Process Description

Graham Kentucky TNT Facility

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1 INTRODUCTION

The Graham Kentucky Trinitrotoluene (TNT) Manufacturing Facility is a joint venture between Dyno Nobel and Paligen Technologies. The facility will be constructed at the existing Dyno Nobel site in Graham, Kentucky. This project is intended to provide a reliable U.S. based source of TNT for defense and industrial use. The new facility will include raw material handling and storage areas, TNT production area, acid recovery, a hazardous waste incinerator (Thermal Destruction Unit) and supporting utilities.

The facility processes are interlocked with control devices such that if the control device is shut down, operation of the emission source will be stopped. See the sitewide emission summary document for the overall emission estimates from the proposed TNT facility. The control devices will be integral and interlocked to the process such that it will be a Synthetic Minor Source. The site is required to apply for a Title V Air Permit, as required for facilities with a hazardous waste incinerator per 40 CFR §63.1200(a)(2).

This document is provided to present a high-level overview of the proposed operations for the new TNT manufacturing facility and is submitted in conjunction with the Kentucky Department for Environmental Protection Division for Air Quality permit application forms. This document also includes the following appendices to support the Title V air permit application:

Appendix 1 – Site map showing the location of the site and the boundaries of the new TNT manufacturing operations on the site

Appendix 2 – Block Flow Diagrams (BFDs) for the processes described in this document:

1. Sitewide air emission sources and control devices
2. TNT Production Area
3. Acid Recovery Unit (ARU)
4. Thermal Destruction Unit (TDU)
5. Raw Material Handling (RMH)
6. Utilities

Appendix 3 – A sitewide pollutant emissions summary for all new and existing sources

Appendix 4 – Documentation of the approach for estimating emissions of regulated air pollutants

Appendix 5 – Information and specifications from equipment vendors for specific equipment (emission sources and/or pollution control devices)

Appendix 6 – An evaluation of applicability of select U.S. EPA New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP).

The remaining sections of this document describe the processes and operations for the new TNT Manufacturing Facility.

2 TNT PRODUCTION UNIT

The nitration of toluene (or alternatively ortho-nitrotoluene - ONT) to trinitrotoluene (TNT) is carried out continuously in a series of nitration reactors where the nitrating acid and toluene / mononitrotoluene (MNT) / dinitrotoluene (DNT) flow counter-current to each other. Toluene reacts with nitric acid in the presence of sulfuric acid (in oleum). The nitric acid supplies the nitro group, and the sulfuric acid absorbs the water formed during the reaction.

2.1 TNT Nitration

Toluene, weak nitric acid (WNA) and oleum are fed to the Extractor and nitration reactors (nitrators). Toluene is fed to the Extractor and Nitrator #1 and oleum is fed to the final nitrator. WNA is fed to the Nitrator #1 and concentrated nitric acid (CNA) is fed to subsequent nitrators.

To form TNT, three nitro groups must be added to the toluene molecule. The introduction of the first nitro group to form MNT is carried out at low temperatures with weak nitric acid. Increasingly higher temperatures and stronger acids are then required for the stepwise conversion of MNT to DNT then DNT to TNT through subsequent nitrators.

The nitrators are cylindrical vessels each provided with an agitator, cooling coil and a liquid-to-liquid dynamic separator. Crude TNT and spent acid leave the system in a constant flow.

Steam, nitrogen, nitrogen oxide (NOX), carbon monoxide (CO), carbon dioxide (CO2), and other organics are vented from the nitrators to the NOX Absorber and the Thermal Oxidizer in the Acid Recovery Unit (ARU) area.

2.2 TNT Washing

The purification of crude TNT involves the removal of mineral acids, oxidation products and unsymmetrical TNT. Each Washer is a cylindrical vessel provided with agitator, heating jacket (circulating hot water) and a liquid-to-liquid Dynamic Separator.

The removal of mineral acids and some of the oxidation products is accomplished by washing the molten TNT with hot water in Washers #1&2, washing solution (sellite) in Washers #3&4 and further hot washing in Washer #5. Wash water from Washer #3, 4, and 5 flows to the Red Water Balance Tank and is pumped to the Red Water Feed Tank then to the Thermal Destruction Unit (TDU). Wash water from Washers #1&2 is recycled to Nitration.

Washers #1 & 2 are also vented to the NOX Absorber and Thermal Oxidizer in the ARU area. Washers #3-5 are vented to atmosphere, as there are no pollutant emissions from these washers.

2.3 TNT Finishing

TNT from Washer #5 flows to the Dryer. Purified TNT contains a small amount of water which must be removed before flaking.

At the outlet of the Static Separator, the TNT passes by gravity to the Dryer. Hot air is supplied to the Dryer. The TNT leaving the Dryer enters the pan in the Flaker. The molten TNT is picked up on a water-cooled rotating drum, solidified and scraped off with a knife which shatters it into small irregular pieces.

Exhaust containing TNT particles from the Dryer and Flaker is scrubbed in the Dryer Scrubber/Filter and Flaker Scrubber/Filter, respectively, each of which consists of a scrubber, and filters.

The flakes drop into a hopper, in the Packaging building, and are packed in boxes before being transported to the intermediate storage area at the site.

Exhaust containing TNT particles from the Packaging operations is collected and sent to the Packaging Scrubber/Filter, which consists of a scrubber, and filter in series.

2.4 TNT Emergency Vents

Other than the exhaust from the Washers #3-5 (which contains no pollutants) and cleaned exhaust from the Dryer and Flaker Scrubbers/Filters and Packaging Scrubber/Filter, there are

no emissions to atmosphere during normal operation. There are additional pressure relief devices (particularly from the Nitrators and Washers #1&2) that will relieve only in the event of an emergency.

3 ACID RECOVERY UNIT (ARU)

The purpose of the Acid Recovery Unit (ARU) is to remove contaminants from spent acids and recover useful materials that can be recycled back to the production process. The ARU area receives spent acid containing nitric acid, sulfuric acid, water, MNT and DNT from Nitration. The ARU area includes the NOX Absorber which is a scrubber for NOX from nitration operations and the other ARU process units. The ARU also includes an Extraction system that extracts organics from wastewater. Process steps in the ARU include:

- Denitration Unit (DENI)
- Organic Stripper
- Sulfuric Acid Concentrators
- Nitric Acid Concentrator (NAC)
- NOX Absorber
- Extraction Unit

3.1 Denitration Unit (DENI)

In the first step, spent acid from the spent acid tank is fed to the DENI unit where nitric acid and nitrous compounds are stripped from spent acid before being condensed and recycled to back to TNT Nitration as weak nitric acid (WNA). The spent acid (now mostly sulfuric acid) is sent to the MNT/DNT Stripping Unit to remove MNT and DNT from the stream.

Some non-condensable exhaust from this process step is sent to the NOx Absorber.

3.2 MNT/DNT Stripping Unit

In the second step, MNT and DNT stripped from the spent acid using steam. MNT and DNT are separated from this stream once condensed then sent to TNT Nitration. The remaining condensate containing organics (MNT/DNT) and is sent to the Extraction unit.

Some non-condensable exhaust from this unit is fed to NOX Absorber unit.

3.3 Sulfuric Acid Concentrators (SAC Unit)

After removing organics, sulfuric acid is concentrated up to 97% by weight (SA97). This takes place in successive concentration stages. The SAC Unit generates additional wastewater (acidic water) which is recycled back to the TDU as conditioning water.

3.4 Nitric Acid Concentrator (NAC Unit)

The Nitric Acid Concentrator (NAC) unit concentrates 50% nitric acid (NA50) from the NOX Absorber into Concentrated Nitric Acid (CNA) and recycled to TNT Nitration.

Exhaust from the NAC is mainly non-condensable exhaust. Nitrous compounds produced by the NAC unit are returned to the NOX Absorber unit.

3.5 Solvent Extraction Unit

The Extraction Unit uses fresh toluene to strip organics in the organic contaminated condensate from the ARU Organic Stripper and then this is sent to TNT Nitration. The clean condensate stream is also recycled. Some exhaust is vented to **atmosphere.**

3.6 NOX Absorber Unit (NOX ABS)

The NOX Absorber unit removes NOX from the various exhaust streams which are collected from upstream processes, including the ARU unit operations (DENI, MNT/DNT Stripper and NAC) as well as exhaust from TNT Nitration and the Weak Nitric Acid Storage Tank. The NOX Absorber uses water to remove NOX from the exhaust. NO is oxidized to NO2 using air. NO2 is absorbed in water to form nitric acid. The NA50 produced in the NOX Absorber column is concentrated to CNA in the ARU NAC and reused in TNT Nitration.

The exhaust from the NOX Absorber is vented to the Thermal Oxidizer. NA50 is sent to the NAC unit and the DENI unit.

3.7 Thermal Oxidizer

The exhaust from the NOX Absorber is routed to a thermal oxidizer (TO) for destruction of CO and TNM generated in the nitration process. The TO is a vertical direct-fired thermal oxidizer. Natural gas is used as a supplemental fuel. Exhaust from the NOX Absorber and supplemental combustion air are mixed in the burner with natural gas. The combustion gases exit through an exhaust stack.

3.8 Emergency Vents

Other than the cleaned exhaust from the NOX Absorber/TO there are no emissions to atmosphere during normal operation. There are additional pressure relief devices (particularly from DENI and SAC units) that will relieve, only in the event of an emergency. During these emergency events, emissions may include steam, NOX, organics, CO, and other inert gases (N2, O2, CO2).

4 THERMAL DESTRUCTION UNIT (TDU)

The Thermal Destruction Unit (TDU) system is a technology designed to destroy the Red Water hazardous waste stream that contains a variety of sulfur and nitrogen bound salts formed in the production of TNT. The system is subject to the National Emission Standards for Hazardous Air Pollutants (NESHAP) from Hazardous Waste Combustors (HWC), which requires the use of Maximum Achievable Control Technology (MACT) and is commonly call the HWC MACT regulation. The waste stream is injected into the Thermal Destruction Unit (TDU) after the flame. The Red Water waste stream is injected via air atomized nozzles. The hot flue gas generated in the Thermal Destruction Unit (TDU) section contains sulfur dioxide (SO2) and sulfur trioxide (SO3) and is treated. In this section, all the sulfur atoms will be converted to SOX (SO2/ SO3) and the nitrogen atoms will be converted to N2 and NOX (NO/ NO2). Any hydrocarbons present will be converted to CO2 and H2O. The burner and combustion chamber are designed to the regulatory requirement of 99.99% Destruction & Removal Efficiency (DRE) of Principal Organic Hazardous Constituents as well as sulfur and nitrogen bound constituents.

After the combustion chamber exhaust gas is passed to a DSI (dry sorbent injection) system. Sulfur dioxide (SO2) and sulfur trioxide (SO3) in the flue gas will be treated by injecting sodium bicarbonate. The SOX scrubbed flue gas from DSI injection passed through a baghouse/HEPA filter for removal of the resulting solids. NOX is then removed from the flue gas by a Selective Catalytic Reduction unit (SCR) via injecting ammonia to convert the NOX to N2 and H2O. After the SCR, the flue gases are emitted to the atmosphere via a stack, in compliance with the gaseous emission limits and performance guarantee provided by technology supplier.

Emissions of semi-volatile metals (SVM) and low volatile metals (LVM) constituents are removed to below HWC MACT emission limits. Any mercury present will be emitted to the atmosphere under the HWC MACT limits via the stack. Halogens are not expected as such, the formation of dioxins and furans is not expected. Any trace HCl/Cl2 will be removed in the DSI system.

5 RAW MATERIAL HANDLING

5.1 Toluene Tank

The toluene tank is located near the TNT Production area and has a capacity of 32,400 gallons. The tank is top-filled by the delivery truck, which includes a vapor balancing recovery system to capture the vapors inside the tank during filling. This eliminates working losses from the toluene tank during filling from delivery trucks. Due to the vapor recovery system, the recycled toluene from the extraction system is the only source of toluene filling where working losses are present. The toluene tank is equipped with a conservation vent with a horizontal discharge.

5.2 Oleum Tank

The Oleum tank is in the Acid Tank Farm and has a capacity of 58,677 gallons. During filling, vapors are captured via a vapor balancing recovery system back to the delivery truck.

The oleum vapor space is connected to the Oleum Scrubber for emission control. The tank is equipped with a conservation vent for inbreathing and emergency venting. Normal outbreathing is sent to the Oleum Scrubber, which scrubs SO3 and sulfuric acid vapors. 97% sulfuric acid from the storage tank is used as the scrubbing liquid in the Oleum Scrubber and is recycled back to the 97% sulfuric acid storage tank.

5.3 97% Sulfuric Acid Tank

97% Sulfuric acid is produced by a Sulfuric Acid Concentrator system in the Acid Recovery Unit (ARU) and is stored in the Acid Tank Farm. The 97% Sulfuric Acid Tank has a capacity of 78,307 gallons and has a vent, which discharges vertically. The 97% sulfuric acid is used to produce oleum for use in TNT production, and as scrubbing liquid for the Oleum Scrubber.

5.4 Concentrated Nitric Acid Tank

Concentrated nitric acid is fed to the tank via delivery truck and recycled from the Nitric Acid Concentrator (NAC Unit) in the ARU. The tank has a capacity of 42,575 gallons. Concentrated nitric acid is used during the Nitration process of TNT production. The vent from the concentrated nitric acid tank discharges to the Nitric Acid Scrubber. Demineralized water is used as the scrubbing liquid. Weak nitric acid removed in the scrubber is sent to the weak nitric acid tank.

5.5 Weak Nitric Acid Tank

Weak nitric acid is generated in the ARU DENI and is fed to a weak nitric acid tank before being used in TNT Nitration. It is in the Acid Tank Farm and has a capacity of 8,338 gallons. This tank is vented to the Nitric Acid Scrubber for emission control.

5.6 Spent Acid Tank

The spent acid tank collects spent acid from TTN Nitration process during TNT production. This spent acid is then processed in the ARU to recover nitric acid and sulfuric acid. The capacity of the tank is 38,772 gallons. The spent acid tank vents to the Nitric Acid Scrubber for air emission control.

5.7 NA50 Tank

The weak nitric acid from the Nitric Acid Scrubber and NOX Absorption Unit (ARU) are stored in the NA50 Tank before being processed to CNA in the ARU NAC. The tank has a capacity of 8,616 gallons. Vapors from the NA50 are sent to the NOX Absorber in the ARU.

5.8 Sellite Washing Solution Preparation and Storage

The raw material bag unloading station is used to prepare the washing solution mixture that is used in the TNT washing process. Two unloading stations are used to unload material, one for each raw material. One bag of each raw material is unloaded per day (~2,420 lbs). Each unloading station is equipped with a hopper and a screw conveyor to feed into the mixing vessel. There are no emissions anticipated from the washing solution mixing tank to the washing solution storage tank.

5.9 Diesel Storage Tank

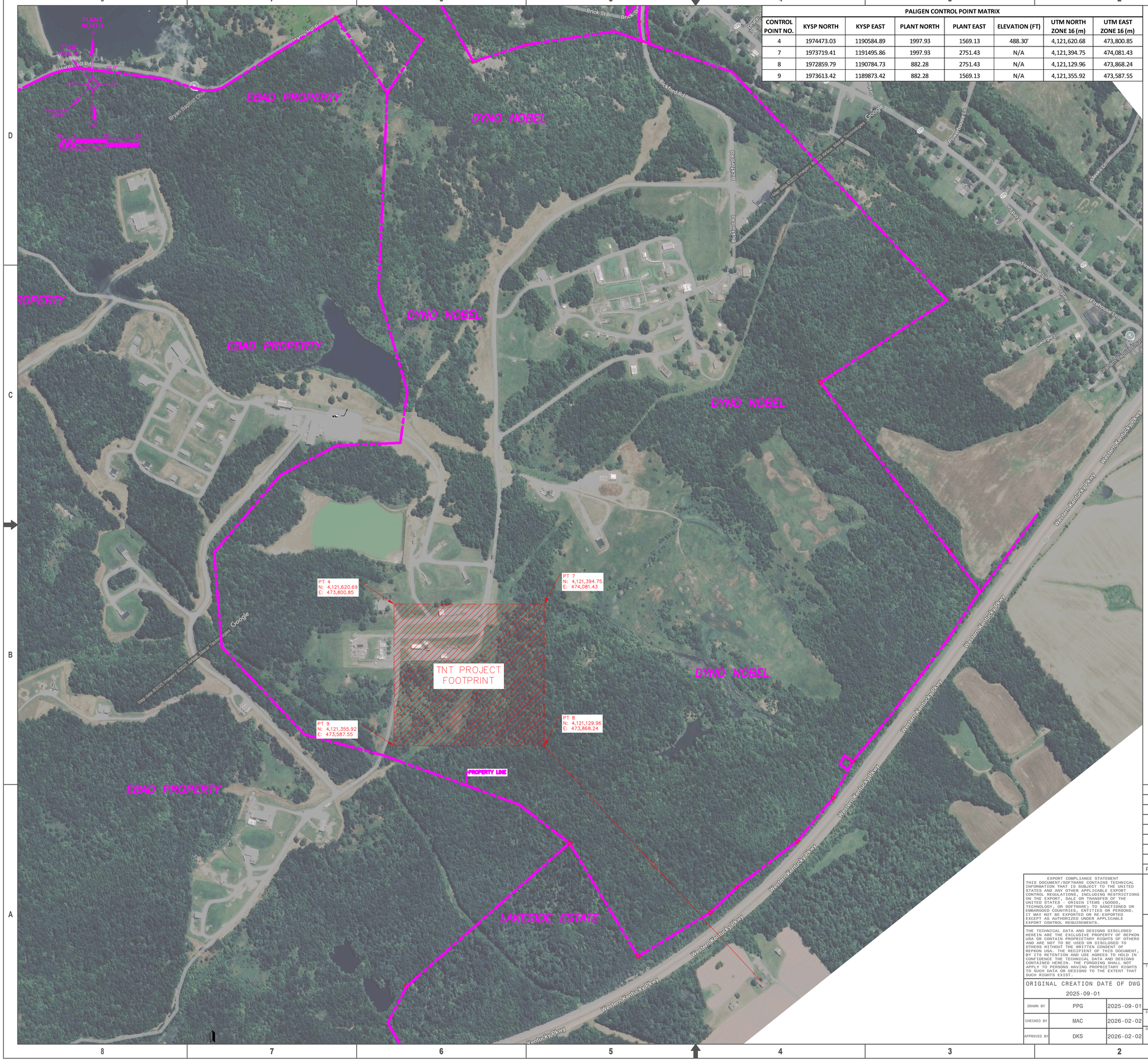
Diesel for the fire water pump is stored in a 550-gallon tank. Minimal emissions of VOC are expected from the Diesel Storage Tank.

6 UTILITIES

The utility equipment includes a package boiler, two natural gas fired emergency generators, a diesel fire water pump, and two packaged cooling tower units. The boiler is natural gas fired and has a rated heat input capacity of 36.3 MMBTU/hr. The fire water pump is fuelled by diesel and has a brake horsepower of 542. Both emergency generators are natural gas fired and have a brake horsepower of 1475. Particulate emissions from the two cooling towers are anticipated to result from drift.

Appendix 1

Site Map



PALIGEN CONTROL POINT MATRIX

CONTROL POINT NO.	KYSP NORTH	KYSP EAST	PLANT NORTH	PLANT EAST	ELEVATION (FT)	UTM NORTH ZONE 16 (m)	UTM EAST ZONE 16 (m)
4	1974473.03	1190584.89	1997.93	1569.13	488.30'	4,121,620.68	473,800.85
7	1973719.41	1191495.86	1997.93	2751.43	N/A	4,121,394.75	474,081.43
8	1972859.79	1190784.73	882.28	2751.43	N/A	4,121,129.96	473,868.24
9	1973613.42	1189873.42	882.28	2751.43	N/A	4,121,355.92	473,587.55

NOTES:

1. FOR GENERAL NOTES AND SYMBOLS SEE DRAWINGS P164-TNT-KB-PG-DWG-P0A-0102A

LEGEND

- EXISTING UNDERGROUND TELEPHONE
- EXISTING GAS LINE
- EXISTING OVERHEAD ELECTRIC
- EXISTING OVERHEAD TELEPHONE LINE
- EXISTING WATERLINE
- EXISTING BUILDING
- EXISTING LIGHT POLE
- EXISTING UTILITY POLE
- EXISTING GAS METER
- EXISTING WATER METER
- EXISTING SANITARY SEWER MAN HOLE

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HOUSTON, TX 77002
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DYNO-NOBEL - EXPLOSIVES PLANT
GRAHAM, KENTUCKY

PALIGEN™ TECHNOLOGIES
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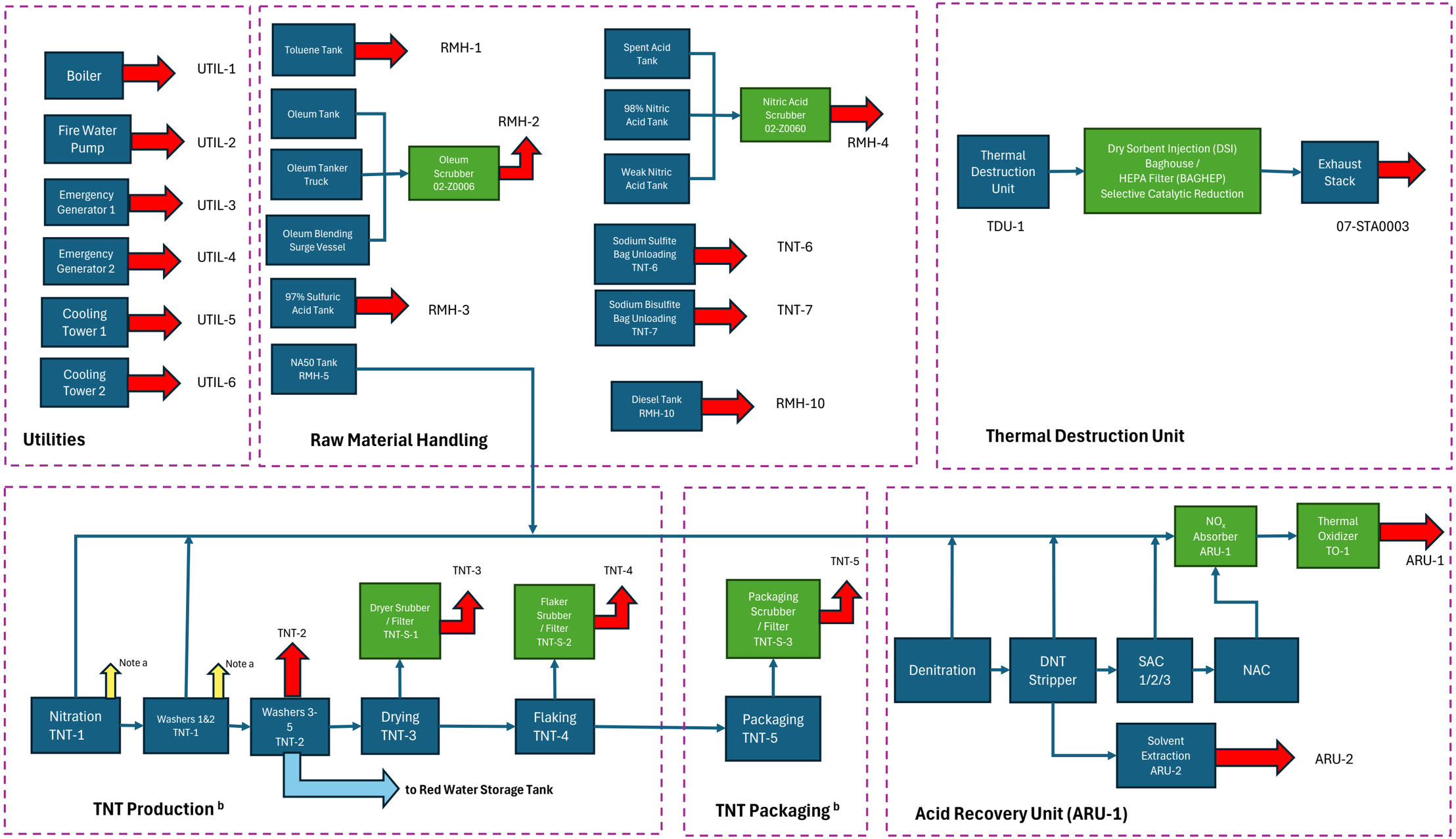
TITLE
TNT MANUFACTURING & STORAGE
TNT PLANT FOOTRPRINT
OVERALL SITE PLAN
SHEET 1 OF 1

SIZE	CAGE CODE	DRAWING NUMBER	REV
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SCALE	WEIGHT	SHEET
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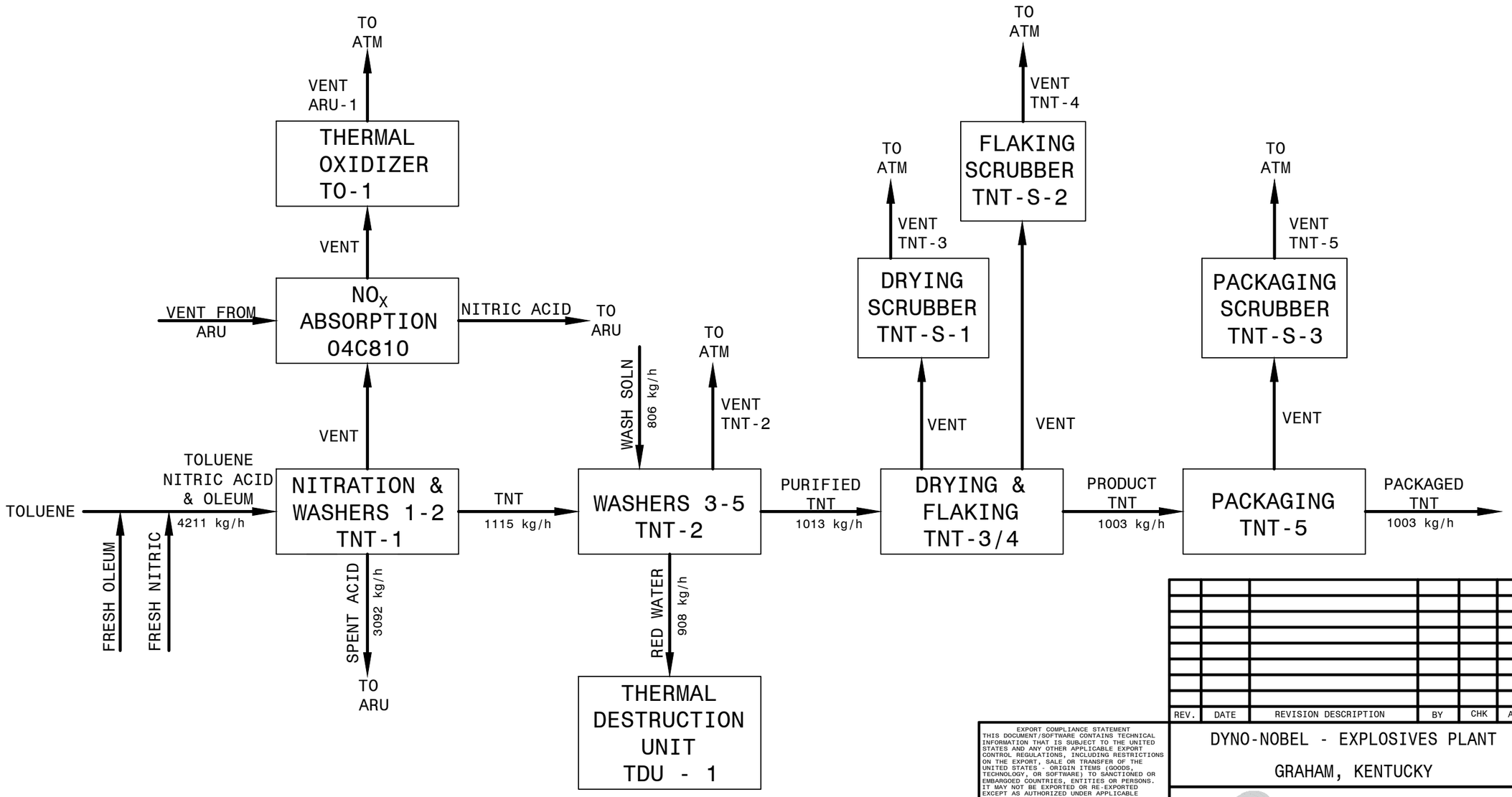
Appendix 2

Block Flow Diagrams (BFDs)



Notes: [a] Nitrators and Washers 1 & 2 can vent to the atmosphere during emergency events.

[b] The HVAC System in this building will exhaust through a HEPA filter.



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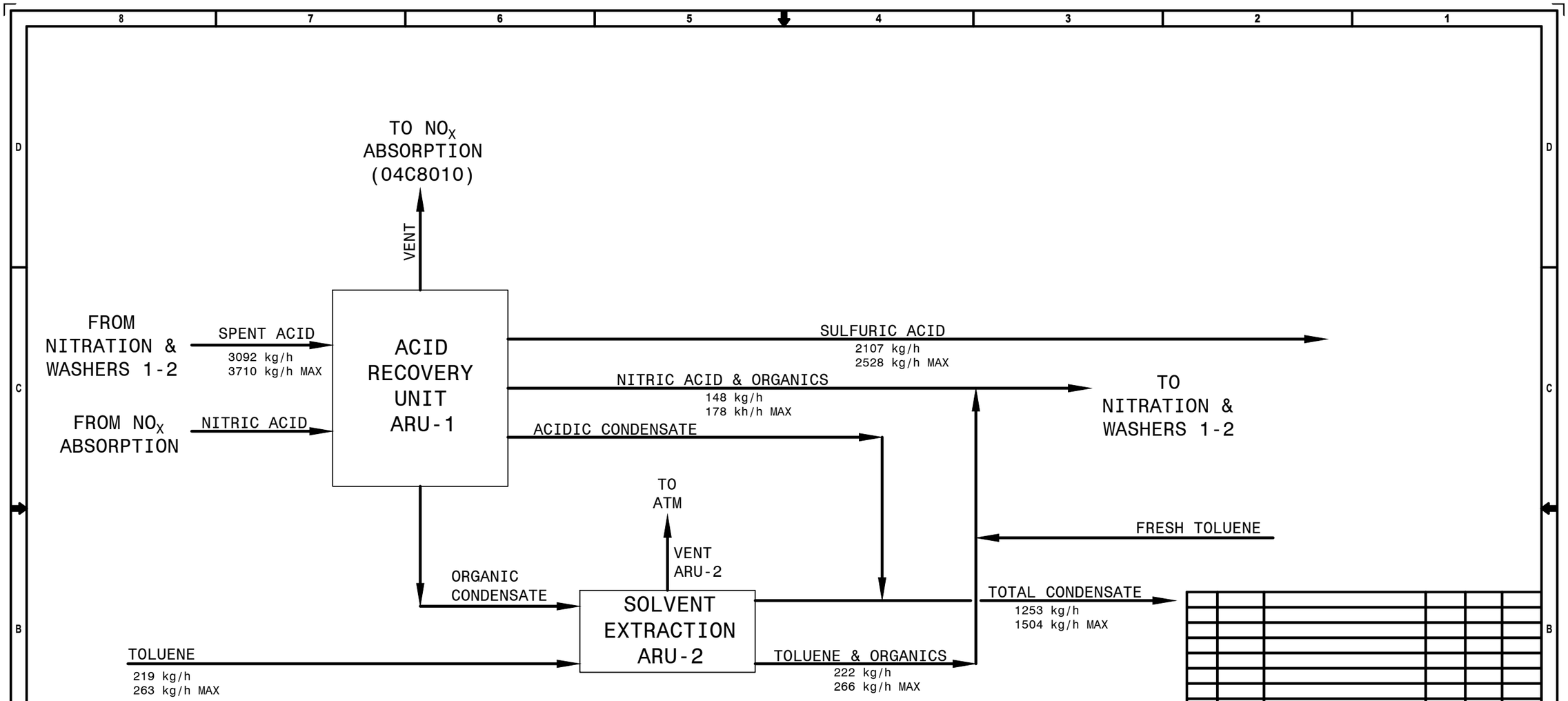
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GRAHAM, KENTUCKY

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TITLE
TNT PRODUCTION
AIR PERMIT
BLOCK FLOW DIAGRAM

SIZE	CAGE CODE	DRAWING NUMBER	REV
B	9YPUO	-	B

SCALE	WEIGHT	SHEET
-	-	1/2



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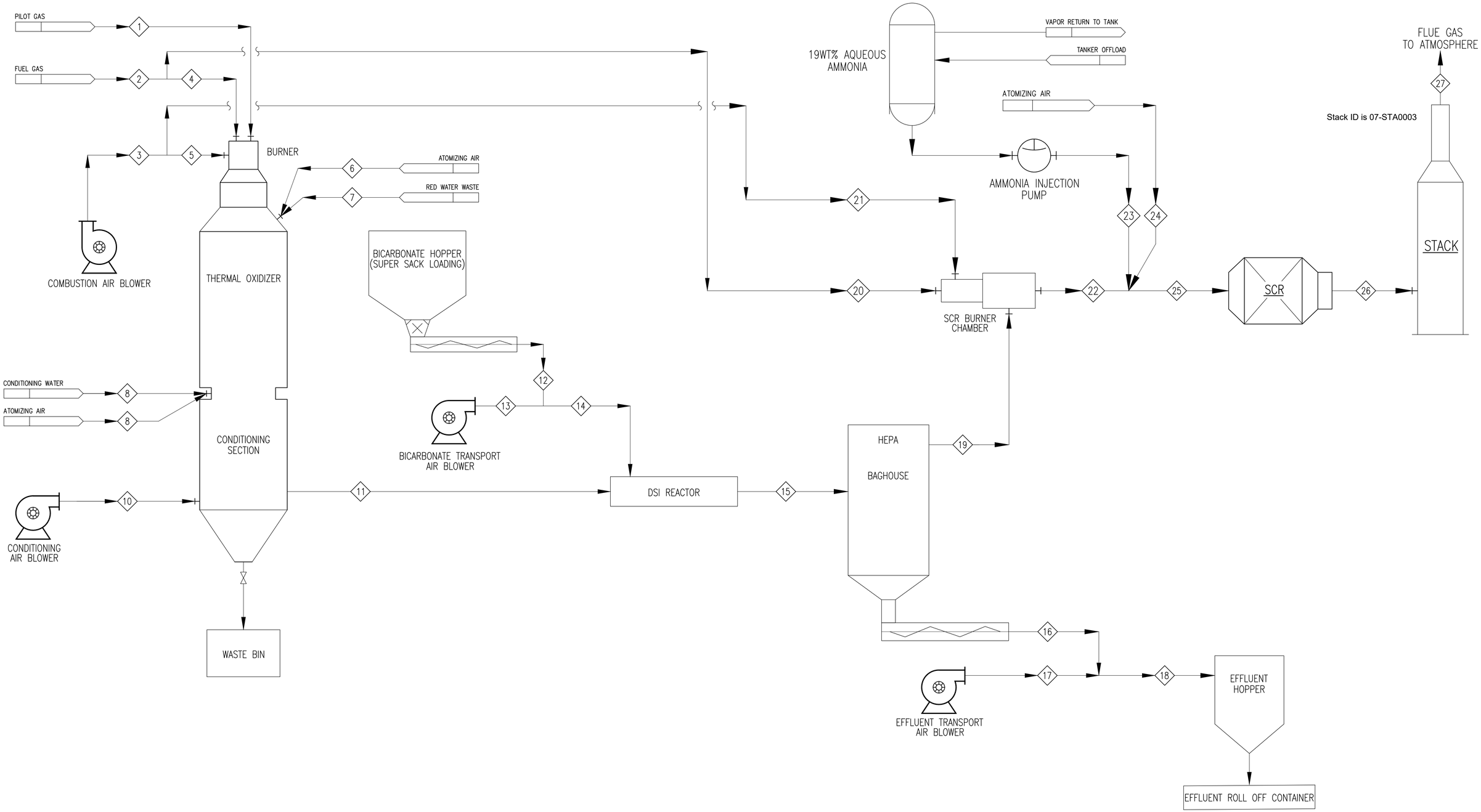
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TITLE
ACID RECOVERY UNIT
AIR PERMIT
BLOCK FLOW DIAGRAM

