKO No.16557 LICENSED – PROFESSIONAL ENGINEER –

Rev.	Date	Description	By	Chk
2	1-26-2021	ISSUED FOR REVIEW	SPS	RW
1	3-20-2020	ADDED EMERGENCY BYPASS	SPS	RW
0	3-10-2020	DRAFT	SPS	RW

DRAWN BY SPS | DESIGNED BY | CHECKED BY US

Environmental Resources Management

SAINT GOBAIN ENGINEERING CONTROL

MERRIMACK NEW HAMPSHIRE

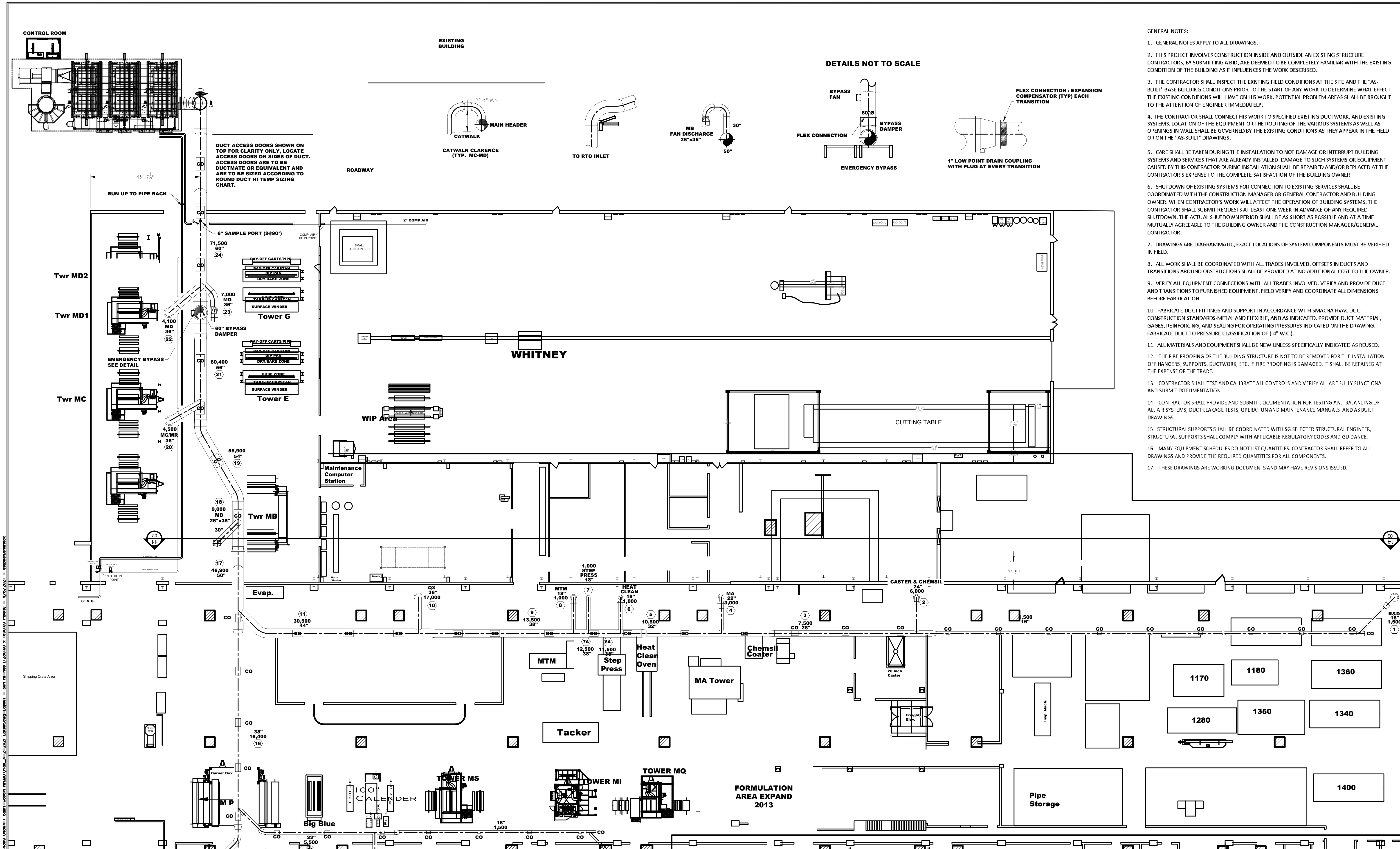
PROCESS & INSTRUMENTATION DIAGRAM

SCALE	PROJECT NUMBER	SHEET	REV.
NONE	0456973	01	2

DATE ISSUE FEBRUARY 2021

Figure 3

System Ventilation Roof Upper/Lower Layout (2 sheets)



CONTROL ROOM
EXISTING BUILDING
DETAILS NOT TO SCALE
MAIN HEADER
CATWALK
CATWALK CLARENCE (TYP. MC-MD)
TO RTO INLET
MB FAN DISCHARGE 26"x35"
BYPASS FAN
FLEX CONNECTION
BYPASS DAMPER
EMERGENCY BYPASS
FLEX CONNECTION / EXPANSION COMPENSATOR (TYP) EACH TRANSITION
1" LOW POINT DRAIN COUPLING WITH PLUG AT EVERY TRANSITION
DUCT ACCESS DOORS SHOWN ON TOP FOR CLARITY ONLY, LOCATE ACCESS DOORS ON SIDES OF DUCT. ACCESS DOORS ARE TO BE DUCTMATE OR EQUIVALENT AND ARE TO BE SIZED ACCORDING TO ROUND DUCT HI TEMP SIZING CHART.
ROADWAY
RUN UP TO PIPE RACK
6" SAMPLE PORT (2@90')
2" COMP AIR
71,500 60" 24
Twr MD2
Twr MD1
Tower G
7,000 MG 36" 23
4,100 MD 36" 22
60" BYPASS DAMPER
EMERGENCY BYPASS SEE DETAIL
60,400 56" 21
Tower E
Twr MC
WHITNEY
WIP Area
CUTTING TABLE
4,500 MC/MR 36" 20
55,900 54" 19
Maintenance Computer Station
18 9,000 MB 26"x35"
Twr MB
17 46,900 50"
Evap.
CASTER & CHEMSIL
QX 36" 17,000 10
11 30,500 44"
9 13,500 38"
MTM 18" 1,000 8
1,000 STEP PRESS 18" 7
HEAT CLEAN 18" 1,000 6
5 10,500 32"
MA 22" 3,000 4
3 7,500 28"
24" 6,000 2
R&D 16" 1,500 1
Shipping Crate Area
MTM
Step Press
Heat Clean Oven
MA Tower
Chemsil Coater
20 Inch Caster
1170
1180
1360
1280
1350
1340
Tacker
38" 16,400 16
TOWER MS
OWER MI
TOWER MQ
FORMULATION AREA EXPAND 2013
Pipe Storage
1400
Big Blue
CALENDER
Cameron
22" 5,500
18" 1,500
MP 28" 10,900 15
4,000 MS 22" 13
12 M/MQ 18"
QC Office

GENERAL NOTES:

1. GENERAL NOTES APPLY TO ALL DRAWINGS.

2. THIS PROJECT INVOLVES CONSTRUCTION INSIDE AND OUTSIDE AN EXISTING STRUCTURE. CONTRACTORS, BY SUBMITTING A BID, ARE DEEMED TO BE COMPLETELY FAMILIAR WITH THE EXISTING CONDITION OF THE BUILDING AS IT INFLUENCES THE WORK DESCRIBED.

3. THE CONTRACTOR SHALL INSPECT THE EXISTING FIELD CONDITIONS AT THE SITE AND THE "AS-BUILT" BASE BUILDING CONDITIONS PRIOR TO THE START OF ANY WORK TO DETERMINE WHAT EFFECT THE EXISTING CONDITIONS WILL HAVE ON HIS WORK. POTENTIAL PROBLEM AREAS SHALL BE BROUGHT TO THE ATTENTION OF ENGINEER IMMEDIATELY.

4. THE CONTRACTOR SHALL CONNECT HIS WORK TO SPECIFIED EXISTING DUCTWORK, AND EXISTING SYSTEMS. LOCATION OF THE EQUIPMENT OR THE ROUTING OF THE VARIOUS SYSTEMS AS WELL AS OPENINGS IN WALL SHALL BE GOVERNED BY THE EXISTING CONDITIONS AS THEY APPEAR IN THE FIELD OR ON THE "AS-BUILT" DRAWINGS.

5. CARE SHALL BE TAKEN DURING THE INSTALLATION TO NOT DAMAGE OR INTERRUPT BUILDING SYSTEMS AND SERVICES THAT ARE ALREADY INSTALLED. DAMAGE TO SUCH SYSTEMS OR EQUIPMENT CAUSED BY THIS CONTRACTOR DURING INSTALLATION SHALL BE REPAIRED AND/OR REPLACED AT THE CONTRACTOR'S EXPENSE TO THE COMPLETE SATISFACTION OF THE BUILDING OWNER.

6. SHUTDOWN OF EXISTING SYSTEMS FOR CONNECTION TO EXISTING SERVICES SHALL BE COORDINATED WITH THE CONSTRUCTION MANAGER OR GENERAL CONTRACTOR AND BUILDING OWNER. WHEN CONTRACTOR'S WORK WILL AFFECT THE OPERATION OF BUILDING SYSTEMS, THE CONTRACTOR SHALL SUBMIT REQUESTS AT LEAST ONE WEEK IN ADVANCE OF ANY REQUIRED SHUTDOWN. THE ACTUAL SHUTDOWN PERIOD SHALL BE AS SHORT AS POSSIBLE AND AT A TIME MUTUALLY AGREEABLE TO THE BUILDING OWNER AND THE CONSTRUCTION MANAGER/GENERAL CONTRACTOR.

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9. VERIFY ALL EQUIPMENT CONNECTIONS WITH ALL TRADES INVOLVED. VERIFY AND PROVIDE DUCT AND TRANSITIONS TO FURNISHED EQUIPMENT. FIELD VERIFY AND COORDINATE ALL DIMENSIONS BEFORE FABRICATION.

10. FABRICATE DUCT FITTINGS AND SUPPORT IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS-METAL AND FLEXIBLE, AND AS INDICATED. PROVIDE DUCT MATERIAL, GAGES, REINFORCING, AND SEALING FOR OPERATING PRESSURES INDICATED ON THE DRAWING. FABRICATE DUCT TO PRESSURE CLASSIFICATION OF (-4" W.C.).

11. ALL MATERIALS AND EQUIPMENTSHALL BE NEW UNLESS SPECIFICALLY INDICATED AS REUSED.

12. THE FIRE PROOFING OF THE BUILDING STRUCTURE IS NOT TO BE REMOVED FOR THE INSTALLATION OFF HANGERS, SUPPORTS, DUCTWORK, ETC. IF FIRE PROOFING IS DAMAGED, IT SHALL BE REPAIRED AT THE EXPENSE OF THE TRADE.

13. CONTRACTOR SHALL TEST AND CALIBRATE ALL CONTROLS AND VERIFY ALL ARE FULLY FUNCTIONAL AND SUBMIT DOCUMENTATION.

14. CONTRACTOR SHALL PROVIDE AND SUBMIT DOCUMENTATION FOR TESTING AND BALANCING OF ALL AIR SYSTEMS, DUCT LEAKAGE TESTS, OPERATION AND MAINTENANCE MANUALS, AND AS BUILT DRAWINGS.

15. STRUCTURAL SUPPORTS SHALL BE COORDINATED WITH SG SELECTED STRUCTURAL ENGINEER, STRUCTURAL SUPPORTS SHALL COMPLY WITH APPLICABLE REGULATORY CODES AND GUIDANCE.

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17. THESE DRAWINGS ARE WORKING DOCUMENTS AND MAY HAVE REVISIONS ISSUED.

Rev.	Date	Description	By	Chk
1	3-20-2020	ADDED EMERGENCY BYPASS	SPS	RW
0	3-10-2020	DRAFT	SPS	RW

DRAWN BY SPS | DESIGNED BY | CHECKED BY US

Environmental Resources Management

SAINT GOBAIN
ENGINEERING CONTROL

MERRIMACK NEW HAMPSHIRE

SYSYEM VENTILATION ROOF UPPER/LOWER LAYOUT

SCALE	PROJECT NUMBER	SHEET	REV.
1/16"=1'-0"	0456973	01	2

DATE ISSUE MARCH 2020

EXISTING BUILDING

RTO BY OTHERS

ROADWAY

DUCT ACCESS DOORS SHOWN ON TOP FOR CLARITY ONLY, LOCATE ACCESS DOORS ON SIDES OF DUCT. ACCESS DOORS ARE TO BE DUCTMATE OR EQUIVALENT AND ARE TO BE SIZED ACCORDING TO ROUND DUCT HI TEMP SIZING CHART.

RUN UP TO PIPE RACK

42'-6"

6" SAMPLE PORT (2@90°)

2" COMP AIR

COMP. AIR TIE IN POINT

SMALL TENSION RED

Twr MD2

Twr MD1

Twr MC

Twr MR

Twr MB

Tower G

RAY-OFF CARTS/PIPE

RAY-OFF CABSTAN

HF FAN

DRY/BAKE ZONE

FUSE ZONE

TAKE-OFF CABSTAN

SURFACE WINDER

MG 36"

MD 36"

MC/MR 36"

MB 26"x35"

60" BYPASS DAMPER

EMERGENCY BYPASS SEE DETAIL

60"

56"

54"

50"

30"

WHITNEY

WIP Area

Maintenance Computer Station

CUTTING TABLE

Evap.

6" N.G.

N.G. TIE IN POINT

QX 36"

MTM 18"

18"

18"

MA 22"

CASTER & CHEMSIL 24"

7'-8"

44"

38"

32"

38"

28"

16"

MTM

Step Press

Heat Clean Oven

Chemsil Coater

MA Tower

20 Inch Caster

Freight Elev.

Insp - Mach.

1170

1180

1360

1280

1350

1340

1400

R&D 16"

Pipe Storage

QC Office

Burner Box

M P

MP 28"

MS 22"

TOWER MS

TOWER MQ

M/MQ 18"

STAIR

STAIR

22"

18"

12'-10"

CO

DETAILS NOT TO SCALE

MB FAN DISCHARGE 26"x35"

30"

50"

BYPASS FAN

60"Ø

BYPASS DAMPER

FLEX CONNECTION

EMERGENCY BYPASS

FLEX CONNECTION / EXPANSION COMPENSATOR (TYP) EACH TRANSITION

1" LOW POINT DRAIN COUPLING WITH PLUG AT EVERY TRANSITION

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STATE OF NEW HAMPSHIRE - JASON P. HNATKO No.16557 - PROFESSIONAL ENGINEER - LICENSED

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1	3-20-2020	ADDED EMERGENCY BYPASS	SPS	RW
0	3-10-2020	DRAFT	SPS	RW

DRAWN BY SPS | DESIGNED BY | CHECKED BY US

Environmental Resources Management

SAINT GOBAIN ENGINEERING CONTROL

MERRIMACK NEW HAMPSHIRE

SYSYEM VENTILATION ROOF UPPER/LOWER LAYOUT

SCALE 1/16"=1'-0" | PROJECT NUMBER 0456973 | SHEET 02 | REV. 2

DATE ISSUE FEBRUARY 2021

Attachment A

Air Permit Application Forms

- **A.1 NHDES Form ARD-1**
- **A.2 NHDES Form ARD-3**

ARD-1 FORM
GENERAL FACILITY INFORMATION

Air Resources Division/Permitting and Environmental Health Bureau

RSA/Rule: RSA 125-C:12 and Env-A 1700

This ARD-1 General Facility Information form shall be submitted with every application for an air permit, except for a Permit by Notification (PBN).

1. TYPE OF FACILITY[1]

☐ Title V ☒ Non-Title V ☐ Unknown

2. TYPE OF PERMIT[2]

☒ Temporary Permit (Construction) ☐ State Permit to Operate ☐ Title V Operating Permit

☐ General State Permit ☐ Limitation on Potential to Emit (Env-A 625)

3. TYPE OF APPLICATION[3]

☐ New ☐ Renewal ☒ Modification ☐ Administrative Amendment

4. FACILITY INFORMATION

FACILITY NAME[4]: Saint-Gobain Performance Plastics Corp.	AFS NUMBER[5]: 3301100165	
PHYSICAL ADDRESS: 701 Daniel Webster Highway		
TOWN/CITY: Merrimack	STATE: NH	ZIP: 03054
GOVERNMENT FACILITY CODE[6]: 0		

5. BUSINESS INFORMATION AS REGISTERED WITH SECRETARY OF STATE (If applicable)

REGISTERED NAME: Saint-Gobain Performance Plastics Corp.		
REGISTERED ADDRESS: 701 Daniel Webster Highway		
TOWN/CITY: Merrimack	STATE: NH	ZIP: 03054

6. PARENT CORPORATION INFORMATION (If applicable)

PARENT CORPORATION NAME: Saint-Gobain Corporation		
MAILING ADDRESS: 20 Moores Road		
TOWN/CITY: Malvern	STATE: PA	ZIP: 19355

7. MAJOR ACTIVITY OR PRODUCT DESCRIPTION

List all activities performed at this facility and provide SIC and/or NAICS Code(s).

SIC Code	Activity Description	NAICS Code	Activity Description
2221	Woven Fiber Glass		
2296	Industrial Fabrics		
2851	Fluoropolymer Films		

At a minimum, please provide contact information below for Responsible Official, Prepared Application, Technical, and Invoicing contacts. Make as many copies of this page as necessary in order to include all contacts that you wish to associate with the application. Multiple people can be assigned one role; multiple roles can be assigned to one person.

8. RESPONSIBLE OFFICIAL INFORMATION		
RESPONSIBLE OFFICIAL NAME[7]: Mark Collette		
TITLE: Global Director EHS		
COMPANY NAME: Saint-Gobain Performance Plastics Corp.		
MAILING ADDRESS: 701 Daniel Webster Highway		
TOWN/CITY: Merrimack	STATE: NH	ZIP: 03054
EMAIL ADDRESS: mark.collette@saint-gobain.com		
TELEPHONE NUMBER: 440-804-6925	EXTENSION:	
FAX NUMBER:		
ROLES: ☒ Responsible Official ☐ Technical ☐ Invoicing ☐ Legal ☐ Emissions ☐ Prepared Application ☐ Corporate ☐ Owner/Operator ☐ Consultant		

9. ADDITIONAL CONTACT INFORMATION		
CONTACT NAME: William Kempskie		
TITLE: EHS Manager		
COMPANY NAME: Saint-Gobain Performance Plastics Corporation		
MAILING ADDRESS: 701 Daniel Webster Highway		
TOWN/CITY: Merrimack	STATE: NH	ZIP: 03054
EMAIL ADDRESS: William.kempskie@saint-gobain.com		
TELEPHONE NUMBER: 603-420-1387	EXTENSION:	
FAX NUMBER:		
ROLES: ☐ Responsible Official ☒ Technical ☒ Invoicing ☐ Legal ☐ Emissions ☐ Prepared Application ☐ Corporate ☐ Owner/Operator ☐ Consultant		

10. ADDITIONAL CONTACT INFORMATION		
CONTACT NAME: Daniel Reilly		
TITLE: Division Manager, Environmental Services		
COMPANY NAME: C.T. Male Associates		
MAILING ADDRESS: 50 Century Hill Drive		
TOWN/CITY: Latham	STATE: NY	ZIP: 12110
EMAIL ADDRESS: d.reilly@ctmale.com		
TELEPHONE NUMBER: 518-786-7400	EXTENSION:	
FAX NUMBER: 518-786-7299		
ROLES: ☐ Responsible Official ☒ Technical ☐ Invoicing ☐ Legal ☐ Emissions ☐ Prepared Application ☐ Corporate ☐ Owner/Operator ☒ Consultant		

11. ADDITIONAL CONTACT INFORMATION		
CONTACT NAME:		
TITLE:		
COMPANY NAME:		
MAILING ADDRESS:		
TOWN/CITY:	STATE:	ZIP:
EMAIL ADDRESS:		
TELEPHONE NUMBER:	EXTENSION:	
FAX NUMBER:		
ROLES: ☐ Responsible Official ☐ Technical ☐ Invoicing ☐ Legal ☐ Emissions ☐ Prepared Application ☐ Corporate ☐ Owner/Operator ☐ Consultant		

12. ADDITIONAL CONTACT INFORMATION		
CONTACT NAME:		
TITLE:		
COMPANY NAME:		
MAILING ADDRESS:		
TOWN/CITY:	STATE:	ZIP:
EMAIL ADDRESS:		
TELEPHONE NUMBER:	EXTENSION:	
FAX NUMBER:		
ROLES: ☐ Responsible Official ☐ Technical ☐ Invoicing ☐ Legal ☐ Emissions ☐ Prepared Application ☐ Corporate ☐ Owner/Operator ☐ Consultant		

13. ADDITIONAL CONTACT INFORMATION		
CONTACT NAME:		
TITLE:		
COMPANY NAME:		
MAILING ADDRESS:		
TOWN/CITY:	STATE:	ZIP:
EMAIL ADDRESS:		
TELEPHONE NUMBER:	EXTENSION:	
FAX NUMBER:		
ROLES: ☐ Responsible Official ☐ Technical ☐ Invoicing ☐ Legal ☐ Emissions ☐ Prepared Application ☐ Corporate ☐ Owner/Operator ☐ Consultant		

For ALL APPLICATIONS except Administrative Amendments, General State Permits, and Limitations on Potential to Emit:

14. FACILITY-WIDE EMISSIONS		
POLLUTANT[8]	POTENTIAL TPY	ACTUAL TPY
VOC	<50	
Total HAP	<25	
Individual HAP	<10	
PFOA	<0.45 POUNDS PER YEAR	0.018 POUNDS PER YEAR
PFOS	<0.57 POUNDS PER YEAR	0.0006 POUNDS PER YEAR

Please include calculations used in determining emissions and include any non-permitted emission devices.

15. FOR NEW APPLICATIONS OR IF CHANGES ARE MADE – PLEASE INCLUDE:	
☐	A copy of the USGS map, property identified, which shows the facility's location.
☐	A site plan to scale of the facility showing: 1. The locations of all emission points; 2. The dimensions of all buildings and tiers, including roof heights; and 3. The facility's property boundary and any security features (fences, walls, etc.).

16. FOR TITLE V PERMIT APPLICATIONS – PLEASE INCLUDE:[9]		
Included in Application	**Previously Submitted and Unchanged**	
☐	☐	A. Identification and details of limitations on source operation, or any work practice standards affecting emissions for all regulated pollutants.
☐	☐	B. Information required by any other applicable requirement of the Act, including, but not limited to, information related to stack height limitations developed pursuant to section 123 of the federal Clean Air Act (42 U.S.C. §7401).
☐	☐	C. A citation and description of state and federal air pollution control regulations and requirements applicable to each emission unit.
☐	☐	D. A narrative description or reference to test methods used or required for initial compliance demonstration with each applicable regulation.
☐	☐	E. Any additional information required to be provided pursuant to the Act or to determine applicability of any other requirements of the Act.
☐	☐	F. A written explanation of proposed exemptions.
☐	☐	G. Any information required to be provided to the director pursuant to the Act in order to evaluate alternative operating scenarios, or to define permit terms and conditions.
☐	☐	H. A list of all equipment and devices located at the source classified as insignificant activities pursuant to Env-A 600, including appropriate sizing data for equipment and devices which are exempt from permitting requirements based on their process ratings, fuel consumption rate, or both.

16. CONTINUED - FOR TITLE V PERMIT APPLICATIONS – PLEASE INCLUDE:[10]	
Included in Application	
☐	I. Compliance plan information containing: 1. A narrative description of the compliance status of the source with respect to all applicable requirements; 2. A narrative statement of methods used to determine continued compliance, including a description of monitoring, recordkeeping and reporting requirements and test methods; 3. A statement indicating the source's compliance status with an applicable enhanced monitoring and compliance certification requirements specified in Env-A 800; 4. A statement that the source shall continue to comply with all applicable requirements; 5. A statement that the source shall meet all applicable requirements that will become effective during the permit term on a timely basis; 6. A compliance schedule stating all applicable requirements with which the source is not in compliance, consistent with the following: a. The compliance schedule shall incorporate the requirements of and be at least as stringent as that contained in any judicial consent decree or administrative order to which the source is subject; b. Such compliance schedule shall be supplemental to, and not sanction non-compliance with, the applicable requirements on which it is based; and c. The compliance schedule shall include the following statements and schedules: i. A narrative description of how the source shall achieve compliance with such requirements; ii. A schedule of remedial measures, including an enforceable sequence of actions with milestones leading to compliance with any applicable requirements for which the source shall be in non-compliance with at the time of permit issuance; and iii. A schedule for submission of certified progress reports no less frequently than every 6 months. 7. For sources deemed in compliance with all applicable requirements, a certified statement signed by a responsible official stating: "The undersigned certifies that, based on information and belief formed after reasonable inquiry, the source is in compliance with all applicable regulations"; and 8. A schedule for submission of compliance certifications during the permit term, to be submitted annually or more frequently as specified by the underlying applicable requirement.
☐	J. For sources subject to Title IV of the Act, the compliance plan requirements, specified in (I.) above, shall apply to and be included in the acid rain portion of a compliance plan for an affected source, except as specifically superseded by regulations promulgated under Title IV of the Act with regard to the schedule and method(s) the source will use to achieve compliance with the acid rain emission limitations.
☐	K. In addition to the forms required pursuant to Env-A 1700, sources subject to Title IV of the Act shall use the nationally standardized forms for the acid rain portions of the Title V operating permit application, pursuant to 40 CFR 72.30.

This section of the form must be completed and signed by the Responsible Official only.

17. CERTIFICATIONS	
	I certify that the applicant, or the owner or operator the applicant represents, has right, title, or interest in all of the property that is proposed for development or use because the owner or operator owns, leases, or has binding options to purchase all of the property proposed for development or use.
☒	I am authorized to make this submission on behalf of the affected source or affected units for which this submission is made. I certify under penalty of law that I have personally examined, and am familiar with, the information submitted in this document and all of its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.

18. RESPONSIBLE OFFICIAL INFORMATION AND SIGNATURE	
RESPONSIBLE OFFICIAL NAME: Mark Collette	
TITLE: Global Director EHS	
RESPONSIBLE OFFICIAL'S SIGNATURE 	12/18/2021 DATE:

ARD-1 GENERAL FACILITY INFORMATION INSTRUCTIONS

1 A list of Title V facilities in NH can be found to the NHDES website. Most facilities are Non-Title V. Check Unknown if you are unsure.

2 Temporary Permit = New Construction at Existing or New Facility
State Permit to Operate = Existing Non-Title V Facilities
Title V Operating Permit = Existing Title V Facilities
GSP = General State Permit
Limitation on Potential to Emit = Small Facilities requesting coverage under Env-A 625

3 New = New devices at facility, change in operation at Existing facility or New facility never permitted before
Renewal = Renewal of any permit type
Modification = Currently permitted by non-expired permit and wants to make amendment/modification to information contained in permit. This includes adding/removing devices covered by GSP.
Administrative Amendment = changes in ownership or responsible official.

4 Facility Name = Trade Name or Doing Business As

5 AFS number is assigned by NHDES and is a 10-digit number starting with 33 (example 3300100001).

6 0 = Facility is not government owned
1 = Source owned by the Federal Government
2 = Source owned by the State
3 = Source owned by the County
4 = Source owned by the Municipality
5 = Source owned by the District

7 Responsible Official:
For a corporation = President, Secretary, treasurer, or vice-president in charge of a principal business function
For a partnership = General partner or proprietor
For a municipality = Principal executive officer or ranking elected official

8 For Title V sources, include facility wide emissions of filterable PM, filterable PM_{10}, filterable $PM_{2.5}$, condensable PM, SO_2, NO_x, CO, NMVOCs, Pb (if appropriate), HAPs, and CO_2e.

9 If any of the information requested in Section 16 A-H was submitted in a previous Title V Operating Permit application and has **not** changed, it can be incorporated by reference in the renewal application package. This previous information must be clearly referenced in the renewal application package and must accurately reflect current operations at the facility. If any changes have occurred at the facility or if changes are proposed in the renewal application package, new information must be provided. The information requested in Section 16 I-K must be completed based on current operations at the facility. Due to the time sensitive nature of this required information, incorporation by reference in the application package is **not** allowed.

ARD-3 FORM
INFORMATION REQUIRED FOR PERMITS FOR A UNIT OF PROCESSING OR MANUFACTURING EQUIPMENT

Air Resources Division/Permitting and Environmental Health Bureau

RSA/Rule: RSA 125-C:12 and Env-A 1700

I. EQUIPMENT INFORMATION – *Complete a separate form for each Emission Unit.*

Emission Unit Description: RTO Bypass Stack

Process/ Device	Manufacturer Model # Serial #	Maximum Raw Material Process Rate	Maximum Finished Material Process Rate	Manufacture Date[1]	Installation Date[1]	Stack #	Hours of Operation per day and days/yr
Paint Booth #3 (Example)	*N/A (Example)*	*8 gal/hr (Example)*	*N/A (Example)*	*1997 (Example)*	*1999 (Example)*	*#1 (Ex)*	*3 hr/day; 250 days/yr (Example)*
Metal Furnace #2 (Example)	*Consumat Model C12 S/N: 2569 (Example)*	*N/A (Example)*	*500 lbs/hr (Example)*	*2002 (Example)*	*2002 (Example)*	*#5 (Ex)*	*9 hr/day; 300 days/yr (Example)*
MA Tower	N/A	6,000 sq. ft/hr	N/A	N/A	1994	EU01	4,230 hr/yr
MB Tower	N/A	17,500 sq. ft/hr	N/A	N/A	1998	EU02	3,132 hr/yr
MC Tower	N/A	9,200 sq. ft/hr	N/A	N/A	1998	EU03	4,649 hr/yr
MR Tower	N/A	9,200 sq. ft/hr	N/A	N/A	2002	EU04	4,320 hr/yr
MD Tower	N/A	9,200 sq. ft/hr	N/A	N/A	1999	EU05	4,595 hr/yr
See Attached							

Process Description - Please provide a brief description of each process performed (attach additional pages as needed):

EU01-EU08, EU12, EU13 EU15, & EU16 - Coating operations for paper, fabric, film, or foil; EU22, research and development coating operations for paper, fabric, film, or foil; EU23 - Chemsil Coater coats and dries silicone onto fiberglass through thermally treating a solid paste without the addition of solvent; EU24 & EU25 - MTM and Step Press/Laminator utilize heat to laminate or otherwise affix coated fabrics and films; EU26 - Heat Clean oven used for cleaning by heating.

A. Parts Washers/Solvent Degreasers

☒ **Not Applicable**

Process/Device	Manufacturer & Model #	Capacity (gal)	Solvent Used	# Solvent Changes per Year
Degreaser #2 (Example)	*Safety-Kleen Model 16 (Example)*	*16 gal (Example)*	*Recycled 150 Solvent (Example)*	*2 (Example)*

B. Coatings, Solvents, and Inks Entering Process – *Use additional sheets if necessary*

☒ **Not Applicable**

Process/ Device	Raw Material or Chemical Compound	Potential Usage (gal or lb per hour and per year)		Density (lb/gal)	Percent VOC[2] (wt %)	Percent HAP[3] (wt %)	Potential VOC emissions (lb/yr)	Potential HAP emissions (lb/yr)
Paint Booth (Example)	*Black Enamel #5693 (Example)*	*13 gal/hr (Example)*	*1360 gal/yr (Example)*	*7.5 lb/gal (Example)*	*67.96% (Example)*	*13.17% (Example)*	*6,932 lb/yr (Example)*	*1,343 lb/yr (Example)*

Provide an example of the calculations used to determine total potential VOC and HAP emitted. Indicate if the results are based on test results; if control equipment was taken into account; if conditions exist where solvents remain in the substrate rather than complete volatilization, transfer efficiency, etc.:

Information previously provided as part of RTO application.

Coating Application Method:

☐ High Volume-Low Pressure (HVLP) Spray ☐ Electrostatic Spray ☐ Zinc-Arc Spray
☐ Air-Assisted Airless Spray ☐ Airless Spray ☐ Dip Coat
☐ A Flow Coating Technique ☐ Other (specify): _____

C. Amount of Liquid Waste Discarded:

_____ ☐ gal/yr ☐ tons/yr

D. Stack Information

Is device equipped with multiple stacks? ☐ Yes ☒ No *(If yes, provide data for each stack)*
Are multiple units connected to this stack? ☐ Yes ☒ No
*(If **yes**, identify other devices on this stack:)*

Stack #	Discharge Height Above Ground Level (ft)	Inside Diameter (ft) or Area (ft^2) at Stack Exit[4]	Exhaust Temperature (°F)	Exhaust Flow (acfm)	Stack Capped or Otherwise Restricted[5] (Yes - Type/No)	Exhaust Orientation[6]	Stack Monitor (Yes/No) and Description
#5 (Ex)	*65 ft (Example)*	*4 ft (Example)*	*70 °F (Example)*	*1500 acfm (Example)*	*Yes - Rain Cap (Example)*	*Vertical (Example)*	*No (Example)*
RTO Bypass Stack	63.52 ft.	5 ft.	236◦F	76,900 ACFM	No	Horizontal	Yes - Open/Closed Monitor

E. Hours of Operation

Hours per day: _____ Days per year: _____

II. NEW HAMPSHIRE REGULATED TOXIC AIR POLLUTANTS (RTAPs) – Env-A 1400

Do any of the devices or processes emit any of the RTAPs listed in Env-A 1400?
☒ Yes ☐ No

If **Yes**, attach your facility's most recent compliance demonstration.

III. SUPPLEMENTAL FUEL USAGE INFORMATION

☒ Not Applicable

A. Fuel Information (List each fuel utilized by the devices)

Device	Fuel Type	Heat Value[7]	Units	Sulfur Content (%)	Maximum Fuel Flow Rate	Units	Maximum Gross Heat Input Rate	Units
Thermal Oxidizer (Example)	*#2 Fuel Oil (Example)*	*140,000 (Example)*	*Btu/gal (Example)*	*0.0015 (Example)*	*20 (Example)*	*gal/hr (Example)*	*1.2 (Example)*	*MMBtu/hr (Example)*

B. Air Pollutant Emissions from Combustion

Pollutant	Emission Factor	Units	Emission Factor Source[8]	Actual (lb/hr)	Potential (lb/hr)	Actual (tpy)	Potential (tpy)
TSP							
PM_{10}							
NO_x							
VOC							
CO							
SO_2							
Other *(specify)*							

Provide an example of the calculations used to determine uncontrolled air pollutant emissions, if applicable:

Note: If process utilizes more than one Supplemental Fuel Burning Device, provide all six pollutant emissions information for each device. Use additional pages if necessary.

IV. POLLUTION CONTROL EQUIPMENT

☒ **Not Applicable**

Note: If the devices utilize more than one type of pollution control equipment, provide data for each type of equipment.

Device	Type of Control Device	Manufacturer of Control Device	Model and Serial Number of Control Device (if known)	Pollutant(s) Controlled by Device
Metal Furnace #2 (Example)	*Baghouse #2 (Example)*	*Ultra-Flow Inc. (Example)*	*2400 CFM Small Dust Collector Serial #: N/A (Example)*	*TSP (Example)*
Paint Spray Booth (Example)	*Filter (Example)*	*Paint Arrestors (Example)*	*3100 Series (Example)*	*Zinc Chromate (Example)*

For each control device, include an Air Pollution Control Equipment Monitoring Plan pursuant to Env-A 810.

A. Controlled Air Pollution Emissions (list emissions that result <u>after all</u> add on controls – *use additional sheets if necessary*)

Pollutant	Controlled Emission Factor	Units	Emission Factor Source[9]	Actual (lb/hr)	Potential (lb/hr)	Actual (tpy)	Potential (tpy)

Provide an example of the calculations used to determine controlled air pollutant emissions, if applicable:

ARD-3 FORM INFORMATION INSTRUCTIONS

1 If exact date is unknown for Manufacture Date or Installation Date, you may use 01/01/year. Manufacture Date refers to the date the emission unit was originally produced. Installation Date refers to the date the emission unit is installed at the facility.

2 Volatile Organic Compound, as defined in Env-A 100.

3 Hazardous Air Pollutant, as defined in section 112 of the 1990 Clean Air Act Amendments.

4 Examples of Inside Diameter or Area at Stack Exit: Diameter at discharge point of convergence cone, if applicable

5 Flapper valves and other devices which do not restrict the vertical exhaust flow while the device is operating are not considered obstructions or restrictions.

6 Examples of Exhaust Orientation: Vertical, Horizontal, Downward
Note: for a stack to be considered vertical and unobstructed, there shall be no impediment to vertical flow, and the exhaust stack extends 2 feet higher than any roofline within 10 horizontal feet of the exhaust stack

7

Liquid Fuels	Heat Value
Ultra-Low Sulfur Diesel (ULSD)	137,000 Btu/gal
#2 Fuel Oil	140,000 Btu/gal
Kerosene	135,000 Btu/gal
Other – Liquid	Obtain from Fuel Supplier

Gaseous Fuels	Heat Value
Natural Gas	1,020 Btu/cubic foot
Propane (LPG)	94,000 Btu/gal
Gasoline	130,000 Btu/gal
Other (Gaseous)	Obtain from Fuel Supplier

8 Emission factor sources may include:
- Continuous Emissions Monitor (CEM)
- Stack Test (Provide Date)
- Vendor Guaranteed Rates (Provide Documentation)
- AP-42 Emission Factors
- Material Balance (Provide Sample Calculation)
- Engineering Estimate

ARD-3 Form Attachment

I. Equipment Information Continued

Process/ Device	Manufacturer Model # Serial #	Maximum Raw Material Process Rate	Maximum Finished Material Process Rate	Manufacture Date	Installation Date	Stack #	Hours of Operation per day and days/yr
QX Tower	N/A	6,000 sq. ft/hr	N/A	N/A	1989	EU06	4,483 hr/yr
20" SBC	N/A	500 sq. ft/hr	N/A	N/A	1986	EU07	0 hr/yr
20" Coater	N/A	500 sq. ft/hr	N/A	N/A	1986	EU08	237.4 hr/yr
MG Tower	N/A	4,375 sq. ft/hr	N/A	N/A	2002	EU12	2,349 hr/yr
MP Tower	N/A	4,375 sq. ft/hr	N/A	N/A	2002	EU13	2,881 hr/yr
MQ Tower	N/A	1,100 sq. ft/hr	N/A	N/A	2002	EU15	2,785 hr/yr
MS Tower	N/A	2,300 sq. ft/hr	N/A	N/A	2002	EU16	3,784 hr/yr
R&D Coater	N/A	2,600 sq. ft/hr	N/A	N/A	N/A	EU22	560 hr/yr
Chemsil Coater	N/A	3,800 sq. ft/hr	N/A	N/A	N/A	EU23	N/A
MTM	N/A	5,000 sq. ft/hr	N/A	N/A	N/A	EU24	N/A
Step Press/ Laminator	N/A	4,800 sq. ft/hr	N/A	N/A	N/A	EU25	N/A
Heat Clean	N/A	N/A	N/A	N/A	N/A	EU26	N/A

Attachment B

Emission Calculations (Revised PFOA/PFOS only)

Calculation of Annual Combined PFOA/PFOS Emissions from RTO and Bypass Operations

Known:

[1] PFOA RTO Outlet Emission Rate = 1.64×10^{-6} lb/hr (from September 2021 Stack Test, Table 4-2)

[2] PFOS RTO Outlet Emission Rate = 6.80×10^{-8} lb/hr (from September 2021 Stack Test, Table 4-2)

[3] PFOA Bypass Emission Rate = 2.06×10^{-5} lb/hr (from September 2021 Stack Test, Table 4-2)

[4] PFOS Bypass Emission Rate = 2.77×10^{-7} lb/hr (from September 2021 Stack Test, Table 4-2)

[5] Air Deposition Modeling results limit operation of bypass at 4,145 hours per year

Assumptions:

[6] RTO hours of operation are anticipated to be 8,760 less the hours of Bypass operation (i.e., 8,760 - 4,145 = 4,615)

[7] Hourly bypass outlet (lb/hr) assumed to equal RTO inlet measured during September 2021 stack test

A. Calculation of Combined Annual Emission Rate at Maximum Allowable Bypass Hours (4,145 hr/yr):

1. PFOA Annual Emissions = Bypass Emissions (lb/hr) * 4,145 (hr/yr) + RTO Outlet (lb/hr) * 4,615 hr/yr)
[item 3] [item 5] [item 1] [item 6]

PFOA Annual Emissions (lb/yr) =	0.093	lb/yr
Maximum Allowable PFOA =	0.45	lb/yr
% of Maximum Emissions =	20.66%	of allowable PFOA on an annual basis

2. PFOS Annual Emissions = Bypass Emissions (lb/hr) * 4,145 (hr/yr) + RTO Outlet (lb/hr) * (8,760 hr/yr - 4,145 hr/yr)
[item 4] [item 5] [item 2] [item 6]

PFOS Annual Emissions (lb/yr) =	0.0015	lb/yr
Maximum Allowable PFOS =	0.57	lb/yr
% of Maximum Emissions =	0.26%	of allowable PFOS on an annual basis

B. Calculation of Combined Annual Emission Rate at Requested Annual Bypass Hours (175 hr/yr*):

1. PFOA Annual Emissions = Bypass Emissions (lb/hr) * 175 (hr/yr) + RTO Outlet (lb/hr) * 8,585 hr/yr)
[item 3] [item 5] [item 1]

PFOA Annual Emissions (lb/yr) =	0.018	lb/yr
Maximum Allowable PFOA =	0.45	lb/yr
% of Maximum Emissions =	3.93%	of allowable PFOA on an annual basis

2. PFOS Annual Emissions = Bypass Emissions (lb/hr) * 175 (hr/yr) + RTO Outlet (lb/hr) * (8,585 hr/yr)
[item 4] [item 5] [item 2]

PFOS Annual Emissions (lb/yr) =	0.0006	lb/yr
Maximum Allowable PFOS =	0.57	lb/yr
% of Maximum Emissions =	0.11%	of allowable PFOS on an annual basis

* - 175 hours per year is equal to 2% of 8,760

Results of the September 7-10, 2021, Regenerative Thermal Oxidizer Compliance Tests at Saint-Gobain Performance Plastics in Merrimack, New Hampshire

RTO PCE01

Temporary Permit No. TP-0256

Barr Project No. 29061003.07

Prepared for
Saint-Gobain Performance Plastics
Merrimack, New Hampshire

November 2021

4300 MarketPointe Drive, Suite 200
Minneapolis, MN 55435-4803
Phone: 952.832.2600
www.barr.com

4 Results

4.1 PFAS Test Results

The PFAS results that satisfy the facility permit are illustrated below. The PFOA annualized emission rate average is 0.014 lb/yr, which is below the permit limit of 0.45 lb/yr. The PFOS annualized emission rate average is 0.00060 lb/yr which is below the permit limit of 0.57 lb/yr.

Table 4-1 PFAS Test Results

Test Methods 1-4, OTM-45	Average Test Results RTO Outlet (PCE01)	Permit Limit
Test Date	9/7-8/21	-
PFOA, lb/yr	0.014	0.45
PFOS, lb/yr	0.00060	0.57

The full results of the RTO inlet and outlet PFAS tests are summarized in Tables 1-2 for each compound in the OTM-45 Table 45-1. The samples were analyzed for the PFAS target analytes listed in Table 45-1 of Other Test Method 45 (OTM-45).

Table 1 provides the RTO outlet controlled PFAS emission rates in pounds per year (lb/yr) Table 2 provides the RTO inlet mass loading rates of PFAS in lb/yr. The calculated destruction/removal efficiency (DRE) for PFOA and PFOS are presented below. Intermediary calculations of PFAS pollutant concentrations, emissions rates and compound DRE are in Appendix A for the inlet and outlet tests.

Table 4-2 RTO PFAS Destruction/ Removal Efficiency

Average Test Results			
Test Methods 1-4, OTM-45	RTO Inlet, lb/hr (PCE01)	RTO Outlet, lb/hr (PCE01)	DRE, %
Test Date	9/7-8/21	9/7-8/21	
PFOA	2.06E-05	1.64E-06	92
PFOS	2.77E-07	6.80E-08	75

Test run one was performed on September 7. Test runs two and three were performed on September 8. Test run three was delayed 27 minutes from 1433-1500 due to an RTO trip out and subsequent reheating to its operating temperature.