SIZE	CAGE CODE	DRAWING NUMBER	REV
B	9YPUO	-	B

SCALE	WEIGHT	SHEET
-	-	2/2



DWG. NO.	REFERENCE DRAWING	NO.	REVISION	DR.	CKD.	APPR.	DATE
		6	ISSUED FOR REVIEW	RAO 02/20/26	TW 03/24/26	SG 03/24/26	
		5	ISSUED FOR REVIEW	RAO 01/20/26	TW 01/26/26	SG 01/26/26	
		4	ISSUED FOR REVIEW	RAO 01/08/26	TW 01/12/26	SG 01/12/26	
		3	ISSUED FOR REVIEW	RAO 10/01/25	TW 10/03/25	SG 10/03/25	
		2	ISSUED FOR REVIEW	RAO 09/11/25	TW 09/12/25	SG 09/12/25	
		1	REVISED PER ENGR. CHANGES	RAO 08/20/25	TW 08/28/25	SG 08/28/25	

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USER	
JOB SITE	

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Honeywell UOP
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Tulsa, OK 74136-5488

PROCESS FLOW DIAGRAM

UOP RED WATER THERMAL DESTRUCTION UNIT

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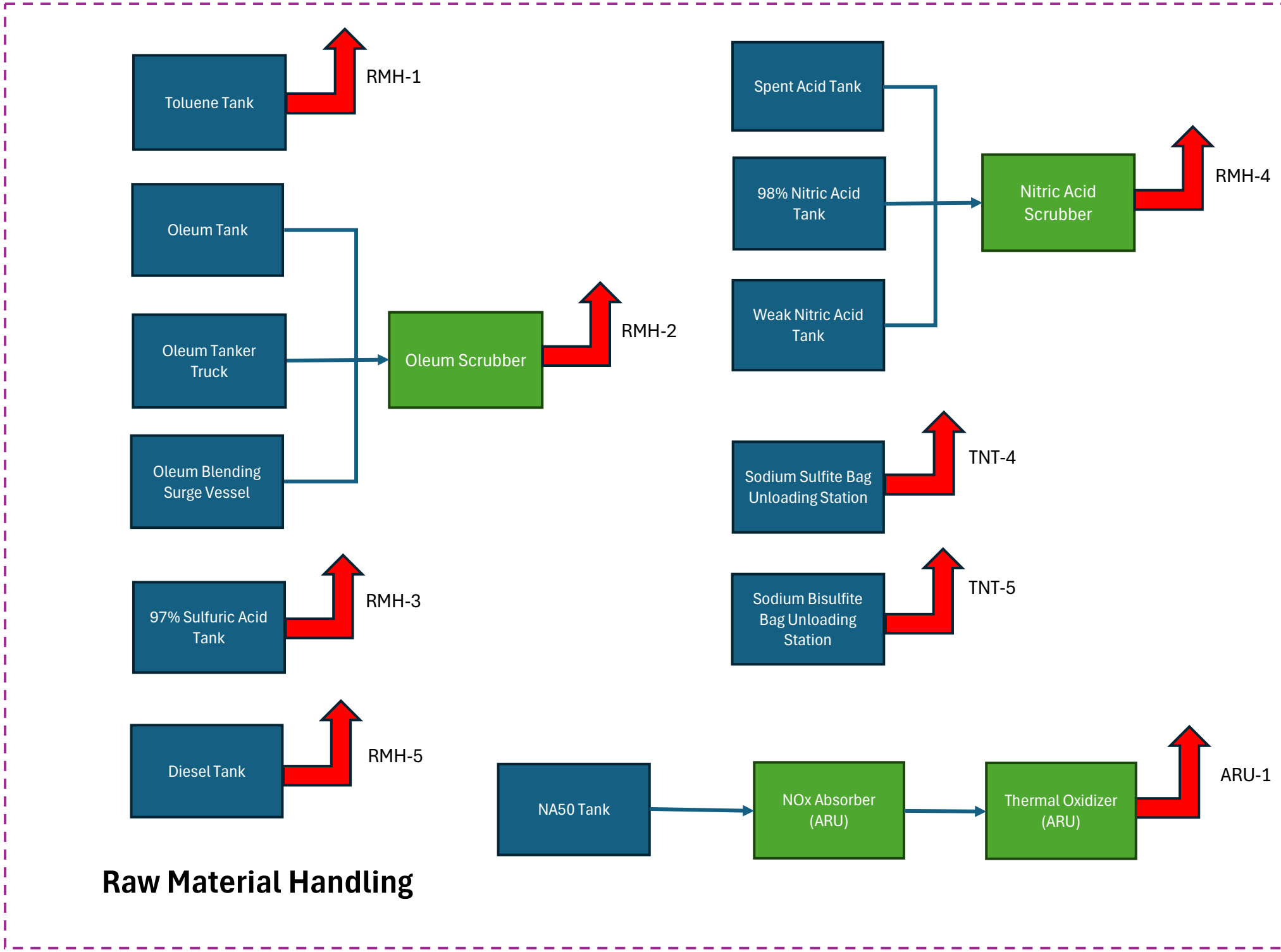
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Toluene Tank
RMH-1
Oleum Tank
Oleum Tanker Truck
Oleum Scrubber
RMH-2
Oleum Blending Surge Vessel
97% Sulfuric Acid Tank
RMH-3
Diesel Tank
RMH-5
Spent Acid Tank
98% Nitric Acid Tank
Weak Nitric Acid Tank
Nitric Acid Scrubber
RMH-4
Sodium Sulfite Bag Unloading Station
TNT-4
Sodium Bisulfite Bag Unloading Station
TNT-5
NA50 Tank
NOx Absorber (ARU)
Thermal Oxidizer (ARU)
ARU-1
Raw Material Handling

Appendix 3

Sitewide Pollutant Emissions Summary

Dyno Nobel TNT Plant

Emission Summary

	Uncontrolled Sitewide Emissions (TPY)			Controlled Sitewide Emissions (TPY)		
	Existing Dyno Nobel Site Emissions	New TNT Facility Emissions	**Total Uncontrolled**	Existing Dyno Nobel Site Emissions	New TNT Facility Emissions	**Total Controlled**
NO_X (as NO_2)*		1,443	**1443.00**		76	**76.33**
SO_X		430	**430.43**		20	**20.07**
CO		425	**424.88**		20.1	**20.06**
VOC / HC		49.7	**49.66**		2.36	**2.36**
Sulfuric Acid	10.07	3.97E-04	**10.07**	10.07	3.01E-04	**10.07**
Ammonia	0.03	1.19	**1.22**	0.03	1.19	**1.22**
DNT		3.3	**3.30**		0.0013	**0.0013**
PM	6.6	1,018	**1024.99**	0.12	10.6	**10.69**
PM10	6.6	645	**651.39**	0.12	10.5	**10.659**
PM2.5	6.58	645	**651.37**	0.11	10.5	**10.649**
Fugitive PM		< 40	**40.00**		< 40	**40**
Nitric Acid	452.17	n/a*	**452.17**	30.32	n/a*	**30.3**
Acetone	806.17		**806.17**	84.17		**84.2**
CO_2		27,906	**27,906**		27,906	**27,906**
N_2O		0.0388	**0.0388**		0.0388	**0.0388**
CH_4		0.386	**0.386**		0.386	**0.386**
Toluene		8.2	**8.2**		8.2	**8.2**
Benzene		3.00E-04	**3.00E-04**		3.00E-04	**3.00E-04**
Xylene		1.00E-04	**1.00E-04**		1.00E-04	**1.00E-04**
Formaldehyde		0.097	**0.097**		0.097	**0.097**
Dioxin/Furan		2.46E-09	**2.46E-09**		2.46E-09	**2.46E-09**
LVM, As+Be+Cr		0.082	**0.082**		5.20E-04	**5.20E-04**
SVM, Cd+Pb		0.017	**0.017**		2.25E-04	**2.25E-04**
Mercury		2.50E-04	**2.50E-04**		2.50E-04	**2.50E-04**
HCl/Cl2		7.10	**7.10**		0.71	**0.71**

* Emissions of nitric acid are not regulated for the New TNT Facility and are not included.

Dyno Nobel TNT Plant
Emission Summary

		UNCONTROLLED (TPY)																							NOx UNCONTROLLED (TPY)				
ID NO.	EMISSION POINT	NO_X (as NO_2)*	SO_X	PM	PM10	PM2.5	Fugitive PM	CO	VOC / HC	Sulfuric Acid	Ammonia	DNT	CO_2	N_2O	CH_4	Toluene	Benzene	Xylene	Formaldehyde	Dioxin/ Furan	Low Volatile Metals (LVM, As+Be+Cr)	Semi Volatile Metals (SVM, Cd+Pb)	Mercury	HCl/Cl2	NO_X (emitted)	NO_2 (emitted)	NO (emitted)	NO_2 (as NO)	NO_X (as NO_2)*
	Toluene Tank Vent															0.058													
	Toluene Equipment Service Leaks															6.0													
	Oleum Scrubber Stack		256																										
	97% Sulfuric Acid Tank Vent									3.00E-04																			
	Nitric Acid Scubber Stack	11.3								9.72E-05																11.3			11.3
	Weak Nitric Acid Tank Vent	0.3																								0.3			0.3
	Diesel Tank								3.97E-05																				
	Boiler Stack	7.88	0.095	1.20	1.20	1.20		13.2	0.867				18602	3.50E-02	3.50E-01										7.88				7.88
	Diesel Fire Water Pump Stack	0.775	0.100	2.00E-02	2.00E-02	2.00E-02		0.102	0.022				56.2	4.56E-04	2.28E-03	0.0001	0.0003	0.0001							0.78				0.78
	Emergency Generator 1 Stack	0.024	0.00140	0.0226	0.0226	0.0226		0.520	0				278	5.24E-04	5.24E-03				0.049						0.02				0.02
	Emergency Generator 2 Stack	0.024	0.00140	0.0226	0.0226	0.0226		0.520	0				278	5.24E-04	5.24E-03				0.049						0.02				0.02
20-ZCT0001	Cooling Tower 1			0.095	0.095	0.095																							
21-ZCT0001	Cooling Tower 2			0.017	0.017	0.017																							
	Washers 3-5			< 5	< 5	< 5																							
	Dryer Scubber Stack			1.45	1.45	1.45																							
	Flaker Scubber Stack			1.45	1.45	1.45																							
	Packaging Scrubber Stack			1.45	1.45	1.45																							
	Sodium Sulfite HEPA Filter Vent			3.64	3.64	3.64																							
	Sodium Bisulfite HEPA Filter Vent			0.0018	0.0018	0.0018																							
	TNT Production Building Vents (4)						< 20***																						
	TNT Packaging Building Vents (2)						< 10***																						
	Sellite Preparation Building Vents (2)						< 10***																						
07-STA1000	ARU NOX Absorber/Thermal Oxidizer Stack	1309						406	48.3 **			3.3	435												454	21.9	544	834	1309
	ARU Thermal Oxidizer (from burner)	47.3	0.01	0.02	0.02	0.02		0.87	0.06				1231	2.32E-03	2.32E-02	3.50E-05						5.16E-06			1.03	46.3			47.3
	Solvent Extraction Vent Stack															2.12													
07-STA0003	TDU Stack	66.0	174	1004	630	630		3.99	0.41		1.19		7026							2.463E-09	0.082	0.017	2.50E-04	7.1	61.3				61.3
	Paved Haul Roads																												
Total Uncontrolled		1,443	430	1,018	645	645	< 40	425	49.7	3.97E-04	1.2	3.3	27906	0.0388	0.386	8.18	3.00E-04	1.00E-04	0.097	2.463E-09	0.082	0.017	2.50E-04	7.1	525	79.8	544	834	1,438

Dyno Nobel TNT Plant
Emission Summary

		CONTROLLED (TPY)																							NOx CONTROLLED (TPY)				
ID NO.	EMISSION POINT	NO_X (as NO_2)*	SO_X	PM	PM10	PM2.5	Fugitive PM	CO	VOC / HC	Sulfuric Acid	Ammonia	DNT	CO_2	N_2O	CH_4	Toluene	Benzene	Xylene	Formaldehyde	Dioxin/ Furan	Low Volatile Metals (LVM, As+Be+Cr)	Semi Volatile Metals (SVM, Cd+Pb)	Mercury	HCl/Cl2	NO_X (emitted)	NO_2 (emitted)	NO (emitted)	NO (as NO_2)	NO_X (as NO_2)*
	Toluene Tank Vent															0.058													
	Toluene Equipment Service Leaks															6													
	Oleum Scrubber Stack		2.56																										
	97% Sulfuric Acid Tank Vent									3.00E-04																			
	Nitric Acid Scubber Stack	11.3								9.72E-07																11.3			11.3
	Weak Nitric Acid Tank Vent	0.003																											
	Diesel Tank								3.97E-05																				
	Boiler Stack	7.88	0.095	1.20	1.20	1.20		13.2	0.867				18602	3.50E-02	3.50E-01										7.88				7.88
	Diesel Fire Water Pump Stack	0.775	0.100	2.00E-02	2.00E-02	2.00E-02		0.102	0.022				56.2	4.56E-04	2.28E-03	0.0001	0.0003	0.0001							0.78				0.78
	Emergency Generator 1 Stack	2.40E-02	0.00140	0.0226	0.0226	0.0226		0.520	0				278	5.24E-04	5.24E-03				0.049						0.02				0.02
	Emergency Generator 2 Stack	2.40E-02	0.00140	0.0226	0.0226	0.0226		0.5203	0				278	5.24E-04	5.24E-03				0.049						0.02				0.02
20-ZCT0001	Cooling Tower 1			0.095	0.095	0.095																							
21-ZCT0001	Cooling Tower 2			0.017	0.017	0.017																							
	Washers 3-5			< 5	< 5	< 5																							
	Dryer Scubber Stack			0.145	0.145	0.145																							
	Flaker Scubber Stack			0.145	0.145	0.145																							
	Packaging Scrubber Stack			0.160	0.160	0.160																							
	Sodium Sulfite HEPA Filter Vent			3.64	3.64	3.64																							
	Sodium Bisulfite HEPA Filter Vent			0.0018	0.0018	0.0018																							
	TNT Production Building Vents (4)						< 20***																						
	TNT Packaging Building Vents (2)						< 10***																						
	Sellite Preparation Building Vents (2)						< 10***																						
07-STA1000	ARU NOX Absorber/Thermal Oxidizer Stack	2.43						0.811	1.0 **			0.00131	435												0.91	0.6	0.6	0.92	2.43
	ARU Thermal Oxidizer	47.3	0.01	0.02	0.02	0.02		0.87	0.06				1231	2.32E-03	2.32E-02	3.50E-05						5.16E-06			1.03	46.3			47.3
	Solvent Extraction Vent Stack															2.12													0
07-STA0003	TDU Stack	6.60	17.3	0.080	0.052	0.052		3.99	0.41		1.19		7026							2.463E-09	5.20E-04	2.20E-04	2.50E-04	0.71	6.1				6.1
	Paved Haul Roads																												
Total Controlled		76	20	10.6	10.5	10.5	< 40	20.1	2.36	3.01E-04	1.2	0.00131	27906	0.0388	0.386	8.18	3.00E-04	1.00E-04	0.097	2.463E-09	5.20E-04	2.25E-04	2.50E-04	0.71	16.7	58.2	0.6	0.92	75.8

* NOx total was calculated by combining emitting NOx, NO_2, and NO (as NO_2).

** VOC shown for ARU NOx Absorber/Thermal Oxidizer Stack is trinitromethane (TNM) generated from nitration.

***Each building vent is < 5 TPY.

NO	30	lb/mol
NO2	46	lb/mol
NOx (as NO2)	1.533* NO	lb/hr

Appendix 4

Emission Estimates

Dyno Nobel

TNT Plant, Graham, KY

Emission Calculation Methodologies

1.0 Raw Material Handling

The Raw Material Handling (RMH) emission sources include:

1. Toluene Storage Tank & Diesel Tank

   The Toluene Storage Tank includes a vapor balancing system that eliminates emission during filling from the tanker trucks. There is a small amount of working loss projected from toluene recycled back from the process. These working losses and breathing losses were estimated using AP 42, Fifth Edition, Volume I Chapter 7: Liquid Storage Tanks and are included in Attachment 1.

   The Firewater Pump is serviced by a 550-gallon diesel storage tank. Working and breathing losses were estimated using US EPA Tanks Version 5.2 and are included in Attachment 1.

2. Oleum Storage Tank, Oleum Tanker Truck, and Oleum Blending Surge Vessel

   Emissions of sulfur trioxide (SO_3) are generated during Oleum unloading and blending. All these operations vent through the Oleum Storage Tank. These emissions were estimated based on vapor-liquid equilibrium process modeling using ASPEN and annual throughputs and are documented in Attachment 2. Emissions of SO_3 from Oleum operations are controlled via the Oleum Scrubber at 99% efficiency.

3. 97% Sulfuric Acid Tank

   A small amount of sulfuric acid (H_2SO_4) emissions are generated from filling the 97% Sulfuric Acid Tank. These emissions were estimated based on vapor-liquid equilibrium process modeling using ASPEN and annual throughputs and are documented in Attachment 2.

4. Spent Acid Tank

   Spent nitric and sulfuric acids from the nitration process are collected in the spent acid tank. Emissions of nitrogen oxides (NO_X) and H_2SO_4 are generated and vented to the Nitric Acid Scrubber to remove any nitric acid fumes/mist and H_2SO_4. These emissions were estimated based on vapor-liquid equilibrium process modeling using ASPEN and annual throughputs and are documented in Attachment 2. Emissions of H2SO4 are controlled at >99% in the Nitric Acid Scrubber.

5. 98% Nitric Acid Tank

Concentrated nitric acid is stored in 98% Nitric Acid Tank. Emissions of NO_X are generated and vented to the Nitric Acid Scrubber to remove any nitric acid fumes/mist. These emissions were estimated based on vapor-liquid equilibrium process modeling using ASPEN and annual throughputs and are documented in Attachment 2.

6. Weak Nitric Acid Tank

   The Weak Nitric Acid Tank receives nitric acid generated from the Acid Recovery Unit. Emissions of NO_X are generated and vented to the Nitric Acid Scrubber to remove any nitric acid fumes/mist. These emissions were estimated based on vapor-liquid equilibrium process modeling using ASPEN and annual throughputs and are documented in Attachment 2.

7. NA50 Tank (50% Nitric Acid Tank)

   The NA50 Tank receives a weak nitric acid stream from the Nitric Acid Scrubber and NO_X Absorber in the ARU. Emissions of NO_X are generated and vented to the NO_X Absorber. These emissions were estimated based on vapor-liquid equilibrium process modeling using ASPEN and annual throughputs and are documented in Attachment 2.

2.0 TNT Production

Emissions from TNT production include

1. Carbon Monoxide (CO), NO_X, Tetranitromethane (aka TNM or $C(NO_2)_4$) and Carbon Dioxide (CO_2) from nitration, and
2. Particulate matter from the Washers #3-5, Dryer, Flaker, Packaging, and Sellite Unloading

Emission factors for CO, NO_X, and CO_2 were provided by the equipment manufacturer based on proprietary modeling and process knowledge. Uncontrolled emissions of 21 kg/hr CO are based on the technology provider's proprietary model and process knowledge. Emissions of TNM were estimated based on a conservative factor of 0.5 kg TNM per 100 kg of TNT from Nitration (Chemistry and Technology of Explosives by Tadeusz Urbański). Emissions from nitration are routed to the NO_X absorber, which will remove NO_X at 99.8% per the manufacturer's specification. The NO_X Absorber exhaust is routed through a direct-fired Thermal Oxidizer (TO) for control of CO at 99.8% destruction efficiency per the manufacturer's specification. TNM will be destroyed in the TO at a conservatively assumed 98% destruction efficiency. Destruction of TNM will result in formation of NO_X (conservatively assumed to convert to 100% NO_2), when the $C(NO_2)_4$

molecule is combusted. Emissions of TNM and NO_X from its combustion are included in Attachment 3.

No emissions are expected from the Washers #3-5, but they are included as insignificant sources in the event of incidental carryover of droplets/mist with Sellite/TNT particles.

For emissions of PM from the Dryer, Flaker, and Packaging, uncontrolled emissions are each conservatively assumed to be 100% of the TNT production losses of 0.15 kg/hr as estimated by the technology provider based on historical operating experience. The vents on these units are each routed through a scrubber and filter. Removal efficiencies for these units are derived from inlet and outlet concentrations provided by a scrubber vendor (Sly), included with vendor equipment specifications.

Fugitive dust (particulate matter) may also be generated during bag changeout/loading of the Sellite (sodium sulfate/sodium bisulfite) bags into the hoppers for conveyance into the washers in the TNT area. PM emissions estimates for the Sellite unloading are documented in Attachment 4.

Dust generated in the TNT Production and Packaging Buildings will be captured by the TNT scrubbers which exhaust through HEPA filters.

3.0 Acid Recovery Unit (ARU)

The operations in the Acid Recovery Unit have potential to generate emissions of mononitrotoluene and dinitrotoluene (MNT/DNT), which are conservatively assumed to be 100% DNT, as it is a hazardous air pollutant (HAP). The ARU will also generate emissions of NO and NO2 (NO_X). Uncontrolled emission estimated for these pollutants are based on proprietary modeling performed by the technology provider, as are the respective control efficiencies in the NO_X Absorber. These process vents are routed through the NO_X Absorber and TO. Additional control of the MNT/DNT (expressed as 100% DNT) will be achieved in the TO. The overall estimated DNT control efficiency (99.96%) is expressed as the combined efficiency of the NO_X Absorber and the TO.

Emissions from combustion of natural gas in the TO (including greenhouse gases (GHG)) are estimated based on US EPA AP-42 and 40 CFR 98 Tables C-1, C-2, and C-3 and are included as Attachment 5.

Emissions from the Solvent Extraction Unit in the ARU consist of short, infrequent emissions of toluene when pressure is relieved. The average uncontrolled emissions of 0.48 lb/hr of toluene were provided by the equipment technology provider based on proprietary process modelling and a schedule of operating scenarios under which emissions may occur.

4.0 Thermal Destruction Unit (TDU)

Regulated emissions from the TDU include:

- Particulate Matter (PM)
- Hydrogen Chloride/Chlorine Gas (HCl/Cl2)
- Dioxins/Furans
- Low Volatile Metals (LVM, sum of As, Be, and Cr)
- Semi-Volatile Metals (SVM, sum of Cd and Pb)
- Mercury (Hg)
- NO_X
- Sulfur Dioxide/Sulfur Trioxide (SO2/SO3)
- Carbon Monoxide (CO)
- Total Hydrocarbons (THC)

Uncontrolled PM emissions are estimated based on the DSI feedrate to the baghouse inlet. Controlled emissions are based on the vendor performance guarantee of 50% of the 40 CFR 63 Subpart EEE HWC MACT emission limit.

Controlled HCl/Cl2 emissions are based on the vendor performance guarantee of 50% of the 40 CFR 63 Subpart EEE HWC MACT emission limit. Uncontrolled HCl/Cl2 emissions are based on the estimated removal efficiency of 90% for the DSI system.

Uncontrolled Dioxin/Furan emissions are based on the vendor performance guarantee of 50% of the 40 CFR 63 Subpart EEE HWC MACT emission limit. No control efficiency is assumed.

Uncontrolled LVM emissions are estimated based on the specified concentration of LVM in the Red Water waste and the waste feedrate. Controlled emissions are based on the vendor performance guarantee of 50% of the 40 CFR 63 Subpart EEE HWC MACT emission limit.

Uncontrolled SVM emissions are estimated based on the specified concentration of LVM in the Red Water waste and the waste feedrate. Controlled emissions are based on the vendor performance guarantee of 50% of the 40 CFR 63 Subpart EEE HWC MACT emission limit.

Uncontrolled Hg emissions are estimated based on the specified concentration of LVM in the Red Water waste and the waste feedrate. Controlled emissions are based on the vendor performance guarantee of 50% of the 40 CFR 63 Subpart EEE HWC MACT emission limit.

Uncontrolled NO_X emissions are based on the equipment vendor's proprietary model of NO_X at the SCR inlet. Controlled NO_X emissions are based on the equipment vendor's expected 90% NO_X removal in the SCR.

Uncontrolled SO2/SO3 emissions are based on the equipment vendor's proprietary model of SO2/SO3 at the combustion chamber outlet. Controlled SO2/SO3 emissions are based on the equipment vendor's expected 90% SO2/SO3 removal by the DSI system.

Uncontrolled (and controlled) CO emissions are conservatively based on the US EPA AP-42 for natural gas combustion, as that value is between 50% and 100% of the 40 CFR 63 Subpart EEE HWC MACT emission limit.

Uncontrolled (and controlled) THC emissions are based on the vendor performance guarantee of 50% of the 40 CFR 63 Subpart EEE HWC MACT emission limit.

Carbon Dioxide (CO_2) emissions are based on the vendor's proprietary combustion model and include CO_2 from combustion of both natural gas and the organic components of Red Water waste.

Ammonia emissions are based on the vendors guarantee for maximum ammonia slip from the SCR.

Emissions estimates are documented in Attachment 6

5.0 Utilities

Utilities include:

1. Boiler
2. Diesel Firewater Pump
3. Two Emergency Generators
4. Two Cooling Towers

Emissions estimates for site utilities are based on US EPA AP-42 and vendor-provided emission factors and are documented in Attachment 7.

6.0 Haul Roads

All of the site roads will be paved as part of the TNT project. Emission estimates are based on US EPA AP-42 and are documented in Attachment 8. The facility roads are more representative of public roads than the examples given in AP-42 for "industrial facilities", which tend to be material processing facilities with high levels of product spillage, unlike the Dyno Nobel facility which manufactures explosives. Therefore, typical values for the variables for public roads were used in the emission factor calculations.

7.0 Fugitive Equipment Leaks

Leaks of Toluene from equipment in toluene service are estimated using EPA-453/R-95-017, Protocol for Equipment Leak Emission Estimates, November 1995. These estimates are documented in Attachment 9.

Attachment 1

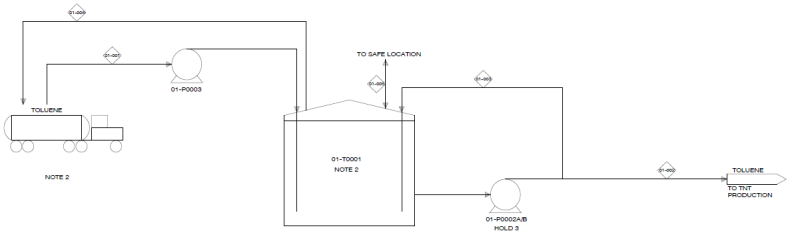
Toluene Storage Tank Calculations

Appendix A-0
Toluene Tank 01-T0001
P&ID P164-TNT-KB-PR-DWG-PCD-01-0020 REV C
Emissions Basis Calculations

Objective: **Determine the yearly emission rate of the toluene tank 01-T0001 stored in a vertical fixed roof cylindrical tank located in Graham, KY.**

Emissions Calculation Basis

1 Toluene tank receives toluene from toluene unloading pump. Tank also outbreaths back to the truck. Tank is equipped with a conservation vent with an assumed set pressure of (+/-) 0.03 psia. The content of the toluene is pumped to TNT production.



2 The tank contains greater than 99.5 (wt%) of toluene.

Description	Units	Value
Toluene Composition (or ONT)		
Toluene (or ONT)	% wt	>99.50
Others	% wt	Nil

3 Toluene tank specifications are the following: Tank shape = cylinder; Tank bottom type = flat; Roof type = cone
Tank and shell characteristics = color white and condition new
Tank is not insulated. Tank cone roof slope = 0.062 ft/ft (Used AP-42 assumption)
Diameter = 5.48m (18ft); Height = 5.545m (18.19ft); Tank max liquid level = 4.495m (14.75ft);
Tank min liquid level = 0.495m (1.624ft); Tank normal operating level 4.195m (13.76ft)

4 Tank is operated at about 22 degC (71.6 degF). Ambient temperature is based from location Padukah, KY.
Average daily maximum ambient temperature (Padukah, KY) = 19.89 degC(67.8 degF). Refer to Table 7.1-7.
Average daily minimum maximum ambient temperature (Padukah, KY) = 8.94 degC(48.1 degF). Refer to Table 7.1-7.

5 Annual tank throughput 0.607 m3/hr (21.44 ft/h3, added 15% margin) which is equivalent to 5,317.32 m3/yr (187,780 ft3/yr = 1,404,687 gal/yr).

6 Tank is not equipped with a control device. However, tank vents back to the truck which helps reduce emissions to the atmosphere.

7 US EPA document AP-42 "Compilation of Air Pollutant Emission Factors" is the reference standard used in estimating emissions from the toluene tank. Refer to Section 7.1.
https://www.epa.gov/system/files/documents/2025-09/c7s1_2025.pdf

8 There are two sources of emissions defined as routine emissions - standing losses and working losses.
Standing losses - This occurs due to daily heating and cooling of the tank vapor space , causing vapor expansion during the day and contraction at night, which results in outbreathing vapor from the tank. The daily heating/cooling of the tank vapor space is due to changes in ambient air through the shell and roof of the tank.
Working losses - This is the evaporative loss from filling. This is due to the increase in the liquid level in the tank. As the liquid level increases, the pressure of the vapor space in the tank increases which leads to outbreathing vapor through the vent.

Any outbreathing due to filling from the toluene unloading pump is directed back to the truck. The other feed is from the solvent extraction.
Thus, the basis for the working loss is due to feed from solvent extraction only.
Total emission loss is the working loss due to fill rate from solvent extraction plus the standing loss due to ambient temperature changes.

9 There are no margin added to the calculation basis.

Emissions Calculation Procedure

1 Method 1 is by manual calculation following US EPA document AP-42 guidance. Refer to Appendix A-1.

2 Method 2 is by using EPA tank estimating tool "TANKS 5.2" following US EPA document AP-42 guidance. Refer to Appendix A-1a.
Emissions Estimation Tools | US EPA
Input the following to the estimation tool: Meteorological location; tank characteristics; shell characteristics; roof characteristics; breather vent settings; and control device if it does exists.
Run the calculation.

Results

Total Emissions

	Method 1: Manual Calculations Mass rate, kg/yr	Method 2: US EPA Estimation Tool TANKS 5.2 Mass rate, kg/yr
Standing Losses, Ls	**43.90**	**39.27**
Working Losses, Lw	**8.82**	**9.23**
Total Losses, Lt	**52.72**	**48.50**

Appendix A-1
Toluene Tank 01-T0001
P&ID P164-TNT-KB-PR-DWG-PCD-01-0020 REV C
EPA AP-42 Emissions Calculation Results (METHOD 1)

Following AP-42 Chapter 7.1.7, Example 1, 9/2025
https://www.epa.gov/system/files/documents/2025-09/c7s1_2025.pdf

Section 7.1 presents emissions estimating methodologies for storage tanks of various types and operating conditions. The methodologies are intended for storage tanks that are properly maintained and in normal working condition. The methodologies do not address conditions of deteriorated or otherwise damaged materials of construction, nor do they address operating conditions that differ significantly from the scenarios described herein.

Sections 7.1.3.1 and 7.1.3.2 present emissions estimating methodologies for routine emissions from fixed roof tanks and floating roof tanks. Use of the terminology "routine emissions" to refer to standing and working losses applies only for the purposes of this document, and not for any other air quality purposes such as New Source Review (NSR) permitting.