Performance tests for HF, NMVOC and permanent total enclosure verification were completed during periods of the three PFAS test runs.

4.2 Hydrogen Fluoride Test Results

Table 3 summarizes the results of the HF test performed on September 7-8, 2021. Four test runs were completed during periods of the PFAS test runs. The first test run on September 7th was compromised due to an inability to lower the sample train exit temperature below 68 degrees Fahrenheit at the beginning of the run. Barr conferred with NHDES representatives onsite, and all agreed to conduct three additional runs that were successfully completed on September 8th and comprise the test. All four samples were analyzed, and results are presented in the table with the test average omitting run one, which had no effect on the results, data usability or reliability. Test run three was delayed from 1145-1410 waiting for the next PFAS test run to begin and also delayed 27 minutes from 1433-1500 due to an RTO trip out and subsequent reheating to its operating temperature.

HF does not have a specific a permit emission limit, but data is used to evaluate 24 -hour and Annual Ambient Air Limits against NHDES RTAP standards. The measured HF emission rates were multiplied by the ratio of molecular weights (19 F, 20 HF) to calculate hydrogen fluoride as F. The result of the HF RTAP evaluation is presented below. The HF adjusted in-stack concentration complies with the 24-hour and annual AALs.

Table 4-3 RTAP Determination of HF Ambient Air Levels

RTAP Compound	Emission Rate (lb/hr)	Exhaust Flow RTO RTAP (acfm)	Adjusted in-stack Concentration (µg/m³)	24-hr AAL (µg/m³)	Annual AAL (µg/m³)
Hydrogen Fluoride as F	1.21E-02	103,600	0.13	1.5	0.98

4.3 RTAP Determination

An RTAP analysis was conducted following the procedures given in the New Hampshire Code of Administrative Rules Part Env-A 1400. The RTAP analysis compares emissions (both on a 24-hour and annual basis) to ambient air levels (AALs) as set forth in NHDES Env-A Table 1450-1: RTAP List. Controlled emissions for HF and APFO were determined by the emissions tests at the RTO.

Measured PFOA emissions were multiplied by the ratio of molecular weights (431 ammonium perfluorooctanoate (APFO), 414 PFOA) to calculate APFO emissions.

A summary of the results of the APFO RTAP analysis are presented in Tables 5-4 below. Ammonia perfluorooctanoate is below the *de minimis* 24-hr and annual emission rate levels. The RTAP calculations are in Appendix F.

Attachment C
Air Dispersion and Deposition Modeling
Prepared by Barr Engineering

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Technical Memorandum

To: Mr. William Kempskie – Director Environmental Health and Safety
Saint-Gobain Performance Plastics, Merrimack, New Hampshire
From: Eric Edwalds
Subject: Bypass Stack, Air Deposition and Dispersion Modeling
Date: December 16, 2021
Project: Merrimack, New Hampshire Facility
c: Brett Slensky, Saint-Gobain

Executive Summary

To address Item #4 in the November 18, 2021 Letter of Deficiency (LOD), air dispersion and deposition modeling was conducted to include emissions from the regenerative thermal oxidizer's (RTO) bypass stack to address RSA 125-C:10-e (deposition of perfluorinated compounds (PFC's)) and Env-A 1400 Regulated Toxic Air Pollutants (RTAP) in accordance with Table 8, Item 6 of Saint-Gobain's Temporary Air Permit TP-0256.

The modeling analysis shows:

- Operating at a maximum of 4,145 hours per year, the bypass stack would be in compliance with RSA 125-C:10-e and will not cause or contribute to an exceedance of groundwater or surface water quality standards (AGQS and SWQS).
- Permit limits for annual operations of the bypass stack pursuant to Env-A 607.01 can be incorporated into Saint-Gobain's Temporary Air Permit TP-0256 to demonstrate compliance with RSA 125-C:10-e.
- The bypass stack is in compliance with Env-A 1400 RTAP limits for hydrogen fluoride (HF) and ammonium perfluorooctanoate (APFO).

Letter of Deficiency and Air Permit Requirements

Item #4 of the November 18, 2021 LOD cites condition VIII, Table 8, Item 6 of the permit (*Update to Air Dispersion and Deposition Modeling Impact Analysis*) that the bypass stack is a new emissions source not included in the modeling analysis for the permit, and consequently the modeling must be updated:

Requested action:

- **No later than 30 days from the date of this letter**, provide an update to the modeling analysis that was submitted with the Application that includes the bypass stack in the analysis. In addition, present the methodology for estimating uncontrolled per- and polyfluoroalkyl substances (PFAS)

emissions and the rationale for the number of hours for any consecutive 12-month included in the analysis.

An updated modeling analysis is also required by permit condition VIII, Table 8, Item 5 *Compliance Demonstration for Env-A 1400, Regulated Toxic Air Pollutant Regulation and RSA 125-C:10-e, Requirements for Air Emissions of Perfluorinated Compounds Impacting Soil and Water* based on final as-built RTO emission parameters and the results of the stack testing conducted pursuant to Table 6, Item 14 for RTAPs and PFCs, respectively of the permit[1]. The updated modeling analysis for the RTO as-built emission parameters[2] has been utilized for developing modeling parameters in the bypass stack modeling analysis.

Updated Modeling Analysis to Include the Bypass Stack

The bypass stack is a necessary safety component of the RTO. The bypass stack allows process exhaust gases to be diverted from entering the RTO in the event that the RTO is inoperable. As such, the RTO and the bypass stack do not operate at the same time, meaning that emissions would not occur from both stacks simultaneously. Consequently, the RTO and the bypass stack do not have combined modeled impacts such that the bypass stack can be modeled independently of the RTO.

Bypass Stack Modeling Parameters

The bypass stack is located on the roof and connected to the process exhaust gas ductwork as shown in **Figure 1**. The bypass stack has a slightly downward horizontal discharge to keep precipitation and other material from entering the process exhaust system. The bypass stack was modeled as source type POINTHOR (horizontal point source).

The modeling input parameters for the bypass stack were developed from the stack testing inlet parameters for the RTO. The RTO inlet measurements were collected just downstream of the bypass stack and represent what would be discharged through the bypass stack. These parameters are appropriate for this modeling analysis because the stack testing was designed to measure maximum pollutant emissions. Modeled emission parameters for the bypass stack are shown in **Table 1**.

For the purposes of preparing a permit amendment to incorporate the bypass stack into Saint-Gobain's temporary permit, a second set of modeling runs were conducted at a typical flow rate of 50,000 scfm to encompass the range of potential maximum modeled impacts.

[1] Saint-Gobain RTO Compliance Test Report 11-09-2021.

[2] December 16, 2021 Technical Memorandum: RTO As-Built Emission Parameters, Air Deposition and Dispersion Modeling

Modeling Methodology

The modeling was conducted following the methodology used in the RTO as-built emission parameter modeling. The model set-up is summarized in **Table 2**.

Compliance Demonstration for *RSA 125-C:10-e, Requirements for Air Emissions of Perfluorinated Compounds Impacting Soil and Water*

Revised Table 11 (from Permit Application Review Summary) on Page 16 of the Permit Document *Temporary Permit – Findings of Fact and Director's Decision* (330110016518-0227TypeFindingsOfFact.pdf) specifies the methodology for evaluating compliance with RSA 125-C:10-e. Compliance demonstration with RSA 125-C:10-e for the bypass stack is shown in **Table 3**. Consistent with previous deposition modeling, Method 2 deposition was greater than Method 1 deposition. Method 2 deposition results were used in the compliance demonstration. Maximum unit impact deposition ($g/m^2/yr$ per g/s) was slightly greater for the measured flow modeling run as compared to the typical flow modeling run. As shown in **Table 3**, PFOA deposition would potentially be detectable if the bypass stack operated continuously. **Table 3** also shows the number of hours per year that the bypass stack could theoretically operate and still demonstrate compliance with RSA 125-C:10-e. **Figure 2** shows the unit impact deposition results for the measured flow rate bypass stack modeling scenario.

This modeling demonstration satisfies the requirement that the operation of the bypass stack (at less than 4,145 hours per year based on conditions at the measured flow rate, which is the more restrictive of the scenarios modeled) does not cause or contribute to or have the potential to cause or contribute to an exceedance of an ambient groundwater quality standard (AGQS) or surface water quality standard (SWQS) due to the deposition of the contaminant from the air. This modeling demonstration will be used as supporting documentation for any permitted annual operating hours limitations.

Compliance Demonstration for *Env-A 1400, Regulated Toxic Air Pollutant Regulation*

Hydrogen fluoride (HF) emissions were not measured at the RTO inlet as part of the compliance testing, consequently, HF emissions from the bypass stack are unquantified. Because one of the primary concerns for operation of the RTO is the potential for generation of HF due to the thermal destruction of PFCs, we have assumed that the measured HF emissions at the RTO outlet would be a conservative representation of HF emissions from the bypass stack.

Measured PFOA emissions at the RTO inlet were multiplied by the ratio of molecular weights (431 APFO, 414 PFOA) to calculate APFO emissions from the bypass stack. APFO emissions from the bypass stack are well below Env-A 1400 *de minimis* emissions and modeled concentrations are well below RTAP AALs.

Compliance demonstration with Env-A 1400, RTAP regulation for the bypass stack is shown in **Table 4**. Very small differences in modeled concentrations occurred between the measured flow rate and the typical flow rate model runs.

Table 1 - Bypass Stack Modeled Stack Parameters
Bypass Stack Air Dispersion Modeling Technical Memorandum
St. Gobain Perfomance Plastics Inc., Merrimack, NH Facility

	UTM Zone 19 Meters		English Units					Metric (Modeling) Units			
Modeled Flow Rate	**X-Coordinate (easting)**	**Y-Coordinate (northing)**	**Ht (ft)**	**Temp (F)**	**Diam (in)**	**Flow (SCFM)**	**Flow (ACFM)**	**Ht (m)**	**Temp (K)**	**Diam (m)**	**Vel (m/s) [2]**
Measured [1]	298,780.62	4,752,031.23	63.52	236	60	57,500	76,900	19.36	386	1.524	19.90
Typical						50,000	65,660				16.99

[1] Saint-Gobain RTO Compliance Test Report 11-09-2021:
Results of the September 7-10, 2021, Regenerative Thermal Oxidizer Compliance Tests
at Saint-Gobain Performance Plastics in Merrimack, New Hampshire
Table 2 - RTO Inlet

[2] Stack gas exit velocity is based on actual airflow (ACFM)

Table 2 – Bypass Stack Model Set-Up Summary
Bypass Stack Air Deposition and Dispersion Modeling Technical Memorandum
St. Gobain Performance Plastics Inc., Merrimack, NH Facility

Model Set-Up

- AERMOD v.21112
- 2013 – 2017 Manchester, NH meteorological data
    - Processed by NHDES – AERMET v.18081 with AERMINUTE and adjusted u-star
    - Upper air data from Gray, ME
- Model Bypass stack at 1 g/s
    - Calculate Unit Impact Rate (UIR)
        - Deposition ($g/m^2/yr$ per g/s)
        - Ambient air concentration ($\mu g/m^3$ per g/s)
- Source type = POINTHOR
- Receptor Grids
    - OXIDIZER.ROU (PFAS deposition) includes receptors on property
    - RTAP_GRID (RTAP compliance) receptors start at facility property boundary
- Deposition Parameters
    - Unknown particle size distribution in bypass stack exhaust
    - Method 1 deposition parameters from Barton et al., 2006, Table 4

Table 4. Average particle size distribution for PFOA at fence line.

Particle Diameter, µm	Mass Fraction %
>4.0	5.6
1.7	12.9
0.8	9.2
0.5	7.2
0.3	5.3
<0.28	59.8

    -
    - Density = 1.8 g/cm^3 (perfluorooctanoic acid - https://pubchem.ncbi.nlm.nih.gov/source/ILO-ICSC)
    - Method 2 deposition parameters (< 2.5 µm) fraction of 0.61 (Barton, 2010)

References:

Barton, C.A., Butler, L.E., Zarzecki, C.J., Flaherty, J., and Kaiser, M., 2006. Characterizing Perfluorooctanoate in Ambient Air near the Fence Line of a Manufacturing Facility: Comparing Modeled and Monitored Values. Journal of the Air & Waste Management Association, 56:48-55.

Barton, C.A., Zarzecki, C.J., and Russell, M.H., 2010. A Site-Specific Screening Comparison of Modeled and Monitored Air Dispersion and Deposition for Perfluorooctanoate. Journal of the Air & Waste Management Association, 60:4, 402-411, DOI:10.3155/1047-3289.60.4.402

Table 3 - Compliance Demonstration for RSA 125-C:10-e [1]
Bypass Stack Air Dispersion and Deposition Modeling Technical Memorandum
St. Gobain Perfomance Plastics Inc., Merrimack, NH Facility

Measured Flow Rate

PFC	Lowest Concentration Minimum Reporting Limits (LCMRL) for Lab Analysis [2] (ppt)	Maximum Concentration of PFC (MC_{PFC}) Infiltrating to Groundwater [3] (ppt)	Maximum Deposition Rate (MDR_{PFC}) [4] ($\mu g/m^2/yr$)	Maximum Annualized Emission Rate [5] (g/s)	Maximum Annualized Emission Rate [6] (lb/hr)	Maximum Annualized Emission Rate [7] (lb/yr)	Annual Emission Rate Based on September 2021 Stack Tests [8] (lb/yr)	Annual Emission Rate Below Maximum Annualized Emission Rate? [9] (Yes / No)	Annual Operating Hours to Meet Limit [10]
PFOA	3.4	< 3.4	< 1.8	< 1.23E-06	< 9.72E-06	< 0.085	0.18	**No**	4,145
PFOS	4.4	< 4.4	< 2.3	< 1.59E-06	< 1.26E-05	< 0.110	0.0024	**Yes**	- -

Typical Flow Rate

PFOA	3.4	< 3.4	< 1.8	< 1.33E-06	< 1.06E-05	< 0.093	0.18	**No**	4,509
PFOS	4.4	< 4.4	< 2.3	< 1.72E-06	< 1.37E-05	< 0.120	0.0024	**Yes**	- -

[1] The calculation methodology used in this table follows the NHDES methodology shown in Table 11 of the Permit Application Review Summary and in the Revised Table 11 in the NHDES response to Comment #16 in the Temporary Permit - Findings of Fact and Director's Decision.

[2] LCMRLs used in the Revised Table 11 from the November 2019 EPA document *Method 533: Determination of Per- and Polyfluoroalkyl Substances in Drinking Water by Isotope Dilution Anion Exchange Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry*

[3] The maximum concentration of PFC (MC_{PFC}) infiltrating to groundwater needs to be less than the LCMRL to demonstrate no impact to groundwater.

[4] MDR_{PFC} ($(\mu g/m^2)/yr$) = MC_{PFC} ($\mu g/m^3$ or ppt) * IR (m/yr)
Precipitation Infiltration Rate (IR) (m/yr) 0.53
IR based on annual precipitation of 46 inches per year as described in the permit application review summary.

[5] Maximum Annualized Emission Rate (g/s) = MDR_{PFC} ($(\mu g/m^2)/yr$) / (UIR ($g/m^2/yr$ per g/s) * 1,000,000 ($\mu g/g$))
Unit Impact Rate (UIR) ($g/m^2/yr$ per g/s) at maximum impact receptor (measured flow rate) 1.47 Method 2 Deposition
Unit Impact Rate (UIR) ($g/m^2/yr$ per g/s) at maximum impact receptor (typical flow rate) 1.35 Method 2 Deposition
UIR from Method 2 deposition (worst-case). Method 1 UIR = 0.423 ($g/m^2/yr$ per g/s) (measured flow rate).

[6] Maximum Annualized Emission Rate (lb/hr) = Maximum Annualized Emission Rate (g/s) * 3600 s/hr * 1 lb/453.6 g/lb

[7] Maximum Annualized Emission Rate (lb/yr) = Maximum Annualized Emission Rate (lb/hr) * 8760 hr/yr

[8] Table 2 - Saint-Gobain RTO Compliance Test Report 11-09-2021.

[9] If the annual emission rate is less than the maximum annualized emission rate (which represents the level at which the PFC would be detectable), this result demonstrates that operation of the RTO will not cause or contribute to an exceedance of a groundwater or surface water quality standard (AGQS and SWQS, respectively) and satisfies the requirements of RSA 125-C:10-e.

[10] Annual operating hours to meet limit = maximum annualized emission rate / stack test annual emission rate * 8,760 hours per year

Table 4 - Compliance Demonstration for Env-A 1400 Regulated Toxic Air Pollutants (RTAP)
Bypass Stack Air Dispersion and Deposition Modeling Report
Saint-Gobain Performance Plastics - Merrimack, NH

Model Run	RTAP	Emission Rate (lbs/hr) [2]	24-hr H1H Concentration [3][4]	24-hr Maximum % of AAL	Maximum Annual Concentration [5]	Annual Maximum % of AAL	24-hr AAL ($\mu g/m^3$) [6]	Annual AAL ($\mu g/m^3$) [6]
As-Built Parameters [1]	Hydrogen fluoride, HF as F-	0.012	0.061	4.1%	0.0092	0.94%	1.5	0.98
	Ammonium perfluorooctanoate (APFO)	2.70E-06	1.4E-05	0.0%	2.1E-06	0.0%	0.05	0.024
Typical Flow Rate (50,000 scfm)	Hydrogen fluoride, HF as F-	0.012	0.061	4.1%	0.0091	0.93%	1.5	0.98
	Ammonium perfluorooctanoate (APFO)	2.70E-06	1.4E-05	0.0%	2.1E-06	0.0%	0.05	0.024

[1] As-Built Bypass Stack Parameters
Stack height - 63.5 feet
Stack temperature - 236 F
Stack diameter - 60 inches
Flow rate - 76,900 acfm (57,500 scfm)

[2] - HF was not measured at the inlet. RTO outlet emission rate (Table 3 Saint-Gobain RTO Compliance Test Report 11-09-2021, HF as Fluoride (F-)) assumed to be worst-case for inlet.

[2] - PFOA measured at RTO inlet (lb/hr) converted to APFO (lb/hr). 2.70E-06 APFO lb/hr
[3] - Maximum modeled concentration for 1 g/s emission rate * RTAP lbs/hr * 0.126 g/s / lbs/hr 0.126 lbs/hr to g/s
[4] - Highest (High-1st-high) 24-hour concentration over 5 years of meteorological data
[5] - Highest annual concentration over 5 years of meteorological data
[6] - New Hampshire Code of Administrative Rules Env-A 1405.01 Table of All Regulated Toxic Air Pollutants.

Figure 1 – Bypass Stack Location

Unit Impact Rate (UIR) Deposition ($g/m^2/yr$ per g/s)

- 0 - 0.05
- 0.05 - 0.50
- 0.50 - 1.0
- 1.0 - 1.3
- 1.3 - 1.47

Bypass Stack

AERMOD Method 2 Deposition

0 35 70 140 210 280

Meters

BARR

PFOA DEPOSITION - NEAR FIELD
BYPASS STACK AIR DEPOSITION MODELING
Measured Flow Rate Scenario
Unit Impact Rate (UIR) Deposition

Merrimack, New Hampshire
Saint-Gobain

FIGURE 2

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engineering and environmental consultants

BARR

Technical Memorandum

To: Mr. William Kempskie – Director Environmental Health and Safety
Saint-Gobain Performance Plastics, Merrimack, New Hampshire
From: Eric Edwalds
Subject: RTO As-Built Emission Parameters, Air Deposition and Dispersion Modeling
Date: December 16, 2021
Project: Merrimack, New Hampshire Facility
c: Brett Slensky, Saint-Gobain

Executive Summary

Air dispersion and deposition modeling was conducted to evaluate the performance of the regenerative thermal oxidizer (RTO) with respect to RSA 125-C:10-e (deposition of perfluorinated compounds (PFC's)) and Env-A 1400 Regulated Toxic Air Pollutants (RTAP) in accordance with Table 8, Item 5 of Saint-Gobain's Temporary Air Permit TP-0256.

The modeling analysis shows:

- The RTO is in compliance with RSA 125-C:10-e and will not cause or contribute to an exceedance of groundwater or surface water quality standards (AGQS and SWQS).
- The RTO does not require permit limits to demonstrate compliance with RSA 125-C:10-e pursuant to Env-A 607.01 (n).
- The RTO is in compliance with Env-A 1400 RTAP limits for hydrogen fluoride (HF) and ammonium perfluorooctanoate (APFO).
- The RTO does not need a permit for control of HF emissions pursuant to Env-A 607.01(t) and Env-A 1403.

Air Permit Requirements

Saint Gobain's Temporary Air Permit TP-0256 for the installation and operation of a regenerative thermal oxidizer has the following condition: Table 8 – Reporting Requirements, Item 5 *Compliance Demonstration for Env-A 1400, Regulated Toxic Air Pollutant Regulation and RSA 125-C:10-e, Requirements for Air Emissions of Perfluorinated Compounds Impacting Soil and Water*

> a.) The owner or operator shall update and submit an Env-A 1400 compliance demonstration in accordance with Table 7, Item 10 and an updated air deposition modeling analysis of post-controlled PFC emissions based on final as-built RTO emission parameters and the results of the stack testing conducted pursuant to Table 6, Item 14 for RTAPs and PFCs, respectively.
> b.) The Env-A 1400 compliance demonstration required in Table 8, Item 5(a) above, shall include the submission of the air dispersion model for RTAP emissions, an evaluation of compliance with the

limitations in Env-A 1400, a determination if the RTO requires a permit pursuant to Env-A 607.01(t) and Env-A 1403, *Permit Requirements*

The results from the September 7-10, 2021 stack testing (conducted pursuant to Table 6, Item 14) were submitted on November 9, 2021[1]. The compliance modeling demonstration described in Table 8, Items 5(a) and 5(b) above, is due to the NHDES within 30 business days of submittal of the stack testing report. This modeling report fulfills the above requirements and demonstrates compliance with RSA 125-C:10-e and Env-A 1400 without any additional permit limits or permitting actions pursuant to Env-A 607.01(n) (PFCs) or Env-A 607.01(t) (RTAP).

As-Built RTO Emission Parameters

Separate performance tests were conducted for PFAS compounds (Modified EPA OTM-45) and HF (EPA Method 26A). Although the measured flow parameters were very similar, the PFAS deposition modeling used the flow parameters from OTM-45, and the RTAP modeling for HF used the flow parameters from Method 26A. Modeled as-built emission parameters are shown in **Table 1**.

The location of the RTO stack is approximately 60 feet northeast of the RTO location in the permit application modeling. The building downwash model (BPIP) was rerun to accommodate this change.

Modeling Methodology

The modeling was conducted following the methodology used in the permit application with the one exception being that the latest version of AERMOD v.21112 was used instead of the AERMOD v.18081[2]. The model set-up is summarized in **Table 2**.

Compliance Demonstration for *RSA 125-C:10-e, Requirements for Air Emissions of Perfluorinated Compounds Impacting Soil and Water*

Revised Table 11 (from Permit Application Review Summary) on Page 16 of the Permit Document *Temporary Permit – Findings of Fact and Director's Decision* (330110016518-0227TypeFindingsOfFact.pdf) specifies the methodology for evaluating compliance with RSA 125-C:10-e. Compliance demonstration with RSA 125-C:10-e for the RTO as-built emission parameters is shown in **Table 3**. **Figure 1** shows the unit impact deposition results ($g/m^2/s$ per g/s) for the as-built emission parameters.

This modeling demonstration satisfies the requirement that the operation of the RTO does not cause or contribute to or have the potential to cause or contribute to an exceedance of an ambient groundwater

[1] Saint-Gobain RTO Compliance Test Report 11-09-2021

[2] AERMOD versions are identified by year and day of year.

quality standard (AGQS) or surface water quality standard (SWQS) due to the deposition of the contaminant from the air.

Compliance Demonstration for *Env-A 1400, Regulated Toxic Air Pollutant Regulation*

Compliance demonstration for Env-A 1400 was provided in the stack test report for hydrogen fluoride, as F (HF), and ammonium perfluorooctanoate (APFO)[3], however the compliance demonstration did not require dispersion modeling. In keeping with Permit Condition VIII Table 8 – Item 5(b) shown above, this report constitutes the submission of the air dispersion model for RTAP emissions. **Table 4** shows the RTAP dispersion modeling results which also demonstrate compliance with Env-A 1400.

In accordance with Env-A 607.01(t) and Env-A 1403.02, the air modeling results demonstrate compliance with the Env-A 1450.01 Ambient Air Levels. Accordingly, Saint-Gobain is not required to obtain a permit to control HF emissions from the RTO based on the measured emissions.

Discussion

For the RTO as-built emission parameters deposition modeling, both AERMOD Method 1 and Method 2 deposition were evaluated. Consistent with previous modeling, Method 2 deposition was greater than Method 1 deposition.

As mentioned above, AERMOD v.18081 was used for the permit application modeling and AERMOD v.21112 was used for the RTO as-built emission parameters compliance demonstration modeling. The model algorithm for Method 2 wet deposition was significantly changed in AERMOD v.19191 to modify an inconsistent calculation[4]. In addition to the wet deposition algorithm change, Method 2 was reclassified to being an ALPHA option in AERMOD, meaning that the Method 2 deposition algorithm has not been rigorously evaluated and use of Method 2 deposition is not approved for regulatory applications by default. Method 1 deposition is not affected by the model update and use of Method 1 is approved by default for regulatory applications.

Method 2 total deposition (wet + dry) Unit Impact Rate (UIR) increased by slightly more than a factor of 10 for the as-built modeling (UIR = 2.91) from that in Revised Table 11 (from Permit Application Review Summary) (UIR = 0.282). Due to low measured emission rates during the September 2021 stack test, even with the increase in UIR, the PFC emissions from the RTO readily demonstrate compliance with RSA 125-C:10-e.

[3] HF demonstrated compliance using the adjusted in-stack concentration ratio method and APFO demonstrated compliance using the *de minimis* emission level method. Refer to Tables 4-3 (HF) and 4-4 (APFO) in the compliance test report.
[4] See AERMOD Model Change Bulletin (MCB) 14 – AERMOD version 19191 for a full description of the wet deposition algorithm change.

Table 1 - RTO As-Built Emission Parameters [1]
RTO As-Built Emission Parameters Air Deposition and Dispersion Modeling Technical Memorandum
St. Gobain Perfomance Plastics Inc., Merrimack, NH Facility

Model Run	UTM Zone 19 Meters		English Units					Metric (Modeling) Units			
	X-Coordinate (easting)	Y-Coordinate (northing)	Ht (ft)	Temp (F)	Diam (in)	Flow (SCFM)	Flow (ACFM)	Ht (m)	Temp (K)	Diam (m)	Vel (m/s) [2]
PFAS Deposition - OTM-45	298,810.07	4,752,033.26	60	350	70	63,500	98,300	18.288	450	1.778	18.69
RTAP - Method 26A			60	351	70	66,900	103,600	18.288	450	1.778	19.69

[1] Saint-Gobain RTO Compliance Test Report 11-09-2021:
Results of the September 7-10, 2021, Regenerative Thermal Oxidizer Compliance Tests
at Saint-Gobain Performance Plastics in Merrimack, New Hampshire
[2] Stack gas exit velocity based on ACFM

Table 2 – RTO As-Built Emission Parameters Model Set-Up Summary
RTO As-Built Emission Parameters Air Deposition and Dispersion Modeling Technical Memorandum
St. Gobain Performance Plastics Inc., Merrimack, NH Facility

Model Set-Up

- AERMOD v.21112
- 2013 – 2017 Manchester, NH meteorological data
    - Processed by NHDES – AERMET v.18081 with AERMINUTE and adjusted u-star
    - Upper air data from Gray, ME
- Model RTO stack at 1 g/s
    - Calculate Unit Impact Rate (UIR)
        - Deposition ($g/m^2/yr$ per g/s)
        - Ambient air concentration ($\mu g/m^3$ per g/s)
- Receptor Grids
    - OXIDIZER.ROU (PFAS deposition) includes receptors on property
    - RTAP_GRID (RTAP compliance) receptors start at facility property boundary
- Deposition Parameters
    - Unknown particle size distribution in RTO exhaust, but most likely 100% < 1 um.
    - Method 1 deposition parameters from Barton et al., 2006, Table 4

Table 4. Average particle size distribution for PFOA at fence line.

Particle Diameter, µm	Mass Fraction %
>4.0	5.6
1.7	12.9
0.8	9.2
0.5	7.2
0.3	5.3
<0.28	59.8

    -
    - Density = 1.8 g/cm^3 (perfluorooctanoic acid - https://pubchem.ncbi.nlm.nih.gov/source/ILO-ICSC)
    - Method 2 deposition parameters (< 2.5 µm) fraction of 0.61 (Barton, 2010)

References:

Barton, C.A., Butler, L.E., Zarzecki, C.J., Flaherty, J., and Kaiser, M., 2006. Characterizing Perfluorooctanoate in Ambient Air near the Fence Line of a Manufacturing Facility: Comparing Modeled and Monitored Values. Journal of the Air & Waste Management Association, 56:48-55.

Barton, C.A., Zarzecki, C.J., and Russell, M.H., 2010. A Site-Specific Screening Comparison of Modeled and Monitored Air Dispersion and Deposition for Perfluorooctanoate. Journal of the Air & Waste Management Association, 60:4, 402-411, DOI:10.3155/1047-3289.60.4.402

Table 3 - Compliance Demonstration for RSA 125-C:10-e [1]
RTO As-Built Emission Parameters Air Deposition and Dispersion Modeling Technical Memorandum
St. Gobain Perfomance Plastics Inc., Merrimack, NH Facility

PFC	Lowest Concentration Minimum Reporting Limits (LCMRL) for Lab Analysis [2] (ppt)	Maximum Concentration of PFC (MC_{PFC}) Infiltrating to Groundwater [3] (ppt)	Maximum Deposition Rate (MDR_{PFC}) [4] ($\mu g/m^2/yr$)	Maximum Annualized Emission Rate [5] (g/s)	Maximum Annualized Emission Rate [6] (lb/hr)	Maximum Annualized Emission Rate [7] (lb/yr)	Annual Emission Rate Based on September 2021 Stack Tests [8] (lb/yr)	Annual Emission Rate Below Maximum Annualized Emission Rate? [9] (Yes / No)
PFOA	3.4	< 3.4	< 1.8	< 6.20E-07	< 4.92E-06	< 0.043	0.014	**Yes**
PFOS	4.4	< 4.4	< 2.3	< 8.02E-07	< 6.36E-06	< 0.056	0.0006	**Yes**

[1] The calculation methodology used in this table follows the NHDES methodology shown in Table 11 of the Permit Application Review Summary and in the Revised Table 11 in the NHDES response to Comment #16 in the Temporary Permit - Findings of Fact and Director's Decision.

[2] LCMRLs used in the Revised Table 11 from the November 2019 EPA document *Method 533: Determination of Per- and Polyfluoroalkyl Substances in Drinking Water by Isotope Dilution Anion Exchange Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry* .

[3] The maximum concentration of PFC (MC_{PFC}) infiltrating to groundwater needs to be less than the LCMRL to demonstrate no impact to groundwater.

[4] MDR_{PFC} (($\mu g/m^2$)/yr) = MC_{PFC} ($\mu g/m^3$ or ppt) * IR (m/yr)
Precipitation Infiltration Rate (IR) (m/yr) 0.53
IR based on annual precipitation of 46 inches per year as described in the permit application review summary.

[5] Maximum Annualized Emission Rate (g/s) = MDR_{PFC} (($\mu g/m^2$)/yr) / (UIR (g/m^2/yr per g/s) * 1,000,000 ($\mu g/g$))
Unit Impact Rate (UIR) (g/m^2/yr per g/s) at maximum impact receptor 2.91
UIR from Method 2 deposition (worst-case). Method 1 UIR = 0.121 (g/m^2/yr per g/s).

[6] Maximum Annualized Emission Rate (lb/hr) = Maximum Annualized Emission Rate (g/s) * 3600 s/hr * 1 lb/453.6 g/lb

[7] Maximum Annualized Emission Rate (lb/yr) = Maximum Annualized Emission Rate (lb/hr) * 8760 hr/yr

[8] Table 1 - Saint-Gobain RTO Compliance Test Report 11-09-2021.

[9] Because the annual emission rate is less than the maximum annualized emission rate (which represents the level at which the PFC would be detectable), this result demonstrates that operation of the RTO will not cause or contribute to an exceedance of a groundwater or surface water quality standard (AGQS and SWQS, respectively) and satisfies the requirements of RSA 125-C:10-e.

Table 4 - Compliance Demonstration for Env-A 1400
RTO As-Built Emission Parameters Air Deposition and Dispersion Modeling Technical Memorandum
Saint-Gobain Performance Plastics - Merrimack, NH

RTAP	Emission Rate (lbs/hr) [1]	24-hr H1H Concentration [2]	24-hr Maximum % of AAL	Maximum Annual Concentration [3]	Annual Maximum % of AAL	24-hr AAL ($\mu g/m^3$) [4]	Annual AAL ($\mu g/m^3$) [4]
Hydrogen fluoride, as F-	0.012	0.032	2.1%	0.0027	0.3%	1.5	0.98
Ammonium perfluorooctanoate	1.7E-06	4.5E-06	0.0%	3.8E-07	0.0%	0.05	0.024

[1] - HF as F- Saint-Gobain RTO Compliance Test Report 11-09-2021, Table 3 (RTO Outlet)

[1] - Saint-Gobain RTO Compliance Test Report 11-09-2021, Table 1 (RTO Outlet) PFOA = 0.014 lbs/yr
APFO (lbs/hr) = PFOA (lbs/yr) * (yr/8760 hr) * 431 (mol wt APFO) / 414 (mol wt PFOA)

[2] - Highest (High-1st-high) 24-hour concentration over 5 years of meteorological data

[2] - Maximum modeled concentration for 1 g/s emission rate * RTAP lbs/hr * 0.126 g/s / lbs/hr 0.126 lbs/hr to g/s

[3] - Highest annual concentration over 5 years of meteorological data

[4] - New Hampshire Code of Administrative Rules Env-A 1450.01 Table of All Regulated Toxic Air Pollutants.

Unit Impact Rate (UIR) Deposition ($g/m^2/yr$ per g/s)

- 0 - 0.05
- 0.05 - 0.50
- 0.50 - 1.5
- 1.5 - 2.5
- 2.5 - 2.91

RTO

AERMOD Method 2 Deposition

N

0 35 70 140 210 280

Meters

BARR

PFOA DEPOSITION - NEAR FIELD
RTO AS-BUILT AIR DEPOSITION MODELING
Unit Impact Rate (UIR) Deposition

Merrimack, New Hampshire
Saint-Gobain

FIGURE 1

ARD-1 FORM
GENERAL FACILITY INFORMATION

Air Resources Division/Permitting and Environmental Health Bureau

RSA/Rule: RSA 125-C:12 and Env-A 1700

This ARD-1 General Facility Information form shall be submitted with every application for an air permit, except for a Permit by Notification (PBN).

1. TYPE OF FACILITY[1]

☐ Title V ☒ Non-Title V ☐ Unknown

2. TYPE OF PERMIT[2]

☒ Temporary Permit (Construction) ☐ State Permit to Operate ☐ Title V Operating Permit

☐ General State Permit ☐ Limitation on Potential to Emit (Env-A 625)

3. TYPE OF APPLICATION[3]

☐ New ☐ Renewal ☒ Modification ☐ Administrative Amendment

4. FACILITY INFORMATION

FACILITY NAME[4]: Saint-Gobain Performance Plastics Corp.	AFS NUMBER[5]: 3301100165	
PHYSICAL ADDRESS: 701 Daniel Webster Highway		
TOWN/CITY: Merrimack	STATE: NH	ZIP: 03054
GOVERNMENT FACILITY CODE[6]: 0		

5. BUSINESS INFORMATION AS REGISTERED WITH SECRETARY OF STATE (If applicable)

REGISTERED NAME: Saint-Gobain Performance Plastics Corp.		
REGISTERED ADDRESS: 701 Daniel Webster Highway		
TOWN/CITY: Merrimack	STATE: NH	ZIP: 03054

6. PARENT CORPORATION INFORMATION (If applicable)

PARENT CORPORATION NAME: Saint-Gobain Corporation		
MAILING ADDRESS: 20 Moores Road		
TOWN/CITY: Malvern	STATE: PA	ZIP: 19355

7. MAJOR ACTIVITY OR PRODUCT DESCRIPTION
List all activities performed at this facility and provide SIC and/or NAICS Code(s).

SIC Code	Activity Description	NAICS Code	Activity Description
2221	Woven Fiber Glass		
2296	Industrial Fabrics		
2851	Fluoropolymer Films		

At a minimum, please provide contact information below for Responsible Official, Prepared Application, Technical, and Invoicing contacts. Make as many copies of this page as necessary in order to include all contacts that you wish to associate with the application. Multiple people can be assigned one role; multiple roles can be assigned to one person.

8. RESPONSIBLE OFFICIAL INFORMATION		
RESPONSIBLE OFFICIAL NAME[7]: David Calentine		
TITLE: Plant Manager		
COMPANY NAME: Saint-Gobain Performance Plastics Corp.		
MAILING ADDRESS: 701 Daniel Webster Highway		
TOWN/CITY: Merrimack	STATE: NH	ZIP: 03054
EMAIL ADDRESS: David.Calentine@saint-gobain.com		
TELEPHONE NUMBER: 603-420-1267	EXTENSION:	
FAX NUMBER:		
ROLES: ☒ Responsible Official ☐ Technical ☐ Invoicing ☐ Legal ☐ Emissions ☐ Prepared Application ☐ Corporate ☐ Owner/Operator ☐ Consultant		

9. ADDITIONAL CONTACT INFORMATION		
CONTACT NAME: William Kempskie		
TITLE: EHS Manager		
COMPANY NAME: Saint-Gobain Performance Plastics Corporation		
MAILING ADDRESS: 701 Daniel Webster Highway		
TOWN/CITY: Merrimack	STATE: NH	ZIP: 03054
EMAIL ADDRESS: William.kempskie@saint-gobain.com		
TELEPHONE NUMBER: 603-420-1387	EXTENSION:	
FAX NUMBER:		
ROLES: ☐ Responsible Official ☒ Technical ☒ Invoicing ☐ Legal ☐ Emissions ☐ Prepared Application ☐ Corporate ☐ Owner/Operator ☐ Consultant		

10. ADDITIONAL CONTACT INFORMATION		
CONTACT NAME: Daniel Reilly		
TITLE: Division Manager, Environmental Services		
COMPANY NAME: C.T. Male Associates		
MAILING ADDRESS: 50 Century Hill Drive		
TOWN/CITY: Latham	STATE: NY	ZIP: 12110
EMAIL ADDRESS: d.reilly@ctmale.com		
TELEPHONE NUMBER: 518-786-7400	EXTENSION:	
FAX NUMBER: 518-786-7299		
ROLES: ☐ Responsible Official ☒ Technical ☐ Invoicing ☐ Legal ☐ Emissions ☐ Prepared Application ☐ Corporate ☐ Owner/Operator ☒ Consultant		

11. ADDITIONAL CONTACT INFORMATION		
CONTACT NAME:		
TITLE:		
COMPANY NAME:		
MAILING ADDRESS:		
TOWN/CITY:	STATE:	ZIP:
EMAIL ADDRESS:		
TELEPHONE NUMBER:	EXTENSION:	
FAX NUMBER:		
ROLES: ☐ Responsible Official ☐ Technical ☐ Invoicing ☐ Legal ☐ Emissions ☐ Prepared Application ☐ Corporate ☐ Owner/Operator ☐ Consultant		

12. ADDITIONAL CONTACT INFORMATION		
CONTACT NAME:		
TITLE:		
COMPANY NAME:		
MAILING ADDRESS:		
TOWN/CITY:	STATE:	ZIP:
EMAIL ADDRESS:		
TELEPHONE NUMBER:	EXTENSION:	
FAX NUMBER:		
ROLES: ☐ Responsible Official ☐ Technical ☐ Invoicing ☐ Legal ☐ Emissions ☐ Prepared Application ☐ Corporate ☐ Owner/Operator ☐ Consultant		

13. ADDITIONAL CONTACT INFORMATION		
CONTACT NAME:		
TITLE:		
COMPANY NAME:		
MAILING ADDRESS:		
TOWN/CITY:	STATE:	ZIP:
EMAIL ADDRESS:		
TELEPHONE NUMBER:	EXTENSION:	
FAX NUMBER:		
ROLES: ☐ Responsible Official ☐ Technical ☐ Invoicing ☐ Legal ☐ Emissions ☐ Prepared Application ☐ Corporate ☐ Owner/Operator ☐ Consultant		

For ALL APPLICATIONS except Administrative Amendments, General State Permits, and Limitations on Potential to Emit:

14. FACILITY-WIDE EMISSIONS		
POLLUTANT[8]	POTENTIAL TPY	ACTUAL TPY
VOC	<50	
Total HAP	<25	
Individual HAP	<10	
PFOA	<0.45 POUNDS PER YEAR	0.018 POUNDS PER YEAR
PFOS	<0.57 POUNDS PER YEAR	0.0006 POUNDS PER YEAR

Please include calculations used in determining emissions and include any non-permitted emission devices.

15. FOR NEW APPLICATIONS OR IF CHANGES ARE MADE – PLEASE INCLUDE:	
☐	A copy of the USGS map, property identified, which shows the facility's location.
☐	A site plan to scale of the facility showing: 1. The locations of all emission points; 2. The dimensions of all buildings and tiers, including roof heights; and 3. The facility's property boundary and any security features (fences, walls, etc.).

16. FOR TITLE V PERMIT APPLICATIONS – PLEASE INCLUDE:[9]		
Included in Application	**Previously Submitted and Unchanged**	
☐	☐	A. Identification and details of limitations on source operation, or any work practice standards affecting emissions for all regulated pollutants.
☐	☐	B. Information required by any other applicable requirement of the Act, including, but not limited to, information related to stack height limitations developed pursuant to section 123 of the federal Clean Air Act (42 U.S.C. §7401).
☐	☐	C. A citation and description of state and federal air pollution control regulations and requirements applicable to each emission unit.
☐	☐	D. A narrative description or reference to test methods used or required for initial compliance demonstration with each applicable regulation.
☐	☐	E. Any additional information required to be provided pursuant to the Act or to determine applicability of any other requirements of the Act.
☐	☐	F. A written explanation of proposed exemptions.
☐	☐	G. Any information required to be provided to the director pursuant to the Act in order to evaluate alternative operating scenarios, or to define permit terms and conditions.
☐	☐	H. A list of all equipment and devices located at the source classified as insignificant activities pursuant to Env-A 600, including appropriate sizing data for equipment and devices which are exempt from permitting requirements based on their process ratings, fuel consumption rate, or both.

16. CONTINUED - FOR TITLE V PERMIT APPLICATIONS – PLEASE INCLUDE:[10]	
Included in Application	
☐	I. Compliance plan information containing: 1. A narrative description of the compliance status of the source with respect to all applicable requirements; 2. A narrative statement of methods used to determine continued compliance, including a description of monitoring, recordkeeping and reporting requirements and test methods; 3. A statement indicating the source's compliance status with an applicable enhanced monitoring and compliance certification requirements specified in Env-A 800; 4. A statement that the source shall continue to comply with all applicable requirements; 5. A statement that the source shall meet all applicable requirements that will become effective during the permit term on a timely basis; 6. A compliance schedule stating all applicable requirements with which the source is not in compliance, consistent with the following: a. The compliance schedule shall incorporate the requirements of and be at least as stringent as that contained in any judicial consent decree or administrative order to which the source is subject; b. Such compliance schedule shall be supplemental to, and not sanction non-compliance with, the applicable requirements on which it is based; and c. The compliance schedule shall include the following statements and schedules: i. A narrative description of how the source shall achieve compliance with such requirements; ii. A schedule of remedial measures, including an enforceable sequence of actions with milestones leading to compliance with any applicable requirements for which the source shall be in non-compliance with at the time of permit issuance; and iii. A schedule for submission of certified progress reports no less frequently than every 6 months. 7. For sources deemed in compliance with all applicable requirements, a certified statement signed by a responsible official stating: "The undersigned certifies that, based on information and belief formed after reasonable inquiry, the source is in compliance with all applicable regulations"; and 8. A schedule for submission of compliance certifications during the permit term, to be submitted annually or more frequently as specified by the underlying applicable requirement.
☐	J. For sources subject to Title IV of the Act, the compliance plan requirements, specified in (I.) above, shall apply to and be included in the acid rain portion of a compliance plan for an affected source, except as specifically superseded by regulations promulgated under Title IV of the Act with regard to the schedule and method(s) the source will use to achieve compliance with the acid rain emission limitations.
☐	K. In addition to the forms required pursuant to Env-A 1700, sources subject to Title IV of the Act shall use the nationally standardized forms for the acid rain portions of the Title V operating permit application, pursuant to 40 CFR 72.30.

This section of the form must be completed and signed by the Responsible Official only.

17. CERTIFICATIONS	
	I certify that the applicant, or the owner or operator the applicant represents, has right, title, or interest in all of the property that is proposed for development or use because the owner or operator owns, leases, or has binding options to purchase all of the property proposed for development or use.
☒	I am authorized to make this submission on behalf of the affected source or affected units for which this submission is made. I certify under penalty of law that I have personally examined, and am familiar with, the information submitted in this document and all of its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.

18. RESPONSIBLE OFFICIAL INFORMATION AND SIGNATURE	
RESPONSIBLE OFFICIAL NAME: David Calentine	
TITLE: Plant Manager	
RESPONSIBLE OFFICIAL'S SIGNATURE	DATE: 1/13/2022

C.T. MALE ASSOCIATES
Engineering, Surveying, Architecture, Landscape Architecture & Geology, D.P.C.

50 Century Hill Drive, Latham, NY 12110
518.786.7400 FAX 518.786.7299 ctmale@ctmale.com

February 25, 2022

PUBLIC VERSION - CONFIDENTIAL BUSINESS INFORMATION REMOVED

Ms. Cathy Beahm
SIP Planning Administrator
NH Department of Environmental Services
Air Resources Division
29 Hazen Drive, PO Box 95
Concord, NH 03302-0095

Re: Saint-Gobain Performance Plastics Merrimack, NH
Permit Application – Request for Additional Information
C.T. Male Project No.: 16.6235

Dear Ms. Beahm:

In response to your correspondence dated January 27, 2022, please find the additional requested information relative to the Saint-Gobain Performance Plastics Corporation facility located at 701 Daniel Webster Highway in Merrimack, New Hampshire. This information is being provided as part of an Application for Significant Amendment of Temporary Permit (TP-0256) for the facility that was submitted to the Department on December 18, 2021. Items included within the correspondence have been addressed in the following manner:

1. *In accordance with Env-A 1705.01, Form ARD-3 Information Required for a Permit for a Unit of Processing or Manufacturing Equipment, the applicant must submit a completed current ARD-3 form for each unit of processing or manufacturing equipment. While an ARD-3 form was submitted with the application, NHDES has determined that information within the application needs corrections.*

An updated Form ARD-3 and associated information is included within this submission as Attachment A.1 and A.2 and includes operations averaged over the period 2019-2021.

Please submit a revised ARD-3 form that addresses the following concerns:

a. NHDES recognizes that the application is for multiple manufacturing equipment all vented to the same regenerative thermal oxidizer (RTO) and the RTO stack or vented directly to the atmosphere via the bypass stack. Therefore, Saint-Gobain shall submit one completed current ARD-3 form and for Section I of the form, attach pertinent information for each connected emission unit.

The attached Form ARD-3 has identified the Emission Units at the facility which will exhaust either to the RTO (identified as Emission Point 1A) or the bypass stack (identified as Emission Point 1B).

> *b. Section I.B requires coating usages pertaining to the manufacturing equipment. The purpose of this section is to use the information to calculate potential uncontrolled emissions. However, NHDES recognizes that Saint-Gobain is using stack test data from the September 2021 test to evaluate the operation of the bypass stack and PFAS emissions that potentially deposit and infiltrate groundwater. Therefore, for Section I.B, Saint-Gobain shall submit up-to-date information on raw material types and 2021 usages but note the utilization of the stack test results in lieu of a material balance approach. Also, Saint-Gobain shall select the coating application method and include the uncontrolled emissions utilized in the application for the operation of the bypass in this section.*

The attached documentation within Attachment A.3 identifies the annual coating products used on the towers in 2021 and includes Total VOC and Total HAP contained in those products. This data provides actual annual pre-control emission information relative to these contaminants for the 2021 operating year. This information also includes the 2021 hours of operation for each of the coating lines and has been utilized to calculate potential pre-control emissions based on scaling production on each Emission Unit to 8,760 hours per year. Stack test data has been utilized relative to PFC and HF emissions from facility operations rather than material balance data. Within this public version, actual names of products have been removed as they constitute Confidential Business Information.

> *c. Section I.D requires Saint-Gobain to submit stack information for both the main RTO stack and the bypass stack.*

The attached Form ARD-3 has identified the stack details for the RTO and bypass stack (Emission Points 1A and 1B respectively).

> *d. Section III.A requires Saint-Gobain to submit fuel information for each manufacturing equipment associated with this application that burns fuel as well as for the burners on the RTO.*

The attached Form ARD-3 and documentation within Attachment A.4 present heat input ratings for the various manufacturing equipment.

> *e. Section III.B requires Saint-Gobain to submit criteria pollutant emission information from the combustion of fuels associated with the manufacturing equipment and the RTO.*

The attached Form ARD-3 and documentation in Attachment A.5 present heat input ratings for the various manufacturing equipment, and 2021 combustion emission calculations in order to calculate annual and potential emissions of criteria pollutants from combustion activities.

> *f. Section IV requires Saint-Gobain to submit information pertaining to the pollution control equipment as well as controlled PFAS air pollution emissions that are emitted from the RTO stack. Also included in the section of the application is a monitoring plan as outlined in Items #2 and #3 below.*

The attached information within Attachment A.6 includes PFAS air emissions from the facility's RTO and bypass stack, which are based on the stack testing completed at the facility in 2021. Saint-Gobain personnel have developed the Monitoring Plan which will be submitted under separate cover.

2. *In accordance with Env-A 810.01, Monitoring Plans for Air Pollution Control Equipment, the applicant shall submit an air pollution control equipment monitoring plan. The plan shall document the maintenance procedures, control equipment parameter monitoring, and any sampling or testing specified by the manufacturer of the device, to demonstrate continued effectiveness of the control equipment. NHDES recognizes that this plan is required by the current Permit and that Saint-Gobain has been submitting monthly update reports pursuant to the Permit starting in March 2020 and continuing through to the present. Please submit a complete and comprehensive monitoring plan for the RTO.*

Saint-Gobain personnel have developed the Monitoring Plan which will be submitted under separate cover.

3. *In accordance with Env-A 810.02, Information Regarding Additional Monitoring, the applicant shall submit any other monitoring that the source intends to follow in order to demonstrate compliance with any applicable state or federal statute, rule, regulation, or permit; and is not otherwise described by the information submitted pursuant to Env-A 810.01. This plan shall document the parameters that Saint-Gobain proposes to monitor regarding operation of the bypass stack. NHDES recognizes that this information has been requested in the Letter of Deficiency No. ARD 21-010. Please submit a complete and comprehensive monitoring plan for the operation of the bypass stack.*

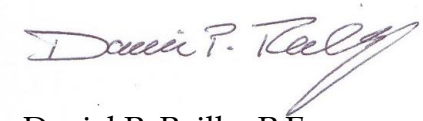
Saint-Gobain personnel have developed the Monitoring Plan which will be submitted under separate cover.

4. *In accordance with Env-A 621.07, Public Access to Information, the applicant must submit two copies of the permit application. Env-A 621.07 requires that NHDES transmit a copy of an application for an air permit to the municipality in which the facility is or is proposed to be located. Please submit a copy of the application as it is amended in response to this letter.*

Two copies of the application package are included for review. The agency copy contains confidential business information (CBI) and has been marked as such in the appropriate locations. The public version has been sanitized from containing CBI and is included for submission to the Town as well as for posting to NHDES One Stop.

If you have any questions or require additional information, please contact me at (518) 786-7625.

Sincerely,
C.T. MALE ASSOCIATES



Daniel P. Reilly, P.E.
Division Manager, Environmental Services

Enclosures

ec: David Calentine, Will Kempskie, Chris Angier (Saint-Gobain)

Attachment A.1
NHDES Form ARD-3

ARD-3 FORM
INFORMATION REQUIRED FOR PERMITS FOR A UNIT OF PROCESSING OR MANUFACTURING EQUIPMENT

Air Resources Division/Permitting and Environmental Health Bureau

RSA/Rule: RSA 125-C:12 and Env-A 1700

I. EQUIPMENT INFORMATION – *Complete a separate form for each Emission Unit.*

Emission Unit Description: PCE01 (Stacks 1A & 1B)

Process/ Device	Manufacturer Model # Serial #	Maximum Raw Material Process Rate	Maximum Finished Material Process Rate	Manufacture Date[1]	Installation Date[1]	Stack #	Hours of Operation per day and days/yr
Paint Booth #3 (Example)	*N/A (Example)*	*8 gal/hr (Example)*	*N/A (Example)*	*1997 (Example)*	*1999 (Example)*	*#1 (Ex)*	*3 hr/day; 250 days/yr (Example)*
Metal Furnace #2 (Example)	*Consumat Model C12 S/N: 2569 (Example)*	*N/A (Example)*	*500 lbs/hr (Example)*	*2002 (Example)*	*2002 (Example)*	*#5 (Ex)*	*9 hr/day; 300 days/yr (Example)*
See Attached							

Process Description - Please provide a brief description of each process performed (attach additional pages as needed):

EU01-EU08, EU12, EU13 EU15, & EU16 - Coating operations for paper, fabric, film, or foil; EU22, research and development coating operations for paper, fabric, film, or foil; EU23 - Chemsil Coater coats and dries silicone onto fiberglass through thermally treating a solid paste without the addition of solvent; EU24 & EU25 - MTM and Step Press/Laminator utilize heat to laminate or otherwise affix coated fabrics and films; EU26 - Heat Clean oven used for cleaning by heating.

A. Parts Washers/Solvent Degreasers

☒ **Not Applicable**

Process/Device	Manufacturer & Model #	Capacity (gal)	Solvent Used	# Solvent Changes per Year
Degreaser #2 (Example)	*Safety-Kleen Model 16 (Example)*	*16 gal (Example)*	*Recycled 150 Solvent (Example)*	*2 (Example)*

B. Coatings, Solvents, and Inks Entering Process – *Use additional sheets if necessary*

☐ **Not Applicable**

Process/ Device	Raw Material or Chemical Compound	Potential Usage (gal or lb per hour and per year)		Density (lb/gal)	Percent VOC[2] (wt %)	Percent HAP[3] (wt %)	Potential VOC emissions (lb/yr)	Potential HAP emissions (lb/yr)
Paint Booth (Example)	*Black Enamel #5693 (Example)*	*13 gal/hr (Example)*	*1360 gal/yr (Example)*	*7.5 lb/gal (Example)*	*67.96% (Example)*	*13.17% (Example)*	*6,932 lb/yr (Example)*	*1,343 lb/yr (Example)*
See Attached								

Provide an example of the calculations used to determine total potential VOC and HAP emitted. Indicate if the results are based on test results; if control equipment was taken into account; if conditions exist where solvents remain in the substrate rather than complete volatilization, transfer efficiency, etc.:

Stack test results are utilized for calculating bypass emissions and allowable hours of operation in lieu of a material balance approach.

Coating Application Method:

☐ High Volume-Low Pressure (HVLP) Spray ☐ Electrostatic Spray ☐ Zinc-Arc Spray
☐ Air-Assisted Airless Spray ☐ Airless Spray ☒ Dip Coat
☐ A Flow Coating Technique ☐ Other (specify): _____

C. Amount of Liquid Waste Discarded:

_____ ☐ gal/yr ☐ tons/yr

D. Stack Information

Is device equipped with multiple stacks? ☒ Yes ☐ No *(If yes, provide data for each stack)*
Are multiple units connected to this stack? ☐ Yes ☒ No
*(If **yes**, identify other devices on this stack:)*

Stack #	Discharge Height Above Ground Level (ft)	Inside Diameter (ft) or Area (ft^2) at Stack Exit[4]	Exhaust Temperature (°F)	Exhaust Flow (acfm)	Stack Capped or Otherwise Restricted[5] (Yes - Type/No)	Exhaust Orientation[6]	Stack Monitor (Yes/No) and Description
#5 (Ex)	*65 ft (Example)*	*4 ft (Example)*	*70 °F (Example)*	*1500 acfm (Example)*	*Yes - Rain Cap (Example)*	*Vertical (Example)*	*No (Example)*
1A (Main RTO Stack)	60 ft.	6 ft.	350◦F	100,000 ACFM	No	Vertical	No
1B (RTO Bypass Stack)	63.52 ft.	5 ft.	236◦F	76,900 ACFM	No	Horizontal	Yes - Open/Closed Monitor

E. Hours of Operation

Hours per day: up to 24 Days per year: up to 365

II. NEW HAMPSHIRE REGULATED TOXIC AIR POLLUTANTS (RTAPs) – Env-A 1400

Do any of the devices or processes emit any of the RTAPs listed in Env-A 1400?

☒ Yes ☐ No

If **Yes**, attach your facility's most recent compliance demonstration.

III. SUPPLEMENTAL FUEL USAGE INFORMATION

☐ Not Applicable

A. Fuel Information (List each fuel utilized by the devices)

Device	Fuel Type	Heat Value[7]	Units	Sulfur Content (%)	Maximum Fuel Flow Rate	Units	Maximum Gross Heat Input Rate	Units
Thermal Oxidizer (Example)	*#2 Fuel Oil (Example)*	*140,000 (Example)*	*Btu/gal (Example)*	*0.0015 (Example)*	*20 (Example)*	*gal/hr (Example)*	*1.2 (Example)*	*MMBtu/hr (Example)*
See Attached								

B. Air Pollutant Emissions from Combustion

Pollutant	Emission Factor	Units	Emission Factor Source[8]	Actual (lb/hr)	Potential (lb/hr)	Actual (tpy)	Potential (tpy)
TSP	See Attached						
PM_{10}							
NO_x							
VOC							
CO							
SO_2							
Other *(specify)*							

Provide an example of the calculations used to determine uncontrolled air pollutant emissions, if applicable:

Calculations detailed in attachment.

Note: If process utilizes more than one Supplemental Fuel Burning Device, provide all six pollutant emissions information for each device. Use additional pages if necessary.

IV. POLLUTION CONTROL EQUIPMENT

☐ **Not Applicable**

Note: If the devices utilize more than one type of pollution control equipment, provide data for each type of equipment.

Device	Type of Control Device	Manufacturer of Control Device	Model and Serial Number of Control Device (if known)	Pollutant(s) Controlled by Device
Metal Furnace #2 (Example)	*Baghouse #2 (Example)*	*Ultra-Flow Inc. (Example)*	*2400 CFM Small Dust Collector Serial #: N/A (Example)*	*TSP (Example)*
Paint Spray Booth (Example)	*Filter (Example)*	*Paint Arrestors (Example)*	*3100 Series (Example)*	*Zinc Chromate (Example)*
PCE01	Regenerative Thermal Oxidizer	Air Clear	Thermgen 3 Canister RTO Serial No. 64504J5	PFOA and PFOS

For each control device, include an Air Pollution Control Equipment Monitoring Plan pursuant to Env-A 810.

A. Controlled Air Pollution Emissions (list emissions that result <u>after all</u> add on controls – *use additional sheets if necessary*)

Pollutant	Controlled Emission Factor	Units	Emission Factor Source[9]	Actual (lb/hr)	Potential (lb/hr)	Actual (tpy)	Potential (tpy)
See Attached							

Provide an example of the calculations used to determine controlled air pollutant emissions, if applicable:

Calculations detailed in attachment

ARD-3 FORM INFORMATION INSTRUCTIONS

1 If exact date is unknown for Manufacture Date or Installation Date, you may use 01/01/year. Manufacture Date refers to the date the emission unit was originally produced. Installation Date refers to the date the emission unit is installed at the facility.

2 Volatile Organic Compound, as defined in Env-A 100.

3 Hazardous Air Pollutant, as defined in section 112 of the 1990 Clean Air Act Amendments.

4 Examples of Inside Diameter or Area at Stack Exit: Diameter at discharge point of convergence cone, if applicable

5 Flapper valves and other devices which do not restrict the vertical exhaust flow while the device is operating are not considered obstructions or restrictions.

6 Examples of Exhaust Orientation: Vertical, Horizontal, Downward
Note: for a stack to be considered vertical and unobstructed, there shall be no impediment to vertical flow, and the exhaust stack extends 2 feet higher than any roofline within 10 horizontal feet of the exhaust stack

7

Liquid Fuels	Heat Value
Ultra-Low Sulfur Diesel (ULSD)	137,000 Btu/gal
#2 Fuel Oil	140,000 Btu/gal
Kerosene	135,000 Btu/gal
Other – Liquid	Obtain from Fuel Supplier

Gaseous Fuels	Heat Value
Natural Gas	1,020 Btu/cubic foot
Propane (LPG)	94,000 Btu/gal
Gasoline	130,000 Btu/gal
Other (Gaseous)	Obtain from Fuel Supplier

8 Emission factor sources may include:
- Continuous Emissions Monitor (CEM)
- Stack Test (Provide Date)
- Vendor Guaranteed Rates (Provide Documentation)
- AP-42 Emission Factors
- Material Balance (Provide Sample Calculation)
- Engineering Estimate

Attachment A.2
Form ARD-3 Section I. Supplement - Equipment Information

Section I. Equipment Information

Process/ Device	Manufacturer Model # Serial #	Maximum Raw Material Process Rate [sq. ft/hr]	Maximum Finished Material Process Rate	Manufacture Date	Installation Date	Stack #	Hours of Operation[1] [hr/yr]
MA Tower (EU01)	N/A	6,000	N/A	N/A	1994	1A/1B	3,595
MB Tower (EU02)	N/A	17,500	N/A	N/A	1998	1A/1B	1,491
MC Tower (EU03)	N/A	9,200	N/A	N/A	1998	1A/1B	3,483
MR Tower (EU04)	N/A	9,200	N/A	N/A	2002	1A/1B	3,147
MD Tower (EU05)	N/A	9,200	N/A	N/A	1999	1A/1B	3,108
QX Tower (EU06)	N/A	6,000	N/A	N/A	1989	1A/1B	3,795
20" SBC (EU07)	N/A	500	N/A	N/A	1986	1A/1B	600
20" Coater (EU08)	N/A	500	N/A	N/A	1986	1A/1B	552
MG Tower (EU12)	N/A	4,375	N/A	N/A	2002	1A/1B	832
MP Tower (EU13)	N/A	4,375	N/A	N/A	2002	1A/1B	1,420
MQ Tower (EU15)	N/A	1,100	N/A	N/A	2002	1A/1B	2,859
MS Tower (EU16)	N/A	2,300	N/A	N/A	2002	1A/1B	3,792
R&D Coater (EU22)	N/A	2,600	N/A	N/A	N/A	1A/1B	458
Chemsil Coater (EU23)	N/A	3,800	N/A	N/A	N/A	1A/1B	N/A
MTM (EU24)	N/A	5,000	N/A	N/A	N/A	1A/1B	N/A
Step Press/ Laminator (EU25)	N/A	4,800	N/A	N/A	N/A	1A/1B	N/A
Heat Clean (EU26)	N/A	N/A	N/A	N/A	N/A	1A/1B	N/A

[1] 3-year average based on 2019-2021 annual operating hours per process/device.

Attachment A.3
Form ARD-3 Section I.B Supplement - Coatings, Solvents and Inks Entering Process

Section I.B. Coatings, Solvents, and Inks Entering Process

(All product tracking is done based on total usage and is not tracked per Emission Unit/Tower)

Raw Material	2021 Usage [lb.]	Potential Usage [lb.][1]	Percent VOC	Percent HAP	Potential VOC emissions [lb/yr][2]	Potential HAP emissions [lb/yr][2]
Product #1	0	0	100.0%	24.00%	0	0
Product #2	0	0	100.0%	0%	0	0
Product #3	0	0	100.0%	0%	0	0
Product #4	0	0	100.0%	0%	0	0
Product #5	41	171	0%	0%	0	0
Product #6	74	310	100.0%	0%	310.1	0
Product #7	104	437	0%	0%	0	0
Product #8	10	42	100.0%	0%	42.11	0
Product #9	0	0	100.0%	0%	0	0
Product #10	906	3,817	0%	0%	0	0
Product #11	0	0	100.0%	0%	0	0
Product #12	0	0	100.0%	0%	0	0
Product #13	0	0	100.0%	0%	0	0
Product #14	0	0	100.0%	0%	0	0
Product #15	0	0	100.0%	0%	0	0
Product #16	2,750	11,579	0%	0%	0	0
Product #17	0	0	100.0%	25.10%	0	0
Product #18	293	1,234	0%	3.10%	0	38.25
Product #19	0	0	0%	0%	0	0
Product #20	171	718	0%	0%	0	0
Product #21	82	346	0%	0%	0	0
Product #22	0	0	100.0%	0%	0	0
Product #23	0	0	100.0%	0%	0	0
Product #24	103	434	0%	0%	0	0
Product #25	0	0	100.0%	100.0%	0	0
Product #26	14	58	100.0%	1.00%	57.86	0.58
Product #27	0	0	100.0%	0%	0	0
Product #28	0	0	100.0%	0%	0	0
Product #29	15	64	100.0%	0%	63.58	0
Product #30	0	0	100.0%	0%	0	0
Product #31	0	0	100.0%	0%	0	0
Product #32	5	19	100.0%	0.10%	19.50	0
Product #33	0	0	100.0%	47.30%	0	0
Product #34	0	0	100.0%	0%	0	0
Product #35	0	0	100.0%	0%	0	0
Product #36	756	3,182	0%	0%	0	0
Product #37	0	0	100.0%	0%	0	0
Product #38	0	0	100.0%	30.10%	0	0
Product #39	0	0	100.0%	12.30%	0	0
Product #40	0	0	100.0%	0%	0	0
Product #41	0	0	100.0%	0%	0	0
Product #42	0	0	100.0%	0%	0	0
Product #43	0	0	100.0%	0%	0	0

Raw Material	2021 Usage [lb.]	Potential Usage [lb.][1]	Percent VOC	Percent HAP	Potential VOC emissions [lb/yr][2]	Potential HAP emissions [lb/yr][2]
Product #44	0	0	0%	0%	0	0
Product #45	0	0	100.0%	0%	0	0
Product #46	0	0	100.0%	0%	0	0
Product #47	0	0	100.0%	0%	0	0
Product #48	0	0	100.0%	0%	0	0
Product #49	0	0	100.0%	0%	0	0
Product #50	0	0	100.0%	0%	0	0
Product #51	0	0	100.0%	0%	0	0
Product #52	0	0	100.0%	0%	0	0
Product #53	0	0	100.0%	0%	0	0
Product #54	0	0	100.0%	0%	0	0
Product #55	0	0	100.0%	0%	0	0
Product #56	0	0	100.0%	0%	0	0
Product #57	0	0	100.0%	0%	0	0
Product #58	0	0	100.0%	0%	0	0
Product #59	0	0	100.0%	0%	0	0
Product #60	0	0	100.0%	0%	0	0
Product #61	0	0	100.0%	0%	0	0
Product #62	0	0	100.0%	0%	0	0
Product #63	0	0	100.0%	0%	0	0
Product #64	0	0	100.0%	0%	0	0
Product #65	0	0	100.0%	0%	0	0
Product #66	0	0	100.0%	0%	0	0
Product #67	0	0	100.0%	0%	0	0
Product #68	0	0	100.0%	0%	0	0
Product #69	0	0	100.0%	0%	0	0
Product #70	0	0	100.0%	0%	0	0
Product #71	0	0	100.0%	0%	0	0
Product #72	1,615	6,800	0%	3.00%	0	204.0
Product #73	631	2,656	0%	3.00%	0	79.68
Product #74	3,877	16,325	0%	0%	0	0
Product #75	0	0	100.0%	0%	0	0
Product #76	0	0	100.0%	0%	0	0
Product #77	0	0	100.0%	0%	0	0
Product #78	3,227	13,588	0%	0%	0	0
Product #79	0	0	100.0%	0%	0	0
Product #80	0	0	100.0%	0%	0	0
Product #81	52	220	100.0%	0%	220.2	0
Product #82	0	0	100.0%	0%	0	0
Product #83	200	842	100.0%	0%	842.1	0
Product #84	304	1,280	0%	0%	0	0
Product #85	0	0	100.0%	0%	0	0
Product #86	0	0	100.0%	0%	0	0
Product #87	0	0	100.0%	0%	0	0
Product #88	778	3,274	100.0%	0%	3274	0

Raw Material	2021 Usage [lb.]	Potential Usage [lb.][1]	Percent VOC	Percent HAP	Potential VOC emissions [lb/yr][2]	Potential HAP emissions [lb/yr][2]
Product #89	0	0	100.0%	0%	0	0
Product #90	269	1,132	0%	0%	0	0
Product #91	429	1,807	0%	0%	0	0
Product #92	75,221	316,734	0%	0%	0	0
Product #93	1,201	5,055	0%	0%	0	0
Product #94	0	0	100.0%	0.30%	0	0
Product #95	25	106	100.0%	0.10%	106.0	0
Product #96	18	77	100.0%	0%	76.63	0
Product #97	676	2,848	0%	0%	0	0
Product #98	570,966	2,404,176	0%	0.010%	0	240.4
Product #99	14,242	59,968	0%	0%	0	0
Product #100	12,582	52,981	0%	0.010%	0	5.30
Product #101	0	0	100.0%	0.010%	0	0
Product #102	0	0	100.0%	0%	0	0
Product #103	22	95	100.0%	0%	94.59	0
Product #104	0	0	100.0%	0%	0	0
Product #105	0	0	100.0%	0%	0	0
Product #106	92	387	100.0%	0%	387.0	0
Product #107	0	0	100.0%	0%	0	0
Product #108	5,537	23,316	0%	0%	0	0
Product #109	0	0	100.0%	0%	0	0
Product #110	315	1,326	0%	0%	0	0
Product #111	0	0	100.0%	25.00%	0	0
Product #112	2,094	8,815	10.00%	0.10%	881.5	8.82
Product #113	77,593	326,720	0%	0%	0	0
Product #114	0	0	100.0%	0%	0	0
Product #115	371	1,563	0%	0.10%	0	2
Product #116	0	0	100.0%	0%	0	0
Product #117	440	1,853	0%	0%	0	0
Product #118	0	0	100.0%	0%	0	0
Product #119	0	0	100.0%	0%	0	0
Product #120	0	0	100.0%	0%	0	0
Product #121	110	464	0%	0%	0	0
Product #122	441	1,856	0%	0%	0	0
Product #123	110	464	100.0%	0%	464.1	0
Product #124	55	232	100.0%	0%	232.1	0
Product #125	26	108	100.0%	30.00%	107.8	32.34
Product #126	0	0	100.0%	0%	0	0
Product #127	88	372	100.0%	0%	371.9	0
Product #128	0	0	100.0%	0%	0	0
Product #129	9	38	100.0%	0%	38	0
Product #130	0	0	100.0%	0%	0	0
Product #131	0	0	100.0%	0%	0	0
Product #132	0	0	100.0%	0%	0	0
Product #133	717	3,017	0%	0%	0	0

Raw Material	2021 Usage [lb.]	Potential Usage [lb.][1]	Percent VOC	Percent HAP	Potential VOC emissions [lb/yr][2]	Potential HAP emissions [lb/yr][2]
Product #134	165	696	100.0%	0%	696.3	0
Product #135	1,112	4,682	0%	0%	0	0
Product #136	0	0	100.0%	0%	0	0
Product #137	0	0	100.0%	0%	0	0
Product #138	0	0	100.0%	0%	0	0
Product #139	0	0	0%	0%	0	0
Product #140	0	0	0%	0%	0	0
Product #141	13,393	56,396	0%	0%	0	0
Product #142	13	57	100.0%	0%	56.76	0
Product #143	0	0	0%	0%	0	0
Product #144	362	1,524	100.0%	0%	1524	0
Product #145	1,903	8,015	0%	0%	0	0
Product #146	0	0	100.0%	0%	0	0
Product #147	451	1,898	0%	0%	0	0
Product #148	0	0	100.0%	0%	0	0
Product #149	16	66	100.0%	0%	65.69	0
Product #150	0	0	100.0%	0%	0	0
Product #151	0	0	100.0%	0%	0	0
Product #152	26	111	100.0%	0%	111.2	0
Product #153	613	2,581	0%	0%	0	0
Product #154	127	535	0%	0%	0	0
Product #155	298	1,255	100.0%	0%	1255	0
Product #156	0	0	100.0%	0.010%	0	0
Product #157	47	199	0%	0%	0	0
Product #158	0	0	100.0%	0%	0	0
Product #159	857	3,609	100.0%	0%	3609	0
Product #160	1,029	4,335	0%	0%	0	0
Product #161	3,330	14,022	3.00%	3.00%	420.6	420.6
Product #162	165,958	698,803	0%	0%	0	0
Product #163	19	82	100.0%	0.0016%	81.73	0
Product #164	794	3,343	0%	0.0016%	0	0
Product #165	11,520	48,507	0%	0.0016%	0	0.78
Product #166	11,520	48,507	0%	0.0016%	0	0.78

[1] - Potential Usage (lb/yr) = 2021 Annual Usage (lb/yr) * (1 / 23.5% Utilization in 2021)
2021 Utilization (%) = 2021 Total Combined Coating Tower Operating Hours / (Combined Possible Tower Hours {8,760 hr/yr per Tower})

[2] - Potential Annual VOC/HAP Emissions (lb/yr) = Potential Usage (lb/yr) x % Total VOC or HAP

All VOC/HAP emissions are pre-control values, 2021 stack testing indicated a 77% VOC DRE.

Attachment A.4
Form ARD-3 Section III.A Supplement - Supplemental Fuel Usage Information

Section III.A. Fuel Information

Device	Fuel Type	Heat Value [Btu/ft^3]	Sulfur Content (%)	Maximum Fuel Flow Rate [ft3/hr]	Maximum Output [MMBtu/hr]
MA Tower (EU01)	Natural Gas	1,020	N/A	3,824	3.9
MB Tower (EU02)	Natural Gas	1,020	N/A	7,353	7.5
MC Tower (EU03)	Natural Gas	1,020	N/A	4,412	4.5
MR Tower (EU04)	Natural Gas	1,020	N/A	4,412	4.5
MD Tower (EU05)	Natural Gas	1,020	N/A	8,824	9
QX Tower (EU06)	Natural Gas	1,020	N/A	7,353	7.5
20” SBC (EU07)	Electric	N/A	N/A	N/A	N/A
20” Coater (EU08)	Electric	N/A	N/A	N/A	N/A
MG Tower (EU12)	Natural Gas	1,020	N/A	5,882	6
MP Tower (EU13)	Natural Gas	1,020	N/A	7,353	7.5
MQ Tower (EU15)	Natural Gas	1,020	N/A	4,412	4.5
MS Tower (EU16)	Natural Gas	1,020	N/A	4,412	4.5
R&D Coater (EU22)	Natural Gas	1,020	N/A	1,961	2
Chemsil Coater (EU23)	Electric	N/A	N/A	N/A	N/A
MTM (EU24)	Natural Gas	1,020	N/A	2,941	3
Step Press/ Laminator (EU25)	Electric	N/A	N/A	N/A	N/A
Heat Clean (EU26)	Natural Gas	1,020	N/A	1,471	1.5
RTO Burner "A"	Natural Gas	1,020	N/A	8,627	8.8
RTO Burner "B"	Natural Gas	1,020	N/A	8,627	8.8

Attachment A.5
Form ARD-3 Section III.B Supplement - Air Pollutant Emissions from Combustion

Section III.B. Air Pollutant Emissions from Combustion

Pollutant	Emission Factor[1] [lb/MMSCF]	Emission Factor[2] [lb/MMBTU]	Actual/Potential[3] [lb/hr]	Actual[4] [tpy]	Potential[5] [tpy]
PM (total)	7.6	0.0075	0.62	0.33	2.73
SO_2	0.6	0.00059	0.049	0.026	0.22
NO_x	100	0.098	8.19	4.28	35.86
CO	84	0.082	6.88	3.59	30.12
VOC	5.5	0.0054	0.45	0.24	1.97

Based on Combined heat input rating for Towers and RTO burner = 83.5 MMBtu/hr

[1] Natural gas emission factors for small boilers as found in Tables 1.4-1 and 1.4-2 of AP-42, Chapter 1.4, July 1998

[2] Per AP-42, "To convert from lb/10^6 scf to lb/MMBtu, divide by 1,020."

[3] Actual & Potential [lb/hr] = Sum of Max Output (from III.A.) [MMBTU/hr] x Emission Factor [lb/MMBTU]

[4] Actual 2021 emissions for combustion operations calculated using measured natural gas usage.

[5] Potential [tpy] = Potential [lb/hr] x 8760 [hr/yr] x 1/2000 [ton/lb]

Attachment A.6
Form ARD-3 Section IV.A Supplement - Controlled Air Pollution Emissions

Section IV.A. Controlled Air Pollution Emissions

Pollutant	Controlled Emission Factor[1] [%]	Actual[2] [lb/hr]	Potential[3] [lb/hr]	Actual[4] [tpy]	Potential[5] [tpy]
PFOA	92	1.64E-06	2.06E-05	8.84E-06	4.65E-05
PFOS	75	6.80E-08	2.77E-07	3.16E-07	7.31E-07
Hydrogen Fluoride as F*	N/A	1.21E-02	1.21E-02	5.19E-02	5.30E-02

[1] RTO Destruction/Removal Efficiency (DRE) from September 2021 stack test results.

[2] Controlled emissions measured at the RTO outlet from the September 2021 stack test results.

[3] Uncontrolled emissions measured at the RTO inlet from the September 2021 stack test results. Potential emissions are equal to the actual emissions when the RTO bypass stack is operating.

[4] Max. Actual for PFOA/PFOS (tpy) = (175 hr/yr x potential (lb/hr)) + (8,585 hr/yr x actual (lb/hr))/2,000 lb/ton
Actual for HF (tpy) = (actual (lb/hr) x 8,585 hr/yr)/2,000 lb/ton

Monitoring plan indicates facility will track bypass minutes and flow.
Actual for PFOA/PFOS (tpy) = Bypass Minutes x Flow to RTO at time of bypass (cfm) x PFOA or PFOS Emission Rate (lb/dscf)

[5] Potential for PFOA/PFOS (tpy) = (4,145 hr/yr x potential (lb/hr)) + (4,615 hr/yr x actual (lb/hr))/2,000 lb/ton
Potential for HF (tpy) = (actual (lb/hr) x 8,760 hr/yr)/2,000 lb/ton

* Hydrogen fluoride is not controlled by the RTO but is a byproduct of operation of the RTO in treating

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Via Electronic Mail and U.S. Mail

February 28, 2022

Mr. Todd Moore
Air Permit Programs Manager
NHDES – Permitting and Environmental Health Bureau
29 Hazen Drive PO Box 95
Concord, NH 03302-0095

Re: Saint-Gobain Performance Plastics Corporation's Response to NHDES' January 27, 2022 Request for Additional Information
Saint-Gobain Performance Plastics Corporation
701 Daniel Webster Highway, Merrimack, New Hampshire
Facility Identification #3301100165; Application #21-0089

Dear Mr. Moore:

In response to your letter dated January 27, 2022, please find the following information enclosed with this letter:

- Air Pollution Control Equipment Monitoring Plan Updates
    - PL-EHS-003 – Air Monitoring Plan
    - G-EHS-004 to G-EHS-015 – Capture Efficiency Verification Plans
    - PL-EHS-001 – Fire Prevention Plan
    - Two Drawings – 1095 (Fuel Trains & Burner PID Drawing) and 1135 (PID Legend Sheet)
- **Confidential** Letter and attachments from C.T. Male Associates regarding Saint-Gobain's Application for a Significant Amendment of Temporary Permit TP-0256 (February 25, 2022) containing **Confidential Business Information**.
- Redacted and Public Version of the letter and attachments from C.T. Male Associates regarding Saint-Gobain's Application for a Significant Amendment of Temporary Permit TP-0256 (February 25, 2022).

Please let us know if you have any questions.

Sincerely,

Adam M. Dumville

AMD:

Cc: Craig Wright, Director, NH DES Air Resources Division
Catherine Beahm, NH DES Air Resources Division
Edward Peduto, NH DES Air Resources Division
Thomas V. Guertin, NH DES Air Resources Division
Pamela Monroe, Esq., NH DES Legal Administrator
K. Allen Brooks, Esq., NH DOJ, Senior Assistant Attorney General

AIR POLLUTION CONTROL EQUIPMENT MONITORING PLAN

SAINT-GOBAIN MERRIMACK MERRIMACK, NH

70,000 SCFM REGENERATIVE THERMAL OXIDIZER (RTO)

Table of Contents

Air Pollution Control Equipment Monitoring Plan

Introduction

The Saint-Gobain Merrimack Air Pollution Control Equipment Monitoring Plan contains information and descriptions of how the facility will operate its Regenerative Thermal Oxidizer and satisfy all regulatory compliance requirements outlined in the site's New Hampshire Department of Environmental Services Temporary Permit. This Plan contains detailed descriptions of RTO operations, which are not typically included in an Air Pollution Compliance Monitoring Plans. Accordingly, as long as Saint-Gobain is in compliance with its Permit conditions in its Temporary Permit, or future State Permit to Operate, (i.e., 1832°F based on an hourly block average, minimum gas residence time of 1 second each for the RTO combustion chamber, inlet flow to RTO shall not exceed 70,000 scfm, and maximum annual controlled PFC emission limits of less than or equal to 0.45 lbs/yr PFOA and 0.57 lbs/yr PFOS, etc.), Saint-Gobain may need to make minor improvements or adjustments to those provisions of this Plan, such as adjusting thermocouples or internal set points to ensure that the RTO is maintained at 1832°F). If Saint-Gobain intends to make any such minor adjustment, it will notify the Department prior to making the change.

Air Pollution Control Equipment Monitoring Plan
Section 1

1.0 GENERAL SPECIFICATIONS and DESIGN CRITERIA

Vendor	Air Clear
Model	THERMGEN 3 Canister RTO
Serial Number	64504J5
Process Type	Coated Films Manufacturing
Customer Exhaust Volume to RTO	70,000 ACFM
Inlet Temperature	70-150ºF
Solvent Loading (Min./Max.)	0 - 150 LB/HR
Combustion Chamber Residence Time	1.0 sec. @ 1832°F
Net Thermal Efficiency (NTE)	95%
VOC Destruction & Removal Efficiency (DRE)	98% or greater
Electric Requirements	480 V / 3Ph / 60Hz 120V / 1Ph / 60Hz
Burner Capacity	15.0 MMbtu
Air Requirements	10 SCFM, 80psig. clean and dry, -40F pressure dew point

RTO TECHNICAL DESIGN SPECIFICATIONS	
The following details out the RTO technical design specifications:	
Process Type	Coated Films Manufacturing
Normal Process Flow at 100% of Design:	70,000 SCFM
Maximum Process Flow at 110% of Design:	77,000 SCFM
Maximum Process Flow Design:	30,000 SCFM
Minimum Process Flow – 5:1% turndown	14,0000 SCFM
Maximum Process Inlet Temperature:	0°F
Minimum Process Inlet Temperature:	200°F
Process Stream Relative Humidity:	0-100%
Combustion Chamber Operating Temperature:	1832°F
Combustion Chamber Maximum Temperature:	2200°F
RTO Outlet Temperature:	250-350°F
RTO VOC Destruction Removal Efficiency:	98% or greater
RTO PFC Destruction Removal Efficiency:	90% or greater
RTO Particulate Loading:	.10 lbs per hour or less
RTO Particulate Matter Removal Efficiency:	99% or greater
Process Stream Maximum VOC Loading	10% LEL
Process Stream Minimum VOC Loading:	0 % LEL
Heat Recovery Design Efficiency:	95%
Combustion Chamber Retention Time @ 1832 F	1.0 seconds
Installation Location:	Outdoors
Electrical Voltage Input:	480 Volt / 3 phase / 60 hertz
Electrical Input:	1200 amperage power supply (preliminary)
Fuel Gas Input:	Natural Gas
Fuel Natural Gas Volume Minimum:	10,000 cubic feet per hour
Fuel Natural Gas Pressure: **Minimum** **Maximum**	 3 psig 15 psig

Air Pollution Control Equipment Monitoring Plan

Section 2

* * WARNING * *

All flame safety, and safety interlocks must be periodically tested by the customer, and maintained by the customer to insure safe operation of the system.

Control panel and all other related equipment contain hazardous voltages, from more than one source of power, and only trained, and authorized personnel should open and/or service equipment.

All operating and maintenance personnel should study operating manual, manufacturer's product literature, and instruction manuals, etc., supplied with Oxidizer, to become familiar with its components, and operating characteristics and requirements.

Proposed customer changes to programmable controller operating program, or other control wiring, MUST be submitted, in writing to AC and written authorization, by AC, received prior to making any such changes. Failure to do so will void any remaining warranty and/or guarantee.

WARNING - UNAUTHORIZED CHANGES TO CONTROL WIRING WILL VOID ALL WARRANTIES AND GUARANTEES OF AC EQUIPMENT.

FAILURE TO OBSERVE THE ABOVE WARNINGS COULD LEAD TO SERIOUS PERSONNEL INJURY OR DEATH.

IN ADDITION, EQUIPMENT MAY BE DAMAGED OR DESTROYED.

GENERAL SAFETY

Please read this entire manual and follow the instructions carefully and completely. Pay close attention to the safety instructions and precautions detailed in all sections of this manual. Some parts of the system can be dangerous if an untrained person attempts to service or operate the unit.

This manual identifies some of the hazards which may occur and lists precautionary measures that should be followed to avoid these problems.

This manual also includes original equipment manufacturer (OEM) operation and maintenance manuals for purchased components that must also be read, understood, and abided by. Failure to follow the instructions provided in the OEM manuals could void the manufacturer's warranty on a component.

AIR CLEAR Oxidizer equipment and systems have been designed in such a manner to minimize the possible safety hazards and risks. It is, however, incumbent upon operating and maintenance personnel to follow all applicable safety procedures. This document does not list every potential hazard that may exist in all the possible operation or maintenance scenarios. Therefore, it is imperative that only trained and competent personnel be allowed to operate and service the equipment.

All of the procedures presented in this manual should be reviewed by site safety personnel to ensure consistency with local company safety programs. All applicable safety requirements must also be followed when performing any maintenance on the system. The operational and maintenance safety items related to this equipment should be incorporated into the periodic safety training and meetings.

SAFETY BANNERS

This manual employs four different kinds of messages to warn of possible hazards:

DANGER: IMMEDIATE hazard which WILL result in severe personal injury or death and/or permanent damage to the equipment.

WARNING: Hazard or unsafe condition which may result in severe personal injury or death and/or permanent damage to the equipment.

CAUTION: Hazard or unsafe condition which could result in minor personal injury or property damage.

NOTICE: A condition that could prevent the system from operating within design parameters or eventually cause premature failure of components.

The following are some examples of the general system safety hazards associated with this equipment.

DANGER
The RTO is wired for up to 480 Volts of electrical potential. The unit can deliver enough Voltage and Amperage to cause death or severe injury.

WARNING
Do not operate this equipment without having first read the owners manual including the section on safety.

WARNING
The proper operation of the system requires that particulate matter in the process stream be filtered out prior to being discharged to the RTO. A build up of particulate mater within the heat exchange media will prevent the unit from operating with design flow and heat transfer characteristics. The build up of combustible particulates can lead to fires and explosions within the RTO system that will damage the equipment.

WARNING
In the event of a fire in or around the RTO system, electrical power should immediately be removed from the system and the fuel source should be manually isolated to the maximum extent. Any fires in external RTO system components are likely to be electrical in nature. Use Class C extinguishing agents for initial fire fighting response.