Estimate routine emissions for Tank 01-T0001 assuming 100% Toluene and assumptions as noted below:

$L_T = L_S + L_W$	L_T	Total Loss, lb/yr	(1-1)
$L_S = 365\ V_V W_V K_E K_S$	L_S	Standing Loss, lb/yr	(1-2)
$L_W = V_Q K_N K_P W_V K_B$	L_W	Working Loss, lb/yr	(1-37)
$V_V = PI()/4\ D^2 H_{VO}$	V_V	tank vapor space volume, ft3	(1-3)
$H_{RO} = (1/3)\ S_R\ R_S$	H_{VO}	Roof Outage	(1-19)
$H_{VO} = H_S - H_L + H_{RO}$	H_{VO}	Vapor Space Outage, ft	(1-18)
$W_V = M_V P_{VA}/(RT_V)$	W_V	Vapor Density, lb/ft3	(1-24)
KS = (1+0.053*PVA*HVO)^-1	Ks	vented vapor space saturation facto	(1-23)
KE = dTV/TLA + (dPV-dPB)/(PA-PVA)	KE	vapor space expansion factor	(1-5)

Tank Details

Diameter, D =	18.0	ft	5.48 meters
Shell Height, H_S =	18.2	ft	5.55 meters
Stock Liquid Height, H_L =	13.76	ft	
Stock Liquid Height, H_{LN} =	1.62	ft	
Tank Cone Slope, S_R =	0.0625	ft/ft	Assumed
Tank Shell Radius, R_S =	8.989501	ft	
Roof Outage, H_{RO} =	0.187281	ft	
Vapor Space Outage, H_{VO} =	4.632819	ft	
Tank Vapor Space Volume, V_V =	1176.16	ft3	
Positive Breather Setting	0.03	psig	Assumed
Negative breather setting	-0.03	psig	Assumed
breather vent pressure setting range, = ΔPB	0.06	psia	
KB = vent setting correction factor, dimensionless	1	No correction	

Appendix A-1
Toluene Tank 01-T0001
P&ID P164-TNT-KB-PR-DWG-PCD-01-0020 REV C
EPA AP-42 Emissions Calculation Results (METHOD 1)

Conditions

Atmospheric Pressure, PA =	14.47	psia	(Table 7.1-7, assume Paducah, KY)
average daily maximum ambient temperature, TAX =	67.8	F	(Table 7.1-7, assume Paducah, KY)
	527.47	R	
average daily minimum ambient temperature, TAN =	48.1	F	(Table 7.1-7, assume Paducah, KY)
	507.77	R	
TAA	517.62	R	
dTA	19.7	R	
surface solar absorptance, αS =	0.25	(Table 7.1-6)	White Paint
tank roof surface solar absorptance, αR=	0.25	(Table 7.1-6)	White Paint
average daily total insolation on a horizontal surface, I =	1334	Btu/ft2d	(Table 7.1-7, assume Paducah, KY)
liquid bulk temperature, TB =	518.62	R	
Average daily liquid surface temperature, TLA =	519.60	R	
	15.5	C	
Average Vapor Temperature, TV =	520.6	R	
average daily vapor temperature range, = ΔTV	21.40	R	
TLX	524.9	R	(Figure 7.1-17, TLX=TLA+0.25dTV)
	18.5	C	
	65.3	F	
TLN	514.2	R	(Figure 7.1-17, TLX=TLA+0.25dTV)
	12.5	C	
	54.6	F	
PVX	0.389	psia	
PVN	0.279	psia	
average daily vapor pressure range, = ΔPV	0.110	psia	
Vapor Space Expansion Factor per day, KE	0.044736		
Vented Vapor Space Saturation Factor, KS =	0.924981		

Mixture Details

Ideal Gas Constant, R =	10.731	psia ft3 / (lbmol R)
Stock Vapor Molecular Weight, MV =	92.1	lb/lbmol
stock vapor pressure at the average daily liquid surface temperature TLA, PVA =	0.330	psia
Vapor Density, Wv =	0.0054	lb/cuft
LS =	96.8	lb/yr
VQ = net working loss throughput,	163340	ft3 /yr
∑HQI	643	
Number of turnovers per year, N	53	
KN = working loss turnover factor, dimensionless	0.73	
KP = working loss product factor, dimensionless	1	Non crude oil = 1
LW =	652.0	lb/yr

Appendix A-1
Toluene Tank 01-T0001
P&ID P164-TNT-KB-PR-DWG-PCD-01-0020 REV C
EPA AP-42 Emissions Calculation Results (METHOD 1)

Mass of toluene inside the tank

Normal liquid level	13.76	ft	
Volume of toluene	3494.12	ft3	Max liquid level is stock liquid height, HL
Density of toluene	54.493	lb/ft3	At average daily liquid surface temperature of 15.5 degC
Mass of toluene	190406	lb	

Net working loss throughput	163340	ft3/yr
Net working loss throughput	1221870	gal/year

Equivalent volumetric flow rate of additional feed flow to toluene from solvent extraction

Additional flow rate	330	kg/hr	
Additional flow rate	727.5	lb/hr	
Density of toluene	54.49	lb/ft3	At average daily liquid surface temperature of 15.5 degC
Volumetric flow rate	4873.0	ft3/yr	

Working Loss, lb/yr	19.45	Pro-rated from AP-42 manual calculation

Results:

Working loss, lb/yr	**19.45**
Standing loss, lb/yr	**96.8**

The only working loss considered is based on the toluene feed from solvent extraction. There is no working loss due to fill rate from the truck because the tank vents back to the truck.

Appendix A-1a
Toluene Tank 01-T0001
P&ID P164-TNT-KB-PR-DWG-PCD-01-0020 REV C
EPA AP-42 Emissions Calculation Results from TANKS 5.2 Emission Calculation Tool
METHOD 2

Routine Losses Report for TANKS 5.2

Storage Tank Emissions Calculation Application

Version 5.2

(released December 2025)

U.S. Environmental Protection Agency
Office of Clean Air Programs
Natural Resources Division
Emissions Data and Assessment Branch
Research Triangle Park, NC 27711

Appendix A-1a
Toluene Tank 01-T0001
P&ID P164-TNT-KB-PR-DWG-PCD-01-0020 REV C
EPA AP-42 Emissions Calculation Results from TANKS 5.2 Emission Calculation Tool
METHOD 2

Report Contents

Accumulated Annual Routine Losses for All Tanks 3

For each tank and all tanks combined:

- Standing Losses
- Rim Seal Losses
- Deck Seam Losses
- Deck Fitting Losses
- Working Losses
- Total Routine Losses

For each tank:

- Tank Characteristics and Meteorological Location by Tank
- Tank Contents by Tank
- Tank Calculations by Tank
  - Fixed Roof Tanks
- Routine Losses by Tank

Accumulated Annual Routine Losses for All Tanks

Tank ID	Standing Losses	Working Losses	Total Losses
Toluene Tank	86.5645	682.1239	768.6884
Total	**86.5645**	**682.1239**	**768.6884**

Appendix A-1a
Toluene Tank 01-T0001
P&ID P164-TNT-KB-PR-DWG-PCD-01-0020 REV C
EPA AP-42 Emissions Calculation Results from TANKS 5.2 Emission Calculation Tool
METHOD 2

Tank Characteristics and Meteorological Location by Tank

Identification

Tank ID	Toluene Tank
Tank Type	Vertical Fixed Roof Tank
Tank Description	–
City	Paducah
State	KY
Company	–
Meteorological Location	Paducah, KY

Tank Characteristics

Tank Shape	Cylinder
Shell Diameter (ft)	18
Maximum Liquid Height (ft)	14.750
Average Liquid Height (ft)	13.760
Tank Bottom Type	flat
Liquid Heel Type at Tank Minimum (ft)	full
Minimum Liquid Heel Height (ft)	1.624
Vapor Space Pressure at Normal Operating Conditions (psig)	0
Is Tank Insulated?	Not Insulated
Liquid Bulk Temperature Calculation Method	AP-42 Calculation

Shell Characteristics

Shell Color/Shade	White
Shell Condition	New

Roof Characteristics

Roof Color/Shade	White
Roof Condition	New
Roof Type	Cone
Tank Cone Roof Slope (ft/ft)	0.063

Breather Vent Settings

Vacuum Setting (psig)	-0.030
Pressure Setting (psig)	0.030

Control Device Settings

Is Tank Equipped with a Control Device?	No Control Device

Tank Contents by Tank

Tank Contents Input Summary

Tank ID	Toluene Tank
Input Type	Annual
Chemical Category of Liquid	Organic Liquids
Sum of Increases in Liquid Level Method	AP-42 Calculation
Working Loss Turnover Factor Method	AP-42 Calculation

Annual Contents

Chemical Name	Throughput (gal/yr)
Toluene	1221870

Appendix A-1a
Toluene Tank 01-T0001
P&ID P164-TNT-KB-PR-DWG-PCD-01-0020 REV C
EPA AP-42 Emissions Calculation Results from TANKS 5.2 Emission Calculation Tool
METHOD 2

Tank Calculations by Tank -- Fixed Roof

Tank ID: Toluene Tank

Annual Calculations

Chemical: Toluene

Annual Vapor Space Volume (cu ft)	1,177.5553
Annual Avg. Vented Vapor Saturation Factor	0.0713
Vapor Space Outage (ft)	4.6275
Avg. Liquid Height (ft)	13.7600
Roof Outage (ft)	0.1875
Tank Cone Roof Slope (ft/ft)	0.0625
Shell Radius (ft)	9
Annual Stock Vapor Density (lb/cu ft)	0.0004
Annual Avg. Vapor Molecular Weight (lb/lb-mole)	7.0877
Annual Avg. Vapor Pressure at Avg. Liquid Surface Temp. (psia)	0.0249
Annual Avg. Liquid Surface Temp. (°R)	39.9204
Annual Avg. Ambient Temp. (°R)	39.8169
Annual Avg. Liquid Bulk Temp. (°R)	518.3003
Tank Paint Solar Absorptance (Shell)	0.1700
Tank Paint Solar Absorptance (Roof)	0.1700
Annual Avg. Vapor Space Expansion Factor	0.0031
Annual Vapor Temp. Range (°R)	1.5103
Annual Vapor Pressure Range (psia)	0.0076
Breather Vent Pressure Setting Range (psia)	0.0600
Annual Avg. Vapor Pressure at Min Liquid Surface Temp. (psia)	0.0213
Annual Avg. Vapor Pressure at Max Liquid Surface Temp. (psia)	0.0290
Annual Avg. Min. Liquid Surface Temp. (°R)	39.5428
Annual Avg. Max. Liquid Surface Temp. (°R)	40.2979
Annual Avg. Ambient Temp. Range (°R)	1.5154
Annual Throughput (gal)	1221870
Annual Turnovers	48.8968
Annual Sum of Increases in Liquid Level (ft/yr)	641.8200
Working Loss Turnover Factor	0.7802
Working Loss Product Factor	1

Routine Losses by Tank

Tank ID: Toluene Tank

Annual Routine Losses

Chemical	Standing Losses	Working Losses	Total Losses
Toluene	86.5645	682.1239	768.6884

Working loss, lb/yr	682.1239	
Standing loss, lb/y3	86.5645	

Equivalent volumetric flow rate of additional feed flow to toluene from solvent extraction

Additional flow rate, kg/hr			330	
Additional flow rate, lb/hr			727.52	
Density of toluene, lb/ft3			54.49	At average daily liquid surface temperature of 15.5 degC
Volumetric flow rate, ft3/yr			4873.0	

Net working loss throughput, ft3/yr	163340	
Net working loss throughput, gal/yr	1221870	
Working loss (based on 330 kg/hr), lb/yr	20.35	Pro-rated from results using US EPA estimation tool

Results:

Working loss, lb/yr			**20.35**	
Standing loss, lb/yr			**86.56**	

The only working loss considered is based on the toluene feed from solvent extraction. There is no working loss due to fill rate from the truck because the tank vents back to the truck.

Routine Losses Report for TANKS 5.2

Storage Tank Emissions Calculation Application

Version 5.2

(released December 2025)

U.S. Environmental Protection Agency
Office of Clean Air Programs
Natural Resources Division
Emissions Data and Assessment Branch
Research Triangle Park, NC 27711

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Accumulated Annual Routine Losses for All Tanks 3
Accumulated Monthly Routine Losses for All Tanks 4

For each tank and all tanks combined:

- Standing Losses
- Rim Seal Losses
- Deck Seam Losses
- Deck Fitting Losses
- Working Losses
- Total Routine Losses

For each tank:

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- Tank Contents by Tank
- Tank Calculations by Tank
  - Fixed Roof Tanks
- Routine Losses by Tank

Accumulated Annual Routine Losses for All Tanks

Tank ID	Standing Losses	Working Losses	Total Losses
RMH-10	0.0781	0.0013	0.0794
Total	**0.0781**	**0.0013**	**0.0794**

Accumulated Monthly Routine Losses for All Tanks

Standing Losses

Tank ID	Chemical	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
RMH-10	No. 2 Fuel Oil (Diesel)	0.0019	0.0024	0.0042	0.0063	0.0085	0.0105	0.0116	0.0118	0.0092	0.0064	0.0034	0.0020	0.0781

Working Losses

Tank ID	Chemical	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
RMH-10	No. 2 Fuel Oil (Diesel)	0.0000	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0013

Total Losses

Tank ID	Chemical	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
RMH-10	No. 2 Fuel Oil (Diesel)	0.0020	0.0024	0.0043	0.0064	0.0086	0.0106	0.0118	0.0120	0.0093	0.0065	0.0034	0.0021	0.0794

Tank Characteristics and Meteorological Location by Tank

Identification

Tank ID	RMH-10
Tank Type	Horizontal Fixed Roof Tank
Tank Description	Diesel Tank
City	Graham
State	Kentucky
Company	--
Meteorological Location	Paducah, KY

Tank Characteristics

Shell Length (ft)	6.250
Shell Diameter (ft)	4
Maximum Liquid Height (ft)	3.800
Minimum Liquid Height (ft)	1
Vapor Space Pressure at Normal Operating Conditions (psig)	0
Is Tank Insulated or Underground?	Not Insulated and Not Underground
Liquid Bulk Temperature Calculation Method	AP-42 Calculation

Shell Characteristics

Shell Color/Shade	White
Shell Condition	New

Breather Vent Settings

Vacuum Setting (psig)	-0.030
Pressure Setting (psig)	0.030

Control Device Settings

Is Tank Equipped with a Control Device?	No Control Device

Tank Contents by Tank

Tank Contents Input Summary

Tank ID	RMH-10
Input Type	Annual
Chemical Category of Liquid	Petroleum Liquids
Sum of Increases in Liquid Level Method	AP-42 Calculation
Working Loss Turnover Factor Method	AP-42 Calculation

Annual Contents

Chemical Name	Throughput (gal/yr)
No. 2 Fuel Oil (Diesel)	60

Tank Calculations by Tank -- Fixed Roof

Tank ID: RMH-10

Annual Calculations

Chemical: No. 2 Fuel Oil (Diesel)

Annual Vapor Space Volume (cu ft)	39.2699
Annual Avg. Vented Vapor Saturation Factor	0.9994
Vapor Space Outage (ft)	1.5708
Shell Radius (ft)	2
Annual Stock Vapor Density (lb/cu ft)	0.0002
Annual Avg. Vapor Molecular Weight (lb/lb-mole)	130
Annual Avg. Vapor Pressure at Avg. Liquid Surface Temp. (psia)	0.0072
Annual Avg. Liquid Surface Temp. (°R)	519.1620
Annual Avg. Ambient Temp. (°R)	517.6200
Annual Avg. Liquid Bulk Temp. (°R)	497.9536
Tank Paint Solar Absorptance (Shell)	0.1700
Annual Avg. Vapor Space Expansion Factor	0.0313
Annual Vapor Temp. Range (°R)	18.3720
Annual Vapor Pressure Range (psia)	0.0022
Breather Vent Pressure Setting Range (psia)	0.0600
Annual Avg. Vapor Pressure at Min Liquid Surface Temp. (psia)	0.0061
Annual Avg. Vapor Pressure at Max Liquid Surface Temp. (psia)	0.0084
Annual Avg. Min. Liquid Surface Temp. (°R)	514.5690
Annual Avg. Max. Liquid Surface Temp. (°R)	523.7550
Annual Avg. Ambient Temp. Range (°R)	19.7667
Annual Throughput (gal)	60
Annual Turnovers	0.0095
Annual Sum of Increases in Liquid Level (ft/yr)	0.3208
Working Loss Turnover Factor	1
Working Loss Product Factor	1

Tank ID: RMH-10

Monthly Calculations

Chemical: No. 2 Fuel Oil (Diesel)

Calculation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Vented Vapor Saturation Factor	0.9998	0.9997	0.9996	0.9995	0.9993	0.9990	0.9989	0.9990	0.9992	0.9995	0.9996	0.9997
Stock Vapor Density (lb/cu ft)	0.0001	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0003	0.0002	0.0002	0.0001	0.0001
Vapor Molecular Weight (lb/lb-mole)	130	130	130	130	130	130	130	130	130	130	130	130
Vapor Pressure at Avg. Liquid Surface Temp. (psia)	0.0028	0.0033	0.0046	0.0065	0.0088	0.0115	0.0126	0.0121	0.0094	0.0066	0.0044	0.0031
Avg. Liquid Surface Temp. (°R)	495.7983	500.2523	509.3849	519.9277	529.1239	537.5517	540.7178	539.3525	531.2471	520.0159	508.2593	498.3127
Avg. Ambient Temp. (°R)	495.0700	499.2200	507.9700	518.0700	527.0200	535.2200	538.3700	537.1700	529.5200	518.7200	507.4200	497.6700
Vapor Space Expansion Factor	0.0228	0.0270	0.0316	0.0351	0.0346	0.0345	0.0337	0.0358	0.0363	0.0344	0.0271	0.0222
Vapor Temp. Range (°R)	13.3420	15.5662	18.1616	20.3038	20.3980	20.6478	20.3454	21.3992	21.3896	19.9814	15.8384	13.0904
Vapor Pressure Range (psia)	0.0007	0.0009	0.0014	0.0022	0.0029	0.0037	0.0039	0.0040	0.0032	0.0022	0.0012	0.0007
Vapor Pressure at Min Liquid Surface Temp. (psia)	0.0025	0.0029	0.0039	0.0055	0.0075	0.0098	0.0108	0.0103	0.0079	0.0056	0.0038	0.0028
Vapor Pressure at Max Liquid Surface Temp. (psia)	0.0032	0.0038	0.0054	0.0077	0.0103	0.0134	0.0147	0.0142	0.0111	0.0077	0.0051	0.0035
Min. Liquid Surface Temp. (°R)	492.4628	496.3608	504.8445	514.8517	524.0244	532.3897	535.6315	534.0027	525.8997	515.0205	504.2997	495.0401
Max. Liquid Surface Temp. (°R)	499.1338	504.1439	513.9253	525.0036	534.2234	542.7136	545.8042	544.7023	536.5945	525.0112	512.2189	501.5853
Ambient Temp. Range (°R)	16	17.9000	20	21.2000	20.3000	19.7000	19.2000	21.4000	23.3000	23.1000	19.1000	16
Throughput (gal/mo)	5	5	5	5	5	5	5	5	5	5	5	5
Sum of Increases in Liquid Level (ft/mo)	0.0267	0.0267	0.0267	0.0267	0.0267	0.0267	0.0267	0.0267	0.0267	0.0267	0.0267	0.0267
Working Loss Product Factor	1	1	1	1	1	1	1	1	1	1	1	1

Supplemental Non-Monthly Data

Vapor Space Volume (cu ft)	39.2699
Effective Diameter (ft)	5.6419
Vapor Space Outage (ft)	1.5708
Liquid Bulk Temp. (°R)	497.9536
Tank Paint Solar Absorptance (Shell)	0.1700
Breather Vent Pressure Setting Range (psia)	0.0600
Turnovers	0.0095
Working Loss Turnover Factor	1

Routine Losses by Tank

Tank ID: RMH-10

Annual Routine Losses

Chemical	Standing Losses	Working Losses	Total Losses
No. 2 Fuel Oil (Diesel)	0.0781	0.0013	0.0794

Tank ID: RMH-10

Monthly Routine Losses

Chemical: No. 2 Fuel Oil (Diesel)

Loss Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Standing Losses	0.0019	0.0024	0.0042	0.0063	0.0085	0.0105	0.0116	0.0118	0.0092	0.0064	0.0034	0.0020
Working Losses	0.0000	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001
Total Losses	0.0020	0.0024	0.0043	0.0064	0.0086	0.0106	0.0118	0.0120	0.0093	0.0065	0.0034	0.0021

Attachment 2

Acid Storage Tanks Calculations

Annual Emissions from Nitric Acid Tanks

The general calculation procedure for emission mass rates from the nitric acid tanks is below:

- Initial vapor mol fractions calculated based on activity coefficients and vapor pressures based on Aspen simulation. Vapor pressures at 30°C were used to provide for a worst case.
- HNO2 in the Spent Acid converted to HNO3, NO, and H2O per the following:
    - $3HNO_2(aq) = HNO_3(aq) + 2NO(g) + H_2O(l)$
- Annual displaced volume was calculated based on tank filling and average thermal venting rate.
- Gibbs Free Energy minimization was used to predict HNO3-NO-NO2 equilibrium
    - Gibbs equilibrium heavily favors NO2 and HNO3
- Based on Gibbs output, final mass emissions calculated based on vent volume at STP.

Details on Annual Displaced Volume Calculation

The maximum thermal outbreathing rate was calculated based on API-2000. The outbreathing hours per year were estimated based on the area of a sinusoidal curve representing the day-night cycle. Thermal outbreathing emissions occur during the daytime while inbreathing occurs during the nighttime, so only the daytime hours are included in calculating annual outbreathing volume.

The plant is assumed to operate 24-7 and thus there are 8,760 total operating hours. The annualized outflow volume from the tank is equal to the annualized inflow volume. The tank outflow rate (or usage rate by the process) in cubic meters per hour is calculated by taking the annualized outflow volume in cubic meters and dividing by 8,760 hours. The annual filling hours are calculated by taking the annual tank inflow volume divided by the sum of the tank fill and tank outflow rates. The annual volume displacement due to tank filling is thus calculated by multiplying the tank fill rate by the filling hours. The total annual vent volume used for calculating emissions becomes the sum of the displacement from filling and the thermal outbreathing. Example volume calculation shown below for the 98% HNO3 Tank.

	98% HNO3 02-T0030
Tank Volume, m3	167.9
Liquid Fill Rate, m3/h	42.30
Thermal Vent Rate m3/h	32.19
Annual Liquid Input, m3	9,093
Annual Liquid Output, m3	9,093
Liquid Usage Rate, m3/h	1.038
Annual Usage Hours	8,760
Annual Fillling Hours	210
Annual Displacement, m3	8,875
Annual Thermal Venting, m3	89,753
Annual Volume, m3	98,628

Annual Emissions from Oleum Tank and Oleum Blending

The emissions from the oleum tank were calculated via a similar procedure as the nitric acid tanks. Vapor pressure data for SO3 was used to estimate the mol fraction of SO3 in the displaced volume caused by tank filling and outbreathing.

There is additional SO3 displaced to the scrubber during the blending process. The blending process creates a dilute oleum solution by mixing 67% oleum with sulfuric acid. The 67% oleum is delivered by a truck. During pump-out from the truck to the blending tank, the vapors are vented back to the truck so there is no emission to the scrubber. The annual volume of 67% oleum delivered to the blending tank was calculated by multiplying the annual throughput of dilute oleum by the ratio of concentrations. The annual volume was then expressed as a usage rate by dividing by 8,760 hours per year. The filling hours required are then determined using the fill rate from the sulfuric acid tank. The displaced volume is assumed to be 100% SO3 and is determined by multiplying the sulfuric acid fill rate by the annual filling hours.

	98% Nitric Acid Tank 02-T0030	Weak Nitric Acid Tank 02-T0042	Spent Acid Tank 02-T0020	NA50 Tank 02-T0040	97% SA Tank	Oleum Blending	Oleum Tank
Composition, kg							
HNO3	24,324	916	2,210	2,936	261	0	0
H2SO4	0	0	0.08	0	0.3	0	0
SO3	0	0	0	0	0	7,941	28,748
NO2	3,666	86	5,992	275	0	0	0
H2O	733	792	2,408	1,343	278	0	0
Other organics	0	0	0	0	0	0	0
N2	78,097	31,880	119,242	45,210	152,442	0	88,027
O2	24,351	9,695	33,472	13,775	46,288	0	26,199
NO	0.004	0	0.4	0	0	0	0
Annual Mass, kg	131,172	43,369	163,324	63,539	199,269	7,941	142,974
Annual volume, m3	98,628	37,027	140,719	53,492	177,507	2,599	112,933
Avg Density, kg/m3	1.330	1.171	1.161	1.188	1.123	3.055	1.266
Uncontrolled Emissions, Ton/year							
HNO3	26.8	1.0	2.4	3.2	0.3	0	0
H2SO4	0	0	9E-05	0	3E-04	0	0
SO3	0	0	0	0	0	8.8	32
NO2	4.0	0.1	6.6	0.3	0	0	0
NO	4E-06	0	4E-04	0	0	0	0

Attachment 3

TNM Emissions and NO_X Generated by TNM Combustion Calculations

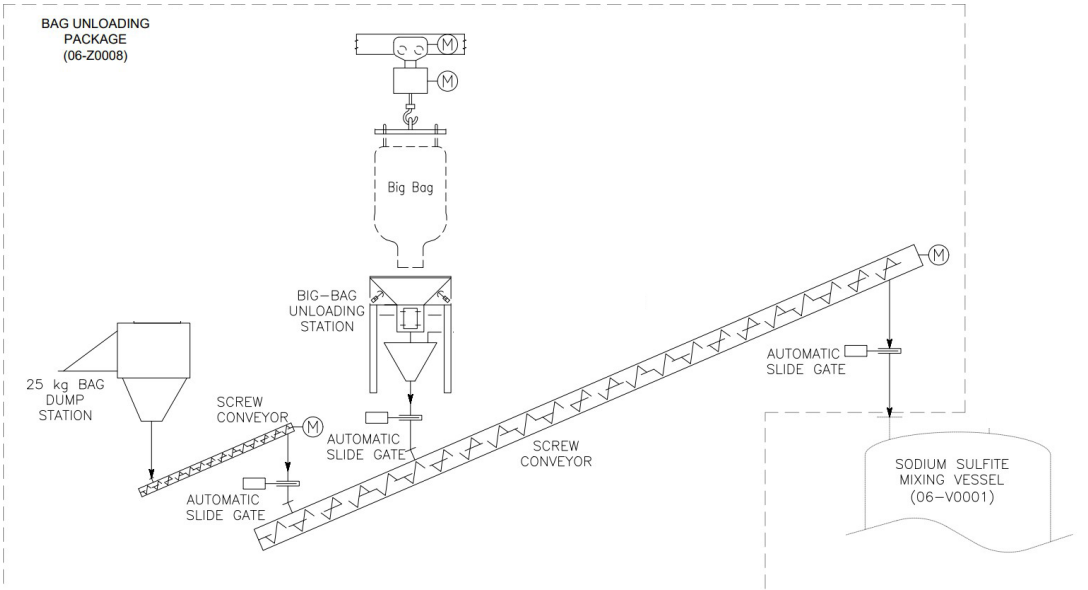
TNM and NOx Generation rates

Range is 0.4-0.5 kg TNM produced / 100 kg TNT produced; use 0.5

0.5	kg TNM produced / 100 kg TNT produced
1,000	kg/hr TNT
5	kg/hr TNM
11.0	lb/hr TNM
43,800	kg/yr TNM
96,579	lb/yr TNM
48.3	tpy TNM uncontrolled
98	% destruction efficiency in TO (assumed)
0.97	tpy TNM controlled
46.3	tpy NOx produced (uncontrolled) by combution TNM in TO

Attachment 4

Sellite Unloading Operations Calculations



The below emission rates are estimated ones.

1) For Sodium Sulfate:

1 ton bag per hour :

Parameter	Typical Value
d10	10–20 µm
d50	40–70 µm
d90	120–180 µm
Top size	200–250 µm

PM2.5 mass fraction in your powder = 0.5% (0.005 kg/kg)

Emisison : 5 kg/hr, 1 batch der day (10 kg/day), 3,300 kg per year

Batch Time for Sodium Sulfate : 2 hours

2) For Sodium Bisulfate:

100 kg per hour : (4-25 kg bag per hour)

Parameter	Typical Value
d10	10–20 µm
d50	40–70 µm
d90	120–180 µm
Top size	200–250 µm

PM2.5 mass fraction in your powder = 0.5% (0.005 kg/kg)

Emisison per batch : 5 g/hr, 1 batch per day = 5 g/day 1.650 kg/year

Attachment 5

TO Combustion Emissions (Acid Recovery Unit) Calculations

Thermal Oxidizer Burner Emission Calculations

Burner Rating:	2.4	MMBtu/hr
Heating Value:	1020	MMBtu/MMscf

	Emission Factor (EF)	EF Unit	Source	Emissions (lb/hr)	Emissions (tons/yr)
NO_X	100	lb/MMscf	AP-42, Table 1.4.2	2.35E-01	1.03E+00
CO	84	lb/MMscf	AP-42, Table 1.4.2	1.98E-01	8.66E-01
Lead	0.0005	lb/MMscf	AP-42, Table 1.4.2	1.18E-06	5.15E-06
PM (F)	1.9	lb/MMscf	AP-42, Table 1.4.2	4.47E-03	1.96E-02
SO_2	0.6	lb/MMscf	AP-42, Table 1.4.2	1.41E-03	6.18E-03
VOC	5.5	lb/MMscf	AP-42, Table 1.4.2	1.29E-02	5.67E-02
Toluene	0.0034	lb/MMscf	AP-42, Table 1.4.2	8.00E-06	3.50E-05
CO_2	53.06	kg/MMBtu	CFR 98 Table C-1	2.81E+02	1.23E+03
N_2O	1.00E-04	kg/MMBtu	CFR 98 Table C-2	5.29E-04	2.32E-03
CH_4	1.00E-03	kg/MMBtu	CFR 98 Table C-2	5.29E-03	2.32E-02

Attachment 6

Thermal Destruction Unit Calculations

TDU Emission Estimates

Particulate Matter		Guarantee	Emission limit		Uncontrolled	Control Efficiency
PM	gr/dscf, 7%O2	0.0008	0.0016	gr/dscf, 7%O2		
	gr/lb	7000	7000	gr/lb		
	% Dry vol	15.95	15.95	% Dry vol		
	dscf/min	7,661	7,661	dscf/min		
	lb/hr	0.019	0.037	lb/hr	229.2	99.99% RE
	lb/ton	2000	2000	lb/ton	2000	
	hr/yr	8760	8760	hr/yr	8760	
	TPY	0.08	0.16	TPY	1004	

Mercury		Guarantee	Emission limit		Uncontrolled	Control Efficiency
Hg	µg/dscm, 7%O2	4.05	8.1	µg/dscm, 7%O2		
	µg/g	1.00E+06	1.00E+06	µg/g		
	g/lb	453.6	453.6	g/lb		
	% Dry vol	15.95	15.95	% Dry vol		
	dscf/min	7,661	7,661	dscf/min		
	dscm/min	217	217	dscm/min		
	lb/hr	0.000041	0.000083	lb/hr	0.000056	26.04% RE
	lb/ton	2000	2000	lb/ton	2000	
	hr/yr	8760	8760	hr/yr	8760	
	TPY	0.00018	0.00036	TPY	0.00025	

Semivolatile Metals		Guarantee	Emission limit		Uncontrolled	Control Efficiency
SVM	µg/dscm, 7%O2	5	10	µg/dscm, 7%O2		
	µg/g	1.00E+06	1.00E+06	µg/g		
	g/lb	453.6	453.6	g/lb		
	% Dry vol	15.95	15.95	% Dry vol		
	dscf/min	7,661	7,661	dscf/min		
	dscm/min	217	217	dscm/min		
	lb/hr	0.000051	0.000102	lb/hr	0.00392	98.70% RE
	lb/ton	2000	2000	lb/ton	2000	
	hr/yr	8760	8760	hr/yr	8760	
	TPY	0.00022	0.00045	TPY	0.01717	

Low volatile Metals		Guarantee	Emission limit		Uncontrolled	Control Efficiency
LVM	µg/dscm, 7%O2	11.5	23	µg/dscm, 7%O2		
	µg/g	1.00E+06	1.00E+06	µg/g		
	g/lb	453.6	453.6	g/lb		
	% Dry vol	15.95	15.95	% Dry vol		
	dscf/min	7,661	7,661	dscf/min		
	dscm/min	217	217	dscm/min		
	lb/hr	0.00012	0.00024	lb/hr	0.01876	99.37% RE
	lb/ton	2000	2000	lb/ton	2000	
	hr/yr	8760	8760	hr/yr	8760	
	TPY	0.00052	0.00103	TPY	0.08217	

Dioxins/Furans		Guarantee	Emission limit		Uncontrolled	Efficiency
D/F	ng/dscm, 7%O2	0.055	0.11	µg/dscm, 7%O2		
	ng/g	1.00E+09	1.00E+09	µg/g		
	g/lb	453.6	453.6	g/lb		
	% Dry vol	15.95	15.95	% Dry vol		
	dscf/min	7,661	7,661	dscf/min		
	dscm/min	217	217	dscm/min		
	lb/hr	5.62E-10	1.12E-09	lb/hr	5.62E-10	0.00% RE
	lb/ton	2000	2000	lb/ton	2000	
	hr/yr	8760	8760	hr/yr	8760	
	TPY	2.46E-09	4.93E-09	TPY	2.46E-09	

Carbon Monoxide		Guarantee	Emission limit		Uncontrolled	Control Efficiency
CO	ppmdv, 7%O2	50	100	µg/dscm, 7%O2		
	dscf/min	7,661	7,661	dscf/min		
	% Dry vol	15.95	15.95	% Dry vol		
	lb/lbmol	28.01	28.01	lb/lbmol		
	lb/hr	5.95E-01	1.19E+00	lb/hr	0.60	0.00% RE
	lb/ton	2000	2000	lb/ton	2000	
	hr/yr	8760	8760	hr/yr	8760	
	TPY	2.6	5.2	TPY	2.6	

Total Hydrocarbons		Guarantee	Emission limit		Uncontrolled	Control Efficiency
THC	ppmdv, 7%O2	5	10	µg/dscm, 7%O2		
	dscf/min	7,661	7,661	dscf/min		
	% Dry vol	15.95	15.95	% Dry vol		
	lb/lbmol	44.10	44.10	lb/lbmol		
	lb/hr	9.37E-02	1.87E-01	lb/hr	0.094	0.00% RE
	lb/ton	2000	2000	lb/ton	2000	
	hr/yr	8760	8760	hr/yr	8760	
	TPY	0.4	0.8	TPY	0.41	

Hydrogen Chloride/Chlorine		Guarantee	Emission limit		Uncontrolled	Control Efficiency
HCl/Cl2	ppmdv, 7%O2	10.5	21	µg/dscm, 7%O2		
	dscf/min	7,661	7,661	dscf/min		
	% Dry vol	15.95	15.95	% Dry vol		
	lb/lbmol	36.46	36.46	lb/lbmol		
	lb/hr	0.16	3.26E-01	lb/hr	1.63	90.00% RE
	lb/ton	2000	2000	lb/ton	2000	
	hr/yr	8760	8760	hr/yr	8760	
	TPY	0.71	1.4	TPY	7.13	

Ammonia		Guarantee	Uncontrolled	Control Efficiency
NH3	ppmv	10		
	acfm	18,831		
	lb/lbmol	17.03		
	lb/hr	0.27	0.27	
	lb/ton	2000	2000	
	hr/yr	8760	8760	
	TPY	1.19	1.19	

Attachment 7

Utilities Calculations

Boiler Emission Calculations

Heating Value:	1020	MMBtu/MMscf
Burner Rating:	36.3	MMbtu/hr
	0.036	MMscf/hr

	Emission Factor (EF)	EF Unit	Source	Emissions (lb/hr)	Emissions (tons/yr)
NO_x	50	lb/MMscf	AP-42	1.8	7.884
SO_x	0.6	lb/MMscf	AP-42	0.0216	0.095
CO	84	lb/MMscf	AP-42	3.024	13.245
VOC	5.5	lb/MMscf	AP-42	0.198	0.867
PM 2.5	7.6	lb/MMscf	AP-42	0.2736	1.198
CO_2	117	lb/MMbtu	CFR 98 Table C-1	4247.1	18602.298
N_2O	0.00022	lb/MMbtu	CFR 98 Table C-2	0.007986	0.03497868
CH_4	0.0022	lb/MMbtu	CFR 98 Table C-2	0.07986	0.3497868

Firewater Pump

Rating	404	kw
	3412.14	Btu/h per kW
	~1,379,000	Btu/h
Diesel HHV	137000	Btu/gal
Usage	1.38	MMBtu/hr
Usage	10.07	Gal/hr
Usage	0.010	1000 gal/hr
	2000	lb/ton
	500	hr/yr

Firewater Pump	AP=42 lb/1000 gal used	AP-42 lb/MMBtu	Vendor g/kW-hr	g/hr	lb/hr	ton/hr	Ton/yr	Source
PM			0.09	36.36	0.080	0.000040	0.020	Vendor data sheet
PM10	4.25E+01				0.428	0.00021	0.107	US EPA AP-42
PM2.5	4.25E+01				0.428	0.00021	0.107	US EPA AP-42
NOx			3.48	1405.92	3.10	0.0015	0.775	Vendor data sheet
SO2	3.97E+01				0.400	0.00020	0.100	US EPA AP-42
VOC			0.1	40.4	0.089	0.000045	0.022	Vendor data sheet
CO			0.46	185.84	0.41	0.00020	0.102	Vendor data sheet
CO2		163.0818	-		225	0.11	56.2	US EPA AP-42
N2O		1.32E-03	-		0.0018	0.00000091	0.00046	US EPA AP-42
CH4		6.62E-03	-		0.0091	0.0000046	0.0023	US EPA AP-42
benzene		9.33E-04			0.0013	0.00000064	0.00032	US EPA AP-42
toluene		4.09E-04			0.00056	0.00000028	0.00014	US EPA AP-42
xylene		2.85E-04			0.00039	0.00000020	0.00010	US EPA AP-42

Emergency Generators

Natural Gas	427	lb/hr	1475	BHP	**FROM GENERAC STATEMENT OF EXHAUST EMISSIONS**
	22,271	Btu/lb	1020	BTU/scf	
	9,509,607.0	Btu/hr	0.0458	lb/scf	
	9.51	MM Btu/hr			

Emergency Generators	AP-42 lb/MM Btu	Vendor g/BHP-hr	g/hr	lb/hr	ton/hr	ton/yr	Source
PM	9.50E-03			0.0903	4.52E-05	2.26E-02	US EPA AP-42
PM10	9.50E-03			0.0903	4.52E-05	2.26E-02	US EPA AP-42
PM2.5	9.50E-03			0.0903	4.52E-05	2.26E-02	US EPA AP-42
NOx (90-105% load)		0.03	44.3	0.0976	4.88E-05	2.44E-02	Vendor data sheet
SO2	5.88E-04			0.00559	2.80E-06	1.40E-03	US EPA AP-42
VOC		0	0	0	0	0	Vendor data sheet
CO (90-105% load)		0.64	944	2.08	1.04E-03	5.20E-01	Vendor data sheet
CO2	1.17E+02			1113	5.56E-01	2.78E+02	US EPA AP-42
N2O	2.21E-04			0.0021	1.05E-06	5.24E-04	US EPA AP-42
CH4	2.21E-03			0.021	1.05E-05	5.24E-03	US EPA AP-42
formaldehyde	2.05E-02			0.195	9.75E-05	4.87E-02	US EPA AP-42

COOLING TOWERS

	4.403	gpm / m3/hr	4.403 gpm / m3/hr
	768.3	m3/hr	133.9 m3/hr
	3383	gpm	590 gpm
	0.038		0.00670
	0.169		0.0295
\			
	86.2	kg/yr	15.0 kg/yr
	190.0	lb/yr	33.1 lb/yr
	0.022	lb/hr	0.0038 lb/hr
	0.095	tpy	0.017 tpy

Cooling Water Tower Emissions (20-ZCT0001A/B and 21-ZCT0001A/B)
P&ID P164-TNT-KB-PR-DWG-PCD-20-0208 REV C,
P&ID P164-TNT-KB-PR-DWG-PCD-21-0226 REV C
Emissions Basis Calculations

Objective: **Calculate emissions from cooling towers**

Emissions Calculation Basis

1 Unit Description
This facility has 2 cooling water systems (20-ZCT0001A/B and 21-ZCT0001A/B) used to provide cooling needs of the facility. These are both open circulating cooling water systems. The heated water circulates back to the basin where it is cooled through direct contact between warm circulating water and ambient air, resulting in evaporative heat removal. The cooled cooling water is then pumped back to the users.
Each cooling water system is equipped with 2 cooling water towers, cooling water pumps, heat exchangers, chemical treatment packages, and high efficiency eliminators

2 Cooling water specifications
Cooling water type - Industrial induced draft; Countercurrent
Drift eliminators - High efficiency
Note that vendor information is not available at this time.

3 Cooling water operating conditions

	CW System 1	CW System 2
Supply Temp, degC	30	30
Return Temp, degC	35.3	40.8
Design recirculation rate, m3/hr	768.3	133.9

4 Air emissions calculation source is from total dissolved solids (TDS) from cooling tower water drifts

Particulate Matter (PM, PM10, PM2.5) - this is the total dissolved solids (TDS) in the cooling water that are emitted as drift droplets. Drift is the loss of liquid water droplets in the exhaust air stream.

TDS in makeup water is based from city water conductivity of 399 µS/cm.
TDS = 255 mg/L

Drift rate factor 0.00005 Per KBR standard

	CW System 1	CW System 2
Drift rate, m3/hr	0.0384	0.0067
Drift rate, gpm	0.1691	0.0295
TDS, mg/L	255.36	255.36
PM (kg/yr)	86.17	15.02

Other sources of air emissions:
Volatile Organic Compounds (VOCs) - This is assumed insignificant and therefore not studied at this time.
Hazardous Air Pollutants (HAPs) - This assumes no regulated substances present in the cooling water.

Attachment 8

Haul Roads Calculations

PM Emissions from Paved Roads

Eext = k (sL/2)0.65 (W/3)1.5 (1-P/4N)

PM 2.5		
E	0.44	g/VKT
k	1.1	g/VKT PM 2.5
sL	0.4	g/m2
W	3.42	metric tonnes average vehicle weight
P	110	no of wet days
N	365	total no of days
	507.2	Vehicle miles/day
	185,128	Vehicle miles/yr
VKT	297,871	Vehicle km/yr
PM 2.5	129,660	g PM 2.5/yr
	129.7	kg PM 2.5/yr
	286	lb PM 2.5/yr
	0.14	TPY PM 2.5

PM 10		
E	1.8	g/VKT
k	4.6	g/VKT PM 10
sL	0.4	g/m2
W	3.42	metric tonnes average vehicle weight
P	110	no of wet days
N	365	total no of days
	507.2	Vehicle miles/day
	185,128	Vehicle miles/yr
VKT	297,871	Vehicle km/yr
PM 10	542,213	g PM 10/yr
	542.2	kg PM 10/yr
	1196	lb PM 10/yr
	0.60	TPY PM 10

PM		
E	9.5	g/VKT
k	24	g/VKT PM
sL	0.4	g/m2
W	3.42	metric tonnes average vehicle weight
P	110	no of wet days
N	365	total no of days
	507.2	Vehicle miles/day
	185,128	Vehicle miles/yr
VKT	297,871	Vehicle km/yr
PM	2,828,936	g PM /yr
	2828.9	kg PM /yr
	6238	lb PM /yr
	3.1	TPY PM

3	tons per pickup truck
210	pickup trucks
95%	of total vehicles
20	tons / tractor trailer
10	tractor trailers
5%	of total vehicles
220	Total vehicles
3.8	Tons average vehicle weight
2000	lb/ton
7545	lb per vehicle
2.205	lb/kg
3422	kg/vehicle

Attachment 9

Fugitive Equipment Leaks Calculations

Equipment	TNT Area	ARU Area	Tanks / Raw Mat'l Handling	Total Count	Emission Factor	Emission Factor	Emission Rate	Emission Rate	Emission Rate
	# points	# points	# points		kg/hr/source	lb/hr/source	lb/hr	lb/yr	ton/yr
Valves	3	5	50	58	0.0040	0.0089	0.52	4514.88	2.3
Pumps		1	3	4	0.0199	0.0439	0.18	1537.54	0.8
Connectors	15	21	75	111	0.0018	0.0040	0.45	3923.62	2.0
Open ended Lines			2	2	0.0017	0.0037	0.01	65.67	0.03
PRVs		3	1	4	0.1040	0.2293	0.16	1381.88	0.7
Sampling Systems			2	2	0.0150	0.0331	0.07	579.47	0.3
				Total					**6.0**

Sitewide Total Toluene Emissions	**TPY**	
Toluene Tank	0.1	
Equip Leaks	6.0	
Solvent extraction vent	2.1	
Fire Pump	0.0001	(diesel combustion)
ARU	0.000035	(NG combustion from TO)
	8.18	TPY sitewide

Appendix 5

Equipment Information and Specifications

	Quotation Number	Product Manager	FOB
SLY A Division Of CPEG	612166-PH1	Dwayne Sanders 440-274-0143	Shipping Point
	Expiration	**Sales Representative**	**Payment Terms**
	Budgetary	Ed McAdoo 610-209-3041	30/30/40
8300 Dow Circle, Suite 600, Strongsville, OH 44136 **www.slyinc.com dsanders@slyinc.com**			

March x, 2026

Edward Czerwinski
KBR | Manager, Procurement and Materials
Integrated Solutions Americas
242 Chapman Road | Newark, DE 19702 I USA
Office: +1 302.452.9030
edward.czerwinski@kbr.com

Subject: Sly 612166-PH1 Venturi Scrubbers and Packed Towers for control of particulate emissions from TNT production operations

Dear Edward,

Thank you for your interest in Sly products. We are pleased to present our proposal in accordance with the attached terms and conditions.

SCRUBBER DESIGN CONDITIONS: (TO BE CONFIRMED BY CUSTOMER)

Scrubber:	**Dryer**	**Flaker**	**Packaging**	**Dryer + Flaker**
Venturi Model:	No. 1	No. 0.5	No. 1	No. 3
Packed Tower Model:	42-36	30-36	36-36	48-36
Inlet Gas Flow Rate:	5333 m3/hr (3139 acfm)	2875 m3/hr (1692 acfm)	4250 m3/hr (2501 acfm)	8203 m3/hr (4828 acfm)
Inlet Temperature:	100C (212F)	20C (68F)	20C (68F)	67C (153F)
Inlet Humidity:	30 kg/hr (66 lb/hr)	10 kg/hr (22 lb/hr)	10 kg/hr (22 lb/hr)	40 kg/hr (88 lb/hr)
Inlet Static Pressure:	100.8 kPaa (-2" WC)	100.8 kPaa (-2" WC)	100.8 kPaa (-2" WC)	100.8 kPaa (-2" WC)
Contaminants:	TNT dust/fumes	TNT dust/fumes	TNT dust/fumes	TNT dust/fumes
Inlet Loading:	Mist	0.15 kg/hr	0.15 kg/hr	0.15 kg/hr
Particle Size Distribution:	0.1 – 1.0 mm	0.1 – 1.0 mm	0.1 – 1.0 mm	0.1 – 1.0 mm
Venturi Water Flow:	114 lpm (30 gpm)	57 lpm (15 gpm)	114 lpm (30 gpm)	189 lpm (50 gpm)
Packed Tower Flow:	170 lpm (45 gpm)	95 lpm (25 gpm)	170 lpm (45 gpm)	284 lpm (75 gpm)
Differential Pressure:	40 mBar (16" WC)	40 mBar (16" WC)	40 mBar (16" WC)	40 mBar (16" WC)
Outlet Gas Flow	4801 m3/hr (2826 acfm)	2921 m3/hr (1719 acfm)	4317 m3/hr (2541 acfm)	7770 m3/hr (4573 acfm)
Outlet Gas Temperature:	34C (93F)	9C (49F)	9C (49F)	26C (79F)
Design Pressure:	-0.1 bar (-40" WC)			
Expected Efficiency:	0.058 gr/m3 (0.0016 gr/ft3)			
Electrical Classification:	Class I, Div 1, Group D, T3 | Class II, Div 1, Group F&G, T3 | Max surface temp 200C			

EQUIPMENT SPECIFICATIONS AND PRICING:

Scrubber:	**Dryer**	**Flaker**	**Packaging**	**Dryer + Flaker**
Venturi Model:	No. 1	No. 0.5	No. 1	No. 3
Packed Tower Model:	42-36	30-36	36-36	48-36
Packed Tower Diameter:	1067 mm (42”)	762 mm (30”)	914 mm (36”)	1219 mm (48”)
Packing Height:	914 mm (36”)	914 mm (36”)	914 mm (36”)	914 mm (36”)
HEPA filter array:	1x2	1x1	1x2	1x3
Pump design flow:	303 lpm (80 gpm)	189 lpm (50 gpm)	303 lpm (80 gpm)	492 lpm (130 gpm)
Pump motor HP:				
Fan design flow:	5333 m3/hr (3139 acfm)	2875 m3/hr (1692 acfm)	4250 m3/hr (2501 acfm)	8203 m3/hr (4828 acfm)
Fan static pressure:	55 mBar (22”)	55 mBar (22”)	55 mBar (22”)	55 mBar (22”)
Fan BHP:				
Fan motor HP:				
Scrubber System:	$	$	$	$
Pump, filter, piping, assembly:	$	$	$	$
HEPA Filter and Ductwork:	$	$	$	$
Exhaust Fan:	$	$	$	$
Total Price:	**$**	**$**	**$**	**$**

MATERIALS OF CONSTRUCTION:

Venturi:	10 gauge 304L stainless steel
Packed Tower/integral Tank:	10 gauge 304L stainless steel
Flanges:	3/16” 304L stainless steel
Fittings/Piping:	304 stainless steel
HEPA filter & Ductwork:	304 stainless steel
Exhaust Fan:	316L stainless steel
Packing and Mesh Pad:	Polypropylene
Hardware:	Stainless steel
Gaskets:	Black neoprene

PAINT:

- Support legs and support structure of carbon steel construction and are to be treated with SSPC-SP-3 preparation and one prime coat of Sherwin-Williams Kembond to 1-2 mils DFT and one finish coat of Mobile Acrylic Enamel 4200 Series to 1-2 mils min DFT. Color: Gray.

EXTERNAL FINISHING:

- Welding is per Sly AWS-D1.1 standard procedures with continuous full penetration welds on the exterior.
- Weld spatter is removed but no further weld finishing is performed.
- All 304L stainless steel sheets are 2B mill finish on internal product contact side.
- External 304L surfaces are grit blasted to a coarse uniform finish.

Sly recommends the following equipment selection:

- Venturi Scrubber with Packed Tower and integral recirculation tank.
- The pressure drop through the Venturi scrubber is adjustable and suggested to be 12" WC.
- The pressure drop through the Packed Tower is 4" WC or less
- HEPA filter between Packed Tower and exhaust fan 2” WC differential pressure
- Induced draft exhaust fan
- Recirculation pump
- Dual bag filter for recirculation liquid
- Preassembled Sch 80 PVC piping and valves
- Instrumentation to monitor and control the process (controls, motor starters, VFD’s by others)

VENTURI AND PACKED TOWER:

- Vertical flanged (square) process air inlet.
- Two Venturi liquid inlet connections
- Manually adjustable Venturi throat damper to control pressure drop through the Venturi.
- 90 degree flooded elbow at bottom of venturi section to minimize abrasion.
- Packed Tower includes lower section, integral gallon recirculation tank.
- Bolted access doors in the Venturi and packed tower.
- Support legs on Venturi.
- Packing support and 3’-0“of polypropylene packing.
- Liquid distributor above packing.
- Mesh pad mist eliminator, polypropylene with support grids.

HEPA FILTER AND DUCTWORK:

- HEPA filter housing, side access housing, crank lock, horizontal airflow, constructed of 304SS
- Prefilters 24x24x2” followed by HEPA filters 24x24x11 ½”
- Inlet/outlet filter housing transitions, 304SS
- Connecting ductwork from Packed Tower discharge to HEPA filter inlet
- Connecting ductwork from HEPA filter to fan inlet

RECIRCULATION SYSTEM:

- Gusher recirculation pump, horizontal, end-suction centrifugal, ANSI pump of 316SS with single mechanical seal, and IEEE 841 TEFC motor for 230/460/3/60 VAC. Pump is rated for 240 kPa (35 psig) discharge pressure.
- Preassembled recirculation piping and valves, Sch. 80 PVC
- Dual bag filter for liquid recirculation filtration

SYSTEM INSTRUMENTATION: Note: field installation and wiring will be by others.
(Class I, Div 1, Group D | Class II, Div 1, Group F&G)

- (3) Rosemount 8705 magnetic flow sensors w/integral 8732 transmitters, SS flanged to monitor the Venturi, Packed Tower, and blowdown flows. SS electrodes, PFA lining, 4-20 mA HART output
- (1) Rosemount 3051 coplanar pressure transmitter and 305 integral 3-valve manifold to monitor Venturi dP.
- (1) Rosemount 3051SAL liquid level transmitter w/1199 remote seals to monitor recirculation tank liquid level.
- (1) Pneumatic make-up water control valve.
- (2) Ashcroft pressure gauges to monitor the line pressure at the venturi water inlets.
- (1) Ashcroft pressure gauge to monitor the pump discharge.
- (2) Dwyer magnehelic pressure indicators for prefilter and HEPA filter.

EXHAUST FAN:

Industrial Air Technology Exhaust Fan, Radial Blade, Arrangement No. 1 belt drive, Class 60/D, 316SS fan wheel and housing. Fan designed for 55 mBar/22" WC static pressure (-2" at Scrubber inlet, 12" dP Venturi, 4" dP Packed Tower, 2" HEPA filer, 2" misc. losses).

Accessories included:

- Shaft and bearing guard
- Flanged inlet and outlet
- Belt drive with guard
- Drain & plug
- Clean out door
- Unitary base
- 1800 rpm, IEEE 841, TEFC inverter duty motor for 230/460/3/60 VAC.

The following items are not included as part of the base proposal and are to be provided by others:

- **100% Compliance with specifications is not necessarily implied, see below**
- Inlet ductwork
- Exhaust stack
- PLC Control panel
- Motor starters and VFD's
- Skid mounting
- Access ladders/platforms
- Freight
- Unloading and storage of equipment
- Foundations and anchors
- Installation labor
- Field engineering services
- Testing
- Commissioning
- Field plumbing
- Field wiring

Compliance with specifications:

1. Sly believes that the equipment offered above generally complies with the specifications.
2. Rosemount instruments were quoted; however, detailed specifications were not available at the time of this proposal.
3. Sly will submit weld procedures and ITP in lieu of fabrication specifications and ITP provided by KBR.
4. Control panel/PLC is not included at this time and could be added later.
5. Sly is not ISO 9001 nor ASME qualified.

For Indoor Installations with Combustible Particulate Solids or Explosion Hazards

In accordance with NFPA-654 (2020 Edition), all wet scrubbing equipment installed indoors where an explosion hazard exists must include an interlock to shut down the system in the event the water supply through the scrubber ceases or becomes inadequate to effectively scrub the particulate from the gas stream. This is to prevent the formation of a combustible dust cloud within the scrubber vessel. Refer to NFPA-654 2020 Edition, sections 7.13.1.1.1 & 7.13.1.1.2 for complete details and guidelines. OSHA regulates facilities regarding combustible dusts and the end user is ultimately responsible for the safety of the installation.

VALIDITY:

The prices contained herein are valid for a period of 30 days, after which we reserve the right to review our quote.

ORDERS:

Purchase orders should be addressed to Sly LLC, 8300 Dow Circle, Suite 600, Strongsville, Ohio 44136. Written purchase orders must be received and accepted by Sly before engineering commences.

TERMS:

30% with order, NET 10 days.
30% with submittal of engineering approvals (NET 30 or before shipment, whichever occurs first).
40% NET 30 DAYS.
Prices are firm for acceptance in 30 days and shipment as noted below. An order placed on any or all the above equipment/services is subject to attached "Terms and Conditions". Any additional terms or conditions contained in Buyers Request for Quote or Purchase Order shall be deemed of no consequence to the contract and shall not be binding upon Seller unless agreed to in writing by the Seller. Acknowledgment of Buyer's Purchase Order by Seller will not constitute acceptance of Buyer's Terms and Conditions regardless of statements to the contrary. Terms are subject to credit approval at time of order.

FREIGHT:

If the cost of freight to deliver your equipment from our production facility is not included above, we will provide you with "pre-pay and add" service at an additional charge of 15% of the actual freight invoice. This cost will appear on your invoice as "Logistic Fee" along with the actual cost of the transportation. Transportation fees will be invoiced separately from the equipment.

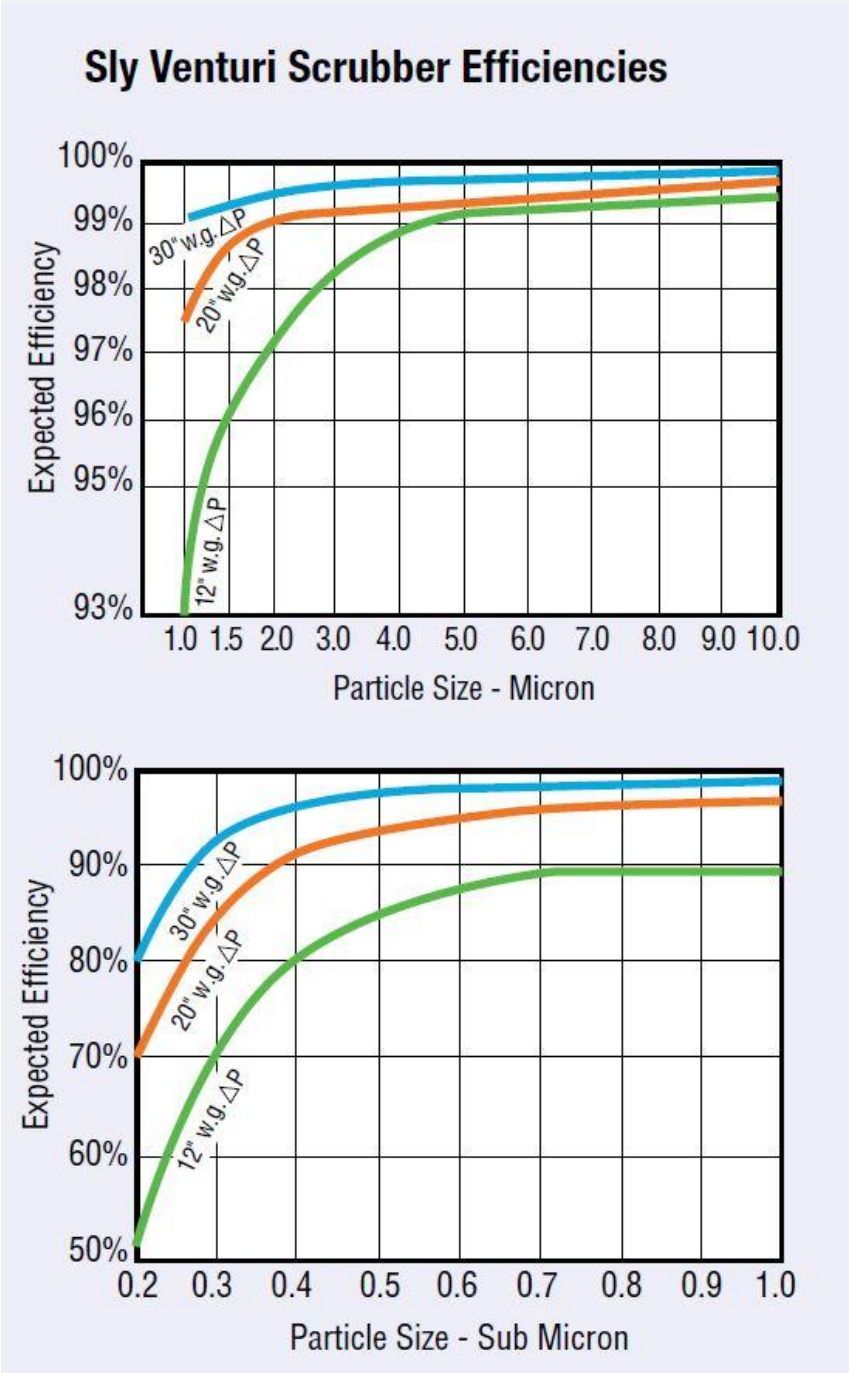
SHIPMENT:

11 to 12 weeks after receipt of approval drawings. Drawings for approval will be submitted in
5 to 6 weeks after date of order acknowledgment and scheduling. Drawings will be provided in AutoCAD, STP, and PDF format. If an alternate format is required please advise immediately to avoid additional charges and/or delays.

NOTE: ABOVE SUBJECT TO VERIFICATION AT TIME OF ORDER.

PERFORMANCE:

Statements of performance expectations for the proposed scrubber system are offered for information purposes only and do not express or imply any guarantees of performance to buyer or specific remedies by Seller. Any guarantees of performance expressed in this quotation will be limited to the stated terms of that guarantee. In all cases, the customer will bear the sole responsibility to verify scrubber design criteria and system performance.



Industrial Boiler & Mechanical Company, Inc.

BUDGET PROPOSAL TO

REPKON USA

REGARDING

30,000 LB/HR WATERTUBE BOILER
&
AUXILIARY EQUIPMENT

REPKON USA
KY-175
GRAHAM, KY
ATTN: EDWARD CZERWINSKI

IB&M PROPOSAL NUMBER: 260220-1-JO

SUBMITTED BY:
JUSTIN OGLESBY
PROJECT ENGINEER

MARCH 10, 2026
REV. 0

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Industrial Boiler & Mechanical Company, Inc.

MARCH 10, 2026 **QUOTE:** 260220-1-JO

ATTN: EDWARD CZERWINSKI
c/o REPKON USA
GRAHAM, KY

SUBJECT: 30,000 LB/HR WATERTUBE BOILERS AND AUXILIARY EQUIPMENT

We at Industrial Boiler and Mechanical Company, Inc. propose to furnish all equipment listed below. The equipment is based on specifications provided to Industrial Boiler and Mechanical Company, Inc. All equipment to be manufactured and assembled in accordance with the applicable codes and standards required by the State of Kentucky (i.e. American Society for Mechanical Engineers (ASME), National Board Boiler Inspection Code (NBIC), NFPA 54: National Fuel Gas Code, NFPA 85: Boiler and Combustion Systems Hazard Code, etc.).

Section 1: Superior Shawnee Ds-type Watertube Boiler

Estimated Design		
Boiler gross capacity with economizer at MCR	30,000	lb/hr
Blowdown Rate at MCR	900	lb/hr
Boiler Net Capacity with economizer at MCR	30,000	lb/hr
Fuel	NG	
Maximum heat input	36.32	MM btu/hr
Maximum allowable working pressure	350	psig
Boiler operating pressure at steam drum	265	psig
Feed water temperature (DA to economizer)	240	°F
Ambient air temperature	70	°F
Relative Humidity	65	%
Elevation (FASL)	1000	ft
Design blow-down rate	3	%
Installation type	Indoor	
Electrical supply power available	460V/3Ph/60Hz	
Control supply power available	120V	
Project location specific	Graham, KY	

Industrial Boiler & Mechanical Company, Inc.

Estimated Specifications		
Boiler type	Ds	
Combustion chamber configuration	Square	
Flue gas discharge location	Top or Side	
Boiler overall height	13’- 0”	ft-in
Boiler overall width	10’- 0”	ft-in
Boiler length over casing (less burner)	15’ - 3”	ft-in
Estimated shipping weight	48,732	lbs
Estimated weight at operation	65,293	lbs
Steam outlet line size at saturated steam drum	4	in
Steam drum diameter (I.D.) and thickness	36 x 1.00	in
Steam drum material of construction	SA-516-Gr.70	
Lower drum diameter (I.D.) and thickness	24 x 0.75	in
Lower drum material of construction	SA-516-Gr.70	
Convection bank tube diameter and thickness	2.0 x 0.105	in
Membrane tube diameter and thickness	2.0 x 0.120	in
Boiler tube material	SA-178-Gr.A	

Auxiliary Equipment					
Included		***Qty***	***Description***	***Ship Loose***	
Yes	**No**			**Yes**	**No**
X		1	Single Fuel Burner		X
X		1	FD Fan and Inlet Air Assembly		X
X		1	Burner Management System (PLC)		X
X		1	Combustion Control System (PLC)		X
X		1	Boiler Feedwater Level Controller		X

Standard Boiler Trim					
Included		***Qty***	***Description***	***Ship Loose***	
Yes	**No**			**Yes**	**No**
X		2	Safety Relief Valve	X	
X		1	Steam Drum Vent Valve	X	
X		1	Continuous Blowdown Metering Valve		X
X		1	Continuous Blowdown Stop Valve		X
X		1	Chemical Feed Check Valve		X
X		1	Chemical Feed Stop Valve		X
X		2	Intermittent Blowdown Valves (1 Slow, 1 Quick)	X	
X		1	Water Column (Probe Type)		X
X		1	Water Column Drain Valve		X

	X	0	Startup Vent and Silencer		
X		1	ASME Rated Gauge Glass with Gauge Glass Valves	X	
X		1	Gauge Glass Drain Valve		X
X		1	Auxiliary Low Water Cut Off (Probe Type)		X
X		1	Auxiliary Low Water Cut Off Drain Valve		X
X		1	Drum Pressure Gauge	X	
X		1	Drum Pressure Gauge Isolation Valve		X
X		1	Drum Pressure Gauge Test Valve		X
X		1	Drum Pressure Gauge Drain Valve		X
X		1	Drum Pressure Transmitter Isolation Valve		X
X		1	Drum Pressure Transmitter Drain Valve		X
X		3	Drum Level Transmitter Isolation Valve		X
X		3	Drum Level Transmitter Drain Valve		X
X		1	Feed Water Dum Inlet Isolation Valve	X	
X		1	Feed Water Drum Inlet Check Valve	X	

Steam Trim					
Included		***Qty***	***Description***	***Ship Loose***	
Yes	**No**			**Yes**	**No**
X		1	Main Steam Stop Valve	X	
X		1	Main Steam Non-Return Valve	X	
X		1	Main Steal Spool Piece with Drain Valve	X	
	X	0	Safety Valve Drip Pan, Vents, and Drains		
	X	0	Automatic Continuous Blowdown		

Feed Water Trim					
Included		***Qty***	***Description***	***Ship Loose***	
Yes	**No**			**Yes**	**No**
	X		Piping from Boiler Feed Water Pump to Control Station		
X			Feedwater Control Station (2 stop valves and 1 bypass)	X	
X			Feedwater Control Valve	X	
X			Feedwater Piping from Control Station to Drum	X	

Economizer					
Included		***Qty***	***Description***	***Ship Loose***	
Yes	**No**			**Yes**	**No**
X		1	Carbon Steel Economizer	X	
X		1	Economizer Safety Relief Valve	X	

X		1	Economizer 3-valve Bypass Station	X	
X		1	Economizer Outlet to Drum Inlet	X	
X		1	Economizer Vent Valve	X	
X		1	Economizer Drain Valve	X	
X		1	Economizer Support Structure	X	

Boiler Breaching/Ducting					
Included		***Qty***	***Description***	***Ship Loose***	
Yes	**No**			**Yes**	**No**
	X	0	Boiler Outlet To Stack Transition		
	X	0	Boiler Outlet Expansion Joint within 10’		
X		1	Boiler Outlet to Economizer Inlet Transition	X	
X		1	Economizer Outlet to Stack Transition within 10’	X	
X		1	Stack (20’)	X	
	X	0	Stack Damper		
	X	0	Stack Damper Actuator		
	X	0	FGR Duct		
	X	0	FGR Damper		
X		1	FD Fan to Windbox	X	
	X	0	Air Pre-heater (Steam) with piping, valves, and controls		

Instrumentation					
Included		***Qty***	***Description***	***Ship Loose***	
Yes	**No**			**Yes**	**No**
X		1	High Steam Pressure Switch (Auto Reset)		X
X		1	High High Steam Pressure Switch (Manual Reset)		X
X		1	Drum Pressure Transmitter with 2-valve Manifold		X
X		1	Drum Level Transmitter with 3-valve Manifold		X
X		1	Steam Flow Transmitter w/ 3-valve Manifold and Orif.	X	
X		1	Feedwater Flow Transmitter w/ 3-valve Man. and Orif.	X	
	X	0	Boiler Outlet Draft Pressure Trans. w/ 3-valve Manifold		
X		1	Flue Gas Oxygen Analyzer	X	
	X	0	Flue Gas Analyzer Calibration Kit		
X		1	Combustion Air Flow Transmitter w/ 3-valve Manifold	X	
X		1	Combustion Air Temperature w/ Thermowell	X	
X		1	NG Flow Transmitter w/ 3-valve Manifold and Orifice	X	
X		1	Feedwater Flow Temperature Trans. w/ Thermowell	X	
	X	0	Feedwater Temperature Gauge w/ Thermowell		

	X	0	Flue Gas Temperature Trans. w/ Thermowell		
	X	0	Flue Gas Temperature Gauge w/ Thermowell		
X		1	Steam Pressure Transmitter with 2-valve Manifold	X	
X		1	Steam Temperature Transmitter w/ Thermowell	X	
	X	0	Aux Steam Flow Trans. w/ 3-valve Man. And Orif.		
X		1	Furnace Pressure Switch		X
X		1	Furnace Pressure Transmitter w/ 3-valve Manifold		X
X		1	NG Pressure Transmitter w/ 2-valve Manifold	X	
	X	0	FD Fan VFD	X	

Platforms					
Included		***Qty***	***Description***	***Ship Loose***	
Yes	**No**			**Yes**	**No**
X		1	Boiler Rear Platform with Ladder (Steam Drum Access)	X	
X		1	Boiler Roof Platform with Ladder (SRV and NRV Access)	X	
X		1	Boiler Front Platform	X	

Note: All ship loose items noted above to be installed by installing contractor.