WARNING
The system contains high voltage electrical circuits and several potential high temperature surfaces. Do not store any combustible materials on, near, or inside any of the RTO components.

CAUTION
Areas on the RTO skin and the exhaust ductwork may be up to 350°F. Always wear gloves when working near the potentially hot external surfaces of the RTO to avoid scorching.

MAINTENANCE SAFETY

To ensure the proper level of safety when performing any maintenance actions on the system equipment, all applicable industrial safety requirements must be followed. This equipment requires that the safety requirements and recommendations of OSHA, NIOSH, and NFPA be followed. Any additional site safety programs and procedures should also be applied when working on this equipment. The primary high energy hazards on this system stem from the electrical distribution sources, natural gas fuel sources, and compressed air sources.

DANGER
The RTO is wired for up to 480 Volts of electrical potential. The unit can deliver enough Voltage and Amperage to cause death or severe injury. Always isolate and lockout electrical power sources when working on electrical powered components. Ensure only qualified electricians perform work on electrical components. Follow all applicable safety standards and maintenance area isolation procedures when working near energized equipment.

WARNING
Electrical and mechanical **lock out** and **tag out** procedures must be strictly adhered to in order to prevent personnel injury or equipment damage. Always test system isolations prior to performing maintenance to ensure the equipment lock out and tag out is sufficient (e.g. test electrical circuits dead and pressurized lines vented/depressurized).

WARNING
Ensure all maintenance areas are properly marked and isolated to prevent entry of unauthorized personnel. All maintenance areas must be properly controlled to ensure that all the proper safety precautions are followed and to verify that only the required work by qualified personnel is performed on the equipment.

WARNING
Control all of the materials, tools, and supplies brought into and taken out of a work area. Operating the equipment with a foreign object inside or missing component can lead to immediate equipment damage or malfunction. Do NOT use electrical enclosures for storage.

WARNING
Do not operate this equipment without all safety guards in place unless secondary safety procedures and barriers are established.

WARNING
The fans used on the RTO system spin at very high speeds and can cause severe injury or death. Keep body parts and clothing away from any fans and blowers that are operating or may be started. The unit is intended for ducted applications only. The unit should not be operated without ductwork.

WARNING
Do NOT bypass or jumper-out any of the control system functions, signals, or interlocks. Bypassing portions of the control system can lead to additional personnel and equipment hazards. It can also prevent the system from operating as designed.

WARNING
Do NOT operate this equipment with combustion chamber temperatures exceeding 125% of the design set point temperature for greater than one minute to prevent damage to the system equipment.

WARNING
Only purge the system with clean air (i.e. air containing flammable substances with a combined LEL level of <1%.) Purging with the process stream or VOC laden air violates safety regulations and an explosive situation may result. Do NOT operate the oxidizer with the purge cycle shortened or bypassed. The purge cycle is factory-set for safe operation and must not be changed.

CAUTION
All of the specific safety, operation, and maintenance instructions for the OEM components must also be understood and followed by any person repairing, replacing, altering, or operating any of the system components.

CAUTION
Personnel in the area must wear safety equipment in compliance with plant and/or site safety standards.

CAUTION
All areas around the system must be restricted to authorized personnel only.

CAUTION
Periodically check for gas leaks in the gas train and main gas line. A gas leak could produce a dangerous explosive condition. Repair all gas leaks immediately.

CAUTION
Do NOT rely on automatic safety shut-off valves to completely close off the fuel lines. Close all of the manual isolation valves in the fuel lines to ensure no fuel leakage when not operating.

NOTICE
All maintenance actions performed on the equipment must be properly documented to keep the system warrantee valid and to allow the system to be restored to design conditions and performance.

MAINTENANCE ITEMS

The maintenance requirements for this equipment should be integrated into the plant or site maintenance procedures and schedules. It is essential that a maintenance log be maintained to properly document all of the work performed on the system equipment and components. Any work performed following a standard maintenance or inspection procedure can simply be recorded by referencing the procedure performed and recording the date and personnel that performed the maintenance. Any work performed that deviates from available procedures or is done without a previously approved procedure must be thoroughly documented to the level that an individual trained on the system could perform or functionally reverse the maintenance actions.

This manual and the associated OEM component manuals provide general periodicity requirements for maintenance actions. These are general recommendations and must be adjusted for various plant conditions and environments. Any equipment or component that appears to be operating abnormally or outside of normal operating tolerances (even if still within design specifications) should be investigated as soon as possible in addition to the scheduled periodic maintenance.

The proper operation of the system requires the full functional performance of numerous components. An inventory of spare components should be available and maintained based upon the expected reliability of the components and the operational requirements of the system. The spare component inventory requirements should be adjusted along with the maintenance periodicities as required by the specific operating conditions and environments.

The following pages identify some of the primary maintenance requirements for the system and can be used as an example template to assist in recording the scheduled maintenance actions.

2.1 AIR MOVING DEVICES

2.1.1 GENERAL

Fans and other air moving devices are made in a wide variety of types, sizes and arrangements. Properly used they help create a better environment for human comfort - both indoors and outdoors.

Improperly used or installed they become a potential danger to life and limb.

This guide is intended to assist in the safe installation and operation of air moving equipment and to warn operating and maintenance personnel of some of the hazards associated with this equipment.

Installation should always be performed by experienced and trained personnel. In addition to following the manufacturer's installation instructions, care must be taken to insure compliance with federal, state and local government requirements.

2.1.2 PERSONNEL SAFETY ACCESSORIES

Protective devices are incorporated as standard construction on some types of fans but on many fans, these devices are offered as optional accessories. This is done because the need for the devices and the design required is independent on the type of system, fan location and operating procedures. The proper protective safety device to meet company standards, local codes, and the requirements of the Occupational Safety and Health Act (OSHA) must be determined by the user since safety requirements vary depending on the location of the equipment. The user should specify and obtain required protective safety devices from the fan manufacturer or others and should not allow the operation of the equipment without them.

2.1.3 FAN GUARDS

All fans have moving parts which may require guarding in the same way as other moving machinery.

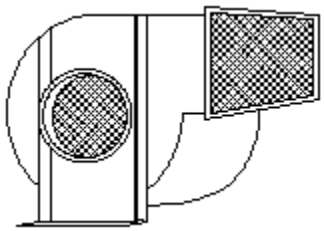
In areas that are accessible only to experienced and trained personnel, a standard industrial type guard may be adequate. This type of guard will prevent the entry of thrown or dropped objects with the minimum restriction of airflow.

Where the fan is accessible to untrained personnel or the general public, maximum safety guards should be used. Fans located less than 7 feet above the floor require special consideration as specified in the Occupational Safety and Health Act.

Even roof-mounted equipment will require guards when access is possible.

2.1.4 INLET AND OUTLET GUARDS

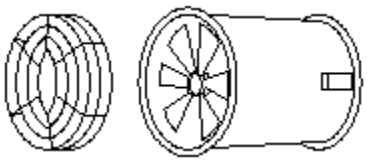
Axial and centrifugal fans are usually connected directly to ductwork that will prevent contact with the internal moving parts; but when the inlet or outlet is exposed, a suitable guard should be installed.



Inlet and outlet guards

on centrifugal fan with

non-ducted installation.



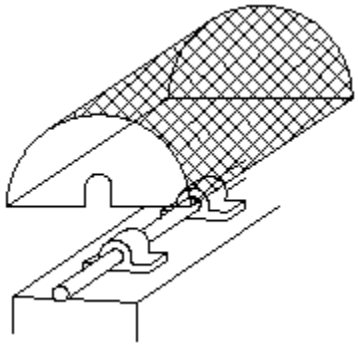
Guard for axial fan with non-ducted inlet or outlet.

2.1.5 DRIVE GUARDS

Fans may be driven directly from the motor shaft or through a belt drive. In every case where the bearing assembly, rotating shaft, sheaves, or belts are exposed a suitable guard should be provided.

Heat Slinger Guard

Drive Coupling Guard



Shaft Guard

2.1.6 HIDDEN DANGER

In addition to the normal dangers of rotating machinery, fans present an additional hazard in their ability to suck in not only air but loose material as well. Solid objects can pass through the fan and be discharged by the wheel as potentially dangerous projectiles.
Intakes to ductwork should, whenever possible, be screened to prevent the accidental entrance of solid objects. For example, on a sawdust handling system an intake screen should be provided which will allow entry of sawdust but prevent the entry of chunks of wood.

Access doors to a duct system should never be opened with the fan running.

On the downstream (or pressure) side of the system, releasing the door with the system in operation may result in an explosive opening. On the upstream (or suction) side the inflow may be sufficient to suck in a person, tools and clothing, etc. Quick release handles should not be provided on access doors since they are a potential hazard.

When a fan is being started up for the first time, a complete inspection should be made of all of the ductwork and the interior of the fan as well to make certain there is no foreign material which can be sucked into or blown through the ductwork.

2.1.7 STARTUP CHECK LIST

Before putting any fan into operation, the following checklist should be completed:

1. Lockout Tag and Try (LOTO) primary and secondary power source.

2. Make sure the foundation or mounting arrangement and the duct connections are adequately designed in accordance with recognized acceptable engineering practices and with the fan manufacturer's recommendations.

3. Check and tighten all hold-down (securing) bolts.

4. Spin wheel to see if rotation is free and does not bind or rub.

5. Inspect wheel to see if it is the proper rotation for the fan design.

6. Check all set screws and tighten, if necessary.

7. Make certain there is no foreign loose material in ductwork leading to and from fan or in fan itself.

8. Properly secure all access doors to fan and ductwork.

9. Switch on electrical supply and allow fan to reach full speed.

10. Check carefully for:

    a. Correct wheel rotation

    b. Excessive vibration

    c. Unusual noise

    d. Proper belt alignment

    e. Proper lubrication

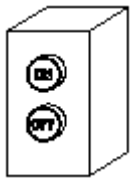
If any problem is indicated, SWITCH OFF IMMEDIATELY. Lockout Tag and Try (LOTO) the electrical supply, check carefully for the cause of the trouble and correct as necessary.

Even if the fan appears to be operating satisfactorily, shut down after a brief period and recheck items 3 through 11 as the initial startup may have relieved the tightness of bolts and set screws.

The fan may now be put into operation but, during the first eight hours of running, it should be periodically observed and checked for excessive vibration and noise. At this time checks should also be made of motor input current and motor and bearing temperatures to ensure that they do not exceed manufacturer's recommendations.

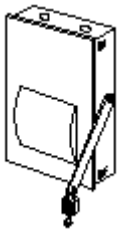
After eight hours of satisfactory operation, the fan should be shut down and the power locked out to check the following items and adjust, if necessary.

1. All set screws and hold-down bolts
2. Drive coupling alignment



Remote Switch

Lock carried by Maintenance Personnel



Disconnect Switch

2.1.8 ELECTRICAL LOCKOUT

Every fan must be provided with a local disconnect switch by the customer which will allow it to be isolated completely from the electrical supply.

Most roof-mounted fans and many others are started by remote switches or push-buttons, by interlocks with other equipment, or by automatic controls.

In these cases, a disconnect switch must be provided close to the fan so that maintenance personnel can “positively” cut off and Lockout Tag and Try (LOTO) the power when working on the fan.

In some installations other equipment, such as gas burner, may be interlocked with the fan so that disconnecting the fan will automatically shut off the burner or other device. Maintenance on systems of this type should be performed only under the supervision of competent personnel.

2.1.9 SPECIAL PURPOSE SYSTEMS

Fans which are used to move anything other than clean air at normal temperatures (say up to 150°F) may require special precautions to insure safe operation. Explosive or toxic fumes or gases, transported solids, high temperatures and corrosive contaminants will present special hazards that must be carefully considered. All federal, state and local codes should be reviewed together with any available national and industry standards which are applicable. The fan manufacturer’s recommendations for the specific type of application should also be closely followed.

Where the system will handle explosive or inflammable fumes or gases, fans of spark-resistant construction should be used. Refer to AMCA Standard 401-66 (latest revision) defines the industry’s standard types of spark-resistant construction.

If the fan is handling toxic or explosive fumes - even in traces – care must be taken to ensure that fumes have not collected in areas that require access by personnel. Concentrations of fumes can collect in “air trap” areas, particularly when a system is shut down. Material-handling fans are specially designed to allow the fan to handle a specific type of material without excessive accumulation of material on the fan wheel. To insure satisfactory operation, it is essential to observe the manufacturer’s limitations concerning the type of material to be handled by the fan.

Fan ratings and maximum speed limits are based on the use of air at 70°F (21°C). At temperatures above the normal range (above, say 150°F (65°C)) a reduction must be made in the maximum speed limit. Information on this reduction and on other precautions to be taken for high temperature applications should be obtained from the fan manufacturer.

Corrosive contaminants can be formed when moisture combines with an active airborne chemical. Unprotected fans subjected to corrosive attack will eventually fail but suitable protective coatings or material used in the fan construction will resist corrosion. Even protected fans must be regularly inspected to ensure that the protection remains effective.

In installations where water can accumulate within the fan housing, provide for the installation of adequately sized drain plugs.

2.2 BURNER AND FUEL TRAIN

2.2.1 GENERAL

1. Proper maintenance is a key factor in the SAFETY of operation of any equipment using burners, flame safeguards and fuel trains. Recommendations for maintenance are given here and in subsequent sections of this manual.

2. Special types of equipment command special attention. A preventive maintenance program should be established and followed. This program should include adherence to the manufacturer's recommendations. In this program, a minimum maintenance schedule should include inspection and action on the recommendations given in the following paragraphs. An adequate supply of repair parts should be maintained.

3. Burners and Pilot. Burner and pilot should be kept clean and in proper operating condition. Burner refractory parts should be examined at frequent regular intervals to assure good condition.

4. Flame Safeguard Equipment. When automatic flame safeguards are used, a complete shutdown and restart should be made at frequent intervals to check the components for proper operation.

5. Other Safeguard Equipment. Accessory safeguard equipment, such as manual reset valves, with pressure or vacuum switches, high temperature limit switches, draft control, shutoff valves, airflow switches, door switches and gas valves, should be operated at frequent/regular intervals to ensure proper functioning. If inoperative, they should be repaired or replaced promptly.

   When fire checks are installed in air-gas mixture piping, the pressure loss across the fire checks should be measured at regular intervals. When excessive pressure loss is found, screens should be removed and cleaned.

5. Safety Shutoff Valves. All safety shutoff valves should be checked for leakage and proper operation at frequent regular intervals.

2.3 EQUIPMENT SAFETY TESTING AND OPERATION CHECKLIST

Operational Checklist

a. Check burners for proper ignition and combustion characteristics.

b. Check pilots or spark plugs, or both, for proper main burner ignition.

c. Check for proper inlet air-gas ratios.

d. Check for proper operating temperatures.

e. Check instrumentation and gauges, or both, for proper flows and temperatures.

f. Make sure filters and/or intakes are clean, and have adequate combustion air.

g. Check for proper operation of ventilating equipment.

Regular Shift Checklist

a. Take necessary gas analyses; if automatic gas analyzers are used, make sure the manual and automatic readings coincide. Recalibrate automatic gas analyzers.

b. Standardize or balance instruments.

c. Check hand-valves, manual dampers, secondary air openings or adjustable bypasses, or both, for proper positions.

d. Check blowers, compressors and pumps for unusual bearing noise and shaft vibration.

Weekly Checklist

a. Inspect flame-sensing devices for good condition, proper location, and cleanliness.

b. Test thermocouples and lead wire for shorts and loose connections.

c. Check setting and operation of high temperature limit device.

d. Test visual or audible alarm systems, or both, for proper signals.

e. Check ignition spark electrodes and check proper gap.

f. Check all pressure switches for proper pressure settings.

g. Check valve motors and control valves or dampers for free, smooth action and adjustment.

Monthly Checklist

a. Test interlocks sequence of all safety equipment. Manually make each interlock fail, noting that related equipment closes or stops as specified by the manufacturer.

b. Test (leak test) safety shutoff valves for tightness of closure.

c. Test main fuel hand-valves for operation.

d. Test pressure switch settings by checking switch movements against pressure settings and comparing with actual impulse pressure.

e. Inspect all electrical switches and contacts; clean if necessary.

f. Test all amplifier and thermocouple fail-safe devices, making certain that the instrument drives in the proper direction.

g. Clean the air blower filters.

h. Clean water, gas compressor, and pump strainers.

i. Clean fire check screens and valve seats, and test for freedom of valve movement.

j. Inspect burner and pilot; clean if necessary.

k. Check all orifice plates, air-gas mixers, flow indicators, meters, gauges, and pressure indicators; and clean or repair, if necessary.

l. Check ignition cable and transformers.

m. Test automatic or manual turndown equipment.

n. Check equipment interior, and ventilation and ductwork systems for cleanliness and flow restrictions.

o. Test pressure relief valves; clean if necessary.

p. Inspect air, fuel, and impulse piping for leaks.

Periodic Checklist

The frequency of maintenance of the following will depend on the actual operating condition and individual plant operation.

a. Inspect ceramic media and heat exchanger tubes (if applicable) for dirt, leakage, and replace if necessary.

b. Lubricate the instrumentation, valve motors, valves, blowers, compressors, pumps, and other components per individual component literature or instructions.

c. Test instrumentation, clean slide wires, check amplifier tubes and battery.

d. Test flame safeguard units.

2.4 CONFINED SPACES

2.4.1 SAFETY PRECAUTIONS AND WARNINGS FOR ENTERING CONFINED SPACES

The following is an example of minimum safety procedure to be used whenever anyone enters equipment.

1. Make sure the following are turned off and follow Lock Out and Tag Out (LOTO) for:
   a. Electrical power (padlock all disconnect switches in "off" position),
   b. Mechanical equipment,
   c. All fuel gases,
   d. All process gases,

   Attach a maintenance tag to each that states:

   "Maintenance being performed - do not operate."

2. Prior to entry, analyze the area to be entered to determine it is not hazardous to health.

   Some examples of acceptable levels are:

   a. carbon monoxide (CO) level below 50 ppm,
   b. carbon dioxide (CO_2) level below 5,000 ppm,
   c. oxygen (O_2) level 21%.
   d. solvent levels below TLV (threshold limit value)

3. Cool all equipment as-required for safe personnel entry and for required work duration.
4. Place a large fan or man cooler in front of the area to be entered and direct the airflow into this area.

   DANGER: Before proceeding, read and follow "toxic poisoning and asphyxiation warnings."

5. Using the "buddy system," the equipment may now be entered.
6. After inside maintenance is complete and all personnel are out of the equipment, remove the maintenance tags.

2.4.2 TOXIC POISONING AND ASPHYXIATION WARNINGS

Equipment Constructions, Testing and Maintenance Warning.

Almost all gases are toxic and can kill. Even though a gas is not toxic, its presence in sufficient quantities will displace oxygen and can cause death by asphyxiation.

Never enter any area where gases have been used without first following Lock Out Tag and Try (LOTO) and:

a. making sure that all electrical power and mechanical equipment is locked off;

b. making sure all fuel and process valves are closed;

c. making sure that all gases have been vented out of the area;

d. making sure all suspected areas have been monitored with proper gas detection equipment;

e. utilizing independent breathing apparatus or providing fresh air ventilation to all internal areas;

f. using the "buddy system" and attaching a lifeline from the person entering the suspected area to his "buddy" outside of the suspected area;

g. knowing the symptoms of gas poisoning:

Dizziness

Headaches

Stiff neck

Weakness in knees

Nausea

If any of the above symptoms is evident, remove all personnel from the area and seal off the area until proper ventilation can be effected.

In the event a man is gassed, employ the following procedures:

a. Remove victim to fresh air immediately.

b. Obtain medical aid promptly.

c. If breathing is poor or stopped, give artificial respiration and administer oxygen, if available.

d. Keep victim warm with blanket.

2.5 SAFETY DATA SHEETS

All safety data sheets for chemicals used in the RTO are saved electronically in SGPP's third party safety data sheet database, Sphera. Employees can access Sphera through the following link:

https://idp.spheracloud.net/identity/signin?id=d79212c41e38c7995024353771e391a7&clientid=Communicator

Air Pollution Control Equipment Monitoring Plan

Section 3

3.0 RTO TECHNOLOGY

3.1 REGENERATIVE THERMAL OXIDIZER BASIC THEORY OF OPERATION

The AC Thermgen® Regenerative Thermal Oxidizer (RTO) converts noxious fumes containing organic solvents, hydrocarbons, and odors to harmless water vapor and carbon dioxide through thermal oxidation. Using regenerative heat transfer technology, the AC RTO will be able to sustain the high temperatures required for complete oxidation with little or no auxiliary fuel, making the system extremely economical to operate.

The three chamber system operating parameters allow for up to 98% VOC destruction and removal efficiency (DRE%) up to 95% thermal efficiency recovery (TER%).

The RTO will automatically compensate for exhaust volume changes through a pressure/volume (P/V) control circuit. A pressure transmitter located on the RTO inlet duct senses a pressure change in the duct and sends a signal to a controller in the PLC, which controls the speed of the RTO process fan to maintain a steady inlet pressure through the use of a variable frequency drive (VFD). If the pressure in the inlet duct rises, the fan speed will accelerate, increasing flow rate. Conversely, if the inlet duct pressure drops, the fan speed decreases. In this manner, any pressure fluctuation from the process exhaust can be stabilized by the controller with relatively little effect on the system as a whole.

Airflow direction in and out of the heat recovery chambers is sequenced to individual heat recovery chambers through the poppet valve system. The poppet valves are damper type, driven by pneumatic cylinders. This valve drive arrangement controls airflow to the chambers and requires very little valve drive maintenance with no valve adjustments necessary.

Contaminated exhaust process air enters the main inlet manifold and is directed to the recovery chamber which is in the "inlet" mode at that time as determined by the position of the valves. The air then passes through the recovery chamber, absorbing thermal energy from a previous "exhaust" mode and gradually increases in temperature until it nears almost 95% of the main combustion chamber temperature. As this contaminated air enters the combustion chamber, the burner(s) provide additional thermal energy required to maintain the oxidation temperature for a retention time required retention time for complete conversion.

The oxidized air then exits the combustion chamber through the recovery chamber that is in the "outlet" mode at that time. Once again, the air passes through the recovery chamber, gradually decreasing in temperature and releasing its thermal energy into the heat exchange media to be used when that recovery chamber is cycled into its "inlet" mode. These recovery chambers have now been "thermally regenerated".

Once the cleaned process air exits the recovery chambers, it is collected in the exhaust manifold and is discharged out the exhaust duct and to downstream equipment and eventual discharge through a stack to the atmosphere.

Air Pollution Control Equipment Monitoring Plan

Section 4

4.0 RTO COMPONENTS

4.1 VALVE AND DAMPERS

Compressed air is supplied at min. 85 PSIG and is used to actuate the poppet valves and other dampers on the unit.

4.1.1 VALVES – 3 Inlet Valves and 3 Outlet Valves

Each of these quick-acting open-close valves is driven by a pneumatic actuator cylinder. The actuators have 120 VAC solenoid valves that pressurize the actuator. The sequencing of the valves is controlled by the PLC, which energizes the solenoids. As indicated on the P&ID Drawing, the fresh air damper and poppet actuators will fail open. This is designed as a safety mode to ensure the RTO can cool down (draft) properly during a total signal or air loss. Cycle time can be adjusted via the PLC. Each recovery chamber has two poppet valves – 1 inlet and 1 outlet. There is a process isolation valve to close off the incoming ductwork and an ambient air valve to allow a fresh air purge of the system before lighting the burners.

The process isolation valve is a butterfly valve which is configured in the fail closed position. This is controlled via a spring that will close the valve upon air and power failure. This isolates the RTO from the process flow. This valve is controlled with a 120VAC solenoid which is either open or closed.

The ambient air valve is a modulated butterfly valve which is configured in the fail open position. This is controlled via a spring that will open the valve upon air and power failure. This valve is modulated with a 4-20mA signal from the PLC. This valve admits outside air for several reasons:

1.) To provide chamber clean air "purge" of the RTO before burner ignition.

2.) To provide a source of air to allow the RTO to operate while warming up and also while in IDLE mode (i.e. the RTO is at normal operating temperature and is ready to go online but is not receiving process air).
3.) To provide a source of air, at a minimum flow rate for the downstream fan and equipment

The valves have proximity switches that provide open and close status to the PLC, with the exception of the ambient air valve and the combustion air valve which have a proximity switch to prove open status only. This indicates that the valves are cycling properly. The valves are fully constructed with 304 Stainless Steel. The seats are metal-to metal, and are machined to provide a low leakage rate (< 0.25%). The valves also feature packing gland shaft seals.

4.2 FANS AND MOTORS

4.2.1 RTO PROCESS FAN

The RTO process fan is the prime mover for air flow through the RTO and downstream equipment. Fan speed (flow) is controlled by a VFD which in turn is controlled by a signal supplied by the PLC. A 4-20mA signal from a pressure transmitter located in the gas train junction box provides the input for the PID loop to maintain a constant inlet pressure to the RTO.

The process fan is driven by 700HP, 460V/60HZ/3PH motor, 1800RPM. The fan is induced draft, an Arrangement 8; direct drive; counter-clockwise rotation; with discharge to the exhaust stack (Air Pro w/ABB motor).

4.2.2 COMBUSTION AIR BLOWER (CAB)

The RTO CAB is driven by a 20HP, 460V/60HZ/3PH motor. The blower includes an inlet filter/silencer. The blower provides combustion air to the RTO burner. CAB is an Arrangement 4, direct-drive, Up-blast discharge (12 in.). (New York Blower w/WEG motor)

4.3 BURNER AND GAS TRAIN

4.3.1 BURNER'S

The RTO utilize two Hauck Burner Model SVG-160 (10 MM BTU/HR), to evenly distribute thermal energy in the combustion chamber. The burners are lit using direct spark ignition. A Siemens modulating motor is used on the combustion air piping and gas valves to modulate air/gas mixtures. The burner is monitored by a Honeywell UV flame scanner burner relay. Temperature is controlled through the PLC by Type-K thermocouple (T/C) signals located within the combustion chamber.

4.3.2 GAS AND COMBUSTION AIR TRAIN

The RTO utilizes a natural gas fuel train to feed the RTO burner. Each fuel train includes a main and a pilot gas train, gas regulators, FM approved safety shutoff valves (auto-reset), approved low and high gas pressure switches, and electric solenoid and manual valves.

Gas train includes pressure switches for proof of combustion airflow and pressure switches for low gas pressure and high gas pressure. All pressure switches are hard wired to relays in the flame control panel for burner interlocks.

The Gas train employs (2) safety shutoff solenoid valves in the "main" gas line. The valves are cast iron body, auto-reset. Both valves instantly close upon loss of power or loss of burner interlock signal. Primary safety valve includes a "valve-closed" auxiliary switch to prove valve closure for burner ignition interlocks.

Pilot gas line includes (2) 120V normally closed safety shutoff solenoid valves. The pilot solenoid valves are energized during the burner trial for ignition period in conjunction with the main gas valves open. This allows the burner to light off at a low-fire condition but also have the capability for reliable re-lights.

The gas train includes a main gas regulator. Should a regulator require replacement, be sure to procure an exact replacement (thread or flange connection, orifice size, spring color) and set the outlet pressure adjusting nut (inside the spring tower) to the same depth as the original regulator.

The gas train includes manually operated gas cocks for safe isolation of the burner and gas train services. These should be closed in the event of a prolonged shutdown or maintenance on the gas train or burner.

A Honeywell Q624A solid state spark generator is provided to power the spark electrode for flame ignition. This is housed in an enclosure close to the burner and controlled through the burner safeguard relay.

4.4 CONTROLS

4.4.1 MAIN CONTROL PANEL

The main control panel is a two door NEMA-4. The surface mounted instrumentation for the operation of the RTO can be divided into a few main groups; panel power OFF-ON, Human-Machine Interface (HMI), burner control display/interfaces, and high temperature shutdown controllers.

The subpanel layout consists of the main PLC, PLC controlled relays, burner relay, safety relay's, power supplies and all necessary wire ways and tracks.

4.4.2 MOTOR CONTROL CENTER (MCC)

The main process fan VFD is located in the Allen Bradley VFD Panel. Located next to the Allen Bradley VFD panel is a single door NEMA-4 enclosure housing the main 1200A disconnect.

4.4.3 IGNITION TRANSFORMER JUNCTION BOX (JB)

The ignition transformer JB's are located next to each RTO burner. Each JB houses the 10,000V solid state spark generator and 120VAC field terminals for the flame scanner and spark generator.

4.4.4 CONTROLLERS

The AC RTO control system is an Allen-Bradley 1769-L33ER Compact Logix 2 MB Memory Controller CPU. The two indicating high temperature limit controllers are of the Honeywell UDC 120L series.

4.4.5 RELAYS

Panel relays located in the subpanel are of the snap-in eight (8) and sixteen (16) pin type, 120VAC input, 10 amp and 24VDC, 6 amp contact ratings with (2) N.O. and (2) N.C. contacts. Relays are used to isolate certain electrical loads from the PLC such as electric valve actuators and solenoids.

Air Pollution Control Equipment Monitoring Plan

Section 5

5.0 OPERATIONS

5.0.1 INTRODUCTION

RTO operations are summarized by one button start, the operator will push the "System Start". This will start the 90 second purge cycle. Once the purge is complete the PLC will energize the Honeywell RM 7897 burner flame safeties will start the burner ignition sequencing. The RM 7897 burner flame safety will energize the pilot and igniter to prove a 10 second pilot ignition. After the pilot is lit, the RM 7897 will energize the main gas valves to open and prove the valves are open with the limit switches. Once the valves prove open and the burner flame stabilizes and is proved by the RM 7897 flame safety the "burner on" is displayed on the HMI.

The operator has two options for stopping the RTO. The operator can select "System Shutdown". This will stop the burners and continue to run both fans to ramp the RTO temperature down to 200 F. The other option is "Maintenance shutdown".

The burner and purge controls are predominantly hard wired using Honeywell RM7898A1000 Series burner controllers located in RTO control panel. This panel is located in the control room adjacent to the RTO. Start and Stop commands initiate from the Panel View HMI on the door of the RTO control panel. All dampers and control valves will revert to a safe condition (either normally closed (NC) or normally open (NO) on loss of power or air via spring return actuators; butterfly valves will fail closed to RTO inlet duct and open to the RTO outlet).

NOTE: *The system was designed with a process isolation damper (FV-300). FV-300 will close and be proven closed for purge.*

An RTO Auto Start will safely purge, ignite the burner, bring the oxidizer up to operating temperature and accept process vents.

RTO system modes are presented in the following table:

TABLE 1: RTO MODES OF OPERATION

MODE	PROCESS FAN VFD	RTO CAB (FN-200)	RTO BURNERS BU-01 & BU-02	POPPET VALVES	STARTUP / RTO INLET AMBIENT AIR DAMPER (FCV-303)	PROCESS ISOLATION DAMPER (FV-300)	BYPASS DAMPER
SYSTEM STATUS	***OFF / FIXED / MODULATING***	***OFF / ON***	***OFF / FIXED / MODULATING***	***CYCLING / CLOSED POSITION***	***OPEN / CLOSED / MODULATING***	***OPEN / CLOSED TO RTO***	***OPEN / CLOSED TO ATMOSPHERE***
OFF	**OFF**	**OFF**	**OFF**	**CLOSED**	**OPEN**	**CLOSED**	**OPEN**
PURGE	**FIXED**	**ON**	**OFF**	**CYCLING**	**OPEN**	**CLOSED**	**OPEN**
STANDBY/ DUCTWORK CLEANING	**FIXED**	**ON**	**MODULATING**	**CYCLING**	**OPEN**	**CLOSED**	**OPEN**
ONLINE	**MODULATING**	**ON**	**MODULATING**	**CYCLING**	**MODULATING**	**OPEN**	**CLOSED**
IDLE	**FIXED**	**ON**	**MODULATING**	**CYCLING**	**OPEN**	**CLOSED**	**OPEN**
BURNER ON	**MODULATING**	**ON**	**ON**	**CYCLING**	**CLOSED IF PROCESS ON LINE**	**OPEN IF PROCESS ON LINE**	**CLOSED**
BURNER OFF	**ON**	**ON**	**OFF**	**CYCLING**	**OPEN**	**CLOSED**	**OPEN**
MAINTENANCE SHUTDOWN	**ON**	**ON**	**OFF**	**CYCLING**	**OPEN**	**CLOSED**	**OPEN**
EMERGENCY SHUTDOWN	**OFF**	**OFF**	**OFF**	**CLOSED**	**OPEN**	**CLOSED**	**OPEN**
RTO SYSTEM SHUTDOWN (OFFLINE)	**FIXED**	**ON**	**OFF**	**CLOSED**	**OPEN**	**CLOSED**	**OPEN**
HIGH INLET TEMP SHUT DOWN	**OFF**	**OFF**	**OFF**	**CLOSED**	**OPEN**	**CLOSED**	**OPEN**

The various details concerning interlocks and control are included herein.

5.1 SHUTDOWN

All soft system shutdown conditions and alarms will employ a nominal time delay through the PLC.

For example, RTO inlet high temperature emergency shutdown is monitored by Type-K thermocouples (T/Cs) TE-306. If TE-306 measures a high inlet temperature, an alarm will sound and the unit will go into HIGH INLET TEMP SHUT DOWN. If a poppet valve position switch ZSC-301, 302, ZSO-301, 302, fails, an alarm will sound and SHUT DOWN.

5.1.1 RTO SYSTEM SHUTDOWN

An *RTO System Shutdown,* initiated from the "Start Up" screen, click the button labeled "System Shut Down". This will isolate the process stream from the RTO by closing the process isolation damper FV-300. The burner will shut down (RTO Modes of Operation, Table 1) the combustion air blower and process fan will shut down.
The full alarm list (See Section 9.1 of this document) details the conditions that cause an; *Emergency Shutdown, RTO System Shutdown, Alarm Only*

In this mode the bypass damper will open. Production is not occurring when *RTO System Shutdown* is initiated.

There are two shut down methods, Burner Off and Maintenance Shut Down.

5.1.2 BURNER OFF

The Burner Off mode will kick out the BURNER START COMMAND in the PLC for the burner. In order for the burner to be reignited, the Burner Start button needs to be pushed for the burner to start. In this mode the bypass damper will open. *Burner Off* is an unplanned event that would result in untreated emissions to the atmosphere if this occurred during a production run.

5.1.3 MAINTENANCE SHUTDOWN

Maintenance Shutdown is the System Shutdown to low temperature. When pushed the unit will turn off the burner will shut off, the process isolation valve will close and the ambient air damper will open. The process fan and combustion air fan, along with the poppet valves will continue to run and cycle until the unit temperature is below 200°F. Once the set temperature is reached, everything on the unit shuts down. In this mode the bypass damper will open. Production is not occurring when *Maintenance Shutdown* is initiated.

5.1.4 EMERGENCY SHUTDOWN

An *Emergency Shutdown* will immediately terminate all RTO operations and all valves will revert to their fail-safe condition. The process isolation valve FV-300 and RTO poppet valves XV-301/XV-302 will fail closed. Ambient air valve FCV will fail open. The Process Blower (FN-300) will stop. An *Emergency Shutdown* is an unplanned event that would result in untreated emissions being sent to the atmosphere via the bypass stack if it occurred during a production run. The occurrence of any of the following conditions will cause a RTO *Emergency Shutdown*:

TABLE 2: EMERGENCY SHUTDOWN

CONDITION	INSTRUMENT TAG	COMMENT
VFD Fault	SC-300	Process Blower VFD failure
Process Blower not running	FN-300	Process Blower not running
Process Isolation Damper (FV-300) Failed to Close	ZSC-300	Process Isolation damper failed to isolate RTO from VOC's

5.1.5 HIGH INLET TEMPERATURE SHUTDOWN

High Inlet Temp Shutdown will isolate the process stream from the RTO by closing the process isolation damper (FV-300). The burner will shutdown; the process fan and combustion air fan will shutdown. ALL VALVES (FV-300, FCV-303, XV-301, XV-302,) will go to a failsafe position to compartmentalize and starve oxygen from the compartments. A *High Inlet Temperature Shutdown* is an unplanned event that would result in untreated emissions being sent to the atmosphere via the bypass stack if it occurred during a production run. The occurrence of any of the following conditions will cause a RTO *High Inlet Temp Shutdown*:

TABLE 3: HIGH INLET TEMPERATURE SHUTDOWN

CONDITION	INSTRUMENT TAG	COMMENT
Process Gas High Temp > 250°F	TE-300 TAH-300	When the limit has engaged. The PLC will alarm only.
Process Gas High High Temp > 350°F	TE-300 TAH-300	When the limit has engaged. The PLC will go to RTO SYSTEM SHUT DOWN.

5.1.7 OFF – SYSTEM STOP MODE

This mode will shutdown the RTO and cool the inner temperature of the RTO down to a low heat recovery chamber temperature. Current shutoff temperature is 350°F for the System Stop Mode. In this mode the bypass damper will open. Production is not occurring when *Off-System Stop* is initiated.

5.2 MODES OF OPERATION

Operator will select the operating mode of the RTO from the Start Up screen on the Panel View Plus display. The current operating mode of the unit will be displayed. By selecting and pushing the on-screen button the operator to switch modes. There are (4) modes to select from, "Production", "Idle", "Auto" and "Manual."

5.2.1 PRODUCTION

In "Production" mode, an RTO Auto Start will allow the unit to purge, ignite the burner and achieve operating temperature. Once the combustion chamber is above the operating SP for a (5) min. time period, the unit will go online if it is in Production mode. The Process Control is described elsewhere.

5.2.2 IDLE

In "IDLE" mode an Auto Start will bring the RTO up to operating temperature, register "RTO At-Temp" after the requisite time delay, but not allow process stream to have online capability of the system. In this mode the bypass damper will open. Production is not occurring when *Idle* mode is initiated.

5.2.3 PURGE

Purge is an automatic part of the RTO sequencing during the startup when the RTO system is purged with outside ambient air to ensure no explosive mixture of gases in the RTO before lighting the RTO burners. The purge timer is 90 seconds and is controlled by the Honeywell Flame Safety Units. In this mode the bypass damper will open. Production is not occurring when *Purge* mode is initiated.

5.2.4 STANDBY/DUCTWORK INSPECTION MODE

"Standby" mode is also referred to as "Ductwork Inspection Mode". If an operator pushes this button from the HMI maintenance screen, the RTO will take the process permissive's "Off-Line" and into Standby Mode. The RTO will remain at the combustion chamber set point temperature while the Isolation Damper will close to the RTO and the Fresh Air Damper will open. In this mode the bypass damper will open. Production is not occurring when *Ductwork Inspection Mode* is initiated.

5.2.5 ONLINE

This mode is automatically entered when the RTO reaches the set point temperature of 1832°F. The RTO will energize the green light relay to allow production to begin after the combustion chamber temperature has stabilized at 1832°F operating temperature.

5.2.6 BURNER ON

Burner on is a function of the RTO Operation that describes any time the RTO burners have been ignited and are putting heat energy into the RTO.

5.2 RTO OPERATIONS

5.3.1 OVERVIEW

The poppet valves in all three chambers are controlled by 120 vac pneumatic solenoid valves, with the valve actuation controlled with a cycle time. Design cycle time for the RTO is (120) sec in each direction.

There are (2) proximity switches for each poppet valve's open and closed. These are labeled: ZSC- & ZSO- 301; ZSC- & ZSO- 302. Valve position recognition is critical to RTO operation.

If any of the poppet proximity switches do not change state on a cycle change (e.g. XV-301 solenoid deactivates and XV-302 is powered, but ZSO-301 remains made), The PLC will alarm and the unit will shut down.

5.3.2 STARTUP

Operator initiates RTO Startup by selecting the "System Start" button from the start up screen on the HMI.

To stop the Startup sequence and safely shut down the RTO select "System Stop." The E-stop button should never be used as a normal shutdown device.

At any time during the Startup sequence, the operator can select the "System Stop" button, which will cancel the current Startup step, prohibit the Startup sequence from proceeding and the RTO will go into cool down.

For example, if the Startup sequence has started the Process Fan, the RTO CAB, and has just initiated the (3) min. purge, selecting "System Stop") will discontinue sequence. Select or "System Start" again to continue with the sequencing.

5.3.3 RTO PURGE AND BURNER IGNITION

*The progress of the interlocks for both the purge and burner commands is displayed on the interlocks page on the HMI.

Tag Descriptions;

- Isolation damper is proved closed (ZSC-300).
- Ambient air damper is proved open (ZSO-303).

- Start Process Fan (FN-300) and run at a fixed speed of 18 Hz)
- After (15) sec. time delay, prove that the ID Fan is running with no alarms (PDSL-300).
- The ambient air damper FCV-303 must be open to the RTO to purge the unit with fresh air.
- Combustion air control valve TCV-200 is driven and held at min. position (4 mA ¼ open); when there is no call for heat (RTO burner off or not released to PID temperature control) TCV-200 should be at min. position.
- Start RTO combustion air blower (CAB) (FN-200)
- Prove flow through the RTO (PDSL-300)

After "System Start" and "Burner Start") button is pressed on HMI Start up Page;

- After (2) sec. time delay, prove that the CAB motor aux contact (XS-200) is made.
- With no alarms, start RTO Burner Controller. The burner controller starts after the purge is complete.
- The Purge interlocks (VFD Running CR-425, FSL-300, ZSC-300, and ZSO-303) and Burner interlocks, (PSL-500, PSH-500, PSL-200, FSL-300, ZSC-500 PDSL-300, TSH-302 AND ZSC-200) are wired to relays. This allows them to be wired in series to the Burner Controller will control the purge, safe start and burner safety controls.
    - The PLC then checks the running interlocks (PSL-500, PSH-500, TISH-302A, PDSL-300, and PSL-200). If they are all not made the PLC will alarm.
    - If all the interlocks are made, the PLC will energize the purge timer (KP310-1). This will start the purge timer. The length of the purge timer is set at startup at 3 minutes. The HMI system will display Oxidizer purging.

- The Burner interlocks, (PSL-500, PSH-500, PSL-200, FSL-300, ZSC-500 PDSL-300&301, TSH-302 and ZSC-200) are wired to relays. This allows them to be wired in series to the Burner Controller will control the purge, safe start and burner safety controls.
    - When purge is complete and the burner interlocks are made (PSL-500, PSH-500, PSL-200, FSL-300, ZSC-500 PDSL-300, TSH-302 AND ZSC-200,) the Burner Controller will energize the ignition transformer (IG-101) and the pilot gas valves XV-503 & XV-504. When the burner is running on the main gas valves the HMI will display burner on.
    - If the flame detector (BE-500) does not detect a flame in 10 seconds while lighting the pilot, the Burner Controller is locked out, and the alarm contact is energized. The HMI will display flame failure via a digital input to the PLC system.
    - If a flame is detected above the minimum level, the Burner Controller goes into auto mode. This provides a digital signal to the PLC control system to allow the temperature control system to automatically control TCV-200 to regulate the air and gas to maintain the temperature setpoint in the Combustion Chamber. The HMI will display Main Flame On via a

digital input to the PLC system. The temperature setpoint ramps up at a specified rate to limit thermal shock to the recovery media.

- The Burner Controller provides digital inputs to the PLC system for alarm status. This will inform the operator which interlock is not proven so proper action can be taken.
- The Burner Controller has an LED display showing operating status and flame signal strength.

5.3.4 FLAME FAILURE RESPONSE

A flame failure alarm produces the following PLC responses;

- Flame failure occurs when the Honeywell Flame Safety Units does not detect flame from the UV Scanners.
- PLC alarms "BURNER #1 OR #2 FLAME FAILURE"
- Combustion air control valves TCV-200 is driven and held at min. position (4 mA)
- See Sect. 3.1.2 for burner ignition
- Once flame fails, operator intervention is required by resetting the burner controller; the reset button is located on the front panel of the flame control panel, built into the Honeywell display.

5.3.5 RTO AT-TEMP

- Once the RTO combustion chamber >= SP of 1832°F, a (5) min. timer is started; this timer is the soak timer.
- Once the timer is done, display will show "RTO At-Temp" on the HMI and the respective PLC DO (digital output) will be triggered; the DO is provided to open FV-300. When FV-300 is proven open by ZSO-300, FCV-303 can be closed. The HMI will display "RTO Online" to process.
- The VFD for the Process Fan FN-300 will be released to pressure control via PIC-300.

5.3.6 RTO ONLINE / OFFLINE CRITERIA

NOTE: The RTO should not be allowed to go online to process if the LEL >= 25%; this level of Hydrocarbons will produce a high temperature shutdown.

With the isolation valve FV-300 proven open the Process stream is "online" to the RTO. High Temperature, Emergency and RTO System Shutdown modes will isolate the RTO from the process vents (i.e. close RTO process damper, FV-300).

Once the RTO has been established online to the process vents, the RTO burner will continue to modulate to maintain combustion chamber SP. If we are not able to maintain the combustion chamber SP for any reason, but still maintain burner flame, the following conditions apply for online operation:

- Unit online to Process stream
- RTO burner flame on
- As long as the RTO burner flame is proven, the RTO will be allowed to remain online to the process stream as long as the combustion chamber temperature is at least 1832°F (the RTO goes "offline" if temperature drops below 1725°F for 60 seconds); if the burner flame is lost at any time while online to the process stream, the RTO will go offline as a "RTO SYSTEM SHUTDOWN" (follow the steps in section 3.2.2).
- RTO going "offline" means FV-300 closes, the RTO is bypassed and process fumes are diverted. The process fan is forced to a fixed speed and the RTO goes to cool down
- Once the RTO is "offline", in "RTO SYSTEM SHUT DOWN" mode, the PLC is waiting for the alarm to be reset "Burner Start" button to be pressed in the startup page on the HMI, process Isolation damper FV-300 closed, Ambient air damper FCV-303 opened and RTO purge interlocks, purge, burner interlock and relight can start.

5.3.7 BURNER STOP or SYSTEM STOP

- The operator selects "Burner Stop" or "System Stop"
- Burner will shut down (de-energize RTO Burner Start)
- Process fan FN-300 will revert back to fixed speed.
- All dampers and valves will revert back to fail safe condition (i.e. 0% output on all control loops and the passive and/or fail state on all valves). FV-300 closed to RTO, Poppet valves closed to RTO inlet and open to outlet, TCV-200 combustion air valve at minimum.

5.4 CONTROL LOOPS

5.4.1 RTO COMBUSTION CHAMBER

5.4.1.1 RTO BURNER'S

- RTO burner is released to PID temp control (TIC-303C) to bring and keep the RTO at operating temperature.
- It is a heating loop (CV=SP-PV)
  - SP=1832°F in Online or "Idle" mode.
  - High temp shutdown at 1950°F.
  - CV goes to TV-200 for modulating combustion air and NG flow.
  - Temperature loop requires a heating ramp function to protect RTO heat recovery media from thermal stress; max. heat ΔT=12°F/min.; there is no step function with the RTO burner.

5.4.2 PRESSURE CONTROL LOOPS

5.4.2.1 RTO PRESSURE VOLUME CONTROL

- RTO is released to PID P/V control (PIT-300) when the RTO is ONLINE; this loop will be used in conjunction with the Process fan FN-300 VFD to maintain a constant SP in the RTO system to adequately control exhaust process vents.
- PIT-300 monitors the system pressure.
- SP= -4" WC during normal operation (set at startup)
- CV goes to ID Fan VFD SP (SC-300)
- This control loop goes to fixed speed when the RTO is "offline". Process fan FN-300 WILL RUN AT A FIXED SPEED AT ALL TIMES THE RTO IS OFFLINE TO THE PROCESS STREAM

5.5 OPERATIONAL PARAMETERS

Saint-Gobain monitors the following RTO operational parameters:

5.5.1 TEMPERATURE

Average RTO combustion chamber temperature is determined by using an average of 7 thermocouples (TE303, TE306, TE309, TE312A, TE312B, TE313A, TE313B) that are located within the 3 RTO combustion chambers. Thermocouples TE312A, TE313A, 312B and TE313B are located at the top of the combustion chamber. Thermocouples TE303, TE306 and TE309 are located at the bottom of the combustion chamber. Using an average of these 7 thermocouples provides a conservative determination of actual combustion chamber temperature as:

1. This methodology includes averaging in thermocouples from the non-active chamber that is regenerating (i.e. non-active chamber will have average temperature <1832°F)
2. Temperature in the levels of the combustion chambers vary depending on inlet flow (i.e. high flow conditions push air to the top of chambers making top warmer, low flow conditions result in more air at bottom of combustion chambers making the bottom warmer)

The combustion chamber also contains 2 additional thermocouples that are used for high temperature safety purposes only (TE311 and TE314). As described in section 5.4.1.1, temperature readings of 1950°F or greater at TE303, TE306, TE309, TE311, TE312A, TE312B, TE313A, TE313B or TE314 will instantaneously shut the unit down to *High Inlet Temp Shutdown* mode.

All thermocouples used for compliance demonstration incorporate a failsafe feature. A malfunction in the thermocouple would result in an RTO *Emergency Shutdown*.

Average RTO combustion chamber temperature is measured each minute. It shall be a minimum of 1832°F during production periods when EUs are running. Average RTO

combustion chamber temperature is calculated by taking an hourly block average of the average 15-minute temperature intervals.

5.5.2 INLET AIRFLOW

Flow into the RTO is measured by an inline flow meter which is located in the inlet ductwork between the bypass stack and the RTO process isolation damper (FV-300). This meter is used to ensure flow into the RTO does not exceed 70,000 cfm. It is also used to determine the length of time a bypass occurs. During an emergency RTO shutdown, the flow meter reads near zero as the airstream is directed out of the ductwork though the bypass stack. When normal flow readings return to being observed by the flow meter (i.e. >10,000 cfm), it is an indication that the bypass stack is no longer in operation.

Airflow to the RTO is measured every minute. The average RTO inlet airflow is calculated through taking an hourly block average of the average 15-minute flow intervals.

5.5.3 RTO INLET GAS FLOW

Gas flow to the RTO is measured in minute, 15-minute and hourly block averages.

5.5.4 IGNITION DATA MANAGEMENT SYSTEM

RTO operational data outlined in 5.5.1, 5.5.2 and 5.5.3 is stored in the Saint-Gobain Ignition cloud. All Ignition data is stored to an MS SQL database on Industrial servers. Industrial servers are backed up at least once a day by Saint-Gobain Technology Services to the Malvern, PA Headquarters. Ignition sends automated email alerts to SG personnel when the RTO goes offline (no matter operational status of coating towers) or an hourly average combustion chamber temperature is <1832°F. Once data has been recorded in Ignition it is permanently stored and cannot be altered.

Table 4 below describes the RTO parameters monitored by Saint-Gobain during each RTO operational mode and if production is occurring during these modes of RTO operation.

Table 5 below describes in detail for each monitored RTO parameter:

- Location of measurement
- Source of measurement
- Frequency of measurement
- Measurement unit
- Data output
- Location of data output
- System notifications for parameter deviations
- Data review frequency

TABLE 4: PARAMETERS MONITORED PER RTO RUN MODES

STANDARD OPERATING CONDITIONS								
RTO ONLINE	**RTO TEMP**	**RTO INLET FLOW**	**EU CAPTURE EFFICIENCY**	**PFOA EMISSIONS**	**PFOS EMISSIONS**	**EU RUN HRS**	**EU RUNNING**	**SPECIAL PARAMETERS**
ONLINE	X	X	X	-	-	-	-	All covered EUs interlocked to not start until average RTO combustion chamber temperature of 1832°F is achieved
PURGE	X	X	X	-	-	-	-	
STANDBY	X	X	X	-	-	-	-	
BURNER ON	X	X	X	-	-	-	-	
IDLE	X	X	X	-	-	-	-	
NON STANDARD OPERATING CONDITIONS								
RTO OFFLINE	**RTO TEMP**	**RTO INLET FLOW**	**EU CAPTURE EFFICIENCY**	**PFOA EMISSIONS**	**PFOS EMISSIONS**	**EU RUN HRS**	**EU RUNNING**	
OFF	-	-	-	-	-	-	-	Planned RTO shutdown modes. No production occurring.
MAINTENANCE SHUTDOWN	-	-	-	-	-	-	-	
RTO SYSTEM SHUTDOWN (OFFLINE)	-	-	-	-	-	-	-	
BURNER OFF	X	X	X	X	X	X	X	Unplanned RTO shutdown modes. Untreated emissions to atmosphere via bypass stack if EUs running
EMERGENCY SHUTDOWN	X	X	X	X	X	X	X	
HIGH INLET TEMP SHUTDOWN	X	X	X	X	X	X	X	

TABLE 5: RTO OPERATIONAL PARAMETERS DETAIL

COMPLIANCE PARAMETER	OPERATION CONDITIONS	EUs RUNNING	LOCATION	SOURCE	MEASUREMENT FREQUENCY	MEASUREMENT UOM	DATA OUTPUT	DATA STORAGE	SYSTEM NOTIFICATIONS	DATA REVIEW FREQUENCY
Temperature	STANDARD OPERATING CONDITIONS	YES	Active Combustion Chamber 7 Thermocouples	TE303; TE306; TE309; TE312A; TE312B; TE313A; TE313B	*Every minute	Fahrenheit	*15 min average all 7 *Hourly average all 7	Ignition System	None	Periodic
		NO	**Measurement Not Required - No operations**							
	NON STANDARD OPERATING CONDITIONS	YES	Active Combustion Chamber 7 Thermocouples	TE303; TE306; TE309; TE312A; TE312B; TE313A; TE313B	*Every minute	Fahrenheit	*15 min average all 7 *Hourly average all 7	Ignition System	Email alert from Ignition when an hourly avg Temp <1832F	Within 48 hrs after deviation
		NO	**Measurement Not Required - No operations**							
Inlet Flow	STANDARD OPERATING CONDITIONS	YES	Inline Pressure Transmitter	Emerson Model 3051SFA	*Every minute	SCFM	*15 min average *Hourly average	Ignition System	None	Periodic
		NO								
	NON STANDARD OPERATING CONDITIONS	YES			(1) Time at which flow reaches near zero (2) Time where flow reestablished	(1) Time logged when near zero flow achieved (2) Time logged when airflow reestablished	(1) Date Time flow goes to zero (2) Date Time airflow reestablished		Email alert from Ignition when RTO goes Offline (bypass online)	Within 48 hrs after shutdown
		NO	**Measurement Not Required - No operations**							
Gas Flow	STANDARD OPERATING CONDITIONS	YES	Inline gas flow meter	Schneider Electric 84CF020-TPRF1SNSTJFN-N	*Every minute	SCFH	*15 min average *Hourly average	Ignition System	None	Periodic
		NO								
	NON STANDARD OPERATING CONDITIONS	YES							Email alert from Ignition when RTO goes Offline (bypass online)	
		NO	**Measurement Not Required - No operations**							

COMPLIANCE PARAMETER	OPERATION CONDITIONS	EUs RUNNING	LOCATION	SOURCE	MEASUREMENT FREQUENCY	MEASUREMENT UOM	DATA OUTPUT	DATA STORAGE	SYSTEM NOTIFICATIONS	DATA REVIEW FREQUENCY
Capture Efficiency Verification	STANDARD OPERATING CONDITIONS	YES	NDO oven entry and exit	NDO Standard SOP for each	Continuous	Visual + inward flow *> -0.007"Water	*Verification of position *Verification of flow	*EHS office	None	*Daily pre-shift visual audit *Monthly flow verification
		NO								
	NON STANDARD OPERATING CONDITIONS	YES							Email alert from Ignition when RTO goes Offline (bypass online)	
		NO	**Measurement Not Required - No operations**							
Time EU Running	STANDARD OPERATING CONDITIONS	YES	EU's	Neomatrix and Ignition	Continuous	Coating Hours (run start and stop times)	Hrs of coating	Neomatrix and Ignition	None	Within 48 hrs after shutdown
		NO								
	NON STANDARD OPERATING CONDITIONS	YES							Email alert from Ignition when RTO goes Offline (bypass online)	
		NO	**Measurement Not Required - No operations**							
PFOA	STANDARD OPERATING CONDITIONS	YES	**Measurement Not Required During Standard Operating Conditions**							
		NO								
	NON STANDARD OPERATING CONDITIONS	YES	Bypass Stack	Bypass Stack	Continuous	(1) CFM of running EUs (2) Time (min) emissions sent to bypass (3) Emission factor PFOA	Pounds (LBS) PFOA	*RTO Malfunction Form *MENH Emissions Spreadsheet	Email alert from Ignition when RTO goes Offline (bypass online)	Within 48 hrs after shutdown
		NO	**Measurement Not Required - No operations**							
PFOS	STANDARD OPERATING CONDITIONS	YES	**Measurement Not Required During Standard Operating Conditions**							
		NO								

COMPLIANCE PARAMETER	OPERATION CONDITIONS	EUs RUNNING	LOCATION	SOURCE	MEASUREMENT FREQUENCY	MEASUREMENT UOM	DATA OUTPUT	DATA STORAGE	SYSTEM NOTIFICATIONS	DATA REVIEW FREQUENCY
	NON STANDARD OPERATING CONDITIONS	YES	Bypass Stack	Bypass Stack	Continuous	(1) CFM of running EUs (2) Time (min) emissions sent to bypass (3) Emission factor PFOS	Pounds (LBS) PFOS	*RTO Malfunction Form *MENH Emissions Spreadsheet	Email alert from Ignition when RTO goes Offline (bypass online)	Within 48 hrs after shutdown
		NO	**No Emissions generated when EUs not running**							

5.6 RTO OPERATING REQUIREMENTS

The Saint-Gobain RTO operates under the conditions outlined in the Saint-Gobain Merrimack NHDES air permit. The operating procedure applies to all emissions units (EU) listed below:

TABLE 6: SAINT-GOBAIN EMISSION UNITS TO RTO

EU01	MA Tower
EU02	MB Tower
EU03	MC Tower
EU04	MR Tower
EU05	MD Tower
EU06	QX Tower
EU07	20” SBC
EU08	20” Coater
EU12	MG Tower
EU13	MP Tower
EU15	MQ Tower
EU16	MS Tower
EU22	R&D Coater
EU23	Chemsil Coater
EU24	MTM
EU25	Step Press/Laminator
EU26	Heat Clean

RTO shall operate at all times the coating towers or auxiliary equipment are operating to meet the following requirements:

- Active combustion chamber of the RTO shall be maintained at a minimum temperature of 1832°F based on hourly block averages
- The combustion chambers of the RTO shall be designed with a minimum residence time of 1 second each
- Inlet flow to the RTO shall not exceed 70,000 scfm
- PFC emission limits shall be less than or equal to 0.45 lbs/yr PFOA and 0.57 lbs/yr PFOS
- The opacity shall not exceed 20 percent for any continuous 6-minute period
- At all times, including periods of startup, shutdown, and malfunction, owners and operators shall, to the extent practicable, maintain and operate any affected facility including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions

5.7 RTO SETPOINT

In order to maintain an average RTO combustion chamber temperature of 1832°F, the RTO is typically set between 1832°F - 1840°F (may vary seasonally). In order to prevent the unit from unexpectedly drifting below the desired setpoint the following work has been completed:

- Replacement of solenoids

- Added compressed air filtration on each poppet valve
- Poppet hoses cleaned/replaced
- Poppet valves cleaned
- Poppet valve assemblies checked for level and sealing
- Poppet valves synchronized
- Replacement of damaged expansion joints
- Burners tuned for improved efficiency
- PID tuning

Additional preventative maintenance measures are documented in section 11.0.

5.8 TOWER OPERATION

- All emission units listed in Table 6 are required to only operate while the RTO is on and meeting requirements of section 5.6.
- Each Tower/Auxiliary Equipment control panel contains a visible RTO status indicator light.
- RTO status indicator lights indicate the following:
  - **Green** – RTO is online at 1832°F. Towers/Auxiliary Equipment can be run.
  - **Yellow** – RTO is warming up to temperature. Towers/Auxiliary Equipment cannot be started until minimum RTO temperature of 1832°F is achieved.
  - **Red** – RTO is offline. Towers/Auxiliary Equipment cannot be run.
- Each Tower/Auxiliary Equipment's drive mechanism is interlocked to the RTO. When the RTO is in the yellow or red state, Towers/Auxiliary Equipment cannot initiate a new run sequence.

5.9 UNEXPECTED RTO MALFUNCTION

- During any shutdown condition, process operations will proceed to a safe stopping point to minimize potential emissions
- In the event of an unexpected RTO malfunction (see "Non Standard Operating Conditions" in Table 4):
  - All coating towers that are currently running will continue to run until the roll length is finished in order to achieve a safe stop.
  - Any coating towers that were not running prior to the RTO malfunction cannot be started until 1832°F is achieved. This condition is automated into the process interlocks of the tower drive mechanisms.
- In the offline (red) state, the RTO emergency bypass fan on the low bay roof will be activated directing all Tower emissions to the atmosphere to protect the health of safety of SGPP employees.
- Once a Tower/Auxiliary Equipment is stopped either manually or the roll length runs out, it cannot be restarted until the RTO returns to the online (green) state where the RTO combustion chamber temperature is at least 1832°F.

5.10 RTO COLD STARTS

- During periods of no production operations (e.g. weekends, holidays, etc.), the RTO may be placed into the *Off* position.

- All coating towers will be sent to the offline (red) state and coating operations will be unable to commence.
- Once a Tower/Auxiliary Equipment is in the offline (red) state, it cannot be restarted until the RTO returns to the online (green) state where the RTO combustion chamber temperature is at least 1832°F.

Air Pollution Control Equipment Monitoring Plan

Section 6

6.0 RTO COMPLIANCE

6.1 COMPLIANCE MONITORING

- RTO operational data is recorded in the MENH Ignition portal cloud.
- EHS Manager or designee will export the RTO run data from Ignition periodically and add to the RTO Compliance Data log.
  - RTO Compliance Data Log is located at \\H79SVFPMER01\merrimack\Health & Safety\Environmental\air\AIR PERMIT
- RTO Compliance Data Log contains the following:
  - RTO combustion chamber temperature (average of thermocouples T-303, T-306, T-309, T-312A, T-312B, T-313A, T-313B) each minute, 15-minute average and hourly block average
    - Hourly block averages will be calculated at the top of each hour (i.e. 9:00a-10:00a)
    - In the event of an unexpected RTO shutdown, the hourly average temperature calculation for compliance will begin the first full hour the RTO runs after returning to 1832°F (i.e. if RTO returns to 1832°F at 9:44p, tracking for combustion chamber temperature compliance will begin for the 10:00p-11:00p hour)
  - RTO inlet flow each minute, 15-minute average and hourly block average
  - RTO gas flow each minute, 15-minute average and hourly block average
- For any variations from permit conditions, a note will be added to the RTO Data Compliance Log indicating why the variation occurred and how it was resolved.
  - A formal internal report (see Appendix A) will also be completed to document the malfunction
  - During bypass events, the minutes of operation each emission unit was in operation during the event will be used to estimate the total PFOA and PFOS emitted (see Appendix A)
  - Completed malfunction forms will be saved at \\H79SVFPMER01\merrimack\Health & Safety\Environmental\air\AIR PERMIT
- Deviations that cannot be resolved within 48 hours must be formally reported to NHDES (see section 6.2).

6.2 PERMIT DEVIATIONS

- A permit deviation is any occurrence that results in an excursion from any emission limitation, operating condition or work practice as specified the Saint-Gobain Merrimack NHDES air permit.
- In the event of a permit deviation that causes excess emissions, or for pollution control equipment monitoring parameters lasting more than 48 hours in duration the following steps must be taken:
  - Notify the department (NHDES) by telephone (603-271-1370), fax (603-271-7053) or e-mail (pdeviations@des.nh.gov), within 24 hours of discovery unless it's a

Saturday, Sunday or state legal holiday, in which event, the department shall be notified on the next day which is not a Saturday, Sunday, or state legal holiday.

- Submit written report of the deviation on paper or by electronic means to the department within 10 days of discovery of the permit deviation. The report shall include all information noted in section IX of the Saint-Gobain Merrimack NHDES air permit.

6.3 STACK TESTING

- Stack testing will be performed in accordance with the requirements listed in applicable NHDES Air permits.
- Notification of stack testing and a stack test plan will be provided to NHDES at least 30 days prior to conducting the test.
- All performance test plans will be approved by NHDES prior to performing the test.

6.4 COMPLIANCE RECORDS

- All records shall be maintained for a minimum of 5 years
- The following records shall be maintained:
  - Total quantity of all material used or produced in each process that are necessary to calculate emissions – Monthly
  - Hours of operation for each process – Monthly
  - Maintain a 12-month running total of facility-wide emissions of VOCs and HAPs – Monthly
  - Stack test results
  - Hourly averaged combustion chamber temperature readings
  - Date, time, duration and probable cause of pollution control equipment parameter excursions (see Appendix A)
  - Air pollution control equipment maintenance activities, including preventative maintenance and annual visual inspections. Records shall include the date and duration of any outages (see Appendix A).
  - Corrective actions and preventative measures taken (see Appendix A)

Air Pollution Control Equipment Monitoring Plan

Section 7

7.0 TOWER CAPTURE EFFICIENCY

- Each coating tower's ovens have been designed to meet USEPA Method 204 requirements for permanent total enclosures (PTE).
- In all coating towers, the entry to the ovens and exit from the ovens are considered natural draft openings (NDO).
- The average facial velocity (FV) of air through all NDO's shall be at least 3,600 m/hr (200 fpm) when coating operations are occurring.
- The direction of air flow through all NDO's shall be into the enclosure when coating operations are occurring.
- In order to ensure the average facial velocity through all NDOs is at least 200 fpm while coating operations occur, each coating tower has set conditions that are maintained to ensure dampers, etc. are in the necessary orientation to maintain the required negative pressure in ovens.

7.1 TOWER UPGRADES

Since 2019 upgrades have been performed on 3 Saint-Gobain coating towers to ensure adequate capture efficiency is achieved.

7.1.2 MP TOWER (EU13)

Following work was completed in August 2019:
- Exhaust system redesign & new duct work including:
- 1 - 12.5", 15Hp, 3735 CFM exhaust fan installed
- 1 - 7200 CFM Smoke Box fan installed
- 4 – 400 CFM Supply fans installed

7.1.1 MG TOWER (EU12)

Following work completed in December 2019:
- Professional system redesign
- New 14,000 CFM exhaust blower
- New re-sized ductwork
- New machine exhaust connections
- New rooftop re-sized ductwork

7.1.3 QX TOWER (EU06)

Following work completed in March 2021:
- Complete redesign of exhaust system blowers and ductwork
- Larger 36" exhaust stack added

- 5 New Independent exhaust blowers and dampers added – 1 for each stage
- New 4 port exhaust plenums installed on Dry, Bake & Fuse Zones (all 5 stages)
- All new ductwork

7.2 CAPTURE EFFICIENCY VERIFICATION PLANS

- As indicated in section 7.0, each coating tower is equipped with a capture efficiency verification plan.
- Each capture efficiency verification plan indicates the damper position and fan speed that is necessary to ensure the average facial velocity through all NDOs is at least 200 fpm while coating operations occur.
- Dampers on coating towers have been visibly marked in the correct location and have been bolted into place to prevent them from being adjusted.
- Prior to initiating a run on a coating tower, machine operators verify that the required damper positions and fan speeds indicated in the capture efficiency verification plan are satisfied.
- Capture efficiency verification plans for EU01, EU02, EU03, EU04, EU05, EU06, EU07, EU08, EU12, EU13, EU15, EU16 and EU22 are included as an attachment to this plan.
- Employees are trained to these capture efficiency verification plans

Air Pollution Control Equipment Monitoring Plan

Section 8

8.0 STARTUP CHECKLIST AFTER SHUTDOWN

When re-starting the unit, please use check the following for reference. Please note that this is not the limit to what can be checked.

VISUAL INSPECTION
UNIT ARRANGEMENT
PIPING AND TUBING
PRESSURE TUBING SLOPED W DRAIN
FAN SET CORRECTLY
DUCTWORK
UNIT LEVEL
INCOMING GAS PIPING INSTALLED
INCOMING GAS PIPING PRESSURE TESTED
INCOMING DUCTWORK INSTALLED
INCOMING DUCTWORK INSPECTED AND CLEAN
FAN HOUSING INTERNAL INSPECTION

ELECTRICAL CONNECTIONS
INCOMING VOLTAGE
VERIFY FIELD CONNECTIONS
PROCESS FAN AMPS
COMBUSTION AIR FAN AMPS
GROUND CONNECTED
WIRES NUMBERED
100% WIRE CONTINUITY CHECK
RESISTOR CLIPPED ON BURNER CONTROL
THERMOCOUPLE SOFTWARE SETUP CHECK
ANALOG, I/O FUNCTIONALITY SOFTWARE SETUP CHECK
OVERTEMP LIMIT SOFTWARE SETUP CHECK
VFD SOFTWARE SETUP CHECK
BURNER SOFTWARE SETUP CHECK
BURNER RAMP SOFTWARE SETUP CHECK
PLC PROGRAM CHECK ALL I/O FOR FUNCTIONALITY

RUN UNIT UP TO TEMPERATURE AND CHECK

POPPET SOFTWARE CHECK
ALL ALARMS SOFTWARE CHECK
ALL ALARMS HARDWARE CHECK
HIGH LIMIT PROGRAMMED AND CHECKED
VFD PROGRAMMED

VFD
OPERATION
INTERLOCKS

PROCESS FAN
ROTATION
NOISE
VIBRATION
PRESSURE REQUIREMENTS
FLOW REQUIREMENTS

CAB's
ROTATION
NOISE
VIBRATION
PRESSURE REQ'TS
FLOW REQ'TS

STARTUP DATA
INLET DUCT
PRESSURE SETPOINT
DUCT VELOCITY PRESSURE
DUCT DIAMETER
TEMPERATURE IN DEG F
DENSITY
VELOCITY
DUCT AREA
ACFM
SCFM

Air Pollution Control Equipment Monitoring Plan

Section 9

9.0 ALARMS

Alarms will be presented as scrolling (listed as they occur) and also as first out enunciator (which alarm tripped first causing other successive alarms). For example, “RTO High Gas Pressure” alarm causes a flame failure. The resultant drop in temperature causes the unit to drop below operating temperature. Alarms that occurred are “RTO High Gas Pressure”, “RTO Flame Failure” and “RTO Not At Operating Temperature”. First out alarm is “RTO High Gas Pressure”.

TABLE 7: RTO HARD ALARMS

ALARM DESCRIPTION	IN HMI	INSTRUMENT TO TRIGGER ALARM	SETPOINT	ALARM TYPE	PROCESS FAN	CA FAN	RTO DAMPERS	BURNER 1 START	BURNER 2 START	ISOLATION DAMPER	AMBIENT AIR DAMPER
VALVES NOT IN PROPER POSITION	YES	ANY RTO INLET OR OUTLET DAMPER	NOT IN PROPER POSITION AFTER 1.5 SECONDS	ALL STOP	OFF	OFF	CLOSED	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
MAIN EXHAUST FAN NOT RUNNING	YES	VFD SC-300	FAN NOT RUNNING 30 SECONDS AFTER START SIGNAL	ALL STOP	OFF	OFF	CLOSED	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
COMBUSTION BLOWER NOT RUNNING	YES	PSL-200	FAN NOT RUNNING 10 SECONDS AFTER START SIGNAL	ALL STOP	OFF	OFF	CLOSED	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
CHAMBER HIGH TEMPERATURE SHUTDOWN	YES	TE-312 TE-313 (A or B), TE-311, TE-314	>1950˚F AFTER 5 SECOND DELAY	COOLDOWN	ON	ON	CYCLING	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
EXHAUST HIGH TEMPERATURE SHUTDOWN	YES	TE-315	>450˚F AFTER 5 SECOND DELAY	COOLDOWN	ON	ON	CYCLING	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
RTO PURGE NOT COMPLETE	YES	FS-501 FS-504	PURGE TIMER NOT DONE AFTER 1.5 MINUTES	ALARM ONLY	ON	ON	CYCLING	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
BURNER GAS PRESSURE LOW	YES	PS-500	<10"wc	COOLDOWN	ON	ON	CYCLING	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
BURNER GAS PRESSURE HIGH	YES	PS-501 PS-504	>40"WC	COOLDOWN	ON	ON	CYCLING	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
BURNER COMBUSTION AIR PRESSURE LOW	YES	PSL-200	<20"wc IF M2 IS RUNNING	COOLDOWN	ON	ON	CYCLING	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
BURNER #1 IGNITION FAILURE	YES	FS-501	#1 FLAME FAIL ON PILOT	COOLDOWN	ON	ON	CYCLING	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
BURNER #1 FLAME FAILURE	YES	FS-501	#1 FLAME FAIL	COOLDOWN	ON	ON	CYCLING	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
RTO NOT AT OPERATING TEMPERATURE	YES	TE-312 TE-313	COMBUSTION CHAMBER <1832˚F	ALARM ONLY	ON	ON	CYCLING	ENABLED	ENABLED	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
FRESH AIR PURGE DAMPER MALFUNCTION	YES	XV-303	NOT IN PROPER POSITION AFTER 10 SECONDS	ALL STOP	OFF	OFF	CLOSED	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
ISOLATION DAMPER MALFUNCTION	YES	XV-300	NOT IN PROPER POSITION AFTER 10 SECONDS	ALL STOP	OFF	OFF	CLOSED	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED

ALARM DESCRIPTION	IN HMI	INSTRUMENT TO TRIGGER ALARM	SETPOINT	ALARM TYPE	PROCESS FAN	CA FAN	RTO DAMPERS	BURNER 1 START	BURNER 2 START	ISOLATION DAMPER	AMBIENT AIR DAMPER
CHAMBER #1 INLET VALVE FAILED TO OPEN	YES	XSO-2301	NOT IN PROPER POSITION AFTER 10 SECONDS	ALL STOP	OFF	OFF	CLOSED	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
CHAMBER #1 INLET VALVE FAILED TO CLOSE	YES	XSC-301	NOT IN PROPER POSITION AFTER 10 SECONDS	ALL STOP	OFF	OFF	CLOSED	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
CHAMBER #2 EXHAUST VALVE FAILED TO OPEN	YES	XSO-304	NOT IN PROPER POSITION AFTER 10 SECONDS	ALL STOP	OFF	OFF	CLOSED	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
CHAMBER #2 EXHAUST VALVE FAILED TO CLOSE	YES	XSC-304	NOT IN PROPER POSITION AFTER 10 SECONDS	ALL STOP	OFF	OFF	CLOSED	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
CHAMBER #1 EXHAUST VALVE FAILED TO OPEN	YES	XSO-302	NOT IN PROPER POSITION AFTER 10 SECONDS	ALL STOP	OFF	OFF	CLOSED	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
CHAMBER #1 EXHAUST VALVE FAILED TO CLOSE	YES	XSC-302	NOT IN PROPER POSITION AFTER 10 SECONDS	ALL STOP	OFF	OFF	CLOSED	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
CHAMBER #2 INLET VALVE FAILED TO OPEN	YES	XSO-303	NOT IN PROPER POSITION AFTER 10 SECONDS	ALL STOP	OFF	OFF	CLOSED	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
CHAMBER #2 INLET VALVE FAILED TO CLOSE	YES	XSC-303	NOT IN PROPER POSITION AFTER 10 SECONDS	ALL STOP	OFF	OFF	CLOSED	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
INLET TEMPERATURE HIGH HIGH	YES	TE-300	>200˚C AFTER 5 SECOND DELAY	COOLDOWN	ON	ON	CYCLING	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
INLET TEMPERATURE HIGH	YES	TE-300	>150˚C AFTER 5 SECOND DELAY	ALARM ONLY	ON	ON	CYCLING	ENABLED	ENABLED	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
BURNER #2 IGNITION FAILURE	YES	FS-504	#2 FLAME FAIL ON PILOT	COOLDOWN	ON	ON	CYCLING	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
BURNER #2 FLAME FAILURE	YES	FS-304	#2 FLAME FAIL	COOLDOWN	ON	ON	CYCLING	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
CHAMBER #1 HIGH TEMPERATURE	YES	TE-303	>1950˚F	COOLDOWN	ON	ON	CYCLING	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
CHAMBER #2 HIGH TEMPERATURE	YES	TE-306	>1950˚F	COOLDOWN	ON	ON	CYCLING	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
CHAMBER #3 HIGH TEMPERATURE	YES	TE-309	>1950˚F	COOLDOWN	ON	ON	CYCLING	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED

ALARM DESCRIPTION	IN HMI	INSTRUMENT TO TRIGGER ALARM	SETPOINT	ALARM TYPE	PROCESS FAN	CA FAN	RTO DAMPERS	BURNER 1 START	BURNER 2 START	ISOLATION DAMPER	AMBIENT AIR DAMPER
CHAMBER #3 INLET VALVE FAILED TO OPEN	YES	XSO-305	NOT IN PROPER POSITION AFTER 10 SECONDS	ALL STOP	OFF	OFF	CLOSED	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
CHAMBER #3 INLET VALVE FAILED TO CLOSE	YES	XSC-305	NOT IN PROPER POSITION AFTER 10 SECONDS	ALL STOP	OFF	OFF	CLOSED	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
CHAMBER #3 EXHAUST VALVE FAILED TO OPEN	YES	XSO-306	NOT IN PROPER POSITION AFTER 10 SECONDS	ALL STOP	OFF	OFF	CLOSED	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
CHAMBER #3 EXHAUST VALVE FAILED TO CLOSE	YES	XSC-306	NOT IN PROPER POSITION AFTER 10 SECONDS	ALL STOP	OFF	OFF	CLOSED	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
VFD FAULT	YES	SC-300	FAULT INPUT FROM VFD	ALL STOP	OFF	OFF	CLOSED	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
CAB MCC FAULT	YES	XS-200	FAN NOT RUNNING 30 SECONDS AFTER START SIGNAL	ALL STOP	OFF	OFF	CLOSED	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
BURNER GAS VALVE NOT AT MINIMUM	YES	TCV-501	BURNER NOT AT MINIMUM 60 SECONDS AFTER MINIMUM SIGNAL	COOLDOWN	ON	ON	CYCLING	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
LOW INSTRUMENT AIR PRESSURE	YES	PS-400	LESS THAN 85 PSIG	ALL STOP	OFF	OFF	CLOSED	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
HIGH PRESSURE DROP RTO	YES	PDIT-300	>25" W.C.	ALARM ONLY	ON	ON	CYCLING	ENABLED	ENABLED	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
FAN HIGH TEMPERATURE SHUTDOWN	YES	TE-315	>450˚F AFTER 5 SECOND DELAY	COOLDOWN	ON	ON	CYCLING	OFF	OFF	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
RECOVERY CHAMBER #1 BOTTOM HIGH TEMP.	YES	TE-301	>450˚F AFTER 5 SECOND DELAY	ALARM ONLY	ON	ON	CYCLING	ENABLED	ENABLED	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
RECOVERY CHAMBER #2 BOTTOM HIGH TEMP.	YES	TE-304	>450˚F AFTER 5 SECOND DELAY	ALARM ONLY	ON	ON	CYCLING	ENABLED	ENABLED	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
RECOVERY CHAMBER #3 BOTTOM HIGH TEMP.	YES	TE-307	>450˚F AFTER 5 SECOND DELAY	ALARM ONLY	ON	ON	CYCLING	ENABLED	ENABLED	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
RTO BEARING TEMPERATURE INBOARD	YES	TE-316	>225^{o}F	ALARM ONLY	ON	ON	CYCLING	ENABLED	ENABLED	CLOSED DE ENERGIZED	OPEN DE ENERGIZED
RTO BEARING TEMPERATURE OUTBOARD	YES	TE-317	>225^{o}F	ALARM ONLY	ON	ON	CYCLING	ENABLED	ENABLED	CLOSED DE ENERGIZED	OPEN DE ENERGIZED

TABLE 8: RTO WARNING ALARMS

ALARM DESCRIPTION	ALARM NO.	ALARM HORN	TURN ON ALARM BIT	SHUT DOWN BURNERS	SHUT DOWN FANS	INSTRUMENT TO TRIGGER ALARM	FRESH AIR DAMPER FCV-303	TYPE OF ALARM	SETPOINT	TRIGGER	ALARM TYPE	PROCESS FAN	CA FAN	INLET AND OUTLET RTO DAMPERS	BURNER 1 START	BURNER 2 START	ISOLATION DAMPER	
INLET TEMPERATURE HIGH		YES	YES	NO	NO	YES	TE-300	CLOSED	OPEN	>250 F AFTER 5 SECOND DELAY		ALARM ONLY	ON	ON	ENABLED	ENABLED	ENABLED	OPEN
OUTLET TEMPERATURE HIGH		YES	YES	NO	NO	YES	TE-300	CLOSED	OPEN	>500˚F AFTER 5 SECOND DELAY		ALARM ONLY	ON	ON	ENABLED	ENABLED	ENABLED	OPEN
MAIN FAN BEARING TEMPERATURE		YES	YES	NO	NO	YES	TE-316	CLOSED	OPEN	>225 F AFTER 5 SECOND DELAY		ALARM ONLY	ON	ON	ENABLED	ENABLED	ENABLED	OPEN
MAIN FAN BEARING TEMPERATURE		YES	YES	NO	NO	YES	TE-317	CLOSED	OPEN	>225 F AFTER 5 SECOND DELAY		ALARM ONLY	ON	ON	ENABLED	ENABLED	ENABLED	OPEN
PROCESS AIR VOLUME LOW		YES	YES	NO	NO	YES	FIT-01	CLOSED	OPEN	LESS THAN 15,000 AFTER 5 SECOND DELAY		ALARM ONLY	ON	ON	ENABLED	ENABLED	ENABLED	OPEN
PT-300 PRESSURE TRANSMITTER LOW		YES	YES	NO	NO	YES	PT-300	CLOSED	OPEN	LESS THAN 0.5" W.C. AFTER 15 SECOND DELAY		ALARM ONLY	ON	ON	ENABLED	ENABLED	ENABLED	OPEN
PT-01 PRESSURE TRANSMITTER LOW		YES	YES	NO	NO	YES	PT-300	CLOSED	OPEN	LESS THAN 0.5" W.C. AFTER 15 SECOND DELAY		ALARM ONLY	ON	ON	ENABLED	ENABLED	ENABLED	OPEN

PT-02 PRESSURE TRANSMITTER LOW		YES	YES	NO	NO	YES	PT-300	CLOSED	OPEN	LESS THAN 0.1" W.C. AFTER 15 SECOND DELAY		ALARM ONLY	ON	ON	ENABLED	ENABLED	ENABLED	OPEN
PT-03 PRESSURE TRANSMITTER LOW		YES	YES	NO	NO	YES	PT-300	CLOSED	OPEN	LESS THAN 0.1" W.C. AFTER 15 SECOND DELAY		ALARM ONLY	ON	ON	ENABLED	ENABLED	ENABLED	OPEN
CHAMBER LOW BED TEMPERATURE HIGH		YES	YES	NO	NO	YES	TE-301 TE-304 TE-307	CLOSED	OPEN	>250 F AFTER 5 SECOND DELAY		ALARM ONLY	ON	ON	ENABLED	ENABLED	ENABLED	OPEN
CHAMBER MID BED TEMPERATURE HIGH		YES	YES	NO	NO	YES	TE-301 TE-304 TE-307	CLOSED	OPEN	>250 F AFTER 5 SECOND DELAY		ALARM ONLY	ON	ON	ENABLED	ENABLED	ENABLED	OPEN
CHAMBER MID BED TEMPERATURE HIGH		YES	YES	NO	NO	YES	TE-301 TE-304 TE-307	CLOSED	OPEN	>250 F AFTER 5 SECOND DELAY		ALARM ONLY	ON	ON	ENABLED	ENABLED	ENABLED	OPEN

Air Pollution Control Equipment Monitoring Plan

Section 10

10.0 TROUBLESHOOTING GUIDE

The following is a general troubleshooting guide for the AIRCLEAR LLC Thermgen® RTO. All HMI point of alarms may not be present on the RTO depending on options ordered with the system.

Familiarity with the Manufacturer's Product Sheets and instruction manuals as well as the PLC program logic and AC electrical wiring schematics will greatly enhance the customer's ability to use this troubleshooting guide.

Only qualified, trained personnel should open and/or service equipment. Lock Out Tag and Try (LOTO) should always be implemented.

1. The HMI is off.

A. Check that panel **"POWER ON-OFF"** selector switch is in the **"ON"** position.
B. Check fuses. Replace if necessary.

2. Not all devices in/on control panel are energized.

A. Check remote I/O Isolation switch
B. Check panel fuses.
C. Pull out E-Stop
D. Press E-Stop reset button

3. No power to the PLC.

A. Check panel fuses.
B. Check voltage across surge suppressor.

4. Valves not cycling.

A. Confirm that instrument air is on with all hand valves open.
B. Check panel fuse controlling valve solenoids.
C. Make sure that there are no pneumatic system failures.
D. Check to see that pneumatic system is at operating pressure.
E. Check proximity switches on valve drive (hold coin to face and check internal LED). **VALVES MUST BE DE-ENERGIZED FOR SAFETY, REMOVE THE SAFETY SCREEN.**
F. Check proximity switch relays located in the Flame Control Panel (LED on relay lights as corresponding proximity switch is made). **VALVES MUST BE DE-ENERGIZED FOR SAFETY, REMOVE THE SAFETY SCREEN.**

5. Combustion blower not operating, (combustion blowers start upon auto start and remain on as long as there is panel power and combustion chamber temperature is above 200F).

A. Make sure all motor disconnect switches are **"CLOSED"**.
B. Check for control power at auxiliary contacts.
C. Check for control power to starter coil contacts.
D. Check for tripped overload contacts.
E. Check for blown fuses.

6. RTO process fan will not start.

A. Make sure all motor disconnect switches are **"CLOSED"**.
B. Check for control power at VFD.
C. Check VFD display.
D. Check for tripped overload contacts.
E. Check for faults, high central chamber temperature, and excessive exhaust temperature, valves not operating or VFD fault. Correct and reset system.

7. Purge timer does not start.

A. Check hard-wired purge interlocks. (vfd running cr425, cr317 air flow, cr318 gas valve closed, cr332 process isolation damper closed, cr333 ambient air damper open.)
B. Fan must be running, Gas safety shutoff valve closed.
B. Check that RTO Differential Pressure is good (PDSL-300 CR319 and PDSL-301 CR320).
C. Check position of ambient air valve FCV-303. Ambient air valve should be open and process isolation valve FV-300 should be closed.

8. Purge timer starts when energized but resets when button is released.

A. Check that purge timer setting is above zero.
B. Replace purge timer.

9. Auto Start button is pushed but burner does not start. Burner Relay is de-energized.

A. If **"PURGE COMPLETE"** light is on, check Burner interlocks. If not, re-purge.
B. If Burner **"INTERLOCKS ARE NORMAL"** display is on, check burner relay it may need to be reset.
C. If Burner **"INTERLOCKS ARE NORMAL"** display is off, check interlock components.

1. Check burner at minimum position light on Interlock screen. Light should be on. If light is not on, the minimum fire proximity switch on the Maxon micro ratio is not made. The control motor circuit breaker/fuse should be checked. Call maintenance for control motor.
2. Check low pressure air switch (PSL_200) on the Combustion Blower.
3. Check Burner fuel train gas pressure switches.

4. Check Burner fuel train proof of closure limit switches in both gas safety shut off valves

10. Interlocks are closed, but burner still doesn't light. Burner Relay is in Standby.

A. Check **"BURNER START"** Output. If it is not energized, check **"BURNER START"** PLC output There are two one is relay 423 The other is isolated output 4/0. If the PLC outputs are energized, check fuse controlling burner circuit FU203.

11. Burner Relay energizes, but burner still does not light.

A. Check for output voltage on Burner Relay output. If there is output voltage present, check ignition transformer for output voltage. If there is no output voltage, replace ignition transformer. **Warning output of ignition transformer is 10,000V.**

12. Voltage is present at ignition transformer, but burner still does not light,

A. Check for ignition spark on spark electrode tip. If there is no spark, check spark wire for continuity. If continuity exists, replace electrode.

13. Burner flame is observed, but is extinguished after pilot valve closes.

A. Check for voltage out of Burner Relay after flame is detected. If voltage is not present, replace flame safeguard. If voltage is present, check for safety shut off valves opening.