Section 2 - Burner

Zeeco Free-Jet 30ppm Burner

Qty	Description
1	Zeeco Free-Jet 30PPM Burner w/ Fully-Metered/Cross-Limited Controls, no FGR
1	ZA2 Raw Gas Igniter and Igniter Gas Train ***
2	Zeeco ProFlame UV Scanner
1	E-Style Windbox, with shelf to mount FD Fan
1	Main Natural Gas Valve Train with Regulator and Flowmeter, Rack-mounted
1	Instrument Air Valve Train, Rack-mounted
1	3" Natural Gas Valve Train (65PSIG regulated to 30psig at valve train inlet)
1	FD Fan, windbox mounted, vertical silencer (sized for 30ppm)
***	Substantial deduct available to go to an HEI Direct Spark Class 3 Special Igniter with retract mechanism

Boiler Data	30ppm NOx Unit
BOILER TYPE	Ds
BOILER MANUFACTURER	SUPERIOR BOILER
YEAR OF MANUFACTURE	NEW
STEAM LOAD, KPPH	30
STEAM TEMPERATURE, °F	SAT
STEAM PRESSURE, PSIG	350
FEEDWATER TEMP, °F	240
FIRING CONFIGURATION	FRONT-FIRED
NUMBER OF BURNER ROWS	1
FURNACE DRAFT / PRESSURE, " W.C.	4.5
FURNACE WIDTH, FT	6.85
FURNACE DEPTH (TO TURNING LANE), FT	11.0
FURNACE DEPTH (TO REAR WALL), FT	12.5
FURNACE HEIGHT, FT	6.8
FRONT WALL REFRACTORY %	50
FLOOR REFRACTORY %	0
SIDE WALL REFRACTORY %	0
ROOF REFRACTORY %	0
REAR REFRACTORY %	0
PROPOSED WINDBOX WIDTH, INCHES	24
PROPOSED WINDBOX HEIGHT, INCHES	24
MIN. TUBE NEST DIAMETER, INCHES	23.5

Predicted Boiler & Burner Data		
Burner Type	FREE-JET	
Fuel Designation	NATURAL GAS	
Burner Heat Input	37	MMBtu/hr (HHV)
Register Draft Loss	7.88	in-wc
Flame Length	6.45	feet
Flame Width	2.5	feet
Burner Turndown	10:1	
Excess Air	16.5	%
Combustion Air Temperature	100	°F
Combustion Air Flow	31,349	lb/hr
Total Fuel Flow per Burner	1,582	lb/hr
Total Fuel Flow per Boiler	34,930	scfh
Fuel Pressure at Valve Train Inlet	30	psig
Fuel Pressure Available at Burner	20	psig
FGR	0	%
FGR Flow	0	lb/hr

MINIMUM GAS PERFORMANCE GUARANTEES	
NOx, ppmv (Corrected to 3% O_2, dry)	30
CO, ppmv (Corrected to 3% O_2, dry)	100
VOC, lb/MMBtu (Corrected to 3% O_2, dry)	0.035
PM, lb/MMBtu (Corrected to 3% O_2, dry)	0.002*
SO_2	NOT OFFERED

1. Zeeco does not guarantee SOx emissions since these are stoichiometrically related to sulfur compounds in the fuels and the equilibrium conditions in the furnace.
2. Zeeco takes exception to providing NOx emission guarantees for any fuel gas compositions containing ammonia (NH_3) and hydrogen cyanide (HCN).
3. Emissions guarantees stated above encompass measured values rounded to the significant digit provided.
4. The emissions guarantees are for operation at the specific conditions stated.
5. Zeeco requires entire furnace cavity including division wall to be fully membrane welded/sealed (i.e. no furnace bypass to convective section).
6. All emissions guarantees are based on 3 mm deposition maximum on all waterwall surfaces. Any further thickness on waterwalls will increase furnace temperatures, thus NOx will increase.
7. If not explicitly stated above, Zeeco has not provided an opacity guarantee.
8. Emissions stated above are applicable for boiler loading from 25% to 100% of MCR, unless noted otherwise above, at steady state conditions.
9. All ppm values stated above (where applicable) are corrected to 3.0% O_2 dry basis.
10. The burner MCR excess air levels stated herein are expected operating levels and may require slight adjustment during commissioning to optimize combustion and achieve performance criteria stated herein (i.e. NOx and/or CO emissions).
11. All emissions provided above are additive to any inlet conditions.
12. The above NOx emission levels are based on the ability of the boiler system design and configured combustion control system to control excess O_2 levels when firing gas or oil at:
    a. The excess air/O_2 levels stated in the technical section of this proposal from 50% to 100% load.
    b. Excess O_2 levels between those stated in the Technical Section of this proposal and not more than 5% O_2 from 25% to 50% load.

A. The FREE-JET is our Low NOx burner which utilizes Zeeco's patented FREE-JET technology to reduce NOx emissions. Requirements for low emissions led to advancements in the firing components of this standard burner technology by adding advanced fuel staging techniques to reduce NOx emissions. Zeeco has expanded upon the fuel staging additions with its FREE-JET technology. The FREE-JET burner contains a center-fired gas burner with an air swirler to provide a stable core flame while our patented FREE-JET gas ring introduces the balance of fuel around the periphery of the burner throat. The FREE-JET design aspirates the products of combustion, using enhanced internal staging, from the furnace around the flame which results in superior low NOx performance.
    1. One (1) FREE-JET burner per boiler, consisting of the following:
        a. One (1) non-insulated front plate, equipped with:
        b. One (1) carbon steel register assembly
        c. One (1) carbon steel center-fired gas gun assembly
        d. One (1) stainless steel swirler
        e. One (1) sight ports
        f. Two (2) scanner swivel mounts
    2. One (1) boiler mounting ring assembly, shipped loose
    3. One (1) carbon steel staged gas manifold with stainless steel risers
    4. One (1) pre-cast, pre-cured refractory throat tile

B. Class 3 Special Igniter:
Each new burner will be equipped with a ZA2 gas-electric igniter for reliable and quick light-off of the main fuel. The ZA2 is a Class 3 igniter of raw gas design as defined by NFPA 85. The gas fuel will be ignited by a high energy (HE) spark rod which provides a robust energy source to start the ignition process. The igniter is provided with a spark module mounted in a NEMA 4 junction box which can be shipped loose for boiler front installation. A cable harness with quick disconnects is supplied with plenty of length for field adjustment for ease of connection.
    1. One (1) ZA2 Class 3 igniter, consisting of the following:
        a. One (1) raw gas firing assembly with stainless steel tip
        b. One (1) high energy spark rod
        c. One (1) high energy capacitance-discharge module mounted in NEMA 4 panel
        d. One (1) flex hose
        e. One (1) cable for connection to spark rod (15' max)

C. *OPTIONAL DEDUCT: Class 3 Special Igniter*
In lieu of a gas pilot, the burner can be equipped with a high capacitance direct spark gas igniter for reliable and quick light-off of the fuel. This also eliminates the igniter valve train described below, avoiding the capital and maintenance cost of

the igniter valve train. This igniter utilizes a high energy (HE) spark rod, which provides a robust energy source to start the ignition process of the Class 3 igniter. The igniter is provided with a high-energy spark generator mounted in a small junction box, which can be shipped loose for boiler front installation. A cable harness with quick disconnects is supplied for ease of connection with enough length for adjustment.

1. *One (1) HE Class 3 special igniter, consisting of the following:*
    a. *One (1) high energy direct spark rod*
    b. *One (1) capacitance-discharge module mounted in a NEMA 4X panel*
    c. *One (1) quick-disconnect harness for connection to spark rod (15' max)*
    d. *One (1) retract system*

D. Flame Scanner
1. Two (2) ProFlame flame scanners per boiler, consisting of the following:
    a. One (1) ProFlame UV flame scanner with flame relay
    b. One (1) ProFlame local LED signal strength and flame relay status
    c. One (1) ProFlame 1" NPT mounting flange

    *5 scfm at 5" w.c. above furnace pressure is required for purging/cooling of the scanner

E. One (1) E-Style windbox per boiler, consisting of:
1. Non-insulated, A36 steel plate construction
2. One (1) lot of flow distribution baffles as required per the physical air flow model (model required on 9ppm version only)
3. One (1) lot of windbox-mounted devices:
    a. One (1) purge air switch
    b. One (1) combustion air proving switch
    c. One (1) high steam drum pressure switch
    d. One (1) excess high steam drum pressure switch
    e. One (1) furnace pressure switch
    f. One (1) NEMA 4 junction box for devices and scanners
4. One (1) structural steel shelf support for FD Fan

F. FJ Valve Trains
1. One (1) natural gas valve train per boiler, consisting of:
    a. One (1) manual shutoff valve
    b. One (1) wye type strainer
    c. One (1) pressure gauge with isolation valve
    d. One (1) pressure regulating valve

e. One (1) manual vent valve
f. One (1) gas flow meter
g. One (1) pressure gauge with isolation valve
h. One (1) low pressure switch
i. One (1) automatic safety shutoff valve with open/closed position switches (pneumatic)
j. One (1) bleed and leak test valve
k. One (1) manual vent valve
l. One (1) automatic vent valve (pneumatic)
m. One (1) automatic safety shutoff valve with open/closed position switches (pneumatic)
n. One (1) bleed and leak test valve
o. One (1) high pressure switch
p. Two (1) flow control valve with low fire position switch for center-fired gun
q. One (1) manual shutoff valve for center-fired gun
r. One (1) pressure gauge with isolation valve for center-fired gun
s. One (1) flow control valve with low fire position switch for FreeJet gas ring
t. One (1) pressure gauge with isolation valves for FreeJet gas ring

2. One (1) igniter gas valve train*, consisting of the following:
   a. One (1) manual shutoff valve
   b. One (1) inlet wye type strainer
   c. One (1) pressure regulating valve
   d. One (1) automatic safety shutoff valve (pneumatic)
   e. One (1) automatic vent valve (pneumatic)
   f. One (1) automatic safety shutoff valve (pneumatic)
   g. One (1) pressure gauge with isolation valve
   h. One (1) pressure switch

   *** Igniter gas valve train is eliminated if the Class 3 Special HEI spark igniter option is exercised.**

3. One (1) instrument air valve train, consisting of the following:
   a. One (1) manual shutoff valve
   b. One (1) low pressure switch
   c. One (1) pressure gauge
   d. Individual component hand valves (as required)

4. General Construction and Wiring for Skid Mounted Valve Trains
    a. Wiring shall be conduit as applicable.
    b. Zeeco assumes that instrument air is received dry and oil free to Zeeco termination point. Instrument air required will be at 80 psig, minimum
    c. Zeeco's systems are designed to the latest edition of NFPA 85. All electrical systems will be designed to NFPA 70.
    d. Valve train is designed for manual leak testing of safety shutoff valves required by NFPA 85.
    e. Valve Train/NFPA54/ASME B31.1 Construction
        i. Piping 2" and under shall be A-106 seamless pipe, schedule 80, socket welded end connections, 3000lb fittings
        ii. Piping 2 ½" and larger will be A-106 seamless pipe, schedule 40, CL150 flanged or butt-welded connection
        iii. All valve rack lifting lugs 100% dye penetration inspection testing
        iv. Bolts shall be ASTM A-193 Grade B7 – Zinc Plated
        v. Nuts shall be ASTM A-194 Grade 2H – Zinc Plated
        vi. Flat-washer: (2) per Stud, (1) per bolt, Type F436 – Zinc Plated
        vii. Gaskets shall be Garlock Blue-Gard 3000, 1/16" thick, or equal
    f. NEMA 4 junction box(es)

5. Preliminary Zeeco Approved Vendors List

Manual Shutoff Valves, Gate	Newco, Chicago, Warren
Manual Shutoff Valves, Ball	Jamesbury, VCI, Sesto, Apollo, Warren
Wye Strainers	Titan
Pressure Regulators	Fisher
Flow Meters	Rosemount
Pressure Gauges	Ashcroft
Pressure Switches	Ashcroft
Automatic Safety Shutoff Valves	Jamesbury
Flow Control Valves	Neles

G. Preparation and Painting
    1. Burner and Windbox Preparation and Painting
        a. Burner Color: RAL 2004 Pure Orange
        b. Igniter Color: RAL 9011 Graphite Black

c. Windbox Color: RAL 7026 Granite Grey
d. All internal carbon steel surfaces to be surface prepped per: SSPC-SP-1 and painted with one coat (1.0 mils DFT (25 micron)) of Dampney company Inc. Thurmalox 270M (metallic charcoal) or equal.
e. All field welded interface points to be surface prepped per SSPC-SP-1 and painted with one coat of Deoxaluminite (or equal) aluminum based organic welding paint primer suitable for use in priming metal prior to welding.

2. Fuel Skid Preparation
   a. Natural and Igniter Gas Train Color: RAL 1021 Colza Yellow
   b. Instrument Air Train Color: RAL 5015 Sky Blue
   c. Fuel skid frame to be hot dip galvanized per ASTM A-123 or painted in accordance with paint specification and painted color: RAL 7030 Stone Grey

3. General Notes and Clarifications
   a. All external carbon steel surfaces to be surface prepped per SSPC-SP-6 and painted with a base coat of Sherwin Williams Macropoxy 646 Fast Dry Epoxy 646 (5.0-10.0 mils DFT (125-250 microns)) and top coat (light buff) with Sherwin Williams Acrolon 218HS Acrylic Polyurethane (3.0-6.0 mils DFT (75-150 microns)) or equal.
   b. All valves and instruments are supplied with OEM standard paint and preparation.

Budgetary price for (1) Superior Boiler with Zeeco Burner: $2,191,650.00

Section 3: IB&M 30,000 lb/hr Tray-type Deaerator

One (1) 30,000 #/hr Triplex Zer-O-Pac Deaerator (sized for (1) 30,000 lb/hr boiler)	
Model #30MTX-320 Triplex Zer-O-Pac system consisting of:	
1	30,000 lb/hr detachable tray type deaerator having a capacity of 610 gallons of deaerated water storage to overflow. Vessel is designed, constructed, and stamped in accordance with ASME Sect. VIII, Div. 1 for 50PSIG @ 400°F and includes 0.125" of corrosion allowance, PWHT, WFMPT of nozzle-shell welds and rust inhibitor in hydrotest water.
1	Storage tank 54" diameter x 96" straight shell, complete with: *items marked with this symbol are piped on tank and removed for shipment
1	Electro-pneumatic water inlet control valve (shipped loose): • 1" Fisher 2052-DVC7k Cl150 SST, pneumatic with 4-20mA position feedback • 2" Cl150 SST make-up bypass with iso. valves and y-strainer
1 *	DP Level transmitter; Rosemount 3051CD-305R w/ 3-vlv manifold
1	• Overflow trap sized to pass the rated capacity of flashing water at deaerator operating pressure
1	Steam pressure control valve sized for 100% make-up at 203psig supply pressure: • 3" CL300 Fisher 667EWT-DVC7k w/ 4-20mA feedback • Sized for 100% make-up at 260 PSIG supply pressure • 94 dBA at full flow
1 *	Tank pressure transmitter: • Rosemount 3051TG-306R, 0-150psig, 4-20mA
1 *	Full capacity relief valve, max capacity greater than failed-open capacity of PRV when supplied with 260psig steam: • Kunkle Cast Iron Relief Valve, set at 50psig (4" x 6") • Model 6252-KPM
1 *	Safety type water glass gauge with isolation valves
1	Water inlet pressure gauge with pigtail and gauge isolation valve
1	Steam pressure gauge with pigtail and gauge isolation valve
1	Steam section pressure gauge
1	Storage section thermometer with thermowell
1 *	Manual vent valve
1 *	Auto (air) vent
1 *	Vacuum breaker
1 *	High level alarm switch • McDonnell Miller 63B

1 *	Low Level Alarm / low level pump cutoff switch • McDonnell Miller 63B
1	Stainless steel chemical injection quill
1	Vessel drain valve
1	12” x 16” elliptical storage tank manway
1	18” CL150 tray access door
1	7’ tall structural steel pump & piping support base
3	Goulds 10SV17N, 17 stage, 316 stainless constructed, low NPSH, centrifugal pumps equipped with high temp mechanical seals. Each pump will have a capacity of 52 GPM @ 781’ TDH
3	Pumps will be mounted on formed steel unit base and close coupled to: • 25hp, 460V, 60Hz, 3-phase, 3500RPM, vertical NEMA PE motors
1	Set 3” Sch40 pump suction piping from common header with all necessary fittings including: • (3) CL150 carbon steel gate valves • (3) CL150 carbon steel Y-strainers • (3) expansion couplings
1	Set 1.5” Sch80 pump discharge piping to a common header with all necessary fittings including: • (3) Powell CL800 FS SW check valves • (3) Powell CL800 FS SW globe valves • (3) Powell CL800 FS SW gate valves • (3) 0-600psig pressure gauges with snubbers and isolation valves • (1) Rosemount 3051TG-306R, 0-600psig, 4-20mA header pressure transmitter
1	Set 1” Sch80 pump recirculation piping to individual tank connections with all necessary fittings including: • (3) Powell CL800 FS SW check valves • (3) Powell CL800 FS SW globe valves • (3) Powell CL800 FS SW gate valves • (3) SS orifices for 10gpm min flow, NPT (mounted on tank)

1	High Voltage NEMA 4 Panel complete with the following: • Single point entry distribution block • (3) Fuse blocks with fuses • (3) Allen Bradley PowerFlex 755 VFDs Each VFD will be equipped with the following: ○ Input line reactor ○ Conduit kit ○ Allen Bradley 20-HIM-A6 ○ Ethernet IP adapter • (1) Control power transformer • (2) Cooling Fans with filters
1	Low voltage PLC controls in NEMA4 enclosure, complete with: • Allen Bradley CompactLogix PLC ○ Power supply ○ 16-channel Analog Input card(s) ○ 8-channel Analog Output card(s) ○ 16-point 120VAC Digital Input card(s) ○ 8-point Isolated Relay Output Card(s) • Allen Bradley PanelView Plus Performance 15" HMI

Technical Notes:

- *Delivery time as quoted is based on current production load, more or less time may be required depending on production loads at time of sale. Holiday schedule at time of order may extend lead time by 1-2 weeks.*
- *Tank will be removed from stand(s) after assembly to facilitate shipping*
- *We take exception to the internal blast requirement in the specification*
- *We take exception to the modulating/actuated vent valve*
- *We take exception to the API-A6 pump design (wellhead pump spec) and have quoted SST vertical centrifugal multi-stage pumps.*

Budgetary price for (1) IB&M 30,000 lb/hr Tray-type Deaerator: $619,365.00

Section 4: Water Softener

One (1) Twin-Alternating Water Softener Skid	
Main System	
1	Marlo MGT-450-2 Twin Alternating Softener System • (2) 30" Diameter x 72" FRP Pressure Vessels • Non-Code Pressure Vessels, 150 psig Rating • 15 ft³ Softening Resin Per Vessel (450,000 grains Capacity Per Vessel) • Washed Gravel Sub-Fill for Media Support • 2" Fleck Model 2900 Top-Mounted Control Valves for Automatic Operation • Pentair 'NXT2' Microprocessor/Digital Display Controller • 120/24 VDC, 60 Hz Electrical Power Rating • Alternating Flow Control Configuration for Continuous Treated Water Supply • (1) Clack stainless steel inline turbine-type Flow Sensor(s) for Volume Initiated Regeneration • (1) 30" x 50" Polyethylene Brine Storage Tank Assembly with Salt Shelf and Safety Overflow Valve • Water Hardness Testing Kit
1	Skid Mount – Pre-piped and Pre-wired • Skid Mounted, Pre-Piped, and Pre-Wired Package • Epoxy-Coated Structural Carbon Steel Skid • 2" Flanged Inlet/Outlet Service Headers (SCHEDULE 80 PVC) • Individual Vessel Inlet/Outlet Isolation Valves • Individual Inlet/Outlet Pressure Gauges & Sampling Valves • Vacuum Breakers to Protect Fiberglass Tanks From Vacuum. • Excludes Brine Tank – To be Floor-Mounted

Budgetary for (1) Marlo MGT-450-2 Water Softener Skid: $21,840.00

Justin Oglesby
Project Engineer
Industrial Boiler & Mechanical Co. Inc.
Cell: 518-569-9934
Work: 423-629-1117
Email: justin@industrialboiler.com

Kyle Morris
Director of Corporate Sales
Industrial Boiler & Mechanical Co. Inc.
Cell: 423-227-7680
Work: 423-629-1117
Email: kyle@industrialboiler.com

Lead Time(s):

Boiler/Burner: 42-44 weeks from order
Deaerator: 28-30 weeks from order
Water Softener: 10-12 weeks from order

Pricing: Pricing is honored for 30-days from the date on this proposal

Payment Terms

15% down payment with purchase order
25% upon receipt of submittal drawings
30% upon release to fabricate
20% upon successful completion of hydrostatic test of boiler
10% upon notification of ready to ship

Quotation Notes:

a.) This proposal is based on the equipment detailed above. Any changes to the equipment detailed above will result in price nullification and necessitate requoting. Any equipment, material, labor, or supervision not detailed above is not included.

b.) No freight is included is this proposal. All pricing is FOB factory.

c.) No start up, commissioning, or SAT is included

d.) Unless otherwise agreed upon or stated above, all payment terms are Net30 from date of invoice. Equipment orders will not occur until down payment has been received.

e.) According to many of our suppliers, they are seeing tariffs being imposed on goods and services to protect domestic industries from foreign competition. The imposition of tariffs introduces uncertainty into the market, causing volatility, particularly in industries that rely on global supply chains. For instance, companies in the automotive, technology, and manufacturing sectors, many of which import raw materials or components such as steel etc., may experience higher production costs. These costs are then passed down to the consumer. Therefore, due to these tariffs and other factors that affect pricing, we at IB&M reserve the right to monitor and adjust all quoted prices on all goods and services that may be affected by the tariffs imposed. Regretfully we at IB&M have no choice but to pass the additional cost to the end user as they arise.

I have the authority to order and accept the work and/or equipment which has been proposed as outlined above. It is agreed that the seller will retain title to any equipment or material that may be furnished until final payment has been made and if settlement is not made as agreed, the seller shall have the right to remove same and the seller will be held harmless for any damages resulting from the removal thereof. Please refer to the statement below for limited warranty statements, terms and conditions which is a part of this agreement. Signature required proceeding with equipment order and/or working as listed.

ACCEPTED BY: _____

SIGNATURE: _____

TITLE: _____ **DATE:** _____

LIMITED WARRANTY

Contractor (Industrial Boiler & Mechanical Co. Inc.) warrants that the service work performed, including replacement parts, as herein specified, shall be done in a prudent and workmanlike manner, shall be free from defects for a period of thirty (30) days from completion of such work.

The Contractor does not warrant the quality of the equipment, materials, and goods furnished in any respect; Owner's remedies for defects in the equipment, materials, and goods shall be limited to those provided by the manufacturers thereof, if any. Removal and reinstallation of any equipment or materials repaired or replaced under a manufacturer's warranty will be at the Customer's expense and at the rates in effect.

Contractor's liability for defective labor or workmanship shall be limited to repair of same. Under no circumstances, whether arising in contract, tort (including negligence), equity or otherwise, will Contractor be responsible for damages arising from loss of use, loss of profit, loss or delay of production, increased operating or maintenance expense, claims, of customer's clients, or any special, indirect, or consequential damages. Consequential and incidental damages, including but not limited to (1) spoilage of other damage to food products or other personal property due to lack of refrigeration before, during or after service and (2) damage due to erosive or corrosive liquids or gases, are specifically excluded.

THERE ARE NO OTHER WARRANTIES, STATUTORY, EXPRESSED OR IMPLIED, IN CONNECTION WITH THE WORK PERFORMED EXCEPT AS EXPRESSLY SET FORTH HEREIN.

TERMS & CONDITIONS

In the event Contractor must commence legal action in order to recover any amount payable for the service, Customer shall pay Contractor all court costs and attorney's fees incurred by the Contractor.

Customer will provide reasonable means of access to the equipment and allow Contractor to start and stop the equipment as necessary to perform our required services.

Customer agrees to pay for all services rendered and materials or parts supplied at the current rates and prices in effect at the time services are performed. Payment is due upon the receipt of invoice.

Services are being performed as required to the Customer and it is specifically understood that Contractor has not had a previous opportunity to inspect the totality of the system, the equipment, or the maintenance records and that the work must done immediately. These terms and conditions are to supersede any other outstanding terms and conditions pertaining to this project.

Repkon USA

TNT Project
Graham, KY

Rentech Proposal No.:
DFB-DTB-7929-JF-26 - Rev 00

February 27, 2026

Boilers for people who know and care

"RENTECH Boilers for people who know and care." ®

February 27, 2026

Edward Czerwinski
Manager, Procurement and Materials
KBR
242 Chapman Rd
Newark, DE 19702
(302) 452-9030
edward.czerwinski@kbr.com

Based upon your request, **RENTECH Boiler Systems, Inc.** is pleased to furnish our **budgetary** proposal for the following:

- One (1) 29,983 lb/hr, D-type Watertube Boiler System with ancillary equipment as described in this proposal.

We hope this proposal meets your needs. Please do not hesitate to contact me if you have any questions or require further information. Thank you for your interest in doing business with RENTECH Boiler Systems, Inc. We look forward to providing a prompt response to all your questions, attention to all details, and a top-quality boiler.

Sincerely,



Jonathan Ford, M.B.A.
Sr. Sales Engineer
jford@rentechboilers.com
(Office): +1 (325) 794-5750
(Mobile): +1 (325) 513-7252

CC: Tom Ryan • G.T. Ryan Corp. • tom@gtryancorp.com
Vince Beringer • Ceeco Solutions, Inc • vberinger@ceecoequipment.com

RENTECH OVERVIEW

With over 500 boilers installed in 25 different countries it is no wonder that more than ever people who need steam are turning to RENTECH Boiler Systems, Inc. Each RENTECH boiler is custom designed by our engineers and built by a team of our experienced employees to perform efficiently and safely in its unique application. We offer excellent technical solutions to the unique needs of our customers for steam with a focus on custom design and service, competitive prices, and reliable delivery schedules.

Every boiler manufactured by RENTECH Boiler Systems is custom engineered, giving us the flexibility to assure that the equipment fits your needs rather than forcing your needs into a pre-designed boiler model.

The following are features that we have included in this proposal to meet specific requirements for this boiler project:

1. Rentech recognizes that this boiler will form a critical part of your steam supply and that reliability is key to the design of our system. We have proposed a boiler with a conservative furnace design resulting in a low furnace heat release rate. This design assures that the equipment will fit your needs, minimize emissions and provide the longest life expectance possible.

2. Because we have the capability of custom designing this equipment, we are able to work closely with your company to assure that if a change is needed in the smallest detail in order to make the equipment as easy as possible to install and operate, we can make that change without causing excessive delays or cost.

3. We have offered a 100% membrane wall construction furnace for this boiler, including the front and rear walls. This design is essential in minimizing the need for refractory in the furnace. Rentech's headered wall construction in the furnace assures that furnace gas seals do not fail due to high furnace temperatures and refractory failure. This will significantly reduce downtime and maintenance cost over the life of the equipment.

4. Rentech will pre-fit all structural steel including ladders and platforms in our shop. Once they are assembled, photos will be taken and they will be disassembled for shipment. This added process is unique to Rentech and we have found will significantly save on field fit-up issues which could result in costly delays.

5. Rentech will utilize 3-D modeling in the engineering and design of your system. This will significantly improve fit up accuracy and avoid costly field modifications.

PROCESS DESIGN SUMMARY - US CUSTOMARY UNITS

Basis of Design

Each boiler is based on the following summary:

Parameter	Units	Values
Environment		
Jobsite		Graham, KY
Installation Location		Indoor
Elevation	ft ASL	528
Ambient Air Temperature	°F	80
Relative Humidity	%	60
Hazardous Classification		Non-Hazardous
Wind Speed	mph	120.79
Seismic Zone		D
Thermal Performance		
Steam Flow [1]	lb/hr	29,983
Steam Pressure	psig	268
Steam Temperature	°F	Saturated
Blowdown Rate	%	3.0
Excess Air	%	15
Emissions - Natural Gas		
NOx	ppm	30
CO	ppm	100
Emissions Turndown		4:1
Utilities		
Make-up Water Temperature	°F	86
Make-up Water Supply Pressure	psig	44
Process Steam Pressure	psig	44
Power - LV Motors	Ph/Hz/V	3/60/480
Power - MV Motors	Ph/Hz/V	3/60/600
Power - Control Panel	Ph/Hz/V	1/60/120
Power - Instruments	Vdc	24

Parameter	Units	Values
Instrument Air	psig	102
Primary Fuel		Natural Gas
- Heat Input	mmBtu/hr	36.05
- HHV	Btu/ft3	1,065
- Supply Pressure	psig	50
- Required Regulated Pressure	psig	25
- Firing Rate Turndown		10:1
Pilot Fuel		Natural Gas

Notes:

1. The steam flow is at 100% MCR and is NET at the terminal point. Does not account for any additional process flow requirements.
2. Feedwater must meet suggested Water Quality Limits per latest edition ASME CRTD - Vol. 34.

Fuel Details

Composition ↓ Fuel Name →	Units	Natural Gas	-	-	-	-	-
CH_4	mol %	92.60	-	-	-	-	-
C_2H_6	mol %	6.36	-	-	-	-	-
C_3H_8	mol %	0.38	-	-	-	-	-
C_4H_{10}	mol %	0.07	-	-	-	-	-
C_5H_{12}	mol %	0.01	-	-	-	-	-
CO_2	mol %	0.24	-	-	-	-	-
N_2	mol %	0.34	-	-	-	-	-
TOTAL	**mol %**	**100.00**	**-----**	**-----**	**-----**	**-----**	**-----**
HHV	Btu/ft3	1,065	-----	-----	-----	-----	-----

PROCESS DESIGN SUMMARY - SI UNITS

Basis of Design

Each boiler is based on the following summary:

Parameter	Units	Values
Environment		
Jobsite		Graham, KY
Installation Location		Indoor
Elevation	m	161.0
Ambient Air Temperature	°C	27
Relative Humidity	%	60
Hazardous Classification		Non-Hazardous
Wind Speed	m/s	54
Seismic Zone		D
Thermal Performance		
Steam Flow [1]	kg/hr	13,600
Steam Pressure	kPa(g)	1,850
Steam Temperature	°C	Saturated
Blowdown Rate	%	3.0
Excess Air	%	15
Emissions - Natural Gas		
NOx	ppm	30.00
CO	ppm	100.00
Emissions Turndown		4:1
Utilities		
Make-up Water Temperature	°C	30
Make-up Water Supply Pressure	kPa(g)	300
Process Steam Pressure	kPa(g)	300
Power - LV Motors	Ph/Hz/V	3/60/480
Power - MV Motors	Ph/Hz/V	3/60/600
Power - Control Panel	Ph/Hz/V	1/60/120
Power - Instruments	Vdc	24

Parameter	Units	Values
Instrument Air	kPa(g)	700
Primary Fuel		Natural Gas
- Heat Input	MW	10.57
- HHV	kJ/m3	39,681
- Supply Pressure	kPa(g)	344.8
- Required Regulated Pressure	kPa(g)	172.4
- Firing Rate Turndown		10:1
Pilot Fuel		Natural Gas

Notes:

1. The steam flow is at 100% MCR and is NET at the terminal point. Does not account for any additional process flow requirements.
2. Feedwater must meet suggested Water Quality Limits per latest edition ASME CRTD - Vol. 34.