14. Burner Relay energizes, but burner flame is not observed.

A. Check for voltage out of flame safeguard. If voltage is present, check burner pilot timer setting. There should be at least 10 seconds pilot in plc logic.

***NOTE**: If timer is operating properly, the "PILOT ON" light should come "ON" for 10 seconds, then goes off.*

15. "PILOT ON" light comes **"ON"**, but burner flame is not observed.

A. Check pilot solenoid valves; pilot solenoid valves should be opening.

16. System will not go online to accept process.

A. Check that **"RUN/STANDBY"** selector switch is in **"RUN"** position.

17. System goes into online mode accepting process, but switches into "STANDBY" mode suddenly.

A. Check central chamber temperature. Temperature may have dipped below minimum set point for process. Sequence process points online with longer intervals or let RTO warm up longer to collect more heat in media.

18. Pressure volume controller constantly displays “xxx” as a process variable.

A. The pressure transmitter has failed. Check 24vdc pressure transmitter power supply fuse.
B. There is positive pressure condition in inlet of system. Double check pressure reading.

19. VFD frequently faulting.

A. Call maintenance.
B. Call supplier.
C. Be able to relate nature of fault. Get fault code.
D. Become familiar with procedure to retrieve faults from VFD fault log.
E. Keep VFD air filters clean. Monitor vfd temperatures shown on the maintenance screen

20. Temperatures indicated on control "jumps" in steps of several degrees up and down.

A. Loose thermocouple extension wire connection.
B. Thermocouple extension wire was run in a conduit that is too close to a hot surface or too high voltages.
C. Thermocouple wire insulation is wearing away due to proximity to a rotating or vibrating surface.
D. Check all connections and replace thermocouple if necessary.
F. Temporarily jump thermocouple connections on controller terminals (see if controller display is now steady).

21. Burner Failure

A. Burner Failure light will come on
B. Alarm horn will sound

To correct this condition, do the following:

A. Press the **"ALARM SILENCE"** button. ACKNOWLEDGE ALARMS
B. Press the **"ALARM RESET"** button and the burner controller reset button. It will reset only after the system fault has been corrected. If the system fault has not been corrected, do the following.

1. Reset the Burner Relay controllers mounted on the bottom right of the burner relay or on the burner display located on the front door of the panel. If it resets, press the **"ALARM RESET"** button to clear alarm. Restart burner.
2. Check all the burner interlocks.
    A. Purge Complete.
    B. Low gas pressure.
    C. High gas pressure. High Gas pressure alarm requires a manual reset on the pressure switch.
    D. Low Combustion air pressure switch.
    E. High combustion Chamber temperature. If the combustion chamber temperature went above the set point of the hard-wired limit the hard-wired limit will have to be manually reset.

F. Burner at minimum position, check proximity switch and Honeywell Modulator.

If devices reset, press the **"ALARM RESET"** button to clear alarm. Restart burner. If device cannot be reset, call maintenance.

22. EXCESSIVE COMBUSTION CHAMBER TEMPERATURE.

A. Alarm light will come on.
B. Alarm horn will sound.
C. System will shut down.

To correct this condition, do the following.

A. Press the **"ALARM SILENCE"** button.
B. Check the temperature of the central combustion chamber. Check that temperature against the temperature trend screen. Check the set point of the high temperature limit controller. If it is correct, call for maintenance.
C. If the set point is incorrect, reset it and press the reset button on the controller keypad.
D. Check for proper burner operation.
E. Press the **"ALARM RESET"** button and start the system per normal start-up sequence.

23. EXCESSIVE EXHAUST TEMPERATURE

A. Alarm light will come on.
B. Alarm horn will sound.
C. System will shut down.

To correct this condition, do the following.

A. Press the "ALARM SILENCE" button.
B. Check the temperature of the exhaust. Check that temperature against the temperature trend screen. If it is correct, call for maintenance.
C. Visually inspect outlet of the RTO for heat damage.
D. Check for mechanical malfunction of valve drives.
E. Press the "ALARM RESET" button and start the system per normal start-up sequence.

Air Pollution Control Equipment Monitoring Plan

Section 11

11. 1 ROUTINE MAINTENANCE

11.1.1 CHAMBERS AND MEDIA

Before removing any door, turn off electric and natural gas, follow Lock Out Tag and Try (LOTO), disconnect switch on the power panel and shut all manual valves on the gas piping train. Follow all "SAFE ENTRY" procedures and Lock Out Tag and Try (LOTO).

Six (6) months after initial start-up (with power off), remove the two (2) upper chamber access doors. Check proper height of media in chamber. Check condition of insulation and burner casting.

Remove access doors on plenums and inspect support grids under the media. **Caution: De-energize all valves and bleed the air from the Oxidizer Valves when entering the access doors.**

On the exterior, look for paint discoloration or any hot spots. Check the wiring and tubing runs.

Repeat this inspection at annual outage.

11.1.2 FANS AND BLOWERS

Do not attempt any maintenance on a fan unless the electrical supply has been completely disconnected and locked out/Tagged out. If a disconnect switch has not been provided, remove all fuses from the circuit and Lockout Tag and Try (LOTO) the fuse panel so that they cannot be accidentally replaced.

Under normal circumstances, handling clean air, the system will require cleaning only about once a year. However, the fan and system should be checked at regular intervals to detect any unusual accumulation.

The fan wheel should be specially checked for build-up of material or dirt that may cause an imbalance with resulting undue wear on bearings and v-belt drives. A regular maintenance program must be established as needed to prevent this build-up.

The inlet filter silencer on the combustion air blower should be checked and kept clean.

Regular inspection of the rotating assembly should be made to detect any indication of weakening of the rotor because of corrosion, erosion, or metal fatigue.

Lubricate and maintain lubrication at recommended intervals per the vendor's recommendations. Refer to Fan Installation Operation Maintenance Instruction. **Be careful not to over grease as this can damage bearing seals.**

EXCESSIVE VIBRATION

Check for material build-up on the wheel. Generally, this will show up as material flaking off the fan wheel and causing an imbalance that may lead to fatigue failure of the wheel. Never allow a fan to operate if the amplitude of vibration is above the maximum safe limit. Contact the fan manufacturer for this information, if it is not included in maintenance instructions.

HIGH MOTOR TEMPERATURES

Check the cooling air to the motor has not been diverted or blocked by dirty guards or similar obstacle. Check input power. An increase in power may indicate that some major change has been made in the system.

11.1.3 BURNERS AND GAS EQUIPMENT

General: These recommendations are prepared for maintenance of gas equipment. Special types of equipment command special attention. A preventive maintenance program should be established and followed. This program should include adherence to the manufacturer's recommendations. In this program, a minimum maintenance schedule should include inspection and action on the recommendations given in the following paragraphs. An adequate supply of repair parts should be maintained.

Burner and Pilot: Burner and pilot should be kept clean and in proper operating condition. Burner refractory parts should be examined at frequent regular intervals to assure good condition.

Burner Relay Equipment: When automatic flame safeguards are used, a complete shutdown and restart should be made at frequent intervals to check the components for proper operation.

Other Safeguard Equipment: Accessory safeguard equipment, such as manual reset valves, with pressure or vacuum switches, high temperature limit switches, draft control, shutoff valves, airflow switches, door switches and gas valves, should be operated at frequent regular intervals to ensure proper functioning. If inoperative, they should be repaired or replaced promptly.

Safety Shutoff Valves: All safety shutoff valves should be checked for leakage and proper operation at frequent regular intervals.

11.4.1 VALVES AND DAMPERS

The valves have rotational shaft movement with packing glands. These should be inspected for normal shaft movement and tightness of packing. Once a month: a) Inspect the Oxidizer Valve. The gland packing can be inspected at the body of the valve. b) Check each bolt and nut on the valve assemblies to assure each is tight. **Caution: De-energize all valves and bleed the air from the Oxidizer Valves when entering the access doors.**

The instrument airline has an inline filter. Once a month, check the filter maintenance indicator. Compressed air must be clean and dry.

These devices have proximity switches that should be checked to see they function properly.

11.2 MAINTENANCE COMPLIANCE

- RTO inspections and preventative maintenance will be performed daily, weekly, monthly, quarterly and annually as directed by the RTO manufacturer (see section 11.3 below).
- Maintenance records will be maintained on the site.
- Maintenance assures that discrepancies, upgrades, replacement of worn items or other issues identified by the manufacturer are addressed or corrected in a timely manner.
- Monthly ductwork inspections will be conducted and documented in accordance with site procedure PL-EHS-001 Fire Prevention Plan.
- Routine preventative maintenance and cleanings are performed on coating towers. Frequency of these maintenance events is documented in PL-EHS-001 Fire Prevention Plan.
- An annual inspection shall be conducted to meet the following:
    - Check visual integrity of the RTO and the ductwork from each source leading to the RTO. The inspection shall include an evaluation of whether all emissions are being vented through the dedicated stack exit.
    - Monitor parameters to ensure total enclosures of applicable emissions units in a manner and a frequency outlined in the Air Pollution Control Equipment Monitoring Plan

- Confirm that collection headers that are routed to the RTO are operating under negative pressure on an annual basis and in accordance with the Air Pollution Control Equipment Monitoring Plan
- The inspections and monitoring shall be conducted by plant personnel familiar with the operation of the oxidizer and associated equipment

11.3 OPERATIONAL AND MAINTENANCE CHECKLIST

Operational Checklist

a. Check burner flame signal of 5.0 volts

b. During pilot ignition, the flame signal must be >1.25 volts or the burner controller will lock out on flame failure.

c. Check for proper inlet gas pressure on gage PI-500. Must be greater than 3 psig

d. Check for proper operating temperatures. The temperature must be greater than 1832°F,

e. Check instrument air pressure gauge, pressure must be greater than 80psig.

f. Make sure filters and/or intakes are clear of debris like plastic bags, and have adequate combustion air.

h. Check fans for excessive vibration, motors should be warm, not hot and vibration should be minimal.

Regular Shift Checklist

a. Check the temperature of the inlet thermocouple. > 250°F will cause alarm.

b. Check all hand-valves, for proper positions.

c. Check pressure drop across the RTO. Greater than 20” requires cleaning.

Weekly Checklist

a. Check burner flame signal of 5.0 volts.

b. Look at RTO Overview screen. Bed 1 and Bed 2 temperatures should be close.

c. The high temperature limit device temperature should be close to the combustion chamber temperature.

d. Check gas pressure after the regulator at PI-501. It should be 32” WC.

e. Go to the Alarm History page on the HMI. Note any repeated alarms and review with maintenance to resolve the issue

f. Every 2 minutes the RTO dampers will switch. Listen to the valves switch, there should be no loud bang as the valves move to the seat.

g. Monitor pressure gauges on instrument air PI-401. Pressure should be maintained above 80 psig and below 110 psig.

Monthly Checklist

Grease the fan bearings.

Yearly Checklist

a. Test interlock sequence of all safety equipment. Manually make each interlock fail, noting that related equipment closes or stops as specified by the manufacturer.
b. Test (leak test) safety shutoff valves for tightness of closure.
c. Test main fuel hand-valves for operation.
d. Test pressure switch settings by checking switch movements against pressure settings and comparing with actual impulse pressure.
e. Inspect all electrical switches and contacts; clean if necessary.
f. Test all amplifier and thermocouple fail-safe devices, making certain that the instrument drives in the proper direction.
g. Clean the air blower filters.
h. Clean air and gas strainers.
i. Inspect burner and pilot; clean if necessary.
j. Check, meters, gauges, and pressure indicators; and clean or repair, if necessary.
k. Check ignition cable and transformers.
l. Check equipment interior, and ventilation and ductwork systems for cleanliness and flow restrictions.
m. Inspect air, fuel, and impulse piping for leaks.

Periodic Checklist

a. The frequency of maintenance of the following will depend on the actual operating condition and individual plant operation.
b. Inspect ceramic media for dirt, leakage, and replace if necessary.
c. Lubricate the instrumentation, valve motors, valves, blowers, compressors, pumps, and other components per individual component literature or instructions.
d. Test flame safeguard units.
e. Check RTO Damper valve seats.

Saint Gobain Merrimack NH	REGENERATIVE THERMAL OXIDIZER	Daily Maintenance Log	
COMPONENT / TASK	**DATE COMPLETED**	**COMMENTS / NOTES**	**INITIALS**
VISUALLY INSPECT RTO - MONDAY			
VISUALLY INSPECT RTO - TUESDAY			
VISUALLY INSPECT RTO - WEDNESDAY			
VISUALLY INSPECT RTO - THURSDAY			
VISUALLY INSPECT RTO - FRIDAY			
VISUALLY INSPECT RTO - SATURDAY			
VISUALLY INSPECT RTO - SUNDAY			
Daily visual inspections of the RTO System and supporting equipment can help in the preventative maintenance of the RTO unit and keep from having undesired emergency shutdowns. Review the following items: **FAN BEARING OIL TEMPERATURE, FAN NOISE, VALVE NOISE, INLET AND OUTLET VALVE PROXIMITY SWITCHES, INLET AND OUTLET VALVE SOLENOIDS, CHAMBER OPERATING TEMPERATURE @ 1832 F, HOT SPOTS ON THE COMBUSTION CHAMBER, CONTROL ROOM TEMPERATURE, VISUAL INSPECTION**			

Saint Gobain Merrimack NH	REGENERATIVE THERMAL OXIDIZER	Weekly Maintenance Log	
COMPONENT / TASK	**DATE COMPLETED**	**COMMENTS / NOTES**	**INITIALS**
Lubricate Main Process Fan Bearings - Daily check oil level on main process fan bearings and fill as necessary. Do not overfill			
Inspect Damper Actuators - visual inspection of actuators and wiring to ensure no looseness to connections or components			
Poppet Valve Cylinders and Proximity Switches - visual inspection of cylinders, shafts, alignment coupling, and proximity switches to ensure no looseness to connections or components			
Review operating setpoints on Control Panel - record setpoints on sheets and check against previous records for substantial variation in any conditions			

Saint Gobain Merrimack	REGENERATIVE THERMAL OXIDIZER	Monthly Maintenance Log	
COMPONENT / TASK	**DATE COMPLETED**	**COMMENTS / NOTES**	**INITIALS**
Drain PIT-300 Pressure Transmitter low point - loosen and remove the plug in the drain leg to ensure no condensate buildup.			
Combustion Blower 20 hp Motor Grease - 2 full squirts of grease from a standard grease gun in each bearing (ensure grease is exiting seal of bearing)			
Main Process Fan 700 hp Motor Grease - 1 full squirt of grease from a standard grease gun in each bearing (ensure grease is exiting seal of bearing)			

Normal Weekly maintenance should be completed at the same time as the monthly maintenance.

Saint Gobain Merrimack NH	REGENERATIVE THERMAL OXIDIZER	Quarterly Maintenance Log	
COMPONENT / TASK	**DATE COMPLETED**	**COMMENTS / NOTES**	**INITIALS**
Open Poppet Valve #1 Access Door - visually inspect condensate and particulate buildup on the inlet collection duct. Consult Air Clear technical personnel on buildup in regard to cleaning or bakeout of particulate.			
Test Gas Train Pressure Switches - adjust setpoint on low and high gas pressure switches to ensure proper alarms for each.			
Review operating setpoints on Control Panel - record setpoints on sheets and check against previous records for substantial variation - this should be a thorough review of all setpoints associated with the equipment.			
Normal Weekly and Monthly maintenance should be completed at the same time as the monthly maintenance. 3 month maintenance should be completed during a weekend shutdown period.			

Saint Gobain Merrimack	REGENERATIVE THERMAL OXIDIZER	Annual Maintenance Log	
COMPONENT / TASK	**DATE COMPLETED**	**COMMENTS / NOTES**	**INITIALS**
Inspect Heat Recovery Media- remove the combustion chamber access door after the RTO unit has been in "cool down" mode for at least 24 hours and the oxidizer chamber temperature is below 75 C for a visual inspection of the heat recovery media.			
Inspect Outlet and Inlet Damper Seal Assemblies - ensure gasket material is not frayed or loose. Reseat gasket material and retighten collar retention ring for gasket material.			
Review operating setpoints on Control Panel - submit recorded data to AIR CLEAR technical department for review			
Inspect outdoor electrical Instrumentation - remove covers and ensure no moisture or corrosion on the inside of the wiring terminals.			
Inspect Thermocouple Assemblies - if thermocouple assemblies are degraded due to high temperature replace with new.			
Check / Tighten nuts and bolts on combustion chamber flanges and inlet and outlet ductwork			
Check / Tighten flange connections on gas train components			
Calibrate PIT-300 Pressure Transmitter - record details of calibration			
Normal Weekly, Monthly, and 3 Month maintenance should be completed at the same time as the annual maintenance. Annual maintenance should be completed during a weekend shutdown period.			

Air Pollution Control Equipment Monitoring Plan

Section 12

12.0 RECOMMENDED SPARE PARTS

QTY	DESCRIPTION
1	Burner Transformers with Cable
2	UV Flame cells
2	Panel Relays
4	Comb. Chamber Thermocouple Assemblies
1	Duct Work Thermocouple Assemblies
1	Flame Guard – PC Controls
1	Main Fan Motor
1	Combustion Air Valve Control Motor
1	Pressure/Volume Transducer
1	Analog Input Module
1	Analog Output Module
1	16 Pt Input Module
1	16 Pt Output Module
1	PLC CPU
1	PLC Power Supply
1	Misc. Fuses
2	Poppet Damper Solenoid valves

Air Pollution Control Equipment Monitoring Plan

Section 13

13.0 AC DRAWING LIST

Drawing Number	Title
MECHANICAL	
64504J5-1000-01	General Arrangement (Elevation)
64504J5-1091-03	Foundation Footprint
64504J5-1045-1	Air Piping Connections
64504J5-1050-01	Gas Train and Combustion Air Layout
64504J5-1050-02	Gas Train Layout
64504J5-1050-05	Combustion Air Piping
64504J5-1135-1	Piping & Instrumentation Diagram
2643901	Air Pro Main Process Fan (700HP)
2021-07032	Combustion Air Fan (20HP)
D-81072	Process Isolation Damper
C-74860	Ambient Air Damper
C-74861	Purge Damper
C-74862	Vacuum Relief Damper
ELECTRICAL	
64504J5-1141 Sheets 1 through 9	Electric Wiring Diagrams
64504J5-1142 Sheet 1	Main Control Panel Front and Inside
64504J5-1143 Sheet 1	Electrical Field Wiring
64504J5-1146 Sheet 1	Electrical Wiring Diagram
M201588 Sheets 1 through 11	Allen Bradley VFD Wiring Diagrams

Appendix A: RTO Maintenance/Malfunction Report

Person(s) Completing Form:

Date and Time of Event:

Event Type (circle one): RTO Malfunction or RTO Maintenance

Did RTO go offline (circle one): yes or no

If RTO went offline

Date and Time RTO Offline:

Date and Time RTO Online:

Did RTO go into bypass (circle one): yes or no

Were Tower emissions sent to atmosphere (circle one): yes or no

Date and Time Tower emissions began going to atmosphere:

Date and Time Tower emissions stopped going to atmosphere:

Describe the event (if malfunction include details on probable cause):

If malfunction, describe corrective actions and preventative measures taken:

Bypass Emissions Calculation:

Tower	Flow rate (cfm)	Bypass minutes	PFOA (CAS #335-67-1) emission rate (lbs/dscf)	PFOS (CAS #1763-23-1) emission rate (lbs/dscf)	PFOA (CAS #335-67-1) emissions (lbs)	PFOS (CAS #1763-23-1) emissions (lbs)
MA Tower	3000		6.15E-12	8.23E-14		
MB Tower	9000		6.15E-12	8.23E-14		
MD Tower	4100		6.15E-12	8.23E-14		
MG Tower	7000		6.15E-12	8.23E-14		
MP Tower	10900		6.15E-12	8.23E-14		
MQ Tower	1500		6.15E-12	8.23E-14		
MR Tower/MR Tower*	4500		6.15E-12	8.23E-14		
MS Tower	4000		6.15E-12	8.23E-14		
QX Caster	17000		6.15E-12	8.23E-14		
20" Caster/20" Coater*	6000		6.15E-12	8.23E-14		
R+D	1500		6.15E-12	8.23E-14		
				Total		

*Equipment share one exhaust point with a single flowrate

REVISION HISTORY				
REV	**Date**	**Description of Change**	**Author**	**Approved By:**
00	25-Feb-22	Initial Release	W. Kempskie	D. Calentine

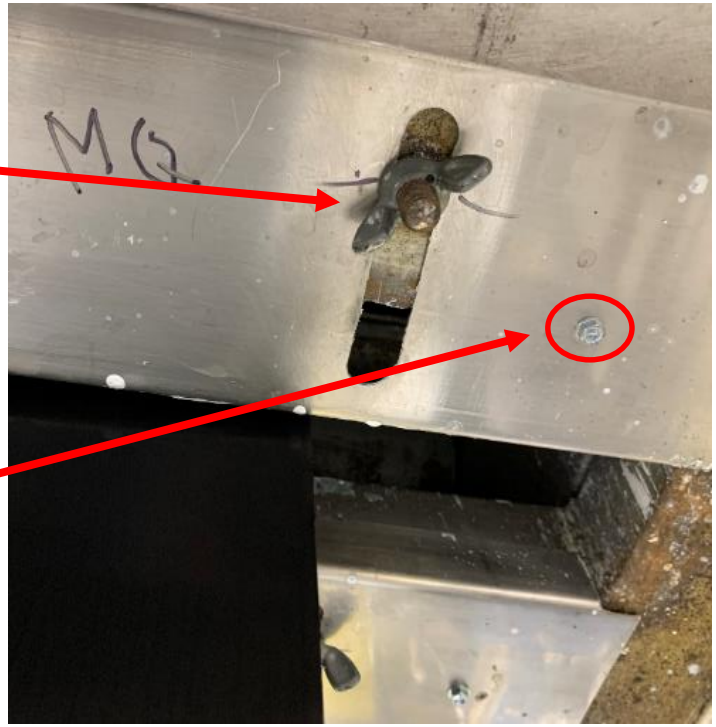
Purpose of this guideline: Mandatory placement of dampers at MQ Tower (EU15) natural draft openings (NDO) and fan set point on Tower to ensure average facial velocity into NDO's is at least -0.007" H2O.

Number of NDOs: 2

Fan set point: 60Hz

NDO into oven

NDO out of oven



Ensure dampers are bolted into place in alignment with marked set point prior to starting operations

Purpose of this guideline: Mandatory placement of dampers at MP Tower (EU13) natural draft openings (NDO) and fan set point on Tower to ensure average facial velocity into NDO's is at least -0.007" H2O.

Number of NDOs: 4 (2 at bottom & 2 at top of tower)
Fan set point: 60 Hz

NDO into oven

NDO out of oven

Damper locked in place

Damper marking

Ensure dampers are bolted into place in alignment with marked set point prior to starting operations

Purpose of this guideline: Mandatory placement of dampers at MG Tower (EU12) natural draft openings (NDO) and fan set point on Tower to ensure average facial velocity into NDO's is at least -0.007" H2O.

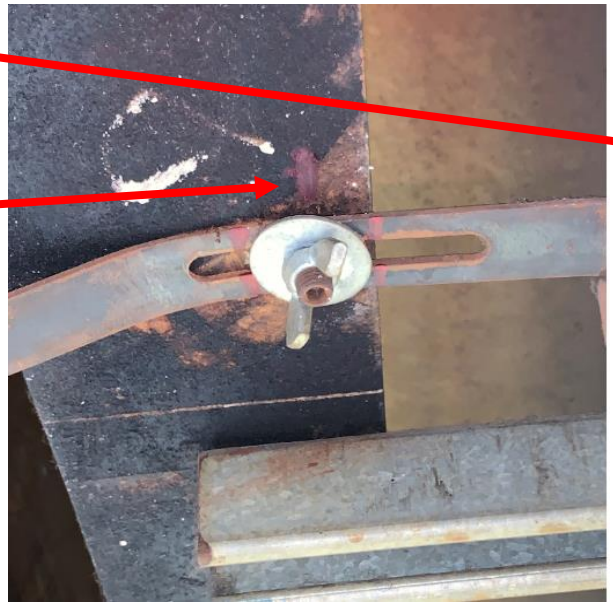
Number of NDOs: 2

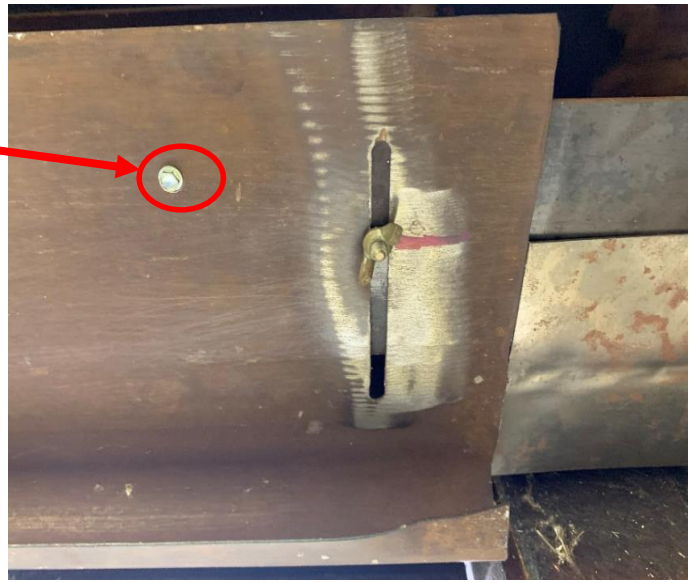
Fan set point: 30.55 Hz

NDO into oven **NDO out of oven**

Damper locked in place

Damper marking





Ensure dampers are bolted into place in alignment with marked set point prior to starting operations

Purpose of this guideline: Mandatory placement of dampers at MC Tower (EU03) natural draft openings (NDO) and fan set point on Tower to ensure average facial velocity into NDO's is at least -0.007" H2O.

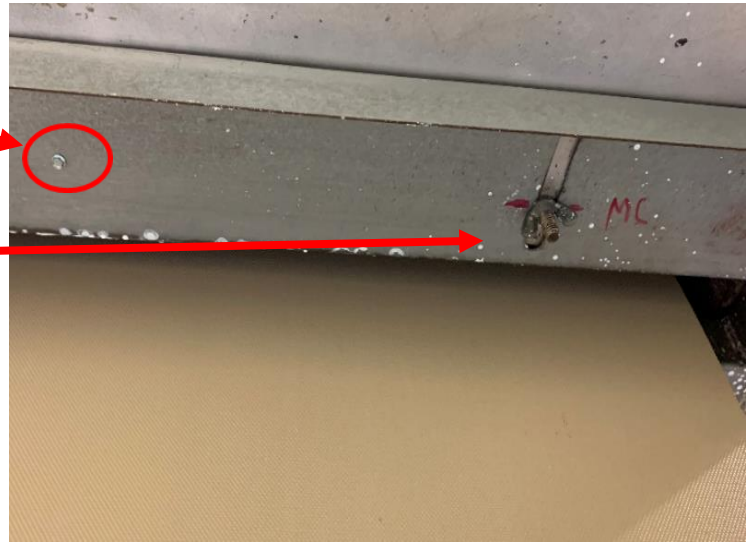
Number of NDOs: 2
Fan set point: 60Hz

NDO into oven

NDO out of oven

Damper locked in place

Damper marking



Ensure dampers are bolted into place in alignment with marked set point prior to starting operations

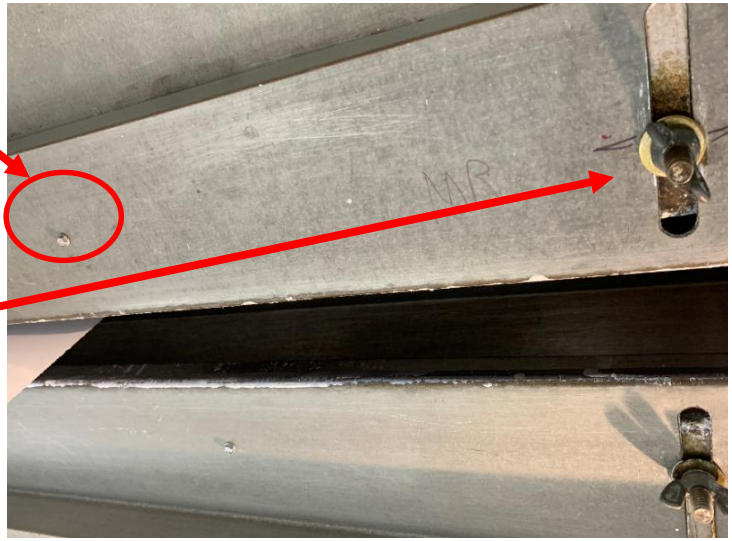
Purpose of this guideline: Mandatory placement of dampers at MR Tower (EU04) natural draft openings (NDO) and fan set point on Tower to ensure average facial velocity into NDO's is at least -0.007" H2O.

Number of NDOs: 2
Fan set point: 60 Hz

NDO into oven

Damper locked in place

Damper marking



NDO out of oven

Ensure dampers are bolted into place in alignment with marked set point prior to starting operations

Purpose of this guideline: Mandatory placement of dampers at MS Tower (EU16) natural draft openings (NDO) and fan set point on Tower to ensure average facial velocity into NDO's is at least -0.007" H2O.

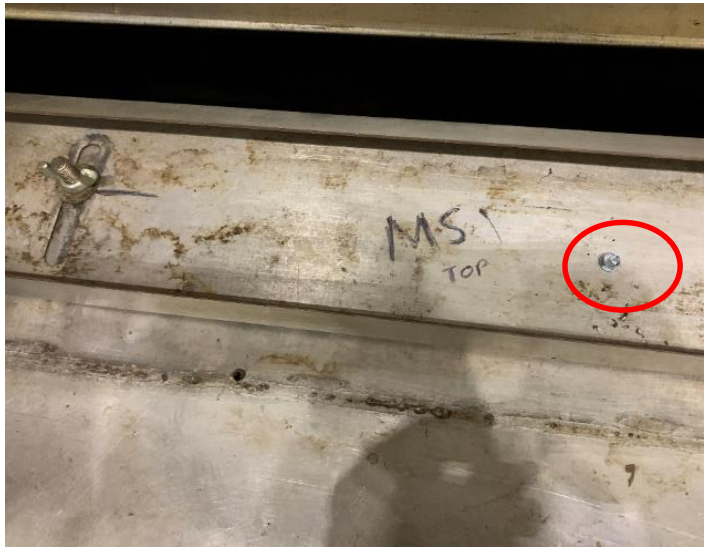
Number of NDOs: 2
Fan set point: 60 Hz

NDO into oven

Damper locked in place

Damper marking

NDO out of oven



Ensure dampers are bolted into place in alignment with marked set point prior to starting operations

Purpose of this guideline: Mandatory placement of dampers at MB Tower (EU02) natural draft openings (NDO) and fan set point on Tower to ensure average facial velocity into NDO's is at least -0.007" H2O.

Number of NDOs: 4
Fan set point: 42 Hz

NDO into oven

NDO out of oven

Damper locked in place

Damper marking

Ensure dampers are bolted into place in alignment with marked set point prior to starting operations

Purpose of this guideline: Mandatory placement of dampers at MA Tower (EU01) natural draft openings (NDO) and fan set point on Tower to ensure average facial velocity into NDO's is at least -0.007" H2O.

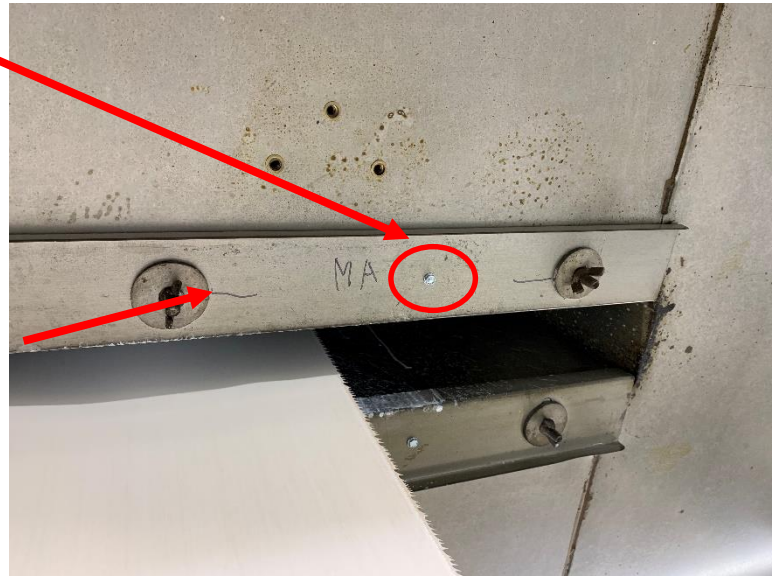
Number of NDOs: 2
Fan set point: 60 Hz

NDO into oven

NDO out of oven

Damper locked in place

Damper marking



Ensure dampers are bolted into place in alignment with marked set point prior to starting operations

Purpose of this guideline: Mandatory placement of dampers at R&D Tower (EU22) natural draft openings (NDO) and fan set point on Tower to ensure average facial velocity into NDO's is at least -0.007" H2O.

Number of NDOs: 4
Fan set point: 60 Hz

NDO into oven

Damper marking

Damper locked in place

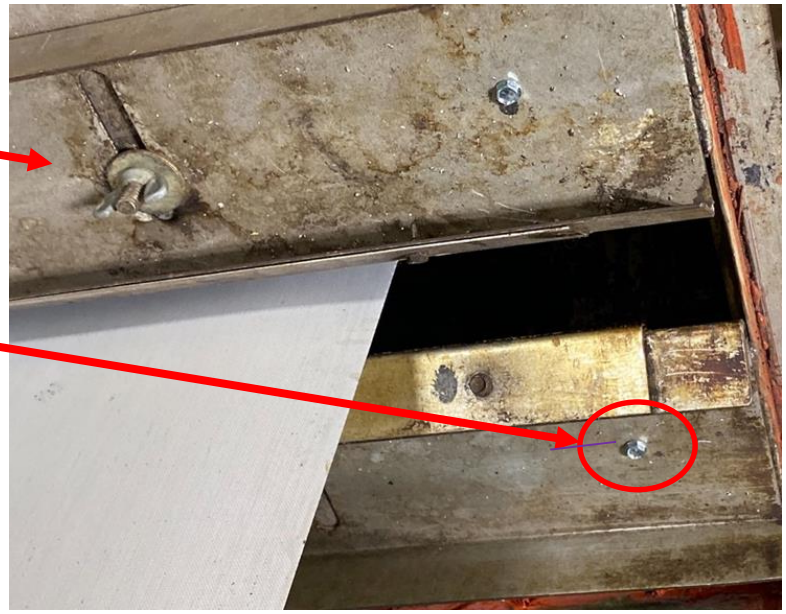
NDO out of oven

Ensure dampers are bolted into place in alignment with marked set point prior to starting operations

Purpose of this guideline: Mandatory placement of dampers at MD Tower (EU05) natural draft openings (NDO) and fan set point on Tower to ensure average facial velocity into NDO's is at least -0.007" H2O.

Number of NDOs: 4
Fan set point: 60 Hz

NDO into oven



NDO out of oven

Ensure dampers are bolted into place in alignment with marked set point prior to starting operations

Purpose of this guideline: Mandatory placement of curtains in 20” SBC/20” Caster Room (EU07 and EU08) natural draft openings (NDO) and fan set point of room exhaust to ensure average facial velocity into the NDO is at least -0.007” H2O.

Number of NDOs: 1 – Room Entry/Exit
Fan set point: 60Hz

NDO (Room entry/exit)

Curtains closed

Set Speed Set point to mark

Ensure curtains to room are closed prior to starting operations

Purpose of this guideline: Mandatory placement of dampers at QX Tower (EU06) natural draft openings (NDO) and fan set point on Tower to ensure average facial velocity into NDO's is at least -0.007" H2O.

Number of NDOs: 10

Fan set points: Stage 1 - 41.23Hz
Stage 2 - 41.23Hz
Stage 3 - 45Hz
Stage 4 - 50.50Hz
Stage 5 - 45Hz

NDO into oven

Damper marking

Damper locked in place

NDO out of oven

Ensure dampers are bolted into place in alignment with marked set point prior to starting operations. On upper NDOs ensure shields are placed on both sides of NDOs.

REVISION HISTORY					
REV	**Date**	**Description of Change**	**Author**	**Approved By:**	
00	24Feb22	Initial Release.	M. Ciccone	Operations	Z. Steffens

Saint-Gobain Performance Plastics Corporation
701 Daniel Webster Highway
Merrimack, NH 03054
Phone: (603) 424-9000
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Fire Response and Prevention Plan

FOR

SGPPL-MENH

Issued: September 2021

SAINT-GOBAIN

Document: PL-EHS-001

1 PURPOSE

This Fire Prevention Plan is designed to outline the procedures Saint-Gobain Merrimack, New Hampshire follows to minimize the occurrence of fires at the facility.

2 FACILITY BACKGROUND

Saint-Gobain Performance Plastics (SGPP) Merrimack, NH is a 4-story facility located at 701 Daniel Webster Highway. General Electric (GE) developed the site property in 1971 and continued to operate at the location until approximately 1982. The GE-owned property consisted of approximately 170 acres located between Daniel Webster Highway and the Merrimack River, and included the existing 90,000-square-foot manufacturing building (referred to as the "Main Building"), several outbuildings and railway spurs.

In 1984, Chemical Fabrics Corporation (Chemfab) purchased the property from GE and in 1987, subdivided and sold approximately 150 acres of the wooded/predominantly-undeveloped land surrounding the facility. In the mid- to late-1990s, Chemfab constructed a 55,000-square foot addition (referred to as the "New Manufacturing Building") east of the facility's Main Building. SGPP acquired Chemfab in 2000 and assumed ownership of the site.

As of July 30th, 2021, all SGPP process exhaust (14 emissions points) is vented through galvanized steel ductwork which exits the building through the roof and connects to a regenerative thermal oxidizer (RTO) which is located at the rear (East) of the facility. There are two natural gas fired burners at the RTO combustion chamber and a natural gas injection nozzle at the RTO inlet ductwork. Each natural gas burner on the RTO combustion chamber has a 15,000,000 BTU/hr. output rating. The burners provide the 1832°F needed to treat the exhaust. Location of RTO and RTO ductwork is provided in Appendix A.

3 FIRE RESPONSE

3.1 In the event a fire occurs at the site, SGPPL personnel are instructed to activate a pull station fire alarm to commence site evacuation. The signal from the pull station will initiate the fire alarm and send a signal to Saint-Gobain Global Monitoring Services, who in turn will notify the Merrimack, NH Fire Department (911).

3.2 When the site emergency evacuation alarm sounds, all personnel in the facility will exit the facility via the nearest emergency exit (See Appendix B) and proceed to the front parking lot on the West side of the property.

3.3 If safe to do so operators are instructed to hit the emergency stop button on their equipment which powers the equipment down.

3.4 Saint-Gobain does not maintain an internal fire brigade. Employees are instructed to not attempt to put out fires. Fire extinguishers are present in the plant and are to be used defensively by employees if they become trapped (See Appendix C). Employees are trained in fire extinguisher use regularly.

3.5 Once in the parking lot all personnel will meet at the designated department muster points (see Appendix D) to begin an attendance check.

3.6 Each employee is assigned to a muster point and each muster point is assigned a group leader to take attendance.

3.7 Upon leaving the facility during an emergency evacuation, each muster point's group leader will collect a high visibility vest and the group's attendance list as they exit the facility.

3.8 In the parking lot the EHS Manager (or designee) will check in with each muster point group leader and determine if any employees are unaccounted for.

3.9 Upon arrival at SGPPL, the Merrimack Fire Department will meet with the site Emergency Coordinator (or designee) at the front employee entrance (see Appendix E for list of Emergency Coordinators). The Emergency Coordinator will provide the Merrimack Fire Department with as much information as possible on the emergency situation:

3.9.1 Number of unaccounted persons and last location person was seen

3.9.2 Location of Fire (if unknown Fire Department to be brought to the Fire Panel Room)

3.9.3 Status of gas (i.e. gas to machine powered off or not, Emergency gas shutoff activated, etc.)

3.9.4 Chemical hazards (toxic gases, inhalation hazards, etc.) – Merrimack Fire Department is also provided annually with site Tier II submittal

3.10 All personnel will remain at the muster points until the building is deemed safe to re-enter by the Merrimack Fire Department.

4 SAFETY AND FIREFIGHTING

4.1 GENERAL

4.1.1 The natural gas train for the entire building in located in the fenced-in area on the North end of the building. Keys to the gate in the Knox boxes located next to the fire pump, door 1, door 14 and door 17

4.1.2 Emergency natural gas shut-off valves for the Low Bay Towers and the RTO natural gas supply are installed in the northwest corner of the Low Bay building. In emergency scenarios these manual valves can be operated by responding staff and/or the fire department.

4.1.3 Firefighting at the RTO natural gas equipment would be best accomplished by isolating the natural gas supply.

4.1.4 Firefighting at the RTO fan would involve a small amount (under ½ gallon total) of combustible lube oil. The appropriate firefighting method would be a CO2 or dry chemical extinguisher. A CO2 extinguisher will be placed nearby the fan enclosure.

4.2 HIGH BAY ROOF

4.2.1 Firefighter access to the High Bay roof is accomplished by using the exterior stairs at the front of the facility (West) which run from grade level to the roof. This exterior stairway is located next to Door #19 (see Appendix B) and is adjacent to a fire hydrant (see Appendix F).

4.2.2 A 4-inch dry standpipe with 2-1/2 inch outlets for firefighter use is in place at the top of the High Bay stairwell.

4.2.3 Fall protection guardrails are provided between the RTO ductwork and roofs edge on the High Bay roof.

4.2.4 Inspection ports are installed on the east and west legs of RTO ductwork located on the High Bay roof.

4.2.5 A metal bridge with handrails is installed to allow safe crossing of the west section of the High Bay RTO ductwork which allows access to all inspection ports on both lines of ductwork.

4.2.6 Roof lighting is provided on the High Bay roof, controlled by a switch at the top of the access stairs to provide lighting when needed for firefighting or other emergency purposes.

4.3 LOW BAY ROOF

4.3.1 Firefighter access to the Low Bay is accomplished by using the exterior stairs at the rear of the facility (East) which run from grade level to the Low Bay roof. This exterior stairway is located between Door #14 and Door #15 (see Appendix B).

4.3.2 A 4 -inch dry standpipe with 2-1/2 inch outlets for firefighter use is in place at the top of the Low Bay stairwell. Control for the standpipe will be on the east wall of the Low Bay.

4.3.3 A catwalk with guardrails is connected to the Low Bay exterior stairwell. This catwalk runs along the RTO ductwork on the Low Bay roof to provide safe access to the ductwork inspection ports.

4.3.4 Lighting is provided on the Low Bay roof, controlled by a switch at the top of the access stairs to provide lighting when needed for firefighting or other emergency purposes.

5 PREVENTATIVE ACTIONS - GAS

5.1 RTO DUCTWORK

5.1.1 Buildup of residue is not expected in the new ductwork or in the RTO based on lack of any buildup within the existing ductwork at the roof level. This will be confirmed by the following inspection frequency.

5.1.2 When operation of the RTO system commences, a monthly internal inspection at every access port and at the base of the RTO will be completed.

5.1.3 Results of the monthly inspection will be recorded (see Appendix G).

5.1.4 Any buildup within the ductwork or RTO will be investigated to determine why the buildup is occurring and how the buildup can be addressed.

5.1.5 This monthly inspection will occur for at least 12 months so the condition of the interior of the ductwork will be investigated and inspected over the range of weather conditions expected at the site over a year.

5.1.6 If after one year, the monthly internal inspections of the ductwork and RTO show no buildup of any residual materials, the inspection frequency will be extended to quarterly.

5.2 COATING TOWERS

5.2.1 Maintenance performs preventative maintenance (PM) on each Tower every 3,000 hours of run time. Preventative maintenance actions are performed as outlined in the site PM checklist.

5.2.2 Facility Manager or Maintenance Supervisor must have a final sign-off inspection, post-PM work, and prior to turning tower back to production.

5.2.3 Maintenance will use the camera to check 10’ (the length of the camera) of internal exhaust duct during each PM.

5.2.4 Gas trains will be inspected annually (NFPA 86) by authorized external vendor.

5.2.5 Production operators will perform housekeeping (5S) on tower stairs, platforms, ledges, shelves, etc. weekly to ensure flammable items are not stored these areas. Flammable chemicals are not used on Towers or in coating processes.

5.3 R & D PILOT TOWER

5.3.1 Maintenance performs preventative maintenance (PM) on R&D Pilot Tower annually. Preventative maintenance actions are performed as outlined in the site PM checklist.

5.3.2 Facility Manager or Maintenance Supervisor must have a final sign-off inspection, post-PM work, and prior to turning tower back to production.

5.3.3 Maintenance will use the camera to check 10’ (the length of the camera) of internal exhaust duct during each PM.

5.3.4 Gas trains will be inspected annually (NFPA 86) by authorized external vendor.

5.3.5 Production operators will perform housekeeping (5S) on tower stairs, platforms, ledges, shelves, etc. weekly to ensure flammable items are not stored these areas. Flammable chemicals are not used on Towers or in coating processes.

5.4 CHEMSIL/20” CASTER

5.4.1 Maintenance performs preventative maintenance (PM) on Chemsil Tower and 20” Caster annually. Preventative maintenance actions are performed as outlined in the site PM checklist.

5.4.2 Facility Manager or Maintenance Supervisor must have final sign-off inspection, post-PM work, prior to turning back to production.

5.4.3 Maintenance will use the camera to check 10’ (the length of the camera) of internal exhaust duct at each PM.

5.4.4 Production operators will perform housekeeping (5S) on tower stairs, platforms, ledges, shelves, etc. weekly to ensure flammable items are not stored these areas. Flammable chemicals are not used on Towers or in coating processes

5.5 AIR HANDLERS

5.5.1 Annual service and NFPA 86 inspections to be performed on all air handlers by licensed outside contractor.

5.6 HEAT CLEAN OVEN

5.6.1 Maintenance performs preventative maintenance (PM) on Heat Clean Oven annually. Preventative maintenance actions are performed as outlined in the site PM checklist.

5.6.2 Maintenance will use the camera to check 10' (the length of the camera) of internal exhaust duct at each PM.

5.7 MTM

5.7.1 Maintenance performs preventative maintenance (PM) on MTM annually. Preventative maintenance actions are performed as outlined in the site PM checklist.

6 PREVENTATIVE ACTIONS - ELECTRIC

6.1 ELECTRICAL PANELS/TRANSFORMERS

6.1.1 Site to arrange for a 3rd party Arc Flash/IR Scan by authorized external vendor every 3 years.

6.1.2 Site to clean all transformers by authorized external vendor every 3 years

6.2 ELECTRIC DUCT HEATERS

6.2.1 EDU's will be inspected annually by authorized external vendor.

6.3 ELECTRICAL HEAT TOOLS (tackers, bar sealers, Whitney, ZA-01, T-Rex, etc.)

6.3.1 Fabrication supervisor will ensure all electrical heat tools (tackers, bar sealers, Whitney, ZA-01, T-Rex, etc.) will be shut off and/or unplugged at the end of the workday.

7 OVERSIGHT

7.1 MONITORING COMPANY

7.1.1 Our fire and security monitoring company is Saint-Gobain Global Monitoring Services

7.2 SMOKING

7.2.1 SGPPL Merrimack is a non-smoking facility.

7.3 FLAMMABLE STORAGE CABINETS/PSA BUILDING/OUTSIDE FLAMMABLE STORAGE BUILDING

7.3.1 All flammable storage cabinets/areas are inspected routinely by EHS for integrity and proper grounding.

7.4 R&D

7.4.1 The R&D labs and production areas are inspected monthly by R&D personnel for adherence to policies and procedures

8 INSPECTION

8.1 INSURANCE RISK ASSESSMENT

8.1.1 An insurance risk assessment is performed annually by a corporate approved company.

8.2 FIRE DEPARTMENT

8.2.1 Saint-Gobain will invite the Merrimack Fire Department to tour the building on an annual basis. Suggestions and recommendations will be acted upon.

8.3 FIRE SUPPRESSION SYSTEMS

8.3.1 This fire pump is inspected/serviced monthly.

8.3.2 The fire pump engine and generator engine are serviced semi-annually.

8.3.3 A hydrostatic test is performed on the fire pump annually.

8.3.4 The fire alarm panel is checked and tested monthly.

8.3.5 The sprinkler risers are inspected quarterly.

8.3.6 The sprinkler system is inspected and tested annually.

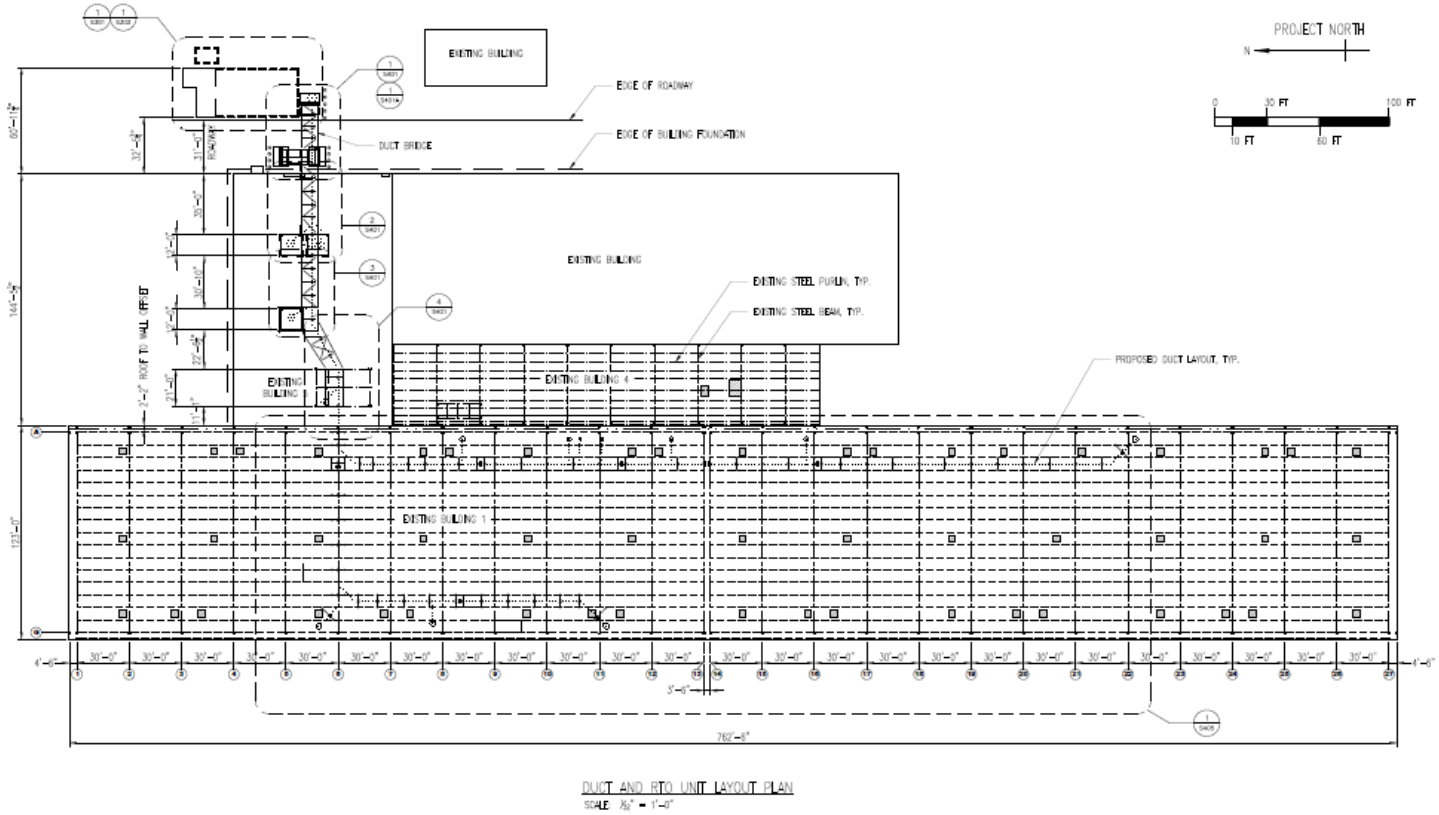
8.3.7 All tests, inspections, and services are done for fire sprinkler, sprinkler risers, fire pump system, and fire alarm system according to NFPA 10, 25, 72, and 101 standards.

8.3.8 All Fire suppression checks are performed by a licensed external contractor.

8.3.9 All modification to the fire suppression system are calculated and designed by a licensed professional engineer

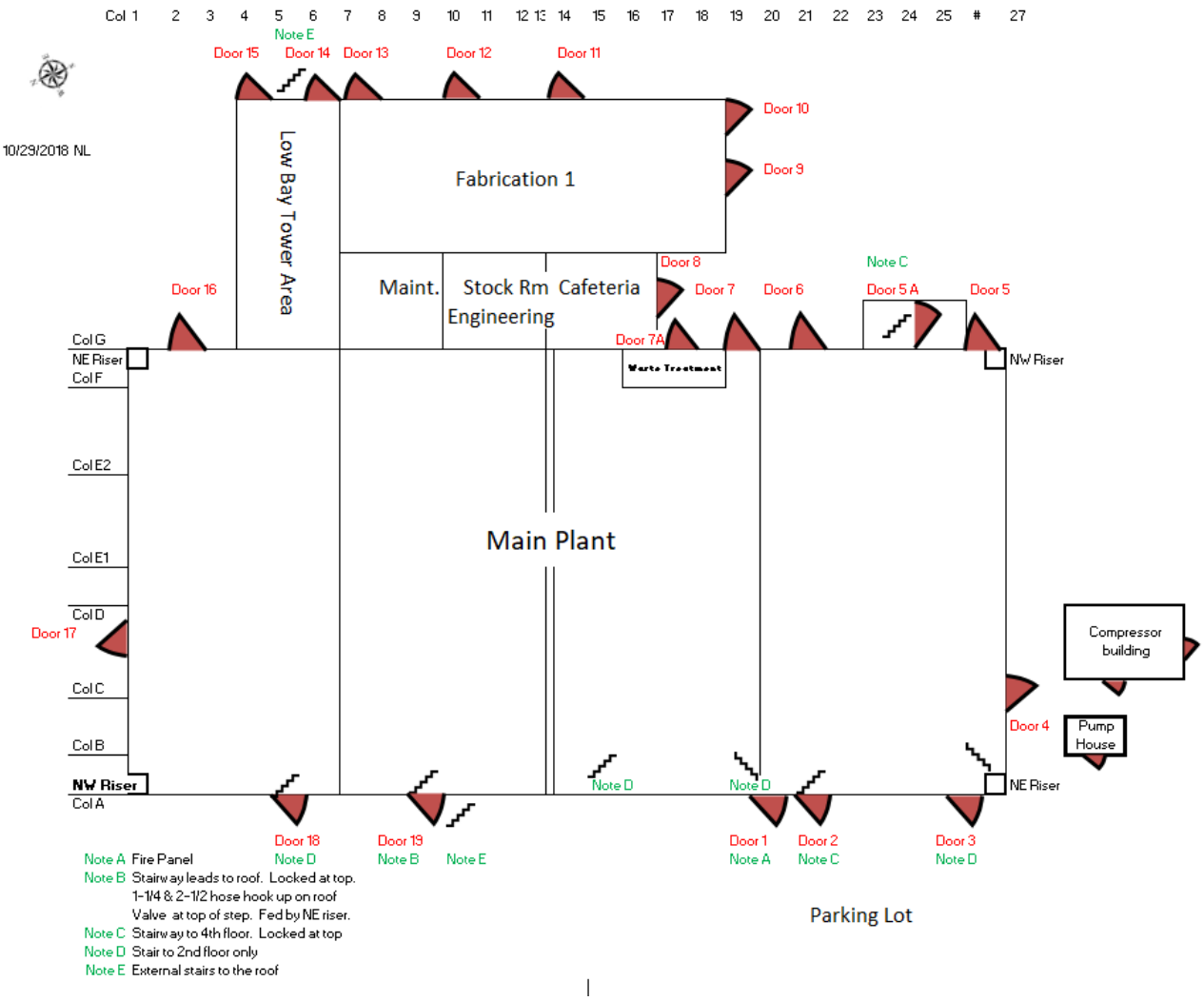
REVISION HISTORY				
REV	**Date**	**Description of Change**	**Author**	**Approved By:**
00	24-Jan-19	Initial Release	C. Gilman	K. Weeks W. Kempskie G. Caridade
01	13-Aug-21	Plan review. Added sections on RTO and RTO ductwork. Added or modified 3.1, 4.1.4, 7.1.1, 8.3.3, 8.3.8, updated appendices.	W. Kempskie	G. Caridade M. Giroux N. Lachance

Appendix A: RTO and RTO Ductwork Layout



DUCT AND RTO UNIT LAYOUT PLAN
SCALE: 1/16" = 1'-0"

Appendix B: Emergency Exit Locations



Appendix C: Location of Portable Fire Extinguishers

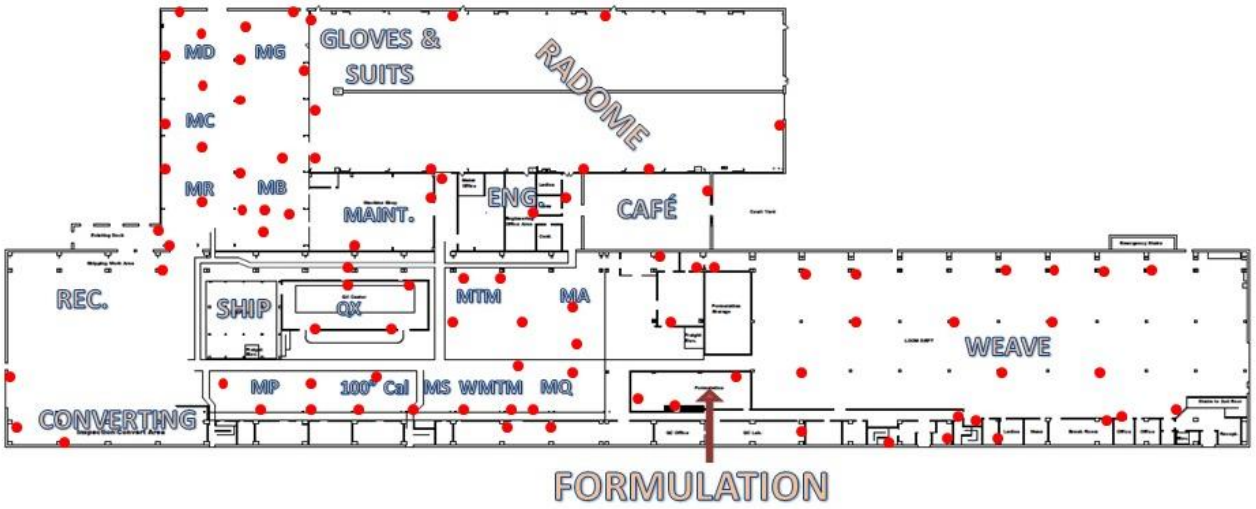


Figure 1C – Fire Extinguishers (1st Floor)

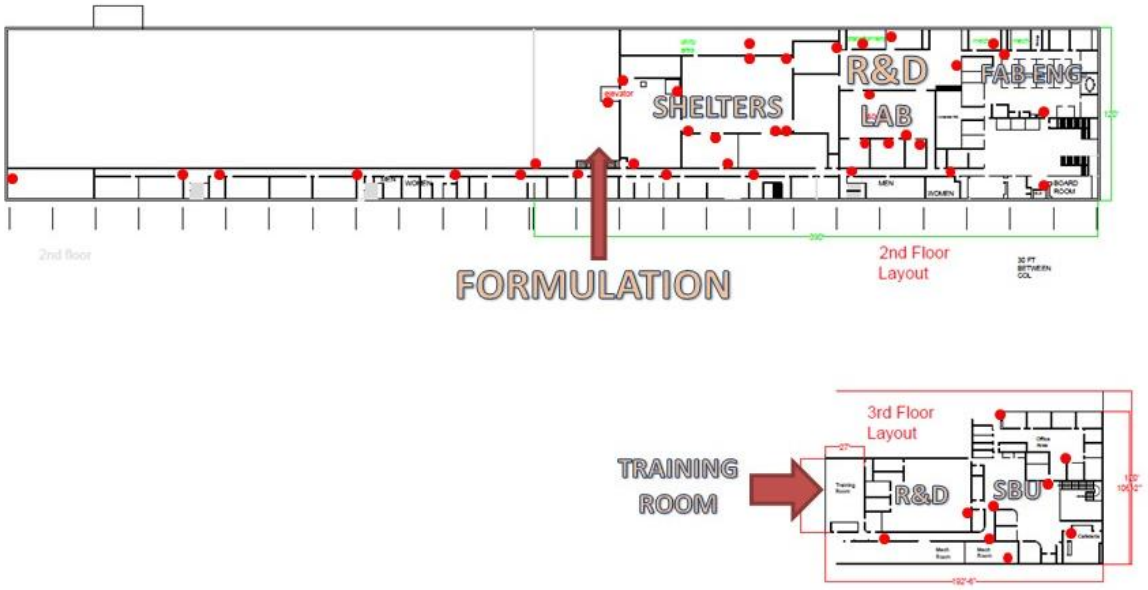


Figure 2C – Fire Extinguishers (2nd + 3rd Floor)

Fire Extinguisher Map Legend	
●	*Fire Extinguisher*

Appendix D: Site Emergency Preparedness Protocol

EMERGENCY PREPAREDNESS PROTOCOL

Evacuation Assembly Areas (notification via: Fire Alarm)

Group A: 2nd & 3rd Floor Offices, HR, Visitors, Contractors
Group B: Weaving & Research / Development
Group C: All Manufacturing Fabrication
Group D: Quality, Engineering & Safety
Group E: Formulation, Shipping, Purchasing, Scheduling & Customer Service
Group F: Coating, Casting & Lamination
Group G: Converting, Maintenance, 2nd , 3rd, Weekend Shifts, ***& all personnel at facility between 5:00 PM to 7:00 AM***

Power Outages (Notification: when power goes out)
2nd Floor Open Area: Groups: A, B, D, (E – Ship/Purch/Sched/CS)
1st Floor Cafeteria: Groups: C, E, F, G

Shelter-In-Place (Notification: verbal from Leadership)
1st Floor Main Aisle near Formulation: Groups: B, E, F, G
3rd Floor Training Center: Groups: A, C, D, (E – Ship/Purch/Sched/CS)

How to Page & Call for Assistance:

TO PAGE INTERNALLY:

•From any house phone dial "# 200"; wait 2 seconds; then Dial "00"; then speak clearly "First Responder to (location)..." then hang up the phone.

OUTSIDE EMERGENCY HELP: (Fire, Police, Ambulance)

•From any house phone dial "9" first then the phone number : "9-911"

Site-Hawk On-line SDS: ***Call Center #*** *: 603-689-1702*

EHS Poster 2, Aug. 2018

EVACUATION ALARM: LOUD PULSING PIERCING WOBBLY SOUND ACCOMPANIED BY LIGHT STROBES

PERFORMANCE PLASTICS

SAINT-GOBAIN

Appendix E: Emergency Contact Numbers

SAINT-GOBAIN

Medical Emergency Contact List

Medical Emergency Response Steps

1. Dial 9-911 to contact Emergency Response
2. Use paging to notify Shift Supervisor & First Aid Responders of situation and location
3. First Aid Responders: Administer First Aid if possible
4. Send an Employee outside to retrieve EMS/Police Services
5. Await further instructions from 911 & Supervisor

Paging System – Dial #200 then 00 for all Zones

Emergency Contacts

EHS Manager – [redacted]

Production Manager (Coating) – [redacted]

1st Shift Supervisor - [redacted]

2nd Shift Supervisor - [redacted]

3rd Shift Supervisor - [redacted]

Production Manager (FAB) – [redacted]

Production Supervisor (FAB) - [redacted]

Facilities Manager – [redacted]

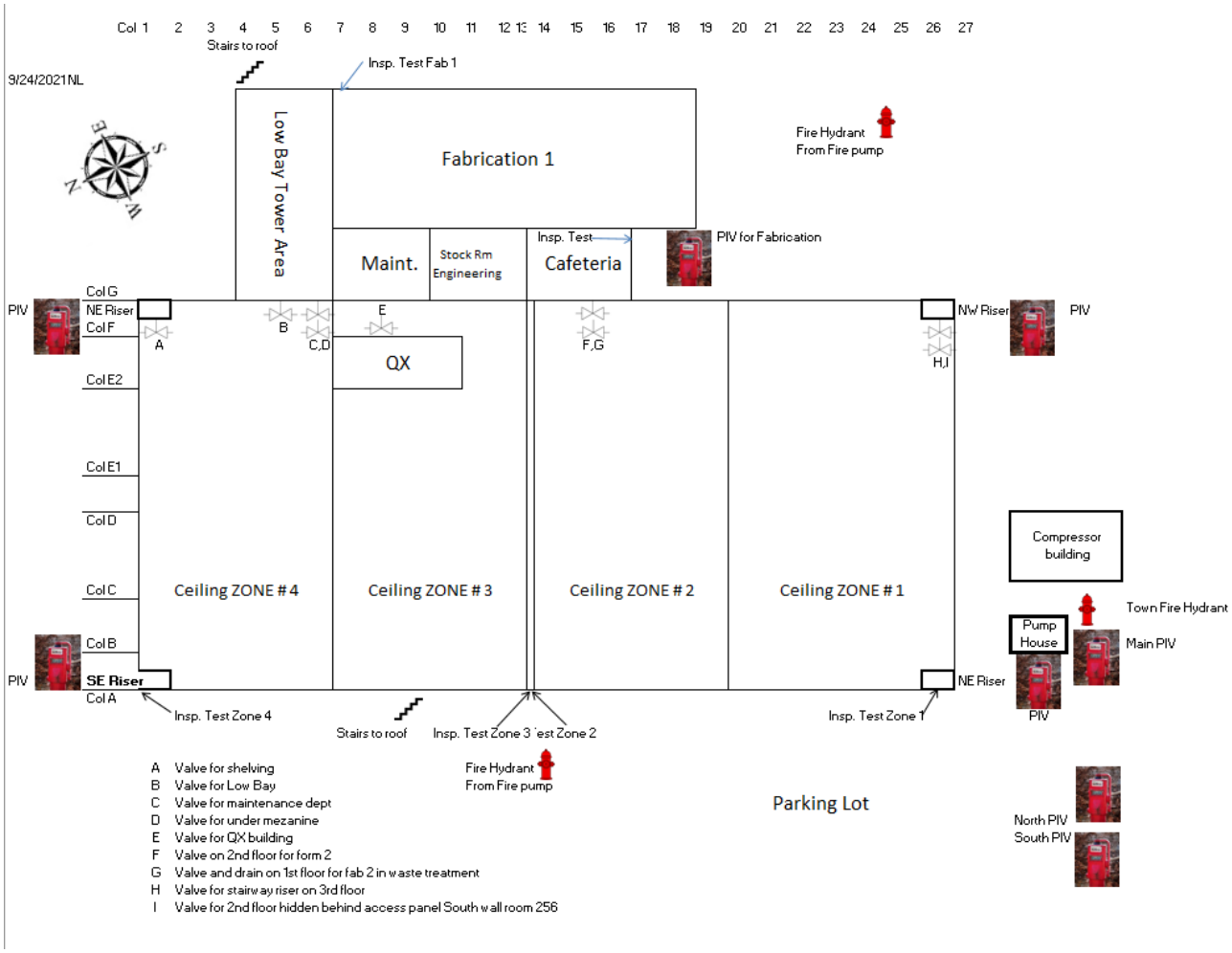
Maintenance Supervisor – [redacted]

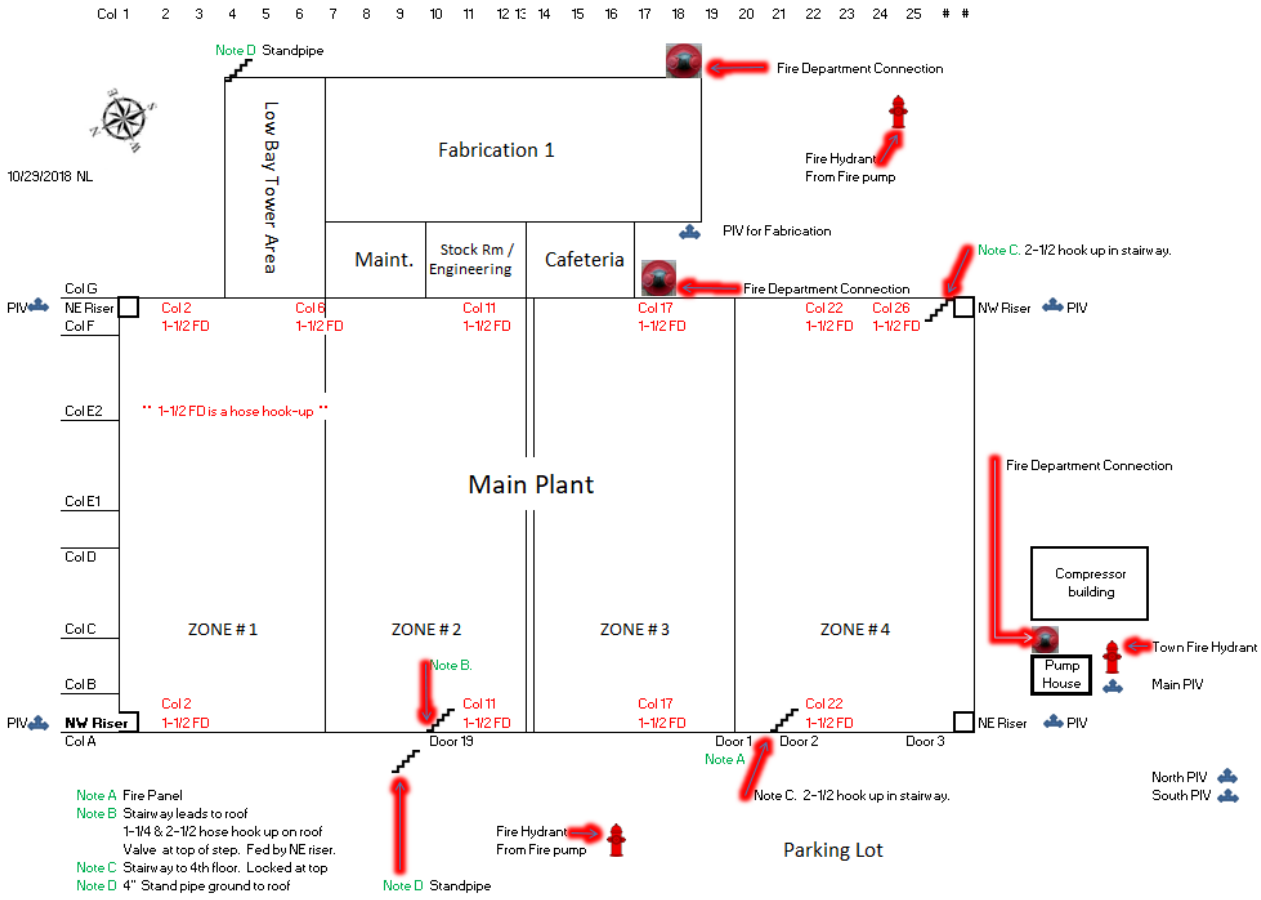
Shipping Supervisor – [redacted]

Police, Fire & Ambulance: Dial: **9-911**

Emergency Contact Numbers – EHS Poster 1A – August 2021

Appendix F: Location of Emergency Fire Hydrants and Valves




Col 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 # #
Note D Standpipe
Fire Department Connection
Fire Hydrant From Fire pump
10/29/2018 NL
Low Bay Tower Area
Fabrication 1
Maint.
Stock Rm / Engineering
Cafeteria
PIV for Fabrication
Note C. 2-1/2 hook up in stairway.
Fire Department Connection
PIV
Col G
NE Riser
Col F
Col 2 1-1/2 FD
Col 6 1-1/2 FD
Col 11 1-1/2 FD
Col 17 1-1/2 FD
Col 22 1-1/2 FD
Col 26 1-1/2 FD
NW Riser
PIV
Col E2
** 1-1/2 FD is a hose hook-up **
Main Plant
Fire Department Connection
Col E1
Col D
Compressor building
Col C
ZONE # 1
ZONE # 2
ZONE # 3
ZONE # 4
Pump House
Town Fire Hydrant
Main PIV
Note B.
Col B
Col 2 1-1/2 FD
Col 11 1-1/2 FD
Col 17 1-1/2 FD
Col 22 1-1/2 FD
PIV
NW Riser
Col A
Door 19
Door 1
Door 2
Door 3
NE Riser
PIV
Note A
Note C. 2-1/2 hook up in stairway.
North PIV
South PIV
Note A Fire Panel
Note B Stairway leads to roof
1-1/4 & 2-1/2 hose hook up on roof
Valve at top of step. Fed by NE riser.
Note C Stairway to 4th floor. Locked at top
Note D 4" Stand pipe ground to roof
Fire Hydrant From Fire pump
Parking Lot
Note D Standpipe

Appendix G: Monthly Ductwork Inspection Sheet

Date of Inspection:

Employees Performing Inspection:

Inspection Start Time:

Inspection End Time:

High Bay Roof – MQ Line (East)

Cleanout Location	Evidence of Residue in Ductwork (Y/N)?	Residue Thickness (if present)	Photo Taken (Y/N)?
MQ1			
MQ2			
MQ3			
MQ4			
MQ5			
MQ6			
MQ7			
MQ8			
MQ9			
High to Low Transition			

High Bay Roof – R&D Line (West)

Cleanout Location	Evidence of Residue in Ductwork (Y/N)?	Residue Thickness (if present)	Photo Taken (Y/N)?
RD1			
RD2			
RD3			
RD4			
RD5			
RD6			
RD7			
RD8			
RD9			
RD10			
RD11			
RD12			
RD13			

RD14			
RD15			
RD16			
RD17			
RD18			
R&D to MQ Transition			

Low Bay Roof

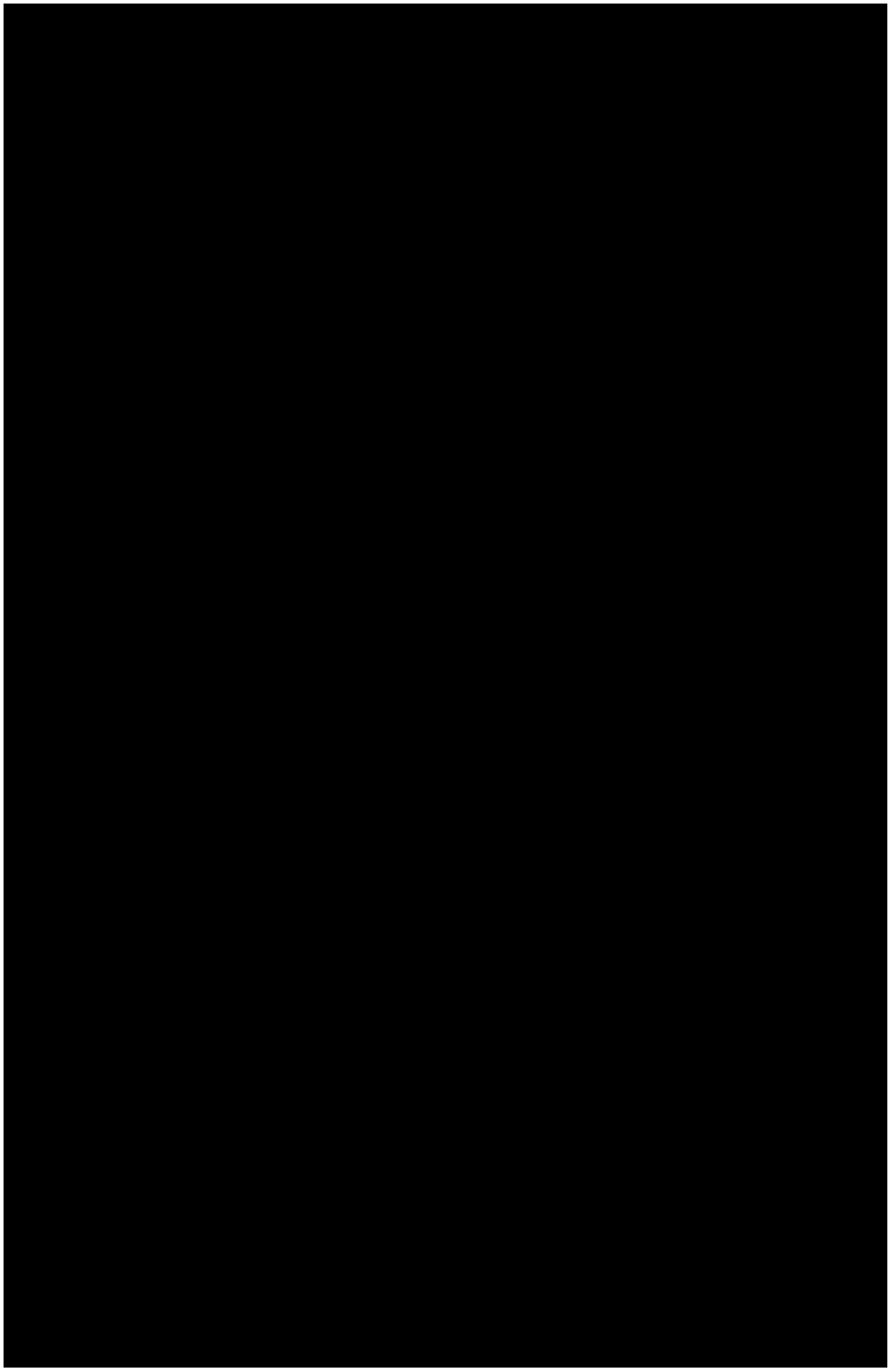
Cleanout Location	Evidence of Residue in Ductwork (Y/N)?	Residue Thickness (if present)	Photo Taken (Y/N)?
LB1			
LB2			
LB3			
LB4			
LB5			
LB6			
LB7			

Inspection Notes:

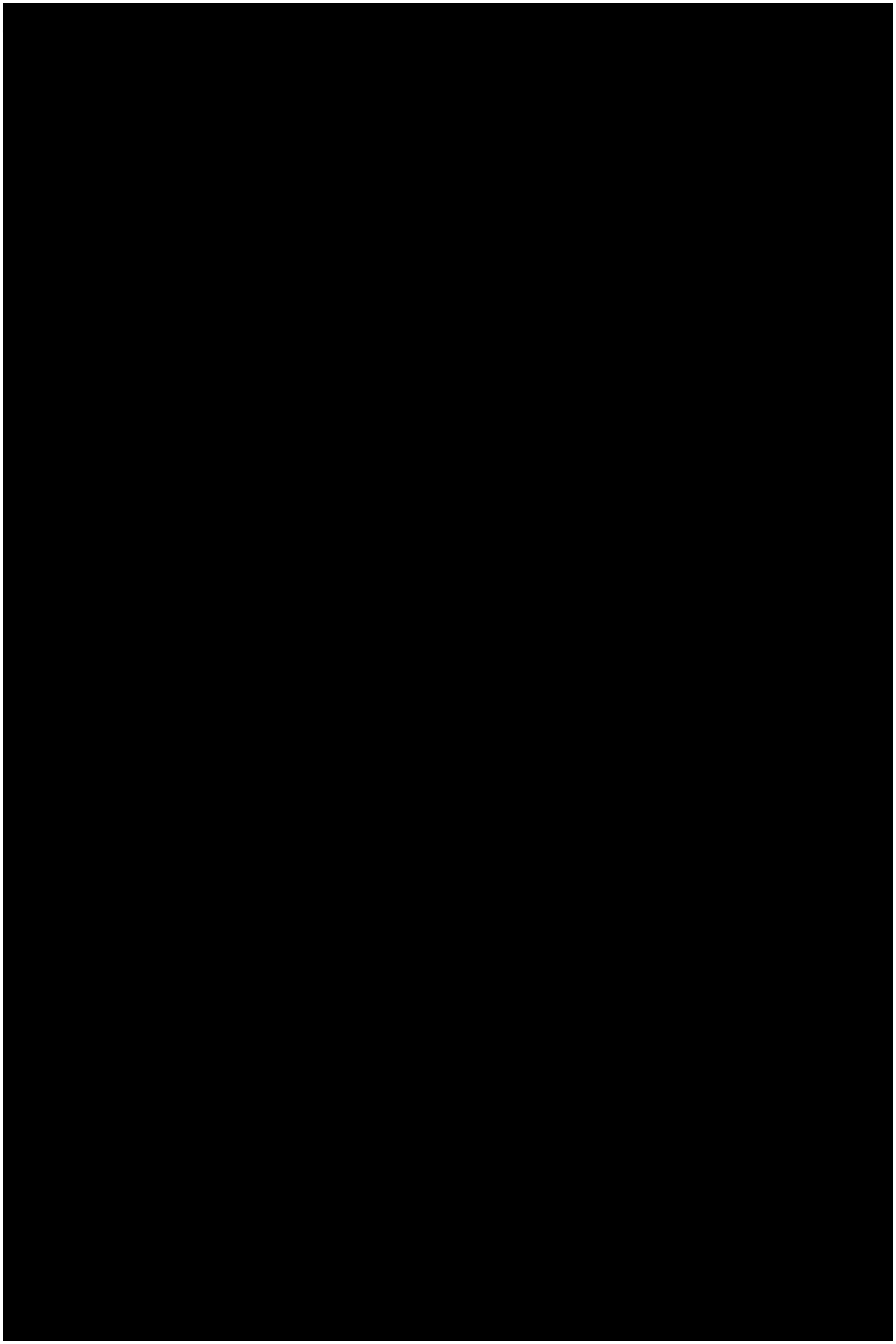
Completed inspection forms and photos saved on T drive: \\H79SVFPMER01\merrimack\Health & Safety\Emergency Preparedness\Ductwork Inspections

Appendix H: Fire Alarm Panel Instructions

Fire Alarm Panel Instructions.



CO2 Fire Alarm Panel Instructions.