Fuel Details

Composition ↓ Fuel Name →	Units	Natural Gas	-	-	-	-	-
CH_4	mol %	92.60	-	-	-	-	-
C_2H_6	mol %	6.36	-	-	-	-	-
C_3H_8	mol %	0.38	-	-	-	-	-
C_4H_{10}	mol %	0.07	-	-	-	-	-
C_5H_{12}	mol %	0.01	-	-	-	-	-
CO_2	mol %	0.24	-	-	-	-	-
N_2	mol %	0.34	-	-	-	-	-
TOTAL	**mol %**	**100.00**	**-----**	**-----**	**-----**	**-----**	**-----**
HHV	MJ/Nm^3	39.68	-----	-----	-----	-----	-----

SCOPE DEFINITION

Major Boiler Island Equipment

One (1) boiler system is offered. The boiler system is supplied with the following:

Description	Qty	Supply		Installation	
		Rentech	Buyer	Rentech	Buyer
Boiler	**1**	☑	☐	☐	☑
Integral Steam Drum	1	☑	☐	☑	☐
Mud Drum	1	☑	☐	☑	☐
Convection Tubes	1 lot	☑	☐	☑	☐
Furnace Panels	1 lot	☑	☐	☑	☐
Steam Drum Internals	1 lot	☑	☐	☑	☐
Boiler Insulation & Lagging (Steel Roof, Alum. Sides)	1 lot	☑	☐	☑	☐
Boiler Base Beams & Supports	1 set	☑	☐	☑	☐
Mud Drum Heating Coil	N/A	☐	☐	☐	☐
Boiler Teflon Slide Plates	N/A	☐	☐	☐	☐
Sootblowers	N/A	☐	☐	☐	☐
Combustion Burner System	**1**	☑	☐	☑	☐
E-Style Windbox	1	☑	☐	☑	☐
Low NOx Burner	1	☑	☐	☑	☐
HE Direct Spark Class 3 Igniter System	1	☑	☐	☑	☐
Fuel Trains - Skid Mounted	**1**	☑	☐	☐	☑
Main Gas Train	1	☑	☐	☑	☐
Main Gas PRV Station	1	☑	☐	☑	☐
Pilot Gas Train	1	☑	☐	☑	☐
Instrument Air Train	1	☑	☐	☑	☐
Forced Draft Fan - Arrgt. 4 SWSI Windbox Mounted	**1**	☑	☐	☐	☑
Non-API FD Fan	1	☑	☐	☐	☑
Motor	1	☑	☐	☑	☐
Rainhood	N/A	☐	☐	☐	☐
Air Heater	N/A	☐	☐	☐	☐
Silencer w/Piezometer Tube	1	☑	☐	☐	☑
Fresh Air/FGR Mixing Box	N/A	☐	☐	☐	☐
Fresh Air Damper	N/A	☐	☐	☐	☐
Inlet Vane Damper w/Actuator	1	☑	☐	☑	☐
VFD (If Required)	0	☐	☑	☐	☑
Economizer - Vertical Gas Flow Up		☑	☐	☐	☑

Description	Qty	Supply		Installation	
		Rentech	Buyer	Rentech	Buyer
Economizer Headers & Tubes	1 lot	☑	☐	☑	☐
Internal Casing	1 lot	☑	☐	☑	☐
External Insulation	1 lot	☑	☐	☑	☐
External Lagging	1 lot	☑	☐	☑	☐
Exhaust Stack - Econ Mounted Stub Stack (52.5 ft)		☑	☐	☐	☑
Stack Cylinder (~30 ft)	1	☑	☐	☐	☑
Test Ports/CEMS Ports	4	☑	☐	☑	☐
Stack Personnel Protection	1 lot	☑	☐	☑	☐
Interconnecting Flues & Ducts	**1 lot**	☐	☐	☐	☐
Air Intake Duct	1 lot	☐	☑	☐	☑
Air Preheater Inlet Transition	N/A	☐	☐	☐	☐
Air Preheater Outlet Transition	N/A	☐	☐	☐	☐
Fan Evasé	N/A	☐	☐	☐	☐
Fan Evasé to Windbox Transition	N/A	☐	☐	☐	☐
Economizer Inlet Transition (Insulated/Lagged)	1	☑	☐	☐	☑
Economizer Outlet Transition	1	☑	☐	☐	☑
Flue Gas Recirc. Ducting	N/A	☐	☐	☐	☐
Expansion Joints - As Required	1 lot	☑	☐	☐	☑
Platforms & Support Steel	**1 Lot**	☐	☐	☐	☐
Platform, Burner Front	1	☑	☐	☐	☑
Platform, Steam Drum Front	1	☑	☐	☐	☑
Platform, Steam Drum Rear	1	☑	☐	☐	☑
Platform, Steam Drum Valve Access	1	☑	☐	☐	☑
Platform, Economizer	1	☑	☐	☐	☑
Platform, AIG Header Access	N/A	☐	☑	☐	☑
Platform, SCR Reactor Access	N/A	☐	☑	☐	☑
Platform, Stack Testing (3 ft x 360°)	1	☑	☐	☐	☑
Steel, FD Fan Inlet Support	N/A	☐	☐	☐	☐
Steel, Boiler PSV Silencer Support	N/A	☐	☐	☐	☐
Steel, Economizer Support (Integral w/Inlet Trans.)	1 lot	☑	☐	☑	☐
Steel, Deaerator Support	1 lot	☑	☐	☐	☑
Steel, Piping Supports	1 lot	☐	☑	☐	☑
Mechanical, FD Fan Motor Hoist		☐	☐	☐	☐
Mechanical, Catalyst Hoist		☐	☐	☐	☐
Mechnical, Stack Davit		☐	☐	☐	☐

Description	Qty	Supply		Installation	
		Rentech	Buyer	Rentech	Buyer
Mechnical, Stack Hoist		☐	☐	☐	☐
Mechanical, Stack Painting Ring		☐	☐	☐	☐
PIP Specifications		☐	☐	☐	☐
PE Stamped Structural Calcs		☐	☐	☐	☐
Control System	**Option**	☑	☐	☐	☑
NEMA 4X BMS Panel (Floor Mounted - Local)	1	☑	☐	☐	☑
- Burner Management System ("BMS")	1	☑	☐	☑	☐
• PLC (Option for AB GuardLogix or DeltaV)	1	☑	☐	☑	☐
• HMI	1	☑	☐	☑	☐
- Combustion Control System ("CCS")	1	☑	☐	☐	☐
• PLC (Option for AB GuardLogix or DeltaV)	1	☑	☐	☑	☐
• Standard Lights & Switches	1 lot	☑	☐	☑	☐
• Control Loops:	1 lot	☑	☐	☑	☐
→ Fully Metered, Cross-Limiting	1	☑	☐	☑	☐
→ 3 Element FW Control	1	☑	☐	☑	☐
→ O2 Trim	1	☑	☐	☑	☐
→ D/A Level Control	1	☑	☐	☑	☐
Blowdown System		☐	☑	☐	☑
Deaerator System	**1**	☑	☐	☐	☑
Deaerator Skid	1	☑	☐	☐	☑
- Deaerator	1	☑	☐	☑	☐
- Storage Tank (10 min storage)	1	☑	☐	☑	☐
- ASME Section VIII, Div. 1	-	☑	☐	☐	☐
- Insulation	1 lot	☐	☑	☐	☐
- Trim & Instrumentation	1 lot	☑	☐	☐	☑
Boiler Feedwater Pump Skid	1	☑	☐	☐	☑
- Pumps	2	☑	☐	☑	☐
- Skid Piping	2 sets	☑	☐	☑	☐
- Trim & Instrumentation	2 sets	☑	☐	☑	☐
- Skid Structure	1	☑	☐	☑	☐
Chemical Feed System		☐	☑	☐	☑
Steam & Water Sampling		☐	☑	☐	☑
Emissions Monitoring System		☐	☑	☐	☑
Trim, Instrumentation, & Piping	**1 lot**	☑	☐	☐	☑
See Trim, Instrumentation, & Piping Sections	1 lot	☑	☐	☐	☑

Description	Qty	Supply		Installation	
		Rentech	Buyer	Rentech	Buyer
Documentation & Engineering					
Standard Submittal Documentation for Approval	1 set	☑	☐	-----	-----
Manuals - English Language	1 set	☑	☐	-----	-----
ASME Documentation	1 set	☑	☐	-----	-----
NBRN & Code Calcs	1	☑	☐	-----	-----

Piping Scope of Supply and Installation

APH = Air Preheater
BFP = Boiler Feed Pump
CBD = Continuous Blowdown
CFS = Chemical Feed Skid
CDR = Condensate Return
DA = Deaerator
DSH = Desuperheater
ECON = Economizer
FW = Feedwater
MUW = Make-up Water
IBD = Intermittent Blowdown
MDHC = Mud Drum Heating Coil
PCV = Pressure Control Valve
TCV = Temperature Control Valve
PS = Pegging Steam

One (1) boiler system is offered. The boiler system is supplied with the following:

Pipe Section		Linear ft	Supply		Installation	
From	To		Rentech	Buyer	Rentech	Buyer
Deaerator						
MUW Header	MUW CV Station Inlet		☐	☑	☐	☑
MUW CV Station Outlet	DA MUW Inlet		☐	☑	☐	☑
PS Source	PS PCV Station Inlet		☐	☑	☐	☑
PS PCV Station Outlet	DA PS Inlet		☐	☑	☐	☑
CDR Header	DA CDR Inlet		☐	☑	☐	☑
DA Vent Outlet	Atmosphere		☐	☑	☐	☑
DA FW Outlet	BFP Suction		☐	☑	☐	☑
BFP Discharge	DA (BFP Recirculation)	TBD	☑	☐	☐	☑
Boiler Feedwater						
BFP Discharge	FW FCV Station Inlet	50	☑	☐	☐	☑
FW FCV Station Inlet	FW FCV Station Outlet	Assembly	☑	☐	☐	☑
FW FCV Station Outlet	Economizer Bypass Inlet	30	☑	☐	☐	☑
Econ Bypass Inlet	Econ Bypass Outlet	Assembly	☑	☐	☐	☑
Economizer Bypass Outlet	Steam Drum Inlet	30	☑	☐	☐	☑
Main Steam						
Non-Return Valve	Main Steam Stop Valve	2	☑	☐	☐	☑
Main Steam Stop Valve	Plant Header Tie Point		☐	☑	☐	☑
Process Steam						
Steam Source	DA PS Inlet		☐	☑	☐	☑
Trim/Drains/Vents						
Level Trim Drain Outlet	Grade - Near Boiler		☑	☐	☑	☐
Level Trim Vent Outlet	Atmosphere		☐	☑	☐	☑
Steam Drum Vent Outlet	Atmosphere		☐	☑	☐	☑
Startup Vent	Silencer Inlet	Option (10 ft)	☑	☐	☐	☑
Safety Valve Outlet(s)	Silencer Inlet	Option (10 ft)	☑	☐	☐	☑
Piping Drains	Grade, Tank, or Sump		☐	☑	☐	☑
Boiler/Econ Drains	Grade, Tank, or Sump		☐	☑	☐	☑

Pipe Section		Linear ft	Supply		Installation	
From	To		Rentech	Buyer	Rentech	Buyer
Blowdown						
Steam Drum CBD Outlet	CBD Code Isolation Valve		☑	☐	☐	☑
CBD Code Isolation Valve	CBD CV		☑	☐	☐	☑
CBD CV	Flash Tank Inlet		☐	☑	☐	☑
Flash Tank Vent Outlet	Low Pressure Header		☐	☑	☐	☑
Mud Drum IBD Outlet	IBD Code Isolation Valve		☑	☐	☐	☑
IBD Code Isolation Valve	Blowdown Tank		☐	☑	☐	☑
Fuel Gas						
Plant Header Tie Point	Gas PRV Station		☐	☑	☐	☑
Gas PRV Station	Fuel Train Inlet	Skid Mounted	☑	☐	☑	☐
Fuel Train Outlet	Burner Inlet Connection	10	☑	☐	☐	☑
Fuel Vent Valve Outlet	Safe Location for Venting		☐	☑	☐	☑
Instrument Air						
Plant Header Tie Point	Pneumatic Actuators		☐	☑	☐	☑
Plant Header Tie Point	Instrument Air Train		☐	☑	☐	☑
Instrument Air Train	Individual Users	Skid Users	☑	☐	☑	☐
Plant Header Tie Point	Observation Port Cooling		☐	☑	☐	☑
Sampling						
FW Sample Outlet	Sample Cooler Inlet		☐	☑	☐	☑
Drum/CBD Sample Outlet	Sample Cooler Inlet		☐	☑	☐	☑
Sat. Steam Sample Outlet	Sample Cooler Inlet		☐	☑	☐	☑
Chemical						
CFS Pump Outlet	Drum Chem. Inlet Valve		☐	☑	☐	☑
Drum Chem. Inlet Valve	Drum Chem. Feed Inlet		☑	☐	☐	☑

Notes:

1. Unless specifically stated, a check in "Installation - Rentech" column means shop installed.
2. Lengths expressed are preliminary. Actual lengths may vary and subject to cost changes.
3. Piping runs are based on transversing the shortest distance and does not account for any impediment.

Boiler Safety Trim

One (1) boiler system is offered. The boiler system is supplied with the following:

Description	Qty	Rentech	Installed	Description	Qty	Rentech	Installed
Safety Relief Valves							
Boiler	2	☑	☐	MDHC	0	☐	☐
Superheater	0	☐	☐	Gags	3	☑	☐
Economizer	1	☑	☐	Spring Covers	0	☐	☐
Deaerator	2	☑	☐	Drip Pan Elbows	3	☑	☐
Air Preheater	0	☐	☐	Silencer w/Supports	0	☐	☐
Water Columns							
Probe Type	1	☑	☑	Standpipe	1	☑	☑
Switches: LALL, LAL, LAH, LAHH	4	☑	☑	Select Switches	0	☐	☐
Process Block Valves	2	☑	☑	Process Block Valves	2	☑	☑
Drain Valve	2	☑	☑	Drain Valve	2	☑	☑
Vent Valve	0	☐	☐	Vent Valve		☐	☐
Water Level Gage Glasses							
Flat Glass	1	☑	☑	Flat Glass	1	☑	☑
Illuminator & Direct Vision Hood	1	☑	☑	Select LG Option		☐	☐
Select Front Remote Level	0	☐	☐	Select Rear Remote Level	1	☑	☑
Water Gage Valves (Set of 2)	1	☑	☑	Water Gage Valves (Set of 2)	1	☑	☑
Drain Valve	2	☑	☑	Drain Valve	2	☑	☑
Vent Valve	0	☐	☐	Vent Valve	0	☐	☐
Auxiliary Low Water Cut-Out (LWCO)							
Probe Type	1	☑	☑	Drain Valve	2	☑	☑
Block Valve	1	☑	☑	Vent Valve	0	☐	☐
Auxiliary Equipment Level Devices							
Deaerator Level Gage	1	☑	☑	Process Block Valves	0	☐	☐
Flash Tank Level Gage		☐	☐	Drain Valve	2	☑	☑
Flash Tank Float		☐	☐	Vent Valve	0	☐	☐
Ammonia Tank Level Gage		☐	☐	Relief Valve	1	☑	☐

Notes:

1. Unless specifically stated, a check in "Installed" column means shop installed.

Trim Valves

G = Gate	GL = Globe	CK = Check	B = Ball
BF = Butterfly	SC = Stop-Check	Str = Strainer	N = Needle
A = Angle	CV = Control Valve	ST = Steam Trap	SSO = Safety Shutoff
H = Manual Hand Valve	P = Pneumatic Actuator	M = Motor Operated	F = Flange
SW = Socketweld	BW = Buttweld	Thd = Threaded	SxT = SW x Thd

One (1) boiler system is offered. The boiler system is supplied with the following:

Description	Installed	Qty	Size	Type	Conn.	Class	Oper
Feedwater							
Feedwater FCV	☐	1	1-1/2"	GL	F	300#	P
FCV Isolation	☐	2	2"	G	F	300#	H
FCV Bypass	☐	1	2"	GL	F	300#	H
FCV Drain	☐	2	3/4"	G	SW	800#	H
Stop	☐	1	2"	G	F	300#	H
Check	☐	1	2"	CK	F	300#	H
Economizer Isolation	☐	2	2"	G	F	300#	H
Economizer Bypass	☐	1	2"	G	F	300#	H
Economizer Vent	☐	1	1"	GL	SW	800#	H
Economizer Drain	☐	2	3/4"	G	SW	800#	H
Main Steam							
Start-up Vent Isolation (Option)	☐	1	2"	G	F	300#	H
Start-up Vent CV (Option)	☐	1	2"	GL	F	300#	P
Steam Non-Return	☐	1	6"	SC	F	300#	H
Main Steam Stop	☐	1	6"	G	F	300#	H
Free Blow Drain	☐	1	1"	GL	SW	800#	H
Boiler Blowdown							
Continuous Blowdown CV	☐	1	1"	GL	SW	800#	H
Continuous Blowdown Block	☐	1	1"	G	SW	800#	H
Intermittent Blowdown	☐	2	1-1/2"	GL	SW	800#	H
Sample Valves							
Steam Sample	☐	2	3/4"	G	SW	800#	H
Water Sample	☐	1	1/2"	G	SW	800#	H
Boiler							
Steam Drum Vent	☐	1	1"	GL	SW	800#	H
Mud Drum Drain	☐						
Air Preheater (APH)	Opt.						
APH TCV	☐	1	1"	GL	F	300#	P

Description	Installed	Qty	Size	Type	Conn.	Class	Oper
TCV Isolation	☐	2	1"	G	SW	800#	H
TCV Bypass	☐	1	1"	G	SW	800#	H
TCV Drain	☐	4	3/4"	G	SW	800#	H
APH Isolation	☐	2	1"	G	SW	800#	H
Trap	☐						
Strainer	☐						
APH Drain	☐	2	3/4"	G	SW	800#	H
Main Gas Fuel Train							
Manual Shutoff	☑	1	3"	G	F	150#	H
Wye Type Strainer	☑	1	3"	Str	F	150#	H
Pressure Gauge Isolation	☑	1	1/2"	G	SW	800#	H
Gas PRV	☑	1	3"	CV	F	150#	P
Vent	☑	1	1"	G	SW	800#	H
Auto Safety Shutoff w/Pos Switches	☑	1	3"	B	F	150#	P
Bleed/Leak Test	☑	1	1/2"	G	SW	800#	H
Manual Vent	☑	1	1-1/2"	G	F	150#	H
Auto Vent w/Pos Switches	☑	1	1-1/2"	B	F	150#	P
Auto Safety Shutoff w/Pos Switches	☑	1	3"	B	F	150#	P
Bleed/Leak Test	☑	1	1/2"	G	SW	800#	H
Manual Shutoff	☑	1	3"	B	F	150#	H
FCV w/Pos Switches	☑	1	1-1/2"	B	F	150#	P
FCV w/Pos Switches	☑	1	1"	B	F	150#	P
Pilot Gas Train							
Manual Shutoff	☑	1	3/4"	G	SW	800#	H
Wye Type Strainer	☑	1	3/4"	Str	F	150#	H
Pressure CV	☑	1	3/4"	CV	F	150#	P
Check Valve	☐						
Pressure Gauge Isolation	☐						
Auto Safety Shutoff w/Pos Switches	☑	1	3/4"	B	F	150#	P
Auto Vent w/Pos. Switches	☑	1	3/4"	B	F	150#	P
Auto Safety Shutoff w/Pos Switches	☑	1	3/4"	B	F	150#	P
Pressure Gauge Isolation	☑	1	1/2"	G	SW	800#	H
Instrument Air Train							
Air Manual Shutoff	☑	1	1"	B	SW	800#	H
Pressure Regulating Valve	☐						
Pressure Gauge Isolation	☑	1	1/2"	B	SW	800#	H
User Isolation	☑	10	1/2"	B	SW	800#	H

Description	Installed	Qty	Size	Type	Conn.	Class	Oper
Deaerator							
Manual Vent	☑	1	3/4"	G	Thd	125#	H
Overfow Trap	☐	1	3"	ST	F	150#	H
Isolation	☑	4	1-1/2"	G	Thd	125#	H
Water Inlet	☑	1	3/4"	B	Thd		M
MUW Isolation	☑	2	2"	G	Thd	125#	H
MUW Bypass	☑	1	2"	GL	Thd	125#	H
MUW Strainer	☑	1	2"	Str	Thd	250#	H
Tank Drain	☑	1	1"	G	Thd	125#	H
Scrubber Drain	☑	1	3/4"	G	Thd	125#	H
E Main Regulator	☑	1	1-1/4"	CV	Thd	300#	P
PRV Isolation	☑	2	1-1/4"	G	Thd	800#	H
PRV Strainer	☑	1	1-1/4"	Str	Thd	600#	H
PRV Bypass	☑	1	1-1/4"	GL	Thd	800#	H
Boiler Feed Pump Skid							
Suction Isolation	☑	2	4"	G	F	125#	H
Suction Wye Strainer	☑	2	4"	Str	F	125#	H
Discharge Isolation	☑	2	2"	G	Thd	800#	H
Pump Discharge Check	☑	2	2"	CK	Thd	800#	H
Pump Discharge Bypass	☐						
Pump Recirc. CV	☐						
Pump Recirc. Check	☑	2	1-1/4"	CK	Thd	125#	H
Pump Recirc. Isolation	☑	2	1-1/4"	G	Thd	125#	H

Instrumentation

One (1) boiler system is offered. The boiler system is supplied with the following:

Description	Qty	Rentech	Installed	Description	Qty	Rentech	Installed
Analyzers							
O2 (Trim Control)	1	☑	☐	COe (Combustibles)	0	☐	☐
O2 (CEMS)	0	☐	☐	Conductivity (Steam)		☐	☐
NOx	0	☐	☐	Conductivity (Water)		☐	☐
SOx	0	☐	☐	pH (Water		☐	☐
NH3	0	☐	☐			☐	☐
Flame Scanners							
Scanners Per Burner	2	☑	☐	UV	-	-	-
Scanners Per Boiler	2	☑	☐	Local Signal Strength	-	☑	☐
1oo2 Voting	-	☑	☐	Local Flame Relay	-	☑	☐

O = Orifice Plate
P = Piezometer
F = Flow Nozzle
V = Venturi Tube
M = Magnetic
C = Coriolis
A = Annubar
T = Thermal
U = Ultrasonic
X = Other
* = Shop Installed

Flow Elements										
Service	**O**	**P**	**F**	**V**	**M**	**C**	**A**	**T**	**U**	**X**
MUW Supply to DA										
Condensate Return to DA										
PS Supply to DA										
Boiler Feedwater Supply to FCV	1									
Chemical Feed to Steam Drum										
Continuous Blowdown										
Steam to Header	1									
Combustion Air Supply		1								
Flue Gas Recirculation										
Fuel Gas Supply	1									

PI = Pressure Indicator
PT = Pressure Transmitter
DPT = Diff. Press. Transmitter
PS = Pressure Switch
PDS = Diff. Press. Switch
PDI = Diff. Press. Indicator

TC/TW = Thermocouple/Thermowell
TI = Temperature Indicator
TS = Temperature Switch
TT = Temperature Transmitter
LT = Level Transmitter
LG = Level Gauge/Glass

LS = Level Switch/Probe
FT = Flow Transmitter
MV = Multi-Variable
O = Option
* = Indicating Transmitter

Miscellaneous Instrumentation															
Description	**PI**	**PS**	**PT**	**PDI**	**PDS**	**DPT**	**TI**	**TS**	**TT**	**TC**	**LT**	**LG**	**LS**	**FT**	**MV**
Combustion Air															
Fresh Air Inlet										1				1	
FD Fan Discharge	1									1					
Combustion Flue Gas															
Burner Windbox			1		2										
Furnace	1	1													
Boiler Convection Section															
Boiler Outlet	1									1					
Economizer Inlet									1						
Economizer Outlet	1		1						1						
Stack Exhaust															
Boiler Feedwater															
Upstream of BFW PRV Station															
Upstream of BFW FCV Station	1						1							1	
FCV Station Outlet															
Upstream of Economizer Inlet							1			1					
Downstream of Economizer							1			1					
Steam															
Steam Drum	1	2	1								3	2			
Steam to Header			1						1					1	
Blowdown															
Continuous Blowdown															
Intermittent Blowdown															
Fuel Trains															
Main Gas	3		2											1	
Pilot Gas	1														
Instrument Air	1		1												

Description	PI	PS	PT	PDI	PDS	DPT	TI	TS	TT	TC	LT	LG	LS	FT	MV
Deaerator															
Heater Section															
Storage Tank	1		1				1		1		1	1	2		
Make-up Water	1														
Condensate Return															
Pegging Steam															
Pump Inlet															
Pump Discharge			1												
Pump Recirc Line															

Notes:

1. Some instrumentation that is located on a skid may be shop installed; however, most instrumentation will be shipped loose for protection during transit. Field installation is by Others.
2. Pressure transmitters will be supplied with a 2-valve manifold. Differential pressure transmitters will be supplied with 3-valve manifold.
3. See Supplier List for Supplier's standard trim & instrumentation manufacturers and model numbers.
4. The above trim sizes, types, connections, and classes are preliminary and subject to change during Engineering Phase.

Buyer's Scope of Supply

The following itmes are not within the scope of this proposal. Design, supply, and installation of and/or associated with these items are understood by Supplier to be in the scope of the Buyer or Other party:

1. Civil works including dirt work, concrete foundations, anchor bolts, grouting, and buildings/shelters as required.
2. Piping beyond boiler terminal points described herein.
3. Piping insulation and lagging.
4. Fuel filtering, conditioning, treatment, and forwarding eqiupment and associated instrumentation not specifically described herein.
5. Electrical wiring, cable, conduit, power supplies, feeds, motor starters/control centers (MCCs), lighting, or grounding unless specifically described herein.
6. HAZOP/LOPA/SIL workshops and evaluations or resulting upgrades/additions.
7. Commissioning activities such as boil-out, flushing, chemical cleaning, steam blowing or field alignment/balancing of rotating equipment unless specifically described herein.
8. Field service not specifically included elsewhere herein.
9. Permits, licenses, or other regulatory requirements for installing, commissioning, or operating the equipment.

COMMERCIAL PROPOSAL

Base Pricing

Rentech provideds the following **BUDGETARY (± 15%)** pricing for the proposed scope:

Item	Description	Unit Price (USD)	Qty	Total Price (USD)
1	RTD-1-40 Saturated Shop Assembled Boiler	1,723,640	1	**1,723,640**
2	Gas Fired Burner System	INCLUDED	1	**INCLUDED**
3	FD Fan System	INCLUDED	1	**INCLUDED**
4	Fuel Train(s)	INCLUDED	1	**INCLUDED**
5	Economizer	INCLUDED	1	**INCLUDED**
6	Control System	OPTION OFFERED	0	**BY OTHERS**
7	Exhaust Stack	INCLUDED	1	**INCLUDED**
8	Lot of Flues & Ducts	INCLUDED	1	**INCLUDED**
9	Lot of Structural Steel & Platforms	INCLUDED	1	**INCLUDED**
10	Lot of Piping	INCLUDED	1	**INCLUDED**
11	Lot of Trim & Instrumentation	INCLUDED	1	**INCLUDED**
12	Deaerator/Feed Pump Skid & Devices	250,760	1	**250,760**
13	Blowdown System	BY OTHERS	0	**BY OTHERS**
14	Chemical Feed System	BY OTHERS	0	**BY OTHERS**
15	Steam & Water Sampling System	BY OTHERS	0	**BY OTHERS**
16	Emissions Monitoring System	BY OTHERS	0	**BY OTHERS**
23	Transportation - FCA Jobsite	145,530	1	**145,530**
	TOTAL PRICE - BASE SCOPE OF SUPPLY FCA Jobsite (Incoterms 2020)			**USD 2,119,930**

Option Pricing

The following Equipment or Services are not included in the Base Pricing above. Pricing shown will be added or subtracted from the base pricing above:

Item	Description	Unit Price (USD)	Qty	Total Price (USD)
1	**ADD** - Change to free-standing stack	28,230	1	**28,230**
2	**ADD** - Change to seamless boiler tubes	37,930	1	**37,930**
3	**ADD** - Change to seamless econ tubes	8,060	1	**8,060**
4	**ADD** - Change to non-overhung FD Fan	20,520	1	**20,520**
5	**ADD** - Start-up Vent w/Silencer	50,270	1	**50,270**
6	**ADD** - Boiler PSV Vent Piping & Silencer	35,890	1	**35,890**
7	**ADD** - Change to front drum LG to Simpliport	12,470	1	**12,470**
8	**ADD** - Probe type WC w/Remote Indicator	18,630	1	**18,630**
9	**ADD** - BMS/CCS: AB GuardLogix PLCs	157,280	1	**157,280**
10	**ADD** - BMS/CCS: DeltaV System	293,830	1	**293,830**
11	**ADD** - Steam Coil Air Preheater System	75,750	1	**75,750**

Technical Field Advisory Services

TFA Services are offered on a per diem basis. Please see the Field Services Rates for TFA rates and restrictions. Actual services will be charged in accordance with our Field Services Rates.

Terms of Payment

The following progress payments are typical:

Item	Description	Wks ARO	% of Order
1	With receipt of project award and notice to proceed.	0	10
2	Upon submittal of mechanical drawings	12	10
3	Upon receipt of boiler tubes	20	20
4	Upon receipt of drum cylinders	26	20
5	Upon stabbing of first boiler tube	30	20
6	Upon successful shop hydro test	42	10
7	Upon notification readiness to ship	52	10

Schedule & Shipment

The following preliminary schedule is provided to meet delivery of equipment.

Item	Description	Wks to Complete	Wks ARO
1	Receipt of Award	0	0
2	Review and Acceptance of Award	1	1
3	Turnover to Project Team	1	2
4	Drawing Submittal: Overall General Arrangement	10	12
5	Drawing Submittal: Foundation Plan & Loads	10	12
6	Drawing Submittal: P&IDs	10	12
7	Customer Review of submittal Drawings	2	14
8	Drawing Submittal: Electrical/Controls Documents	4	18
9	Receipt of Boiler Tubes at Manufacturing Facility	16	20
10	Receipt of Boiler Drum Cylinders at Manuf. Facility	22	26
11	Boiler Assembly Starts	10	32
12	Boiler Ready for Hydro Test	12	44
13	Boiler Ready for Smoke Test	4	48
14	Boiler Ready for Shipment	4	52
15	Boiler Delivered to Jobsite	2	54
16	Installation	10	64
17	Start-up/Commissioning	2	66
18	3rd Party Emissions Testing	2	68
19	Acceptance	0	68

ARO = After Receipt of Order

Guarantees

One (1) boiler system is offered. The boiler system is supplied with the following:

Parameter	Units	Values	Variance
Thermal Performance [1, 2, 3, 4]			
Maximum Continuous Rating (MCR)	kg/h (lb/hr)	13,600 (29,983)	Must Meet
Steam Pressure	kPag (psig)	1,850 (268)	
Steam Temperature	°F	Saturated	
Thermal Efficiency (HHV Basis)	%	83.7	Must Meet
Steam Purity	%	99.9	Must Meet
Total Dissolved Solids in Steam	ppm	1	NTE
Emissions - Natural Gas			
NOx	ppm	30	NTE
CO	ppm	100	NTE
Emissions Turndown		4:1	

Commercial Notes

1. Transportation

Transportation prices for major equipment can vary widely depending on location, regulatory approval of route, and utility work/police escort required by local authorities along the route. The estimate is based on previous experience for similar equipment to the same region and is shown at cost plus 15%.

2. Bid Validity

Pricing is for budgetary purposes only and can be made firm if requested. RENTECH intends for pricing to be valid for thirty (30) days and is based upon this proposal and the bid specifications received to date.

3. Escalation Statement

Should the price of material or energy increases more than three (3%) percent during the term of the contract through no fault of the Seller and not due to the Buyer's request for change in scope of supply, the contract sum shall be equitably adjusted by a change order as provided for in the agreed contract. The contract will be adjusted for the difference between the actual material cost at the time of this proposal and the actual material cost at the time the material is received. Such price adjustments shall be documented by vendor quotes, invoices, catalogs, receipts, or other documents of commercial use.

4. Payment Terms

Payment Terms are **Net 30** days from receipt of invoice.

5. Storage

Buyer will be notified that Equipment is ready for shipment. Buyer will have ten (10) business days to release Equipment for shipment. After ten (10) days, Buyer will be charged a storage fee for the Equipment. Storage fee will be assessed at 1% of the contract price per week.

6. Schedule & Shipment

Schedule is ± 2 wks.

Schedule is based on current lead times in effect at time of proposal. Lead times will be updated at time of award.

Schedule is based on normal working hours and does not include overtime or holiday schedule.

Electrical/Controls drawings are submitted approximately 4 weeks after the return of approved P&IDs and GAs. This is to better coordinate tag numbers and Equipment that may have changed during the approval process of the original submittal documents.

7. Guarantees

Above performance is at 100% MCR only and based on firing .

Feedwater analysis must meet suggested Water Quality Limits per latest edition of ASME CRTD Vol. 34.

The steam conditions are at the NRV Outlet.

MCR is gross capacity is at the Terminal Point without considering any takeoff for Deaerator heating/pegging steam, atomizing steam, or other such uses.

Steam is Saturated. No variance is offered.

Emission guarantees stated are at 3% O_2.

ASME WATER QUALITY

Suggested Water Chemistry Limits for Industiral Watertube, High Duty, Natural Gas Fired, RTD-1-40

Make-up water percentage: Up to 100% feedwater

Conditions: Includes superheater, turbine drives, or process restriction on steam purity

Saturated steam purity target: See tabulated values below.

Drum Operating Pressure psig (MPa)	0 - 300 (0-2.1)	301-450 (2.1-3.1)	451-600 (3.4-4.1)	601-750 (4.2-5.2)	751-900 (5.2-6.2)	901-1000 (6.2-6.9)	1001-1500 (6.9-10.3)	1501-2000 (10.4-13.8)
Feedwater								
Dissolved oxygen, ppm O2 Measured before chemical oxygen scavenger addition	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
Total iron, ppm Fe	< 0.1	< 0.05	< 0.03	< 0.025	< 0.02	< 0.02	< 0.01	< 0.01
Total copper, ppm Cu	< 0.05	< 0.025	< 0.02	< 0.02	< 0.015	< 0.01	< 0.01	< 0.01
Total hardness, ppm $CaCO_3$	< 0.3	< 0.3	< 0.2	< 0.2	< 0.1	< 0.05	ND	ND
pH @ 25°C	8.3 - 10.0	8.3 - 10.0	8.3 - 10.0	8.3 - 10.0	8.3 - 10.0	8.8 - 9.6	8.8 - 9.6	8.8 - 9.6
Chemicals for preboiler system protection	NS	NS	NS	NS	NS	VAM	VAM	VAM
Nonvolatile TOC, ppm C	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2
Oil matter, ppm	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2
Boiler Water								
Silica, ppm	< 150	< 90	< 40	< 30	< 20	< 8	< 2	< 1
Total alkalinity, ppm (mg/L)	< 700 (3)	< 600 (3)	< 500 (3)	< 200 (3)	< 150 (3)	< 100 (3)	< NS (4)	< NS (4)
Free OH alkalinity, ppm [2]	NS	NS	NS	NS	NS	NS	ND [4]	ND [4]
Specific conductance, µΩ/cm (µS/cm) @ 25°C without neutralization [5]	5400 - 1100	4600 - 900	3800 - 800	1500 - 300	1200 - 200	1200 - 200	< 150	< 80
Total Dissolved Solids in Steam [9]								
TDS (max), ppm	1.0 - 0.2	1.0 - 0.2	1.0	0.2	0.5 - 0.1	0.5 - 0.1	0.1	0.1

NS = Not Specified; ND = Not Detectable; VAM = Use only volatile alkaline materials upstream of attemperation water source.