MARK	DESCRIPTION
BSL	BURNER SAFETY LIMIT
BE	FLAME ULTRAVIOLET EYE
BV	BALANCING VALVE
BY	BURNER/SFI VALVE
DE	DUAL THERMOCOUPLE ELEMENT
EY	SOLENOID
FCV	FLOW CONTROL VALVE
F	AIR FILTER
FQI	FLOW QUANTITY INDICATOR
FIT	FLOW INDICATOR TRANSMITTER
FV	FLOW VALVE
HV	HAND VALVE
IA	INSTRUMENT AIR
IG	IGNITOR
LEL	LEL MONITOR
LT	LEVEL TRANSMITTER
LSH	LEVEL SWITCH HIGH
LSL	LEVEL SWITCH LOW
LSHH	LEVEL SWITCH HIGH HIGH
LSLL	LEVEL SWITCH LOW LOW
PAF	PROOF OF AIR FLOW
PB	PUSH BUTTON
DPS	PRESSURE DIFFERENTIAL SWITCH
DPT	PRESSURE DIFFERENTIAL TRANSMITTER (4–20mA)
PCV	PRESSURE CONTROL VALVE
PDSH	PRESSURE DIFFERENTIAL HIGH SWITCH
PDSL	PRESSURE DIFFERENTIAL LOW SWITCH
PI	PRESSURE INDICATION (GAUGE)
PLC	PROGRAMMABLE LOGIC CONTROLLER
PSH	PRESSURE SWITCH HIGH
PSL	PRESSURE SWITCH LOW
PSV	PRESSURE SAFETY VALVE
PT	PRESSURE TRANSMITTER (4–20mA)
SE	SINGLE THERMOCOUPLE ELEMENT
TCV	MODULATING BURNER CONTROL VALVE
TE	THERMOCOUPLE ELEMENT
TSH	HIGH TEMPERATURE SWITCH
VFD	VARIABLE FREQUENCY DRIVE
ZSO	LIMIT SWITCH OPEN
ZSC	LIMIT SWITCH CLOSED
XS	MOTOR AUX. CONTACT
MS	MOTOR STARTER
HS	HAND SWITCH

◇I AUTOMATIC SHUT–DOWN INTERLOCK

◇R MANUAL RESET

(I) LOGIC INTERLOCK

(PCV 1) DEVICE DEVICE NUMBER

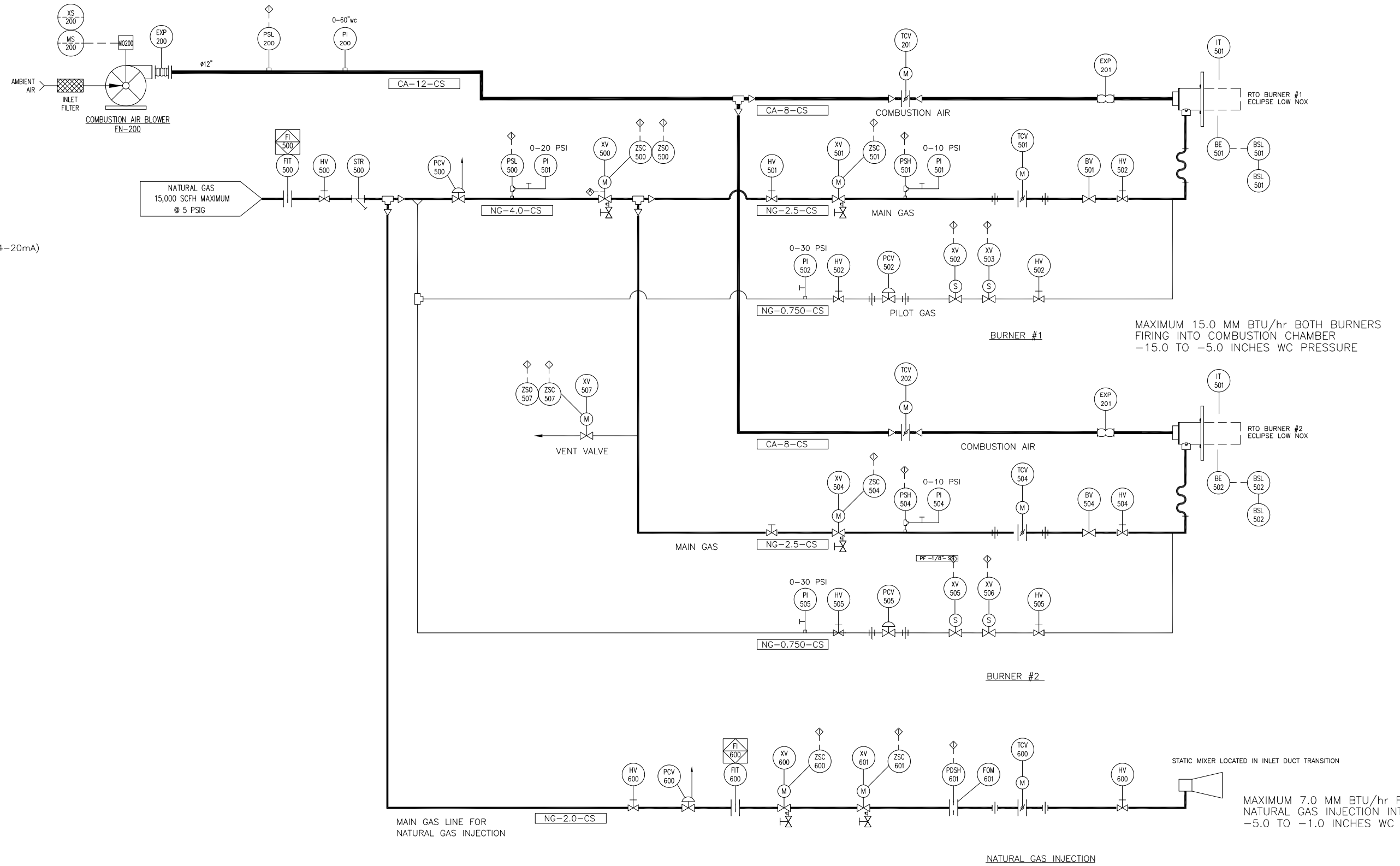
◇PLC DI PROGRAMMABLE LOGIC CONTROLLER
DI–DISCRETE INPUT
DO–DISCRETE OUTPUT
AI–ANALOG INPUT
AO–ANALOG OUTPUT

[M] MOTOR ACTUATOR

[S] ELECTRIC SOLENOID

COMPRESSED AIR

ELECTRICAL POWER SIGNAL



BUYER: SAINT GOBAIN PLASTICS
BUYER SITE LOCATION: MERRIMACK, NH
PROJECT NAME: THERMGEN 3 CANISTER REGENERATIVE THERMAL OXIDIZER
AIR CLEAR PROJECT NUMBER: 64504J5
BUYER PO NUMBER: #43018755
EQUIPMENT NAME: JM–01–09182020
EQUIPMENT TYPE: REGENERATIVE THERMAL OXIDIZER (70,000 SFCM)

REVISION	DESCRIPTION	DESIGN	SHOP	ENGINEER	SALES
0	ADDED VENT VALVE	PAS 01–07–21		RLH 01–07–21	

DATE/ STAMP –

AIR CLEAR

SAINT GOBAIN PLASTICS, MERRIMACK, NH
REGENERATIVE THERMAL OXIDIZER

AIR–CLEAR, LLC.
ELKTON MARYLAND

DRAWING TITLE *FUEL TRAINS & BURNER PID DRAWING*

TOLERANCES +/–1/8",2°

DRAWING NUMBER P64504J53–1095–01

SHEET 5

REV. 1

PIPING & INSTRUMENTATION NOMENCLATURE

AE	ANALYSIS ELEMENT
AI	ANALOG INPUT
AS	AIR FLOW SWITCH
AT	ANALYSIS TRANSMITTER
AO	ANALOG OUTPUT
BE	UV SCANNER FOR BURNER FLAME DETECTION
BDV	UV SCANNER COOLING AIR ISOLATION VALVE
BW	BURNER IGNITER
DE	DUAL ELEMENT (THERMOCOUPLE)
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
EXP	EXPANSION JOINT
FLR	FLAME ROD
FRD	FILTER CARTRIDGE DRY (COMPRESSED AIR)
FRC	FILTER CARTRIDGE COALESCING
FCV	FLOW CONTROL VALVE
FE	FLOW ELEMENT
FFC	FLOW GAS CONTROL VALVE
FIA	FLOW INDICATING ALARM
FLR	FLAME ROD (FLAME SUPERVISION)
FO	FLOW ORIFICE
FRL	FILTER, REGULATOR, LUBRICATOR (COMPRESSED AIR)
FS	FLOW SWITCH
FSCV	FLOW SAFETY CONTROL VALVE
FT	FILTER
FV	FLOW VALVE
FVB	FLOW VALVE BALANCE
GLV	ADJUSTABLE LIMITING FLOW ORIFICE
HOA	HAND–OFF–AUTOMATIC SWITCH
HS	HAND SWITCH
HV	HAND VALVE
HVC	HAND/CHECK VALVE
HVD	HAND VALVE DRAIN
HVS	HAND VALVE SAFETY VENT
LB	LUBRICATOR
M	MOTOR
MAG	PRESSURE MAGNAHELIC
MBV	MANUAL BALANCE VALVE
PCV	PRESSURE CONTROL VALVE
PDI	DIFFERENTIAL PRESSURE INDICATOR
PDS	DIFFERENTIAL PRESSURE SWITCH
PDT	DIFFERENTIAL PRESSURE SENSOR & TRANSMITTER
PCV	PRESSURE CONTROL VALVE
PDSL	PRESSURE DIFFERENTIAL SWITCH LOW
PDT	PRESSURE DIFFERENTIAL TRANSMITTER
PE	PRESSURE ELEMENT
PIAL	PROCESS INLET ALARM LOW
PIAH	PROCESS INLET ALARM HIGH
PR	PRESSURE RECORDING
PSL	PRESSURE SWITCH LOW
PSV	PRESSURE RELIEVE VALVE
PT	PRESSURE TRANSMITTER
RG	REGULATOR, COMPRESSED AIR
RIT	INFRARED FLAME DETECTION DEVICE
STR	STRAINER ("Y" OR BASKET TYPE)
SV	SOLENOID VALVE
TE	TEMPERATURE ELEMENT (THERMOCOUPLE)
TIA	TEMPERATURE INDICATING ALARM
TR	TEMPERATURE RECORDER
TSH	TEMPERATURE SWITCH HIGH
TT	TEMPERATURE TRANSMITTER
VFD	VARIABLE FREQUENCY DRIVE (VFD)
ZSC	POSITION SWITCH CLOSED
ZSO	POSITION SWITCH OPEN

LINE TAG NOMENCLATURE

CA	COMBUSTION AIR	NG	NATURAL GAS
CF	CHEMICAL FEED	QW	QUENCH LIQUOR
DRN	DRAIN LIQUOR	SMP	SUMP DRAIN LIQUOR
FLS	FLUSH WATER	BLW	BLOWDOWN
MW	MAKE–UP WATER	PF	PRESSURE FEEDBACK
		PA	PLANT AIR

MODIFIERS

C	CLOSED	FC	FAIL CLOSED
F	FLOW	FO	FAIL OPEN
H	HIGH	I/P	ELECTRIC to PNEUMATIC
I	INTERMEDIATE	NC	NORMALLY CLOSED
L	LOW	NLL	NORMAL LIQUID LEVEL
O	OPEN	NNF	NORMALLY NO FLOW
pH	ACIDITY or BASICITY	NO	NORMALLY OPEN
		SO_2	SULFUR DIOXIDE

INSTRUMENT & EQUIPMENT SYMBOLS

- LOCAL INSTRUMENT (XXX / XXX)
- REMOTE INSTRUMENT (XXX / XXX)
- INSTRUMENT MOUNTED BEHIND REMOTE PANEL (XXX / XXX)
- INSTRUMENT MOUNTED ON LOCAL PANEL (XXX / XXX)
- INSTRUMENT MOUNTED BEHIND LOCAL PANEL (XXX / XXX)
- INTERLOCK (I)
- AUTOMATIC RESET (A)
- PROGRAMMABLE LOGIC CONTROL (XXX / XXX)
- DIAPHRAGM ACTUATED VALVE
- HAND ACTUATED VALVE
- MOTOR ACTUATED VALVE (M)
- PNEUMATIC ACTUATED VALVE (P)
- CENTRIFUGAL PUMP
- CENTRIFUGAL FAN
- DIAPHRAGM PUMP
- MOTOR
- HEATER (RESISTANCE)
- MIST ELIMINATOR (MESH PATTERN)
- HEAT RECOVERY MEDIA
- PNEUMATIC ACTUATED VALVE (double acting) (P)
- SOLENOID ACTUATED VALVE (S)

LINE DESIGNATIONS

XXX–XXX–XXX

- LINE SPECIFICATION
- LINE SIZE
- LINE TAG

LINE SYMBOLS

- MAIN PROCESS LINE (heavy)
- PROCESS & UTILITY LINES (medium)
- INSTRUMENT LEAD LINES (light)
- INSTRUMENT PRESSURE IMPULSE
- COMPRESSED AIR PIPING
- ELECTRO–MAGNETIC/SONIC or RADIATION SIGNALS
- INSTRUMENT ELECTRICAL SIGNALS
- PROCESS CONTROL LOOPS
- ELECTRICAL HEAT TRACING
- MECHANICAL LINKAGE
- SPECIFICATION CHANGE

LINE SPECIFICATION NOMENCLATURE

CS	CARBON STEEL (ASTM A–120 or A–53)
CPV	CPVC (CHLORINATED POLYVINYL CHLORIDE) ASTM D–1784
SST	STAINLESS STEEL – TYPE 316L (ASTM–A778 or A774)

VALVE, PIPING, AND DUCTING SYMBOLS

- GATE VALVE
- GATE VALVE NORMALLY CLOSED
- GLOBE VALVE
- GLOBE VALVE NORMALLY CLOSED
- BALL VALVE
- BALL VALVE NORMALLY CLOSED
- NEEDLE VALVE
- NEEDLE VALVE NORMALLY CLOSED
- PINCH VALVE
- PINCH VALVE NORMALLY CLOSED
- ANGLE VALVE
- THREE–WAY VALVE
- FOUR–WAY VALVE
- CHECK VALVE
- CHECK VALVE POSITION LOCK
- BUTTERFLY VALVE
- KNIFE GATE VALVE
- Y–TYPE STRAINER W/VALVE
- BASKET STRAINER W/VALVE
- HOSE CONNECTION
- WELD CAP
- BLIND FLANGE
- PIPE PLUG
- UNION
- EXPANSION JOINT
- REDUCING (CONC.) EXPANSION JOINT
- REDUCING (ECCEN.) EXPANSION JOINT
- EXPANSION JOINT (DUCT)
- DIAPHRAGM SEAL
- FLEXIBLE HOSE
- LUBRICATOR
- PRESSURE RELIEF VALVE (angle)
- PRESSURE RELIEF VALVE (straight)
- RUPTURE DISK (pressure)
- RUPTURE DISK (vacuum)
- ORIFICE PLATE
- QUICK CHANGE ORIFICE PLATE
- PITOT TUBE
- VENTURI TUBE
- ROTARY AIR LOCK
- SPECTACLE BLIND
- STEAM TRAP
- STEAM TRAP W/VALVE
- INSULATION
- SPRAY NOZZLE
- FILTER W/SCREEN & RAIN HOOD (AIR)
- LOUVER DAMPER
- GUILLOTINE DAMPER
- LOUVER DAMPER (OPPOSED)
- BUTTERFLY DAMPER
- DAMPER MANUAL
- DAMPER MOTORIZED, PNEUMATIC, HYDRAULIC (X)
- POPPET DAMPER PNEUMATIC ACTUATED
- FILTER (F)
- REGULATOR

BUYER: SAINT GOBAIN PLASTICS
BUYER SITE LOCATION: MERRIMACK, NH
PROJECT NAME: THERMGEN 3 CANISTER REGENERATIVE THERMAL OXIDIZER
AIR CLEAR PROJECT NUMBER: 64504J5
BUYER PO NUMBER: #43018755
EQUIPMENT NAME: JM–01–09182020
EQUIPMENT TYPE: REGENERATIVE THERMAL OXIDIZER (70,000 SFCM)

REVISION	DESCRIPTION	DESIGN	SHOP	ENGINEER	SALES
0	REVISED FOR CONSTRUCTION	12/19/20 RLH		12/19/20 RWS	

DATE/ STAMP –

AIR CLEAR

SAINT GOBAIN MERRIMACK, NEW HAMPSHIRE
REGENERATIVE THERMAL OXIDIZER

AIR–CLEAR, LLC.
ELKTON MARYLAND

DRAWING TITLE: *PID LEGEND SHEET*

TOLERANCES | DRAWING NUMBER: 64504J5–1135 | SHEET: 2 | REV.: 0

C.T. MALE ASSOCIATES
Engineering, Surveying, Architecture, Landscape Architecture & Geology, D.P.C.

50 Century Hill Drive, Latham, NY 12110
518.786.7400 FAX 518.786.7299 ctmale@ctmale.com

February 25, 2022

PUBLIC VERSION - CONFIDENTIAL BUSINESS INFORMATION REMOVED

Ms. Cathy Beahm
SIP Planning Administrator
NH Department of Environmental Services
Air Resources Division
29 Hazen Drive, PO Box 95
Concord, NH 03302-0095

Re: Saint-Gobain Performance Plastics Merrimack, NH
Permit Application – Request for Additional Information
C.T. Male Project No.: 16.6235

Dear Ms. Beahm:

In response to your correspondence dated January 27, 2022, please find the additional requested information relative to the Saint-Gobain Performance Plastics Corporation facility located at 701 Daniel Webster Highway in Merrimack, New Hampshire. This information is being provided as part of an Application for Significant Amendment of Temporary Permit (TP-0256) for the facility that was submitted to the Department on December 18, 2021. Items included within the correspondence have been addressed in the following manner:

1. *In accordance with Env-A 1705.01, Form ARD-3 Information Required for a Permit for a Unit of Processing or Manufacturing Equipment, the applicant must submit a completed current ARD-3 form for each unit of processing or manufacturing equipment. While an ARD-3 form was submitted with the application, NHDES has determined that information within the application needs corrections.*

An updated Form ARD-3 and associated information is included within this submission as Attachment A.1 and A.2 and includes operations averaged over the period 2019-2021.

Please submit a revised ARD-3 form that addresses the following concerns:

a. NHDES recognizes that the application is for multiple manufacturing equipment all vented to the same regenerative thermal oxidizer (RTO) and the RTO stack or vented directly to the atmosphere via the bypass stack. Therefore, Saint-Gobain shall submit one completed current ARD-3 form and for Section I of the form, attach pertinent information for each connected emission unit.

The attached Form ARD-3 has identified the Emission Units at the facility which will exhaust either to the RTO (identified as Emission Point 1A) or the bypass stack (identified as Emission Point 1B).

> *b. Section I.B requires coating usages pertaining to the manufacturing equipment. The purpose of this section is to use the information to calculate potential uncontrolled emissions. However, NHDES recognizes that Saint-Gobain is using stack test data from the September 2021 test to evaluate the operation of the bypass stack and PFAS emissions that potentially deposit and infiltrate groundwater. Therefore, for Section I.B, Saint-Gobain shall submit up-to-date information on raw material types and 2021 usages but note the utilization of the stack test results in lieu of a material balance approach. Also, Saint-Gobain shall select the coating application method and include the uncontrolled emissions utilized in the application for the operation of the bypass in this section.*

The attached documentation within Attachment A.3 identifies the annual coating products used on the towers in 2021 and includes Total VOC and Total HAP contained in those products. This data provides actual annual pre-control emission information relative to these contaminants for the 2021 operating year. This information also includes the 2021 hours of operation for each of the coating lines and has been utilized to calculate potential pre-control emissions based on scaling production on each Emission Unit to 8,760 hours per year. Stack test data has been utilized relative to PFC and HF emissions from facility operations rather than material balance data. Within this public version, actual names of products have been removed as they constitute Confidential Business Information.

> *c. Section I.D requires Saint-Gobain to submit stack information for both the main RTO stack and the bypass stack.*

The attached Form ARD-3 has identified the stack details for the RTO and bypass stack (Emission Points 1A and 1B respectively).

> *d. Section III.A requires Saint-Gobain to submit fuel information for each manufacturing equipment associated with this application that burns fuel as well as for the burners on the RTO.*

The attached Form ARD-3 and documentation within Attachment A.4 present heat input ratings for the various manufacturing equipment.

> *e. Section III.B requires Saint-Gobain to submit criteria pollutant emission information from the combustion of fuels associated with the manufacturing equipment and the RTO.*

The attached Form ARD-3 and documentation in Attachment A.5 present heat input ratings for the various manufacturing equipment, and 2021 combustion emission calculations in order to calculate annual and potential emissions of criteria pollutants from combustion activities.

> *f. Section IV requires Saint-Gobain to submit information pertaining to the pollution control equipment as well as controlled PFAS air pollution emissions that are emitted from the RTO stack. Also included in the section of the application is a monitoring plan as outlined in Items #2 and #3 below.*

The attached information within Attachment A.6 includes PFAS air emissions from the facility's RTO and bypass stack, which are based on the stack testing completed at the facility in 2021. Saint-Gobain personnel have developed the Monitoring Plan which will be submitted under separate cover.

2. *In accordance with Env-A 810.01, Monitoring Plans for Air Pollution Control Equipment, the applicant shall submit an air pollution control equipment monitoring plan. The plan shall document the maintenance procedures, control equipment parameter monitoring, and any sampling or testing specified by the manufacturer of the device, to demonstrate continued effectiveness of the control equipment. NHDES recognizes that this plan is required by the current Permit and that Saint-Gobain has been submitting monthly update reports pursuant to the Permit starting in March 2020 and continuing through to the present. Please submit a complete and comprehensive monitoring plan for the RTO.*

Saint-Gobain personnel have developed the Monitoring Plan which will be submitted under separate cover.

3. *In accordance with Env-A 810.02, Information Regarding Additional Monitoring, the applicant shall submit any other monitoring that the source intends to follow in order to demonstrate compliance with any applicable state or federal statute, rule, regulation, or permit; and is not otherwise described by the information submitted pursuant to Env-A 810.01. This plan shall document the parameters that Saint-Gobain proposes to monitor regarding operation of the bypass stack. NHDES recognizes that this information has been requested in the Letter of Deficiency No. ARD 21-010. Please submit a complete and comprehensive monitoring plan for the operation of the bypass stack.*

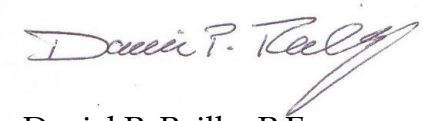
Saint-Gobain personnel have developed the Monitoring Plan which will be submitted under separate cover.

4. *In accordance with Env-A 621.07, Public Access to Information, the applicant must submit two copies of the permit application. Env-A 621.07 requires that NHDES transmit a copy of an application for an air permit to the municipality in which the facility is or is proposed to be located. Please submit a copy of the application as it is amended in response to this letter.*

Two copies of the application package are included for review. The agency copy contains confidential business information (CBI) and has been marked as such in the appropriate locations. The public version has been sanitized from containing CBI and is included for submission to the Town as well as for posting to NHDES One Stop.

If you have any questions or require additional information, please contact me at (518) 786-7625.

Sincerely,
C.T. MALE ASSOCIATES



Daniel P. Reilly, P.E.
Division Manager, Environmental Services

Enclosures

ec: David Calentine, Will Kempskie, Chris Angier (Saint-Gobain)

Attachment A.1
NHDES Form ARD-3

ARD-3 FORM
INFORMATION REQUIRED FOR PERMITS FOR A UNIT OF PROCESSING OR MANUFACTURING EQUIPMENT

Air Resources Division/Permitting and Environmental Health Bureau

RSA/Rule: RSA 125-C:12 and Env-A 1700

I. EQUIPMENT INFORMATION – *Complete a separate form for each Emission Unit.*

Emission Unit Description: PCE01 (Stacks 1A & 1B)

Process/ Device	Manufacturer Model # Serial #	Maximum Raw Material Process Rate	Maximum Finished Material Process Rate	Manufacture Date[1]	Installation Date[1]	Stack #	Hours of Operation per day and days/yr
Paint Booth #3 (Example)	*N/A (Example)*	*8 gal/hr (Example)*	*N/A (Example)*	*1997 (Example)*	*1999 (Example)*	*#1 (Ex)*	*3 hr/day; 250 days/yr (Example)*
Metal Furnace #2 (Example)	*Consumat Model C12 S/N: 2569 (Example)*	*N/A (Example)*	*500 lbs/hr (Example)*	*2002 (Example)*	*2002 (Example)*	*#5 (Ex)*	*9 hr/day; 300 days/yr (Example)*
See Attached							

Process Description - Please provide a brief description of each process performed (attach additional pages as needed):

EU01-EU08, EU12, EU13 EU15, & EU16 - Coating operations for paper, fabric, film, or foil; EU22, research and development coating operations for paper, fabric, film, or foil; EU23 - Chemsil Coater coats and dries silicone onto fiberglass through thermally treating a solid paste without the addition of solvent; EU24 & EU25 - MTM and Step Press/Laminator utilize heat to laminate or otherwise affix coated fabrics and films; EU26 - Heat Clean oven used for cleaning by heating.

A. Parts Washers/Solvent Degreasers

☒ **Not Applicable**

Process/Device	Manufacturer & Model #	Capacity (gal)	Solvent Used	# Solvent Changes per Year
Degreaser #2 (Example)	*Safety-Kleen Model 16 (Example)*	*16 gal (Example)*	*Recycled 150 Solvent (Example)*	*2 (Example)*

B. Coatings, Solvents, and Inks Entering Process – *Use additional sheets if necessary*

☐ **Not Applicable**

Process/ Device	Raw Material or Chemical Compound	Potential Usage (gal or lb per hour and per year)		Density (lb/gal)	Percent VOC[2] (wt %)	Percent HAP[3] (wt %)	Potential VOC emissions (lb/yr)	Potential HAP emissions (lb/yr)
Paint Booth (Example)	*Black Enamel #5693 (Example)*	*13 gal/hr (Example)*	*1360 gal/yr (Example)*	*7.5 lb/gal (Example)*	*67.96% (Example)*	*13.17% (Example)*	*6,932 lb/yr (Example)*	*1,343 lb/yr (Example)*
See Attached								

Provide an example of the calculations used to determine total potential VOC and HAP emitted. Indicate if the results are based on test results; if control equipment was taken into account; if conditions exist where solvents remain in the substrate rather than complete volatilization, transfer efficiency, etc.:

Stack test results are utilized for calculating bypass emissions and allowable hours of operation in lieu of a material balance approach.

Coating Application Method:

☐ High Volume-Low Pressure (HVLP) Spray ☐ Electrostatic Spray ☐ Zinc-Arc Spray
☐ Air-Assisted Airless Spray ☐ Airless Spray ☒ Dip Coat
☐ A Flow Coating Technique ☐ Other (specify): _____

C. Amount of Liquid Waste Discarded:

_____ ☐ gal/yr ☐ tons/yr

D. Stack Information

Is device equipped with multiple stacks? ☒ Yes ☐ No *(If yes, provide data for each stack)*
Are multiple units connected to this stack? ☐ Yes ☒ No
*(If **yes**, identify other devices on this stack:)*

Stack #	Discharge Height Above Ground Level (ft)	Inside Diameter (ft) or Area (ft^2) at Stack Exit[4]	Exhaust Temperature (°F)	Exhaust Flow (acfm)	Stack Capped or Otherwise Restricted[5] (Yes - Type/No)	Exhaust Orientation[6]	Stack Monitor (Yes/No) and Description
#5 (Ex)	*65 ft (Example)*	*4 ft (Example)*	*70 °F (Example)*	*1500 acfm (Example)*	*Yes - Rain Cap (Example)*	*Vertical (Example)*	*No (Example)*
1A (Main RTO Stack)	60 ft.	6 ft.	350◦F	100,000 ACFM	No	Vertical	No
1B (RTO Bypass Stack)	63.52 ft.	5 ft.	236◦F	76,900 ACFM	No	Horizontal	Yes - Open/Closed Monitor

E. Hours of Operation

Hours per day: up to 24 Days per year: up to 365

II. NEW HAMPSHIRE REGULATED TOXIC AIR POLLUTANTS (RTAPs) – Env-A 1400

Do any of the devices or processes emit any of the RTAPs listed in Env-A 1400?

☒ Yes ☐ No

If **Yes**, attach your facility's most recent compliance demonstration.

III. SUPPLEMENTAL FUEL USAGE INFORMATION

☐ Not Applicable

A. Fuel Information (List each fuel utilized by the devices)

Device	Fuel Type	Heat Value[7]	Units	Sulfur Content (%)	Maximum Fuel Flow Rate	Units	Maximum Gross Heat Input Rate	Units
Thermal Oxidizer (Example)	*#2 Fuel Oil (Example)*	*140,000 (Example)*	*Btu/gal (Example)*	*0.0015 (Example)*	*20 (Example)*	*gal/hr (Example)*	*1.2 (Example)*	*MMBtu/hr (Example)*
See Attached								

B. Air Pollutant Emissions from Combustion

Pollutant	Emission Factor	Units	Emission Factor Source[8]	Actual (lb/hr)	Potential (lb/hr)	Actual (tpy)	Potential (tpy)
TSP	See Attached						
PM_{10}							
NO_x							
VOC							
CO							
SO_2							
Other *(specify)*							

Provide an example of the calculations used to determine uncontrolled air pollutant emissions, if applicable:

Calculations detailed in attachment.

Note: If process utilizes more than one Supplemental Fuel Burning Device, provide all six pollutant emissions information for each device. Use additional pages if necessary.

IV. POLLUTION CONTROL EQUIPMENT

☐ **Not Applicable**

Note: If the devices utilize more than one type of pollution control equipment, provide data for each type of equipment.

Device	Type of Control Device	Manufacturer of Control Device	Model and Serial Number of Control Device (if known)	Pollutant(s) Controlled by Device
Metal Furnace #2 (Example)	*Baghouse #2 (Example)*	*Ultra-Flow Inc. (Example)*	*2400 CFM Small Dust Collector Serial #: N/A (Example)*	*TSP (Example)*
Paint Spray Booth (Example)	*Filter (Example)*	*Paint Arrestors (Example)*	*3100 Series (Example)*	*Zinc Chromate (Example)*
PCE01	Regenerative Thermal Oxidizer	Air Clear	Thermgen 3 Canister RTO Serial No. 64504J5	PFOA and PFOS

For each control device, include an Air Pollution Control Equipment Monitoring Plan pursuant to Env-A 810.

A. Controlled Air Pollution Emissions (list emissions that result <u>after all</u> add on controls – *use additional sheets if necessary*)

Pollutant	Controlled Emission Factor	Units	Emission Factor Source[9]	Actual (lb/hr)	Potential (lb/hr)	Actual (tpy)	Potential (tpy)
See Attached							

Provide an example of the calculations used to determine controlled air pollutant emissions, if applicable:

Calculations detailed in attachment

ARD-3 FORM INFORMATION INSTRUCTIONS

1 If exact date is unknown for Manufacture Date or Installation Date, you may use 01/01/year. Manufacture Date refers to the date the emission unit was originally produced. Installation Date refers to the date the emission unit is installed at the facility.

2 Volatile Organic Compound, as defined in Env-A 100.

3 Hazardous Air Pollutant, as defined in section 112 of the 1990 Clean Air Act Amendments.

4 Examples of Inside Diameter or Area at Stack Exit: Diameter at discharge point of convergence cone, if applicable

5 Flapper valves and other devices which do not restrict the vertical exhaust flow while the device is operating are not considered obstructions or restrictions.

6 Examples of Exhaust Orientation: Vertical, Horizontal, Downward
Note: for a stack to be considered vertical and unobstructed, there shall be no impediment to vertical flow, and the exhaust stack extends 2 feet higher than any roofline within 10 horizontal feet of the exhaust stack

7

Liquid Fuels	Heat Value
Ultra-Low Sulfur Diesel (ULSD)	137,000 Btu/gal
#2 Fuel Oil	140,000 Btu/gal
Kerosene	135,000 Btu/gal
Other – Liquid	Obtain from Fuel Supplier

Gaseous Fuels	Heat Value
Natural Gas	1,020 Btu/cubic foot
Propane (LPG)	94,000 Btu/gal
Gasoline	130,000 Btu/gal
Other (Gaseous)	Obtain from Fuel Supplier

8 Emission factor sources may include:
- Continuous Emissions Monitor (CEM)
- Stack Test (Provide Date)
- Vendor Guaranteed Rates (Provide Documentation)
- AP-42 Emission Factors
- Material Balance (Provide Sample Calculation)
- Engineering Estimate

Attachment A.2
Form ARD-3 Section I. Supplement - Equipment Information

Section I. Equipment Information

Process/ Device	Manufacturer Model # Serial #	Maximum Raw Material Process Rate [sq. ft/hr]	Maximum Finished Material Process Rate	Manufacture Date	Installation Date	Stack #	Hours of Operation[1] [hr/yr]
MA Tower (EU01)	N/A	6,000	N/A	N/A	1994	1A/1B	3,595
MB Tower (EU02)	N/A	17,500	N/A	N/A	1998	1A/1B	1,491
MC Tower (EU03)	N/A	9,200	N/A	N/A	1998	1A/1B	3,483
MR Tower (EU04)	N/A	9,200	N/A	N/A	2002	1A/1B	3,147
MD Tower (EU05)	N/A	9,200	N/A	N/A	1999	1A/1B	3,108
QX Tower (EU06)	N/A	6,000	N/A	N/A	1989	1A/1B	3,795
20" SBC (EU07)	N/A	500	N/A	N/A	1986	1A/1B	600
20" Coater (EU08)	N/A	500	N/A	N/A	1986	1A/1B	552
MG Tower (EU12)	N/A	4,375	N/A	N/A	2002	1A/1B	832
MP Tower (EU13)	N/A	4,375	N/A	N/A	2002	1A/1B	1,420
MQ Tower (EU15)	N/A	1,100	N/A	N/A	2002	1A/1B	2,859
MS Tower (EU16)	N/A	2,300	N/A	N/A	2002	1A/1B	3,792
R&D Coater (EU22)	N/A	2,600	N/A	N/A	N/A	1A/1B	458
Chemsil Coater (EU23)	N/A	3,800	N/A	N/A	N/A	1A/1B	N/A
MTM (EU24)	N/A	5,000	N/A	N/A	N/A	1A/1B	N/A
Step Press/ Laminator (EU25)	N/A	4,800	N/A	N/A	N/A	1A/1B	N/A
Heat Clean (EU26)	N/A	N/A	N/A	N/A	N/A	1A/1B	N/A

[1] 3-year average based on 2019-2021 annual operating hours per process/device.

Attachment A.3
Form ARD-3 Section I.B Supplement - Coatings, Solvents and Inks Entering Process

Section I.B. Coatings, Solvents, and Inks Entering Process

(All product tracking is done based on total usage and is not tracked per Emission Unit/Tower)

Raw Material	2021 Usage [lb.]	Potential Usage [lb.][1]	Percent VOC	Percent HAP	Potential VOC emissions [lb/yr][2]	Potential HAP emissions [lb/yr][2]
Product #1	0	0	100.0%	24.00%	0	0
Product #2	0	0	100.0%	0%	0	0
Product #3	0	0	100.0%	0%	0	0
Product #4	0	0	100.0%	0%	0	0
Product #5	41	171	0%	0%	0	0
Product #6	74	310	100.0%	0%	310.1	0
Product #7	104	437	0%	0%	0	0
Product #8	10	42	100.0%	0%	42.11	0
Product #9	0	0	100.0%	0%	0	0
Product #10	906	3,817	0%	0%	0	0
Product #11	0	0	100.0%	0%	0	0
Product #12	0	0	100.0%	0%	0	0
Product #13	0	0	100.0%	0%	0	0
Product #14	0	0	100.0%	0%	0	0
Product #15	0	0	100.0%	0%	0	0
Product #16	2,750	11,579	0%	0%	0	0
Product #17	0	0	100.0%	25.10%	0	0
Product #18	293	1,234	0%	3.10%	0	38.25
Product #19	0	0	0%	0%	0	0
Product #20	171	718	0%	0%	0	0
Product #21	82	346	0%	0%	0	0
Product #22	0	0	100.0%	0%	0	0
Product #23	0	0	100.0%	0%	0	0
Product #24	103	434	0%	0%	0	0
Product #25	0	0	100.0%	100.0%	0	0
Product #26	14	58	100.0%	1.00%	57.86	0.58
Product #27	0	0	100.0%	0%	0	0
Product #28	0	0	100.0%	0%	0	0
Product #29	15	64	100.0%	0%	63.58	0
Product #30	0	0	100.0%	0%	0	0
Product #31	0	0	100.0%	0%	0	0
Product #32	5	19	100.0%	0.10%	19.50	0
Product #33	0	0	100.0%	47.30%	0	0
Product #34	0	0	100.0%	0%	0	0
Product #35	0	0	100.0%	0%	0	0
Product #36	756	3,182	0%	0%	0	0
Product #37	0	0	100.0%	0%	0	0
Product #38	0	0	100.0%	30.10%	0	0
Product #39	0	0	100.0%	12.30%	0	0
Product #40	0	0	100.0%	0%	0	0
Product #41	0	0	100.0%	0%	0	0
Product #42	0	0	100.0%	0%	0	0
Product #43	0	0	100.0%	0%	0	0

Raw Material	2021 Usage [lb.]	Potential Usage [lb.][1]	Percent VOC	Percent HAP	Potential VOC emissions [lb/yr][2]	Potential HAP emissions [lb/yr][2]
Product #44	0	0	0%	0%	0	0
Product #45	0	0	100.0%	0%	0	0
Product #46	0	0	100.0%	0%	0	0
Product #47	0	0	100.0%	0%	0	0
Product #48	0	0	100.0%	0%	0	0
Product #49	0	0	100.0%	0%	0	0
Product #50	0	0	100.0%	0%	0	0
Product #51	0	0	100.0%	0%	0	0
Product #52	0	0	100.0%	0%	0	0
Product #53	0	0	100.0%	0%	0	0
Product #54	0	0	100.0%	0%	0	0
Product #55	0	0	100.0%	0%	0	0
Product #56	0	0	100.0%	0%	0	0
Product #57	0	0	100.0%	0%	0	0
Product #58	0	0	100.0%	0%	0	0
Product #59	0	0	100.0%	0%	0	0
Product #60	0	0	100.0%	0%	0	0
Product #61	0	0	100.0%	0%	0	0
Product #62	0	0	100.0%	0%	0	0
Product #63	0	0	100.0%	0%	0	0
Product #64	0	0	100.0%	0%	0	0
Product #65	0	0	100.0%	0%	0	0
Product #66	0	0	100.0%	0%	0	0
Product #67	0	0	100.0%	0%	0	0
Product #68	0	0	100.0%	0%	0	0
Product #69	0	0	100.0%	0%	0	0
Product #70	0	0	100.0%	0%	0	0
Product #71	0	0	100.0%	0%	0	0
Product #72	1,615	6,800	0%	3.00%	0	204.0
Product #73	631	2,656	0%	3.00%	0	79.68
Product #74	3,877	16,325	0%	0%	0	0
Product #75	0	0	100.0%	0%	0	0
Product #76	0	0	100.0%	0%	0	0
Product #77	0	0	100.0%	0%	0	0
Product #78	3,227	13,588	0%	0%	0	0
Product #79	0	0	100.0%	0%	0	0
Product #80	0	0	100.0%	0%	0	0
Product #81	52	220	100.0%	0%	220.2	0
Product #82	0	0	100.0%	0%	0	0
Product #83	200	842	100.0%	0%	842.1	0
Product #84	304	1,280	0%	0%	0	0
Product #85	0	0	100.0%	0%	0	0
Product #86	0	0	100.0%	0%	0	0
Product #87	0	0	100.0%	0%	0	0
Product #88	778	3,274	100.0%	0%	3274	0

Raw Material	2021 Usage [lb.]	Potential Usage [lb.][1]	Percent VOC	Percent HAP	Potential VOC emissions [lb/yr][2]	Potential HAP emissions [lb/yr][2]
Product #89	0	0	100.0%	0%	0	0
Product #90	269	1,132	0%	0%	0	0
Product #91	429	1,807	0%	0%	0	0
Product #92	75,221	316,734	0%	0%	0	0
Product #93	1,201	5,055	0%	0%	0	0
Product #94	0	0	100.0%	0.30%	0	0
Product #95	25	106	100.0%	0.10%	106.0	0
Product #96	18	77	100.0%	0%	76.63	0
Product #97	676	2,848	0%	0%	0	0
Product #98	570,966	2,404,176	0%	0.010%	0	240.4
Product #99	14,242	59,968	0%	0%	0	0
Product #100	12,582	52,981	0%	0.010%	0	5.30
Product #101	0	0	100.0%	0.010%	0	0
Product #102	0	0	100.0%	0%	0	0
Product #103	22	95	100.0%	0%	94.59	0
Product #104	0	0	100.0%	0%	0	0
Product #105	0	0	100.0%	0%	0	0
Product #106	92	387	100.0%	0%	387.0	0
Product #107	0	0	100.0%	0%	0	0
Product #108	5,537	23,316	0%	0%	0	0
Product #109	0	0	100.0%	0%	0	0
Product #110	315	1,326	0%	0%	0	0
Product #111	0	0	100.0%	25.00%	0	0
Product #112	2,094	8,815	10.00%	0.10%	881.5	8.82
Product #113	77,593	326,720	0%	0%	0	0
Product #114	0	0	100.0%	0%	0	0
Product #115	371	1,563	0%	0.10%	0	2
Product #116	0	0	100.0%	0%	0	0
Product #117	440	1,853	0%	0%	0	0
Product #118	0	0	100.0%	0%	0	0
Product #119	0	0	100.0%	0%	0	0
Product #120	0	0	100.0%	0%	0	0
Product #121	110	464	0%	0%	0	0
Product #122	441	1,856	0%	0%	0	0
Product #123	110	464	100.0%	0%	464.1	0
Product #124	55	232	100.0%	0%	232.1	0
Product #125	26	108	100.0%	30.00%	107.8	32.34
Product #126	0	0	100.0%	0%	0	0
Product #127	88	372	100.0%	0%	371.9	0
Product #128	0	0	100.0%	0%	0	0
Product #129	9	38	100.0%	0%	38	0
Product #130	0	0	100.0%	0%	0	0
Product #131	0	0	100.0%	0%	0	0
Product #132	0	0	100.0%	0%	0	0
Product #133	717	3,017	0%	0%	0	0

Raw Material	2021 Usage [lb.]	Potential Usage [lb.][1]	Percent VOC	Percent HAP	Potential VOC emissions [lb/yr][2]	Potential HAP emissions [lb/yr][2]
Product #134	165	696	100.0%	0%	696.3	0
Product #135	1,112	4,682	0%	0%	0	0
Product #136	0	0	100.0%	0%	0	0
Product #137	0	0	100.0%	0%	0	0
Product #138	0	0	100.0%	0%	0	0
Product #139	0	0	0%	0%	0	0
Product #140	0	0	0%	0%	0	0
Product #141	13,393	56,396	0%	0%	0	0
Product #142	13	57	100.0%	0%	56.76	0
Product #143	0	0	0%	0%	0	0
Product #144	362	1,524	100.0%	0%	1524	0
Product #145	1,903	8,015	0%	0%	0	0
Product #146	0	0	100.0%	0%	0	0
Product #147	451	1,898	0%	0%	0	0
Product #148	0	0	100.0%	0%	0	0
Product #149	16	66	100.0%	0%	65.69	0
Product #150	0	0	100.0%	0%	0	0
Product #151	0	0	100.0%	0%	0	0
Product #152	26	111	100.0%	0%	111.2	0
Product #153	613	2,581	0%	0%	0	0
Product #154	127	535	0%	0%	0	0
Product #155	298	1,255	100.0%	0%	1255	0
Product #156	0	0	100.0%	0.010%	0	0
Product #157	47	199	0%	0%	0	0
Product #158	0	0	100.0%	0%	0	0
Product #159	857	3,609	100.0%	0%	3609	0
Product #160	1,029	4,335	0%	0%	0	0
Product #161	3,330	14,022	3.00%	3.00%	420.6	420.6
Product #162	165,958	698,803	0%	0%	0	0
Product #163	19	82	100.0%	0.0016%	81.73	0
Product #164	794	3,343	0%	0.0016%	0	0
Product #165	11,520	48,507	0%	0.0016%	0	0.78
Product #166	11,520	48,507	0%	0.0016%	0	0.78

[1] - Potential Usage (lb/yr) = 2021 Annual Usage (lb/yr) * (1 / 23.5% Utilization in 2021)
2021 Utilization (%) = 2021 Total Combined Coating Tower Operating Hours / (Combined Possible Tower Hours {8,760 hr/yr per Tower})

[2] - Potential Annual VOC/HAP Emissions (lb/yr) = Potential Usage (lb/yr) x % Total VOC or HAP

All VOC/HAP emissions are pre-control values, 2021 stack testing indicated a 77% VOC DRE.

Attachment A.4
Form ARD-3 Section III.A Supplement - Supplemental Fuel Usage Information

Section III.A. Fuel Information

Device	Fuel Type	Heat Value [Btu/ft^3]	Sulfur Content (%)	Maximum Fuel Flow Rate [ft3/hr]	Maximum Output [MMBtu/hr]
MA Tower (EU01)	Natural Gas	1,020	N/A	3,824	3.9
MB Tower (EU02)	Natural Gas	1,020	N/A	7,353	7.5
MC Tower (EU03)	Natural Gas	1,020	N/A	4,412	4.5
MR Tower (EU04)	Natural Gas	1,020	N/A	4,412	4.5
MD Tower (EU05)	Natural Gas	1,020	N/A	8,824	9
QX Tower (EU06)	Natural Gas	1,020	N/A	7,353	7.5
20” SBC (EU07)	Electric	N/A	N/A	N/A	N/A
20” Coater (EU08)	Electric	N/A	N/A	N/A	N/A
MG Tower (EU12)	Natural Gas	1,020	N/A	5,882	6
MP Tower (EU13)	Natural Gas	1,020	N/A	7,353	7.5
MQ Tower (EU15)	Natural Gas	1,020	N/A	4,412	4.5
MS Tower (EU16)	Natural Gas	1,020	N/A	4,412	4.5
R&D Coater (EU22)	Natural Gas	1,020	N/A	1,961	2
Chemsil Coater (EU23)	Electric	N/A	N/A	N/A	N/A
MTM (EU24)	Natural Gas	1,020	N/A	2,941	3
Step Press/ Laminator (EU25)	Electric	N/A	N/A	N/A	N/A
Heat Clean (EU26)	Natural Gas	1,020	N/A	1,471	1.5
RTO Burner "A"	Natural Gas	1,020	N/A	8,627	8.8
RTO Burner "B"	Natural Gas	1,020	N/A	8,627	8.8

Attachment A.5
Form ARD-3 Section III.B Supplement - Air Pollutant Emissions from Combustion

Section III.B. Air Pollutant Emissions from Combustion

Pollutant	Emission Factor[1] [lb/MMSCF]	Emission Factor[2] [lb/MMBTU]	Actual/Potential[3] [lb/hr]	Actual[4] [tpy]	Potential[5] [tpy]
PM (total)	7.6	0.0075	0.62	0.33	2.73
SO_2	0.6	0.00059	0.049	0.026	0.22
NO_x	100	0.098	8.19	4.28	35.86
CO	84	0.082	6.88	3.59	30.12
VOC	5.5	0.0054	0.45	0.24	1.97

Based on Combined heat input rating for Towers and RTO burner = 83.5 MMBtu/hr

[1] Natural gas emission factors for small boilers as found in Tables 1.4-1 and 1.4-2 of AP-42, Chapter 1.4, July 1998

[2] Per AP-42, "To convert from lb/10^6 scf to lb/MMBtu, divide by 1,020."

[3] Actual & Potential [lb/hr] = Sum of Max Output (from III.A.) [MMBTU/hr] x Emission Factor [lb/MMBTU]

[4] Actual 2021 emissions for combustion operations calculated using measured natural gas usage.

[5] Potential [tpy] = Potential [lb/hr] x 8760 [hr/yr] x 1/2000 [ton/lb]

Attachment A.6
Form ARD-3 Section IV.A Supplement - Controlled Air Pollution Emissions

Section IV.A. Controlled Air Pollution Emissions

Pollutant	Controlled Emission Factor[1] [%]	Actual[2] [lb/hr]	Potential[3] [lb/hr]	Actual[4] [tpy]	Potential[5] [tpy]
PFOA	92	1.64E-06	2.06E-05	8.84E-06	4.65E-05
PFOS	75	6.80E-08	2.77E-07	3.16E-07	7.31E-07
Hydrogen Fluoride as F*	N/A	1.21E-02	1.21E-02	5.19E-02	5.30E-02

[1] RTO Destruction/Removal Efficiency (DRE) from September 2021 stack test results.

[2] Controlled emissions measured at the RTO outlet from the September 2021 stack test results.

[3] Uncontrolled emissions measured at the RTO inlet from the September 2021 stack test results. Potential emissions are equal to the actual emissions when the RTO bypass stack is operating.

[4] Max. Actual for PFOA/PFOS (tpy) = (175 hr/yr x potential (lb/hr)) + (8,585 hr/yr x actual (lb/hr))/2,000 lb/ton
Actual for HF (tpy) = (actual (lb/hr) x 8,585 hr/yr)/2,000 lb/ton

Monitoring plan indicates facility will track bypass minutes and flow.
Actual for PFOA/PFOS (tpy) = Bypass Minutes x Flow to RTO at time of bypass (cfm) x PFOA or PFOS Emission Rate (lb/dscf)

[5] Potential for PFOA/PFOS (tpy) = (4,145 hr/yr x potential (lb/hr)) + (4,615 hr/yr x actual (lb/hr))/2,000 lb/ton
Potential for HF (tpy) = (actual (lb/hr) x 8,760 hr/yr)/2,000 lb/ton

* Hydrogen fluoride is not controlled by the RTO but is a byproduct of operation of the RTO in treating