Notes:

1. With local heat fluxes >1.5 x 105 Btu/hr/ft^2 (>473.2 kW/m^2), use values for at least the next higher pressure range.
2. Minimum hydroxide alkalinity concentrations in boilers below 900 psig (6.21 MPa) must be individually specified by a qualified water treatment consultant with regard to silica solubility and other components of internal treatment. See section 6.6 of ASME code.

3. Maximum total alkalinity consistent with acceptable steam purity. If necessary, should override conductance as blowdown control parameter. If makeup is demineralized quality water and boiler operates at less than 1000 psig (6.89 MPa) drum pressure, the boiler water conductance should be that in table for 100-1500 psig (6.9-10.34 MPa) range. In this case, the necessary continuous blowdown will usually keep these parameters below the tabulated maximum values. Alkalinity values in excess of 10% of specific conductance values may cause foaming.

4. Not detectable in these cases refers to free sodium or potassium hydroxide alkalinity. Some small variable amount of total alkalinity will be present and measurable with the assumed congruent or coordinated phosphate-pH control or volatile treatment employed at these high pressure ranges.

5. Maximum values are often not achievable without exceeding maximum total alkalinity values, especially in boilers below 900 psig (6.21 MPa) with >20% makeup of water whose total alkalinity is >20% of TDS naturally or after pretreatment by lime-soda, or sodium cycle ion exchange softening. Actual permissible conductance values to achieve any desired steam purity must be established for each case by careful steam purity measurements. Relationship between conductance and steam purity is affected by too many variables to allow its reduction to a simple list of tabulated values.

6. Nonvolatile TOC is that organic carbon not intentionally added as part of the water treatment regime. See Section 6.4 of ASME code.

7. Boilers below 900 psig (6.21 MPa) with large furnaces, large steam release space, and internal chelant, polymer, and/or antifoam treatment can sometimes tolerate higher levels of feed water impurities than those in the table and still achieve adequate deposition control and steam purity. Removal of these impurities by external pretreatment is always a more positive solution. Alternatives must be evaluated as to practicality and economics in each individual case.

8. Values in the table assume existence of a deaerator.

9. Achievable steam purity depends on many variables, including boiler water total alkalinity and specific and specific conductance as well as design of boiler steam drum internals and operating conditions [(Note 5)]. Since boilers in this category require a relatively high degree of steam purity for protection of the superheaters and turbines, more stringent steam purity requirements such as process steam restrictions on individual chemical species or restrictions more stringent than 0.1 ppm (mg/l) TDS turbine steam purity must be addressed specifically.

10. As a general rule, the requirements for attemperation spray water quality are the same as those for steam purity. In some cases boiler feed water is suitable; however, frequently additional purification is required. In all cases the spray water should be obtained from a source that is free of deposit forming and corrosive chemicals such as sodium hydroxide, sodium sulfite, sodium phosphate, iron, and copper. The suggested limits for spray water quality are < 30 ppb (µg/l) TDS maximum, < 10 ppb (µg/l) Na maximum, < 20 ppb (µg/l) SiO_2 maximum, and it should be essentially oxygen free.

11. Low pressure boilers frequently use feed water that is suitable for use in higher pressure boilers. In these cases the boiler water chemistry limits should be based on the pressure range that is most consistent with the feed water quality. See Sections 1 and 6.2 of ASME code regarding blowdown.

12. Conversion from ppm (mg/l) TDS values in the ABMA standards [12] used a factor of 0.65. See Section 6.7 of ASME code.

CLARIFICATIONS & EXCEPTIONS

C = Clarification; E = Exception; G = General Comment

Comments

Item	Type	Section	Page(s)	Comments
General Commercial Comments				
1	G	-	-	This proposal is for budgetary pricing and delivery and is based on a typical equipment package for the application using manufacturer standard offerings. Compliance with any Buyer specifications will require review and estimating at the time of firm-price bidding.
2	G	-	-	The basis of pricing is this proposal and its associated documents. In an instance where there is conflict between the Supplier's proposal and Buyer's specifications, this proposal shall take precedence. Only the Equipment and Services specifically stated as included shall be considered part of Supplier's offering and pricing. Any additional Equipment and/or Services may be offered at an additional price.
3	G	-	-	The schedule stated in this proposal and associated documents is considered estimated only and not a guaranteed lead time. Supplier has made every effort to estimate the lead times based on material lead times and shop availability at time of proposal.
4	G	-	-	This proposal is made on the basis of Supplier's attached Standard Terms and Conditions contained herein. In the event scope of this proposal offering is accepted, a mutually acceptable set of terms and conditions may be negotiated.
5	G	-	-	Supplier can estimate freight costs based on previous experience. Actual freight costs for heavy haul transport such as that for boilers can vary widely depending on site location, regulatory approval of route, and utility work / police escort required by local authorities along the route. In the event Supplier is made responsible for transport of Equipment to the agreed to FOB Point, Buyer will be billed at cost plus 15%.
General Technical Comments				
1	G	-	-	Boiler, pressure vessels, and piping shall be designed and manufactured in accordance with ASME Boiler and Pressure Vessel Code. Price and delivery are subject to adjustment for consideration of other codes, standards, or Buyer specifications.

Item	Type	Section	Page(s)	Comments
2	G	-	-	This equipment is understood to be installed indoors in a non-hazardous area. Fuel trains and burner equipment will be rated for Class I Division 2 hazardous area installation. If hazardous area classification per NEC, IEC, or other standard or specification is to be considered for other equipment, pricing and delivery may require adjustment to comply. Freeze protection is not included.
3	G	-	-	Supplier has included shop wiring and junction boxes for the burner windbox and fuel trains. All other instrumentation devices will be shipped loose for field mounting and field wiring by Buyer to the control cabinet(s).
4	G	-	-	No MCCs, motor starters, or power distribution panels are provided. Motors shall be field wired to the Buyer’s MCC by the Buyer. Motor I/O shall be field wired from the Buyer’s MCC to the Supplier’s PLC cabinet. All other electric power supply circuits shall be fed and field-wired from Buyer’s power distribution system by Buyer.

Technical Field Advisory Services
2026 Domestic Rate Sheet

Rentech Boiler Systems, Inc. can provide Technical Field Advisory (TFA) services by authorized representatives for installation, inspection, commissioning / startup support, consulting, and plant personnel training activities. The following rates will apply:

TFA Service Type	Standard Hourly Rate[1,5,6]	General Description
Boiler Mechanical Installation	$190.00[2,3,4]	Boiler mechanical assembly, erection, pre-commissioning inspection support.
Boiler Mechanical Commissioning / Startup or Engineering Consultation	$255.00[2,3,4]	Boiler mechanical startup / commissioning support, performance or condition assessment, test witnessing, design or process safety workshop attendance, FAT attendance, etc.
Burner Installation, Commissioning / Startup	$325.00[2]	Burner inspection, checkout, adjustment, combustion tuning support.
Control System Commissioning / Startup	$275.00[2]	Checkout, adjustment, tuning, etc. of boiler equipment controls and/or burner management systems provided by Rentech
Fan Installation, Commissioning / Startup	$225.00[2]	Installation support and Inspection, checkout, startup, test witnessing, etc. Motor or VFD TFA service may be separate if requested.
Emissions System Installation, Commissioning / Startup	$255.00[2]	SCR or similar systems associated with emissions control.

Notes:

1. Validity: Rates are quoted on a time and material basis, and do not include travel or living expenses. The rates above are good through **December 31st, 2026** only.
2. Estimated Rates and Billing Rates: Boiler mechanical TFA services will be billed at the rates shown. For TFA Services provided by authorized TFA's of Rentech's equipment subvendors (controls, burner, fan, emissions systems, etc.), Rentech will estimate TFA services per the rates and terms on this sheet, but will bill at the subvendor's billed amount plus 15% and according to the terms stipulated by that subvendor. Billed hourly subvendor rates will not be allowed to exceed the standard hourly rates for the categories listed above. (Rentech may elect to use subcontractors for Boiler Mechanical TFA service, but the Boiler Mechanical TFA rates listed above will still apply.)
3. Expenses and Per Diem: All travel, lodging, and incidental expenses will be billed in addition to the hourly TFA service charges at cost plus 15% administration fee. Meal expenses will be billed at a **per diem rate of $100.00**. No meal receipts will be submitted.
4. Rates and Time Charging Notes:
    a. Standard, Overtime & Premium Time Rates: Standard Hourly Rate is used for time worked or on standby from Monday to Friday up to a maximum of 8 hours per day. Time worked on weekdays beyond this and/or during the hours of 6:00 PM through 6:00 AM is

considered overtime and will be billed at 1.5 times the standard hourly rate. Any work performed on Saturdays will be billed at 1.5 times the standard hourly rate. On Sundays or US holidays, work performed during the hours of 6:00 AM through 6:00 PM will be billed at the premium rate of 2 times the standard hourly rate and during the hours of 6:00 PM through 6:00 AM will be billed at the premium rate 2.5 times the standard hourly rate.

b. Travel Time: Travel time will be billed same as working time. Overtime / premium rates apply to weekend and holiday travel time. Days that include both travel time and service time will be billed up to 8 hours at the applicable rate, and overtime / premium rates will apply to anything beyond 8 hours. Company/personal vehicle mileage will be charged at $0.72/mile.

c. Standby Time: The customer may elect to have a TFA service representative not attend the job site, but to be readily available to report to the jobsite, such as standing by in the hotel rather than releasing them from service to travel home or elsewhere. This is defined as standby time and is billed at the standard hourly rate up to a maximum of 8 hours per day. Standby will be charged for any non-working days if the technician has not been released by the customer to travel home or elsewhere, including weekends.

d. Minimum Time Charge: Minimum charge per day will be 8 hours. This applies to travel, onsite, and standby hours.

e. Documentation and Approval: TFA services are provided at request of and under direction of the customer. Timesheets will be provided to the customer by all TFA service representatives. Customer will specify and monitor hours/days worked while onsite and sign timesheets approving those hours before the technician is dismissed from the site.

5. Service Notes:

a. Role & Responsibility: All TFA services provided by or through Rentech (including sub-vendors) are strictly advisory services. Service is provided under the direction of and as requested and scheduled by the customer. Coordination and scheduling of all activities and operation between parties and facilities remains the responsibility of the customer. Any tools, safety equipment other than basic PPE, equipment access, permits, work by qualified tradesmen, or any other physical labor are the responsibility of the customer.

b. Operations Personnel: The customer shall supply qualified operators at all times for any equipment, especially during startup and commissioning. Personnel dispatched by Rentech and its sub-vendors are not necessarily qualified or permitted to operate boilers or other equipment unassisted. Any direction by Rentech or its sub-vendors in the operation of the equipment is made in good faith, but any final operational decisions shall remain the responsibility of the qualified operators provided by the customer.

6. Terms & Conditions: "Rentech Boiler Systems, Inc. Technical Assistance Terms and Conditions" apply to all TFA service contracted through Rentech Boiler Systems, Inc.

RENTECH BOILER SYSTEMS, INC. STANDARD TECHNICAL ASSISTANCE TERMS AND CONDITIONS

All Technical Assistance provided by RENTECH Boiler Systems, Inc. (the "Seller") are based upon and conditioned upon the following terms and conditions. No provision, printed or otherwise, contained in any order, acceptance, confirmation or acknowledgment which is inconsistent with, different from or in addition to these Standard Terms and Conditions of Sale is accepted by Seller, unless specifically agreed to in writing by Seller. No order for or changes to any terms or scope of an order for the Seller's Technical Assistance ("Service") shall be binding until accepted in writing by the Seller at its home office at Abilene, Texas.

1. **QUOTATIONS.** Seller's quotations are valid for thirty (30) days from the date of the quotation unless otherwise stated. The latest quotation supersedes all previous quotations or correspondence concerning the transaction. If Service is performed on an hourly basis then the most current Rate Sheet will apply.

2. PRICE. Rates are valid for thirty days from date of initial dispatch of the Service technician. Thereafter rates may be changed by Seller with one week advance written notice.

3. PAYMENT. Unless otherwise stated in writing by Seller, payment of all invoices shall be net 30 days. To the extent permitted by applicable laws, Buyer shall pay on demand, as a late charge, an amount equal to 1.5% per month of each payment which remains overdue or the maximum rate allowed by applicable law. Buyer's failure to make payment when due shall be a material breach of the order and these terms and conditions. The Seller, at its sole option, and without incurring any liability, may suspend its performance until such time as the overdue payment is made or Seller is provided assurances, adequate in Seller's opinion, that the payment shall be promptly made. Payments due hereunder shall in no event be subject to set-off with any other order or business arrangement. Waivers of lien by Seller shall be contingent upon Seller receiving in full all payments due hereunder.

4. **WARRANTY** All Service shall be performed by seller in a workman like manner, consistent typical industry practices. If within 90 days of the performance of service, any service that is found to be deficient, the Seller will correct the deficiency. There are no other warranties, express or implied, except as expressly stated herein. Seller extends no implied warranty of merchantability or fitness for a particular purpose. The seller shall not be responsible for Goods and Services furnished by the Buyer or other third parties, or the costs thereof. Buyer's remedies under this warranty are specifically limited to the correction of any deficient Services performed by Seller and are exclusive of all other remedies.

5. **OBLIGATIONS OF BUYER**. Services rendered by Seller, whether with or without charge, are only technical or advisory in nature and are merely incidental to the sale of any Equipment. When any such services are rendered, Buyer will retain full responsibility for and full control, custody and supervision of the Equipment and the installation, selection of material therefore, use or operation there of, and a representative of Buyer shall be present with full authority to direct operations. If Seller furnishes technical or other advice to Buyer, whether or not at Buyer's request, with respect to Buyer's process or equipment, such advice shall be made in good faith, and Buyer assumes all risk of such advice and the results thereof. Buyer shall provide for free and safe access to the worksite and equipment.

6. **LIMITATION OF LIABILITY**. SELLER'S LIABILITY IS LIMITED TO THE PRICE ALLOCABLE TO THE SERVICE DETERMINED DEFECTIVE, AND IN NO EVENT WILL SELLER'S CUMULATIVE LIABILITY BE IN EXCESS OF THE TOTAL PRICE OF SERVICE, WHETHER ARISING UNDER WARRANTY, CONTRACT, NEGLIGENCE, STRICT LIABILITY, INDEMNIFICATION, OR ANY OTHER CAUSE OR COMBINATION OF CAUSES WHATSOEVER. SELLER AND BUYER WILL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOST PROFIT WHETHER ARISING UNDER WARRANTY, CONTRACT, NEGLIGENCE, STRICT LIABILITY, INDEMNIFICATION, OR ANY OTHER CAUSE OR COMBINATION OF CAUSES WHATSOEVER. THIS LIMITATION SHALL APPLY NOTWITHSTANDING ANY FAILURE OF ESSENTIAL PURPOSE OF ANY LIMITED REMEDY. BUYER'S REMEDIES ARE SPECIFICALLY LIMITED TO THE REPAIR OR REPLACEMENT OF THE DEFECTIVE SERVICE AND ARE EXCLUSIVE OF ALL OTHER REMEDIES. SHOULD THESE REMEDIES BE FOUND INADEQUATE OR TO HAVE FAILED THEIR ESSENTIAL PURPOSE FOR ANY REASON WHATSOEVER, BUYER AGREES THAT RETURN OF THE FULL SALES ORDER PRICE TO IT BY SELLER SHALL PREVENT THE REMEDIES FROM FAILING THEIR ESSENTIAL PURPOSE AND SHALL BE CONSIDERED BY BUYER AS A FAIR AND ADEQUATE REMEDY.

7. **EQUIPMENT SALE**. It is expressly understood that any Equipment furnished by Seller will be addressed in a separate written agreement between the parties. In no event will any such Equipment provided by Seller constitute a waiver by Seller of any of these terms and conditions or affect or expand Seller's obligations under these terms and conditions, this order or any other contractual arrangement.

8. **DURATION**. If, at the request of the Buyer, the service personnel are required to remain on site in excess of five days beyond the original schedule, Seller, at its option, may replace the service personnel with a service personnel of like qualifications and all cost associated with such a replacement will be to the Buyer's account.

9. **INDEMNITY** Seller shall, at its own cost and expense and to the fullest extent allowed by applicable laws, subject to the limit on Seller's liability, defend, indemnify and hold harmless Purchaser, its parent, affiliates, subsidiaries, officers, directors, employees and agents, and their successors and assigns against all damages, losses, costs, claims, strict liability claims, liens, encumbrances, liabilities, and expenses (including attorneys' fees), as and to the extent arising out of or resulting from the negligent acts or omissions of Seller. Purchaser shall, at its own cost and expense and to the fullest extent allowed by applicable laws, subject to the limits on Purchaser's liability, defend, indemnify and hold harmless Seller, its parent, affiliates, subsidiaries, officers, directors, employees and agents, and their successors and assigns, against all damages, losses, costs, claims, strict liability claims, liens, encumbrances, liabilities, and expenses (including attorneys' fees), as and to the extent arising out of or resulting from the negligent acts or omissions of Purchaser. All liability, losses, damages, costs or expenses resulting from personal injury, including death, loss of or physical damage to property, caused by the joint or concurring acts of Purchaser and Seller, and their respective officers, directors, employees or agents, shall be borne by Purchaser and Seller to the extent each is determined negligent either by agreement of the parties or by a court of competent jurisdiction. The obligations of the parties under this paragraph shall survive the expiration or other termination of this agreement.

10. **SEVERABILITY**. Invalidity of any of these terms and conditions will not affect the validity of any other provision and the remaining provisions will remain in full force and effect.

11. **WAIVER**. Failure to enforce any of these terms and conditions in a particular instance will not constitute a waiver of, or preclude subsequent enforcement of, any of these provisions.

12. **APPLICABLE LAW**. These terms and conditions, this order and the legal relations of the parties shall be determined in accordance with the laws of the State of Texas. The parties consent and will submit to the jurisdiction of the courts of, and of the federal courts seated in, the State of Texas with respect to disputes relating to the order.

EQUIPMENT TERMS AND CONDITIONS OF SALE

All quotations (offers) and sales made by RENTECH Boiler Systems, Inc. (the "Seller") are based upon and conditioned upon the following terms and conditions. No provision, printed or otherwise, contained in any order, acceptance, confirmation or acknowledgment which is inconsistent with, different from or in addition to these Standard Terms and Conditions of Sale is accepted by Seller, unless specifically agreed to in writing by Seller. No order for or changes to any terms or scope of an order for the Seller's goods ("Goods") shall be binding until accepted in writing by the Seller at its home office at Abilene, Texas.

1. QUOTATIONS. Seller's quotations are valid for thirty (30) days from the date of the quotation unless otherwise stated. The latest quotation supersedes all previous quotations or correspondence concerning the transaction. The Seller's quotations contain proprietary information of Seller and are provided to Buyer with the understanding that the information will be used by Buyer solely for purposes of its internal evaluation of the quotations. The Seller's quotations and the proprietary information contained therein may not be disclosed by the Buyer to any third party or used in the preparation of any request for quotation for Goods similar to, or as a substitution for, Goods quoted by Seller.

2. PRICE. Unless otherwise stated in writing by Seller, the price offered by Seller does not include any cost of transportation, handling, crating, packing, duties, tariffs or any taxes, other than Seller's contributions or taxes for unemployment insurance, old age retirement benefits, pensions and annuities, now or hereafter imposed by the United States or any state or political subdivision thereof, however measured. To the extent allowed by applicable law, the Buyer shall be responsible for all other taxes and filing and payment thereof, including, but not limited to, transfer, VAT, provincial, sales, use and excise taxes, and shall indemnify and hold harmless the Seller against any liability arising therefrom.

3. PAYMENT. Unless otherwise stated in writing by Seller, the following payment terms shall apply hereunder: (a) 10% of the order price upon receipt of the order; (b) 10% of the order price upon initial submittal of general arrangement drawings; (c) 15% of the order price upon receipt of tubes; (d) 15% of the order price upon receipt of cylinders; (e) 20% of the order price upon stabbing of the first tube; and (f) 30% of the order price upon notice of availability for shipment. Payment of all invoices shall be net 30 days. If requested by Seller, payment shall be made by irrevocable letter of credit confirmed by a prime U.S. bank. To the extent permitted by applicable laws, Buyer shall pay on demand, as a late charge, an amount equal to 1.5% per month of each payment which remains overdue or the maximum rate allowed by applicable law. Buyer's failure to make payment when due shall be a material breach of the order and these terms and conditions. The Seller, at its sole option, and without incurring any liability, may suspend its performance until such time as the overdue payment is made or Seller is provided assurances, adequate in Seller's opinion, that the payment shall be promptly made. In the event of such suspension of performance by Seller, there shall be an equitable adjustment made to the delivery schedule and order price reflecting the duration and cost resulting from such suspension. Payments due hereunder shall in no event be subject to set-off with any other order or business arrangement. Waivers of lien by Seller shall be contingent upon Seller receiving in full all payments due hereunder.

4. LIMITED WARRANTY. If, within 18 months after the date of notice of availability for shipment, or one year after start up, whichever occurs first, any Goods furnished by Seller prove to be defective in material or workmanship, and Seller is so notified in writing, upon examination by Seller, Seller will, at Seller's discretion, either repair the Goods or supply identical or substantially similar replacement Goods, F.O.B. Seller's manufacturing facility. Any repaired or replacement Goods will be warranted against defects in material or workmanship for the unexpired portion of the warranty applicable to the particular Goods. Goods not manufactured by Seller are subject only to warranties of Seller's vendors and Seller hereby assigns to Buyer all rights in such vendors' warranties, provided however, Seller shall furnish to th eBuyer reasonable assistance in enforcing such rights. Seller will not be responsible for

costs of making access for, or of export/import, shipment, removal or installation of any items needed to repair or replace any defective Goods. Inexpensive items requiring repairs or replacements and routine maintenance-related or consumable items shall be outside the scope of these limited warranties. With regard to warranty related remedial work, the Seller will not be responsible for materials or workmanship of others or shipment, labor and other related expenses for any work performed by others in the repair or replacement of defective Goods, without Seller's prior written consent. Seller's performance guarantees, if any, shall be deemed to be met by a satisfactory demonstration of the performance guarantees during a performance test, which shall be the responsibility of the Buyer, pursuant to mutually agreed upon test procedures.

These limited warranties will be voided if: (a) the Goods were not stored, installed, maintained or operated in accordance with accepted U.S. industrial practice and any specific instructions provided by Seller; (b) the Goods were subjected to any accident, misapplication, environmental contaminant, corrosion, abrasion, abuse or misuse; (c) Buyer used, repaired, or modified the Goods after discovery of the defect without Seller's prior written consent to continue use; or (d) Buyer failed to permit Seller to examine the Goods and operating data or failed to furnish routine operating data sufficient to determine the nature of the defect claimed. THERE ARE NO OTHER WARRANTIES, EXPRESS OR IMPLIED EXCEPT, AS EXPRESSLY PROVIDED HEREIN; SELLER EXTENDS NO IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE. NO WARRANTY, EITHER EXPRESS OR IMPLIED, IS GIVEN AS TO THE CAPACITY, EFFICIENCY OR PERFORMANCE OF THE GOODS, EXCEPT AS MAY BE EXPRESSLY AGREED TO BY THE PARTIES WRITING.

5. OBLIGATIONS OF BUYER. Buyer is solely responsible for identifying and defining all processes and mechanical considerations which may affect the performance, reliability or operation of the Goods furnished by Seller. Seller's quotation and any sale is based upon the covenant by Buyer that all the information and data provided to Seller by Buyer is full, complete, accurate and does not contain information which is misleading.

6. LIMITATION OF LIABILITY. SELLER'S LIABILITY IS LIMITED TO THE PRICE ALLOCABLE TO THE GOODS DETERMINED DEFECTIVE, AND IN NO EVENT WILL SELLER'S CUMULATIVE LIABILITY BE IN EXCESS OF THE TOTAL PRICE, WHETHER ARISING UNDER WARRANTY, CONTRACT, NEGLIGENCE, STRICT LIABILITY, INDEMNIFICATION, OR ANY OTHER CAUSE OR COMBINATION OF CAUSES WHATSOEVER.

EXCEPT FOR ANY LIQUIDATED DAMAGES, IF ANY, EXPRESSLY PROVIDED FOR, WHICH DO NOT CONSTITUTE A PENALTY, SELLER WILL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOST PROFIT WHETHER ARISING UNDER WARRANTY, CONTRACT, NEGLIGENCE, STRICT LIABILITY, INDEMNIFICATION, OR ANY OTHER CAUSE OR COMBINATION OF CAUSES WHATSOEVER. THIS LIMITATION SHALL APPLY NOTWITHSTANDING ANY FAILURE OF ESSENTIAL PURPOSE OF ANY LIMITED REMEDY.

BUYER'S REMEDIES ARE SPECIFICALLY LIMITED TO THE REPAIR OR REPLACEMENT OF THE DEFECTIVE GOODS AND ARE EXCLUSIVE OF ALL OTHER REMEDIES. SHOULD THESE REMEDIES BE FOUND INADEQUATE OR TO HAVE FAILED THEIR ESSENTIAL PURPOSE FOR ANY REASON WHATSOEVER, BUYER AGREES THAT RETURN OF THE FULL SALES ORDER PRICE TO IT BY SELLER SHALL PREVENT THE REMEDIES FROM FAILING THEIR ESSENTIAL PURPOSE AND SHALL BE CONSIDERED BY BUYER AS A FAIR AND ADEQUATE REMEDY.

7. TECHNICAL ASSISTANCE. It is expressly understood that any services or technical assistance furnished by Seller will be addressed in a separate written agreement between the parties. In no event will any such services or technical assistance provided by Seller constitute a waiver by Seller of any of these terms and conditions or order or affect or expand Seller's obligations under these terms and conditions, this order or any other contractual arrangement.

8. PATENTS. Seller will, at its expense, defend and indemnify Buyer from any suit or proceeding brought against Buyer based on a claim that Goods manufactured and furnished by Seller constitute an infringement of any United States patent, if Seller is notified promptly in writing and given authority, information and assistance for the defense of the suit or proceeding. Defense and settlement of any claim shall be within Seller's sole discretion. Should it be held that the Goods constitute infringement and the use of the Goods is enjoined, Seller will, at its own expense and discretion, either procure for Buyer the right to continue using the Goods, replace the Goods with noninfringing goods, modify the Goods to become noninfringing, or remove the infringing Goods and refund the price paid for the respective Goods. Seller does not accept any liability for infringement of any chemical, process or flow patents, or for Goods designed for or used in connection with such chemical, process or flow patents. Buyer will indemnify Seller from any suit or proceeding brought against Seller by any third party based on claims that the Goods infringe any such patent, or with respect to any Goods designed and manufactured in accordance with designs furnished by Buyer.

9. CANCELLATION FEE. Unless otherwise agreed in writing by the parties, the Buyer may not cancel the order, except upon written notice and payment to Seller of an amount consisting of all costs incurred by Seller up to the time of cancellation, including a reasonable overhead allocation, along with those costs which arose out of or resulted from the cancellation, plus a cancellation fee. When calculating the cancellation related payments, payments made by Buyer to Seller prior to cancellation shall be taken into account.

10. FORCE MAJEURE. Except for the obligations of making of payment when due, Seller and Buyer will be excused from their respective obligations in the event, and to the extent of, their respective performance being delayed or prevented: (a) by any circumstance (except financial) reasonably beyond their control, or (b) by act of God, fire, explosion, breakdown of machinery or equipment, plant shutdown, strikes or other labor disputes, riots or other civil disturbances, or voluntary or involuntary compliance with any law, order, regulation, recommendation or request of any governmental authority. In addition, Seller will be excused in the event of its inability to obtain materials necessary for manufacture of the Goods, or total or partial failure of any of its usual means of transportation of the Goods.

11. ASSIGNABILITY AND RESHIPMENT. No claim against Seller arising directly or indirectly out of or in connection with the Goods furnished by Seller to Buyer may be assigned by Buyer or by operation of law without the prior written approval of Seller. Goods sold hereunder shall not be reshipped or rerouted to end-users or end-use in violation of U.S. laws.

12. SHIPMENT. Unless stated otherwise, the terms of shipments made for within the U.S.A. shall be FOB (U.C.C.) manufacturing facility and the terms of shipments exported from the U.S.A. shall be EXW (Incoterms 2000) Seller's manufacturing facility. If the Buyer has not issued inspection or shipping instructions by the time the Goods are ready for shipment, Seller may select any reasonable method of shipment, without liability by reason of its selection. Shipments made on Buyer's behalf shall be insured at Buyer's expense. If the Seller is required to arrange for shipment of the Goods or any parts thereof, Buyer shall reimburse Seller for all freight, insurance and other shipping related costs and handling fee for such shipment. Shipment of Goods held by reason of Buyer's request or inability to receive the Goods will be at the risk and expense of Buyer. Timely delivery of the Goods shall be contingent upon, among other things, Seller's receipt, within two (2) weeks of the respective initial submittal, of all of the final customer approvals of drawings and other documents which require customer approvals and Seller's receipt of the order containing all of the mutually agreed upon terms and documents by a date no later than set forth in the Seller's proposal.

13. SEVERABILITY. Invalidity of any of these terms and conditions will not affect the validity of any other provision and the remaining provisions will remain in full force and effect.

14. WAIVER. Failure to enforce any of these terms and conditions in a particular instance will not constitute a waiver of, or preclude subsequent enforcement of, any of these provisions.

15. APPLICABLE LAW. These terms and conditions, this order and the legal relations of the parties shall be determined in accordance with the laws of the State of Texas. The parties consent and will submit to the jurisdiction of the courts of, and of the federal courts seated in, the State of Texas with respect to disputes relating to the order.

MECHANICAL DETAILS

Boiler

Parameter	Units	Values
General		
Manufacturer		Rentech Boiler Systems, Inc.
Shop Location		Abilene, TX
Fabrication		Shop Assembled
Boiler Type		D-Type
Steam Drum Type		Integral
Model		RTD-1-40
Max Continuous Rating @ NRV Outlet	lb/hr	29,983
Design Pressure	psig	325
Steam Temperature	°F	Saturated
Dimensions & Weights		
Shipping Dimensions w/o Burner (LxWxH)	ft	22.88 x 11.12 x 14.03
Shipping Weight w/o Burner	lbs	52,000
Operating Weight w/o Burner	lbs	62,800
Flooded Weight w/o Burner	lbs	68,200
Furnace Design		
Construction		Membraned Water-Cooled
Front Wall		Membraned Water-Cooled
Floor		Membraned Water-Cooled
Dimensions (LxWxH)	ft	13.54 x 6.48 x 8.69
Volume	ft^3	763
Flat Projected Surface Area	ft^2	502
Total Heat Input	mmBtu/hr	36.05
Volumetric Heat Release Rate (HHV)	$Btu/ft^3 \cdot hr$	47,279
Surface Area Heat Release Rate (HHV)	$Btu/ft^2 \cdot hr$	71,784
Convection Bank Surface Area	ft^2	1,868
Furnace Access Door		
Location		Furnace Rear Wall
Size	in x in	15 x 18
Convection Access Door(s)		N/A
Obersation Ports in Rear Wall	# / in. dia.	2 / 3
Drums & Headers		
Steam Drum		
Diameter (ID)	in	36.00
Length (Seam to Seam)	ft	15.17
Nom. Thickness	in	0.875
Material		SA516-70
Manways	# / in x in	2 / 12 x 16
Manway Type		Elliptical
Drum Internals		Chevrons
Mud Drum		

Parameter	Units	Values
Diameter (ID)	in	22.50
Length (Seam to Seam)	ft	15.17
Nom. Thickness	in	0.75
Material		SA516-70
Manways	# / in x in	2 / 12 x 16
Manway Type		Elliptical
Mud Drum Heating Coil		N/A
Furnace End Wall Headers		
Diameter (NPS)	in	4.00
Nom. Thickness	Sch	80
Material		SA106B
Burner Ring Header		
Diameter (NPS)	in	4.00
Nom. Thickness	Sch	80
Material		SA106B
Boiler Tubes		
Furnace Tubes		
Diameter, OD	in	2.00
Min. Wall Thickness	in	0.135
Tube Material		SA178A
Centerline Spacing	in	4.00
Membrane, WxThk	in x in	2 x 0.3125
Membrane Material		Carbon Steel
Flat Projected Surface Area	ft^2	502
Convection Bank		Section 1
Type		Finned Tubes
Diameter, OD	in	2.00
Min. Wall Thickness	in	0.095
Material		SA178A
Tube Pitch, Transverse	in	4.00
Tube Pitch, Longitudinal	in	4.00
Rows Wide		10
Rows Deep		40
Insulation, Casing, Lagging		
Type		Mineral Fiber Board[1]
Density	lb/ft^3	8.00
Thickness per Layer	in	1.00
No. of Layers (min)		
Vertical & Horizontal Sections		4
Steam Drum		3
Mud Drum		3
Drum Heads		By Others

Parameter	Units	Values
Lagging		
Side Walls, Floor, & End Walls		
Type		Corrugated
Material		Aluminum
Thickness	in	0.040
Roof		
Type		Flat Plat
Material		Carbon Steel
Thickness	in	0.250
Steam Drum		
Type		Flat Plat
Material		Carbon Steel
Thickness	ga	12

Notes:

1. Steam and Mud Drum, excluding heads, are insulated with rigid wrap.

Burner and Windbox

Parameter	Units	Values
Manufacturer		Zeeco
Fabrication Location		Mexico
Type		Ultra Low NOx
Installation		Shop Installed
Design Total Heat Input @ 100% MCR	mmBtu/hr	36.05
Weight	lbs	5,000
Materials of Construction		
Front Plate		Carbon Steel
Air Register		Carbon Steel
Gas Manifold		Carbon Steel
Gas Nozzles		Stainless Steel
Swirler		Stainless Steel
Windbox		Carbon Steel

Notes:

Fan and Motor

Parameter	Units	Values
Manufacturer		TBD
Fabrication Location		TBD

Parameter	Units	Values
Design Standard		Windbox/Industrial
Arrangement		Arrgt. 4
Fan Speed	RPM	1,780
Weight, estimated	lbs	3,735
Bearings		
Type		Spherical Anti-friction
Lubrication		Grease
Cooling		Air
Mechanical Design		
Temperature	°F	110
Design Speed	RPM	1,800
Motor		
Manufacturer		TBD
Design Horsepower	HP	30
Electrical	Ph/Hz/V	3/60/480
Speed	RPM	1,800
VFD Ready		Yes
Area Classification		Non-Hazardous

Notes:

Exhaust Gas Recover - Economizer

Parameter	Units	Values
General		
Manufacturer		Rentech Boiler Systems, Inc.
Fabrication Location		Abilene, TX
Type		Box Type
Gas Flow Direction		Vertical Flow Up
Dimensions & Weights		
Box Dimensions (LxWxH)	ft	9.85 x 2.67 x 8.17
Shipping Weight	lbs	15,000
Flooded Weight	lbs	16,100
Economizer Coil		
MAWP Pressure	psig	400
Tube Design Temperature	°F	500
Tubes		
Type		Finned Tubes
Arrangement		Inline
Flow Direction		Counter
Diameter, OD	in	2.00

Parameter	Units	Values
Min. Wall Thickness	in	0.120
Material		SA178A
Tube Pitch, Transverse	in	4.00
Tube Pitch, Longitudinal	in	4.00
Rows Wide		8
Rows Deep		12
Fin Density	fins/in	6.0
Fin Height	in	0.75
Fin Thickness	in	0.05
Fin Material		Serrated, CS
Surface Area	ft^2	5,080
Headers		
Diameter (NPS)	in	4.00
Nom. Thickness	Sch	80
Material		SA106B
Construction		
Internal Casing		
Material		Carbon Steel
Thickness	in	0.25
External Casing/Lagging		
Material		Aluminum
Thickness	in	0.040
Insulation		
Type		Mineral Wool Block
Thickness	in	2
Access Manway, WxH	in x in	N/A

Notes:

Stack

Parameter	Units	Values
Manufacturer		Rentech Boiler Systems, Inc.
Fabrication Location		Abilene, TX
Type		Economizer Supported
Height - Overall Above Grade	ft	52.5
Diameter	in	26
Weight	lbs	5,819
Insulation		Personnel Protection
Location		At Platform Level
Type		Mineral Wool Blanket
Thickness	in	1
Test Ports, Qty/Diameter/Connection	#/in/CL	4 / 4.0 / 150# RF

Notes:

PREDICTED PERFORMANCE

Case 1: Natural Gas

Parameter	Units	100%	75%	50%	25%
Thermal					
Gross Steam Generation	lb/hr	29,983	-----	-----	-----
Net Steam Flow @ NRV Outlet	lb/hr	29,983			
Spraywater Flow	lb/hr				
Pegging Steam Flow	lb/hr	0			
Aux Process Steam Flow	lb/hr	0			
Steam Pressure @ NRV Outlet	psig	268			
Steam Temperature	°F	412			
Excess Air	%	15			
Fresh Combustion Air Flow	lb/hr	31,159			
Flue Gas Recirculation	%	0			
FGR Flow	lb/hr	-----	-----	-----	-----
Boiler Gas Exhaust Flow	lb/hr	32,698	-----	-----	-----
Boiler Gas Exhaust Temperature	°F	632			
Stack Exhaust Flow	lb/hr	32,698			
Stack Exhaust Temperature	°F	310			
Blowdown Rate	%	3.0			
BFW Flow Rate	lb/hr	899	-----	-----	-----
Fuel Heat Input (HHV)	mmBtu/hr	36.05			
Volumetric Heat Release Rate (HHV Basis)	Btu/hr-ft^3	47,279			
Area Heat Release Rate (HHV Basis)	Btu/hr-ft^2	71,784			
Fuel Flow	ft^3/hr	33,850			
Efficiency					
Dry Gas Losses	%	4.17			
Air Moisture Losses	%	0.14			
Fuel Moisture Losses	%	10.41			
Ambient (Radiantion) Losses	%	0.50			
Manufacturer's Margin	%	1.00			
Total Losses	%	16.22			
Efficiency - HHV Basis	%	83.78	-----	-----	-----
Efficiency - LHV Basis	%	92.77	-----	-----	-----

Notes:

1. Performance is based on an Ambient Air Temperature of 80°F at 60% RH and BFW Temperature of 241°F.

BOILER PROCESS SUMMARY

Case 1: Natural Gas

Parameter	Units	Furnace	Screen	SH (1ry)	SH (2ry)	Evap.	SH	Econ
Gas / Air Side								
Flue Gas Flow Rate	lb/hr	32,698	-	-	-	32,698	-	32,698
Inlet Temperature	°F	Comb.	-	-	-	1,991	-	632
Outlet Temperature	°F	1,991	-	-	-	632	-	310
Fouling Factor	$h{\cdot}ft^2{\cdot}°F/Btu$	0.001	-	-	-	0.001	-	0.001
Heat Duty	mmBtu/hr	13.42	-	-	-	27.10	-	2.93
Pressure Drop	in w.c.	0.00	-	-	-	0.53	-	0.78
Water / Steam Side								
Design Pressure	psig	325	-	-	-	325	-	400
Operating Pressure	psig	272	-	-	-	272	-	275
Pressure Drop	psi	0.0	-	-	-	0.0	-	1.5
Inlet Temperature	°F	333	-	-	-	333	-	241
Outlet Temperature	°F	413	-	-	-	413	-	333
Blowdown	%	3.0	-	-	-	3.0	-	0.0
Fouling Factor	$h{\cdot}ft^2{\cdot}°F/Btu$	0.001	-	-	-	0.001	-	0.001
Flow Rate	lb/hr	29,983	-	-	-	29,983	-	30,882
Heating Surface	ft^2	502	-	-	-	1,868	-	5,080

Notes:

1. Flue Gas Flow Rate does not include FGR
2. Water/Steam Side Pressure Drop includes additional pressure drop to account for piping and NRV.

CLARKE®

C18H0 MODELS

UFAD12 UFAD20 UFAD58 UFAC18
UFAD18 UFAD38 UFAD50 UFAC10
UFAD22 UFAD42 UFAD68 UFAC28
UFAD10 UFAD30 UFAA78 UFAC20
UFAD32 UFAD48 UFAD78
UFAD28 UFAD40 UFAD70

UL/FM - cUL APPROVED RATINGS **BHP**/*kW*

C18H0 MODEL ♦	RATED SPEED 1470		1760		1900		2100	
UFAD12*	**450**	*335*						
UFAD18			**460**	*343*				
UFAD22*	**475**	*354*						
UFAD10					**488**	*364*	**488**	*364*
UFAD32*	**491**	*366*						
UFAD28			**510**	*380*				
UFAD20					**525**	*392*	**525**	*392*
UFAD38			**542**	*404*				
UFAD42	**570**	*425*						
UFAD30					**575**	*429*	**575**	*429*
UFAD48			**600**	*447*				
UFAD40					**600**	*447*	**600**	*447*
UFAD58			**650**	*485*				
UFAD50					**650**	*485*	**650**	*485*
UFAD68			**687**	*512*				
UFAA78	**700**	*522*						
UFAD78			**700**	*522*				
UFAD70					**700**	*522*	**700**	*522*
UFAC18			**755**	*563*				
UFAC10					**755**	*563*	**755**	*563*
UFAC28			**800**	*596.5*				
UFAC20					**800**	*596.5*	**800**	*596.5*

*Utilizes a single turbo base ♦ All Models are available for export



Image shown represents a C18H0 NSR with TSP-E Dual Turbo model

Models UFAD12- UFAD68 are EPA Tier 3 Certified.
Model UFAA78 is Non-Emissionized.
Models UFAD78-UFAC20 are EPA Tier 2 Certified.

ENGINE SPECIFICATIONS

Number of Cylinders	6
Aspiration	TRWA
Rotation*	CW
Overall Dimensions - in. (mm)	66.1(1678) H X 79.6(2022) L X 45.2(1147) W
Crankshaft Centerline Height - in. (mm)	17.0 (432)
Weight - lb (kg)	4100 (1860)
Compression Ratio	16.3:1
Displacement - cu. in. (l)	1104 (18.1)
Engine Type	4 Stroke Cycle - Inline Construction

Abbreviations: TRWA - Turbocharged and Raw Water Aftercooled CW - Clockwise
*Rotation viewed from Heat Exchanger / Front of engine

CERTIFIED POWER RATING

- Each engine is factory tested to verify power and performance
- FM-UL power ratings are shown at specific speeds. Clarke engines can be applied at a single rated RPM setting +/- 50 RPM.

c UL us LISTED NFPA FM c us APPROVED

ENGINE RATINGS BASELINES

- Engines are to be used for stationary emergency standby fire pump service only. Engines are to be tested in accordance with NFPA 25.
- Engines are rated at standard SAE conditions of 29.61 in. (752.1 mm) 77°F (25°C) inlet air temperature [approximates 300 ft. (91.4 m) above sea level] by the testing laboratory (see SAE Standard J 1349).
- A deduction of 3 percent from engine horsepower rating at standard SAE conditions shall be made for diesel engines for each 1000 ft. (305 m) altitude above 300 ft. (91.4 m)
- A deduction of 1 percent from engine horsepower rating as corrected to standard SAE conditions shall be made for diesel engines for every 10°F (5.6°C) above 77°F (25°C) ambient temperature.

CLARKE®

C18H0 MODELS

UFAD12 UFAD20 UFAD58 UFAC18
UFAD18 UFAD38 UFAD50 UFAC10
UFAD22 UFAD42 UFAD68 UFAC28
UFAD10 UFAD30 UFAA78 UFAC20
UFAD32 UFAD48 UFAD78
UFAD28 UFAD40 UFAD70

ENGINE EQUIPMENT

EQUIPMENT	STANDARD	OPTIONAL
Air Cleaner with Air Differential Gauge	Direct Mounted, Washable, Indoor Service with Drip Shield	Disposable, Drip Proof, Indoor Service Outdoor Type, Single or Two Stage
Alarm	Overspeed Alarm & Shutdown, Low Oil Pressure, Low & High Coolant Temperature, Low Raw Water Flow, High Raw Water Temperature, Alternate ECM Warning, Fuel Injection Malfunction, ECM Warning and Failure with Automatic Switching	Low Coolant Level, Low Oil Level, Oil Filter Differenetial Pressure, Fuel Filter Differential Pressure, Air Filter Restriction
Alternator	24V-DC, 50 Amps with V-Belt and Guard	
Coupling	Bare Flywheel	Driveshaft and Guard
Crankcase Ventilation		Crankcase Breather
Engine Heater	230V-AC, 3500 Watt	
Exhaust Flex Connection	SS Flex. 150# ANSI Flanged Connection. 8”	SS Flex. 150# ANSI Flanged Connection. 10”
Exhaust Protection	Metal Guard on Manifold and Turbocharges	
Flywheel Housing	SAE #1	
Flywheel Power Take Off	14” SAE Industrial Flywheel Connection	
Fuel Connections	Fire Resistent Supply and Return Lines	SS, Braided, cUL Listed, Supply and Return Lines
Fuel Filter	Primary Filter / Water Separator with Priming Pump, Secondary Filter	
Fuel Injection System	Unit Injector	
Governor, Speed	Electronic, Dual Electronic Engine Control Modules	
Heat Exchanger	Serviceable Shell and Tube Type, 60 PSI (4 Bar), NPT (F) Connections, Fresh Water Only	Serviceable 90/10 CuNi Sea Water Compatible (Provided with optional sea water, 316 stainless steel or 90/10 CuNi cooling loop)
Instrument Panel	Standard NEMA Type 4 (IP66) touch screen panel with digital tachometer, hour meter, water temperature, oil pressure and voltmeter gauges. Front Opening. *Note: Some models may include powerview display in place of TSP-E*	Stainless Steel NEMA Type 4X (IP66) touch screen panel with digital tachometer, hour meter, water temperature, oil pressure and voltmeter gauges. Front Opening.
Junction Box		
Lube Oil Cooler	Jacket Water Cooled, Shell and Tube Type	
Lube Oil Filter	Full Flow, Dual Element	
Lube Oil Pump	Gear Driven, Gear Type	
Manual Start Control	Dual Manual Start Contactors & On Instrument Panel with Control Position Warning Light	
Overspeed Control	Electronic, Factory Set	
Raw Water Cooling Loop w/ Alarms	Galvanized	Seawater, All 316 SS, High Pressure
Raw Water Solenoid Operation	Automatic from Fire Pump Controller and from Engine Instrument Panel (for Horizontal Fire Pump Applications)	
Run - Stop Control	On Instrument Panel with Control Position Warning Light	
Starters	One (1) 24V-DC	
Throttle Control	Adjustable Speed Control by Increase/Decrease Button, Tamper Proof Adjustable Speed Control	
Water Pump	Centrifugal Type, Gear Driven	

Abbreviations: DC - Direct Current, AC - Alternating Current, SAE - Society of Automotive Engineers, BSP(F) - British Standard Pipe Thread (Female), SS - Stainless Steel

MODEL NOMENCLATURE (11 Digit Models)

C18H0-UFAD78

- C18H0 — Base Engine
- 18 — Liter
- H — Heat Exchanger Cooled
- 0 — Non-Hazardous Environment
- U — UL Listed and FM Approved
- F — Built in USA
- A — EPA Tier 3 Certified (“C” = EPA Tier 2 Certified, “A” = Non-Emissionized)
- D78 — Rating Code

Specifications and information contained in this brochure is subject to change without notice.

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C137765 RevH
23JAN25

www.clarkefire.com

Clarke Model	C18H0-UFAD38	
Derived Rating	404 kW	542 hp
Rated Speed	1760 rpm	1760 rpm
NOx	3.4 g/kW-hr	2.54 g/hp-hr
HC	0.11 g/kW-hr	0.08 g/hp-hr
PM	0.095 g/kW-hr	0.071 g/hp-hr
CO	0.48 g/kW-hr	0.36 g/hp-hr
Certified Rating	448 kW	600 hp
Rated Speed	1760 rpm	1760 rpm
NOx	3.48 g/kW-hr	2.60 g/hp-hr
HC	0.1 g/kW-hr	0.07 g/hp-hr
PM	0.09 g/kW-hr	0.067 g/hp-hr
CO	0.46 g/kW-hr	0.34 g/hp-hr

-Applicable to Cat C18 800hp Tier 2, 700hp Tier 3 & 600hp Tier 3 firepump driver engines.

-PQ3058, PQ3057 & PQ3056 respectively

-800hp, 700hp and 600hp nameplate ratings have been certified according to EPA requirements for firepump driver engines at the stated speeds.

-Subsequent derivative rating cycle emissions have been calculated based on the available emissions data for the base rating, as depicted in the above tables. Emissions cycle requirements are only mandated for the base ratings.

-This information is the property of Caterpillar Inc. Unauthorized distribution of this information is prohibited.

Caterpillar: Confidential Green

MG1000 | 49.0L | 1,000 kW

INDUSTRIAL SPARK-IGNITED GENERATOR SET

EPA Certified Stationary Emergency and Non-Emergency

GENERAC | INDUSTRIAL POWER

DEMAND RESPONSE READY

Standby Power Rating
1,000 kW, 1,250 kVA, 60 Hz

Demand Response Rating
1,000 kW, 1,250 kVA, 60 Hz

ISO 9001:2008

USA ENGINEERED & BUILT*

*Assembled in the USA using domestic and foreign parts

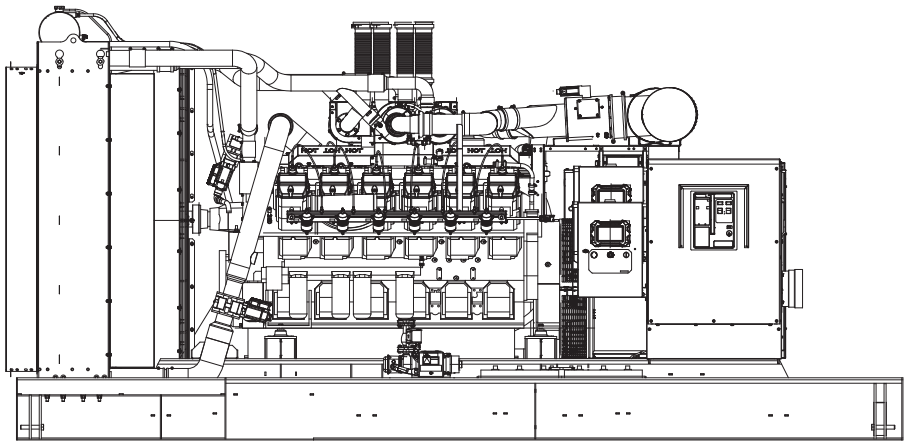


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Codes and Standards

Not all codes and standards apply to all configurations. Contact factory for details.

- UL2200, UL6200, UL1236, UL489
- CSA C22.2, B149
- BS5514 and DIN 6271
- SAE J1349
- NFPA 37, 70, 99, 110
- NEC700, 701, 702, 708
- ISO 3046, 7637, 8528, 9001
- NEMA ICS10, MG1, 250, ICS6, AB1
- ANSI C62.41

Powering Ahead

Generac ensures superior quality by designing and manufacturing most of its generator components, such as alternators, enclosures, control systems and communications software. Generac also makes its own spark-ignited engines, and you'll find them on every Generac gaseous-fueled generator. We engineer and manufacture them from the block up — all at our facilities throughout Wisconsin. Applying natural gas and LP-fueled engines to generators requires advanced engineering expertise to ensure reliability, durability and necessary performance. By designing specifically for these dry, hotter-burning fuels, the engines last longer and require less maintenance. Building our own engines also means we control every step of the supply chain and delivery process, so you benefit from single-source responsibility.

Plus, Generac Industrial Power's distribution network provides all parts and service so you don't have to deal with third-party suppliers. It all leads to a positive owner experience and higher confidence level. Generac spark-ignited engines give you more options in commercial and industrial generator applications as well as extended run time from utility-supplied natural gas.

MG1000 | 49.0L | 1,000 kW

INDUSTRIAL SPARK-IGNITED GENERATOR SET

EPA Certified Stationary Emergency and Non-Emergency

GENERAC | INDUSTRIAL POWER

STANDARD FEATURES

DEMAND RESPONSE READY

ENGINE SYSTEM

- Oil Drain System
- Heavy Duty Air Cleaner
- Level 1 Fan and Belt Guards (Open Set Only)
- Stainless Steel Flexible Exhaust Connection
- Factory Filled Oil and Coolant
- Radiator Duct Adapter (Open Set Only)
- Critical Silencer/Catalyst
- Coolant Heater Ball Valves
- Oil Temperature Sender with Indication Alarm

FUEL SYSTEM

- NPT Fuel Connection on Frame
- Primary and Secondary Fuel Shutoff

COOLING SYSTEM

- Closed Coolant Recovery System
- Factory-Installed Radiator
- 50/50 Ethylene Glycol Antifreeze
- Radiator Drain Extension

ELECTRICAL SYSTEM

- Battery Charging Alternator
- Battery Cables
- Battery Tray
- Rubber-Booted Engine Electrical Connections
- Solenoid Activated Starter Motor

ALTERNATOR SYSTEM

- UL2200 GENprotect™
- Class H Insulation Material
- 2/3 Pitch
- Skewed Stator
- Permanent Magnet Excitation
- Sealed Bearing
- Amortisseur Winding
- Temperature Rise < (120 °C)
- Motorized Main Line Circuit Breaker

GENERATOR SET

- Spring Isolators Under Frame
- Separation of Circuits - High/Low Voltage
- Separation of Circuits - Multiple Breakers
- Standard Factory Testing
- 2 Year Limited Warranty (Standby or Demand Response Rated Units)
- Ready to Accept Full Load in <10 Seconds

ENCLOSURE (If Selected)

- Structural Steel Sub-Base
- Sub-Base Lifting Eyes
- Enamel Finish
- Zinc Plated Fasteners
- Zinc Plated Cast Aluminum Keylock Door Handles
- Heavy Duty Stainless Steel Hinges
- Modular Construction
- Rhino Coat™ - Textured Polyester Powder Coat Paint

CONTROL SYSTEM



Power Zone® Pro Sync Controller

- NFPA 110 Level 1 Compliant
- Engine Protective Functions
- Alternator Protective Functions
- Digital Engine Governor Control
- Digital Voltage Regulator
- Multiple Programmable Inputs and Outputs
- Remote Display Capability
- Remote Communication via Modbus® RTU, Modbus TCP/IP, and Ethernet 10/100
- Alarm and Event Logging with Real Time Stamping
- Expandable Analog and Digital Inputs and Outputs
- Remote Wireless Software Update Capable
- BMS and Remote Telemetry
- Built-In Programmable Logic Eliminates the Need for External Controllers Under Most Conditions
- Ethernet Based Communications Between Generators
- Programmable I/O Channel Properties
- Built-In Diagnostics
- Arc Flash Maintenance Mode (When Properly Equipped)

Alarms and Warnings

- Low Oil Pressure
- Low Coolant Level
- High/Low Coolant Temperature
- Sensor Failure
- Oil Temperature
- Over/Under Speed
- Over/Under Voltage
- Over/Under Frequency
- Over/Under Current
- Over Load
- High/Low Battery Voltage
- Battery Charger Current
- Phase to Phase and Phase to Neutral Short Circuits (I^2T Algorithm)

7 Inch Color Touch Screen Display

- Resistive Color Touch Screen
- Sunlight Readable (1400 NITS)
- Easily Identifiable Icons
- Multi-Lingual
- On Screen Editable Parameters
- Key Function Monitoring
- Three Phase Voltage, Amperage, kW, kVA, and kVAr
- Selectable Line to Line or Line to Neutral Measurements
- Frequency
- Engine Speed
- Engine Coolant Temperature
- Engine Oil Pressure
- Engine Oil Temperature
- Battery Voltage
- Hourmeter
- Warning and Alarm Indication
- Diagnostics
- Maintenance Events/Information

CONTROLS

- Auto-Synchronization Process
- Isochronous Load Sharing
- Reverse Power Protection
- Maximum Power Protection
- Electrically Operated, Mechanically Held Paralleling Switch
- Sync Check System
- Independent On-Board Paralleling
- Optional Programmable Logic Full Auto Back-Up Controls (PLS)
- Shunt Trip and Auxiliary Contact

MG1000 | 49.0L | 1,000 kW

INDUSTRIAL SPARK-IGNITED GENERATOR SET

EPA Certified Stationary Emergency and Non-Emergency

GENERAC® | INDUSTRIAL POWER

CONFIGURABLE OPTIONS

DEMAND RESPONSE READY

ENGINE SYSTEM

- ○ Engine Coolant Heater
- ○ Oil Heater
- ○ Level 1 Fan and Belt Guards (Enclosed Units Only)
- ○ Two Stage Air Cleaner
- ○ Air Filter Restriction Indicator
- ○ Radiator Stone Guard (Open Set Only)
- ○ Baseframe Cover/Rodent Guard

ELECTRICAL SYSTEM

- ○ 20A UL Listed Battery Charger
- ○ Battery Warmer

ALTERNATOR SYSTEM

- ○ Alternator Upsizing
- ○ Anti-Condensation Heater

FUEL SYSTEM

- ○ NPT Flexible Fuel Line

CIRCUIT BREAKER OPTIONS

- ○ Main Line Circuit Breaker
- ○ Electronic Trip Breakers
- ○ Shunt Trip and Auxiliary Contacts

GENERATOR SET

- ○ Spring Vibration Isolator
- ○ Extended Factory Testing
- ○ 24 Position Load Center

ENCLOSURE

- ○ Level 0 Sound Attenuated
- ○ Level 1 Sound Attenuated
- ○ Level 2 Sound Attenuated
- ○ Level 2 Sound Attenuated with Motorized Dampers
- ○ Steel Enclosure
- ○ Aluminum Enclosure
- ○ AC/DC Enclosure Lighting Kit
- ○ Enclosure Heater (With Motorized Dampers Only)
- ○ Up to 180 MPH Wind Load Rating (Contact Factory for Availability)

CONTROL SYSTEM

- ○ NFPA 110 Level 1 Compliant 21-Light Remote Annunciator
- ○ Remote Output Relays (8 or 16)
- ○ Remote E-Stop (Break Glass-Type, Surface Mount)
- ○ Remote E-Stop (Red Mushroom-Type, Surface Mount)
- ○ Remote E-Stop (Red Mushroom-Type, Flush Mount)
- ○ 10A Engine Run Relay
- ○ Ground Fault Annunciator
- ○ 100 dB Alarm Horn
- ○ 120V GFCI and 240V Outlets
- ○ Permissive/Load Shed Module
- ○ Damper Alarm Contacts (With Motorized Dampers Only)

WARRANTY (Standby Gensets Only)

- ○ 2 Year Extended Limited Warranty
- ○ 5 Year Limited Warranty
- ○ 5 Year Extended Limited Warranty
- ○ 7 Year Extended Limited Warranty
- ○ 10 Year Extended Limited Warranty

ENGINEERED OPTIONS

CONTROL SYSTEM

- ○ Battery Disconnect Switch
- ○ Additional Spare Inputs/Outputs

GENERATOR SET

- ○ Special Testing
- ○ Battery Box

ALTERNATOR SYSTEM

- ○ Unit Mounted Load Banks
- ○ Medium Voltage Alternators

ENCLOSURE

- ○ Door Open Alarm Horn

MG1000 | 49.0L | 1,000 kW

INDUSTRIAL SPARK-IGNITED GENERATOR SET

EPA Certified Stationary Emergency and Non-Emergency

GENERAC® | INDUSTRIAL POWER

APPLICATION AND ENGINEERING DATA

DEMAND RESPONSE READY

ENGINE SPECIFICATIONS

General

Make	Generac
Cylinder #	12
Type	V
Displacement - in^3 (L)	2,992 (49.03)
Bore - in (mm)	6.69 (170)
Stroke - in (mm)	7.09 (180)
Compression Ratio	10.0:1
Intake Air Method	Turbocharged/Aftercooled
Number of Main Bearings	7
Number of Connecting Rods	12
Cylinder Head	4 Valve
Cylinder Liners	Yes
Ignition	MotorTech
Piston Type	Cast Aluminum Alloy
Crankshaft Type	Chromium Molybdenum Steel SCM440H
Lifter Type	Solid
Intake Valve Material	Proprietary Alloy
Exhaust Valve Material	Proprietary Alloy
Hardened Valve Seats	Proprietary Alloy

Engine Governing

Governor	Electronic
Frequency Regulation (Steady State)	±0.25%

Lubrication System

Oil Pump Type	Gear Driven
Oil Filter Type	Full Flow Spin-On Cartridge
Crankcase Capacity with Filter - qt (L)	285 (270)

Cooling System

Cooling System Type	Forced Circulation by Centrifugal Pump
Fan Type	Pusher
Fan Speed - RPM	1,025
Fan Diameter - in (mm)	76 (1,930)

Fuel System

Fuel Type	Natural Gas
Carburetor	Variable Venturi
Secondary Fuel Regulator	Standard
Fuel Shut Off Solenoid	Standard
Operating Fuel Pressure - in H_2O (kPa)	14 - 28 (3.5 - 7.0)

Engine Electrical System

System Voltage	24 VDC
Battery Charger Alternator	Standard
Battery Size	See Battery Index 0161970SBY
Battery Voltage	(4) - 12 VDC
Ground Polarity	Negative

ALTERNATOR SPECIFICATIONS

Standard Model	K1248064N22
Poles	4
Field Type	Rotating
Insulation Class - Rotor	H
Insulation Class - Stator	H
Total Harmonic Distortion	<5%
Telephone Interference Factor (TIF)	<50

Standard Excitation	Permanent Magnet
Bearings	Single
Coupling	Flexible Plates
Prototype Short Circuit Test	Yes
Voltage Regulator Type	Full Digital
Number of Sensed Phases	All
Regulation Accuracy (Steady State)	±0.5%

MG1000 | 49.0L | 1,000 kW

INDUSTRIAL SPARK-IGNITED GENERATOR SET

EPA Certified Stationary Emergency and Non-Emergency

OPERATING DATA

DEMAND RESPONSE READY

POWER RATINGS

	Standby/Demand Response	
Three-Phase 277/480 VAC @0.8pf	1,000 kW/1,250 kVA	Amps: 1,505
Three-Phase 346/600 VAC @0.8pf	1,000 kW/1,250 kVA	Amps: 1,204

MOTOR STARTING CAPABILITIES (skVA)

skVA vs. Voltage Dip

277/480 VAC	30%
K1248064N22	3,300
K1344064N22	4,000
K1500064N22	4,500

FUEL CONSUMPTION RATES*

Natural Gas – scfh (m^3/hr) at Standard Conditions 68 °F (20 °C), 14.7 psi (101 kPa)

Percent Load	Standby/Demand Response
25%	3,418 (96.8)
50%	6,021 (170.5)
75%	8,655 (245.1)
100%	11,243 (318.4)

* Fuel supply installation must accommodate fuel consumption rates at 100% load.

COOLING

		Standby/Demand Response
Air Flow (Fan Air Flow Across Radiator) - Open Set	cfm (m^3/min)	57,846 (1,638)
Coolant Flow	gpm (Lpm)	489 (1,850)
Coolant System Capacity	gal (L)	80 (303)
Maximum Operating Ambient Temperature	°F (°C)	122 (50)
Maximum Operating Ambient Temperature (Before Derate)		See Bulletin No. 0199270SSD
Maximum Additional Radiator Backpressure	in H_2O (kPa)	0.5 (0.12)

COMBUSTION AIR REQUIREMENTS

	Standby/Demand Response
Flow at Rated Power - cfm (m^3/min)	2,205 (62.4)

ENGINE

		Standby/Demand Response
Rated Engine Speed	RPM	1,800
Horsepower at Rated kW**	hp	1,467
Piston Speed	ft/min (m/min)	2,126 (648)
BMEP	psi (kPa)	216 (1,488)

EXHAUST

		Standby/Demand Response
Exhaust Flow (Rated Output)	cfm (m^3/min)	8,500 (241)
Maximum Allowable Backpressure (Post Silencer)	inHg (kPa)	0.73 (2.49)
Exhaust Temperature (Rated Output)	°F (°C)	1,458 (792)

** Refer to "Emissions Data Sheet" for maximum bHP for EPA and SCAQMD permitting purposes.

Deration – Operational characteristics consider maximum ambient conditions. Derate factors may apply under atypical site conditions.
Please contact a Generac Power Systems Industrial Dealer for additional details. All performance ratings in accordance with ISO3046, BS5514, ISO8528, and DIN6271 standards.
Standby - See Bulletin 0187500SSB
Demand Response - See Bulletin 10000018250

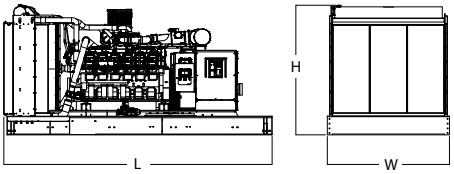
MG1000 | 49.0L | 1,000 kW

INDUSTRIAL SPARK-IGNITED GENERATOR SET

EPA Certified Stationary Emergency and Non-Emergency

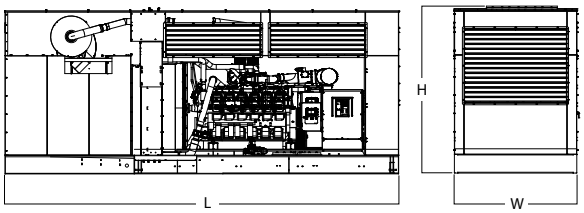
DIMENSIONS AND WEIGHTS*

DEMAND RESPONSE READY



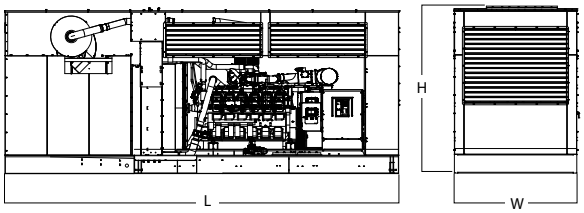
OPEN SET

L x W x H - in (mm)	220.3 (5,597) x 102.0 (2,590) x 108.1 (2,745)
Weight - lbs (kg)	22,798 - 24,495 (10,334 - 11,114)



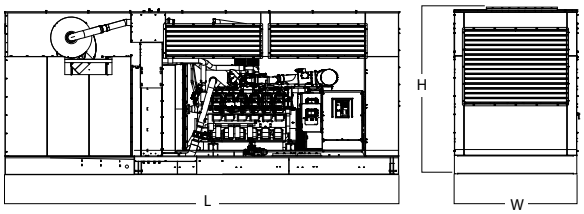
LEVEL 0 SOUND ATTENUATED ENCLOSURE

L x W x H - in (mm)	329.3 (8,356) x 105.8 (2,688) x 136.9 (3,477)
Weight - lbs (kg)	Steel - 26,558 - 28,256 (12,050 - 12,820) Aluminum - 24,092 - 25,789 (10,931 - 11,701)



LEVEL 1 SOUND ATTENUATED ENCLOSURE

L x W x H - in (mm)	329.3 (8,356) x 105.8 (2,688) x 136.9 (3,477)
Weight - lbs (kg)	Steel - 27,801 - 29,499 (12,614 - 13,384) Aluminum - 25,337 - 27,034 (11,496 - 12,266)



LEVEL 2 SOUND ATTENUATED ENCLOSURE

L x W x H - in (mm)	329.3 (8,356) x 105.8 (2,688) x 136.9 (3,477)
Weight - lbs (kg)	Steel - 29,697 - 31,394 (13,474 - 14,244) Aluminum - 26,279 - 27,976 (11,923 - 12,693)

* All measurements are approximate and for estimation purposes only.

YOUR FACTORY RECOGNIZED GENERAC INDUSTRIAL DEALER

Specification characteristics may change without notice. Please contact a Generac Power Systems Industrial Dealer for detailed installation drawings.

SPEC SHEET

Generac Power Systems, Inc. | P.O.Box 8 | Waukesha, WI 53189
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Part No. A0000863975
Rev. B 07/06/2022

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2025 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: **Generac Power Systems, Inc.**
(U.S. Manufacturer or Importer)

Certificate Number: SGNXB49.02C1-003

Effective Date: 11/14/2024

Expiration Date: 12/31/2025

Byron J. Bunker, Division Director
Compliance Division

Issue Date: 11/14/2024

Revision Date: N/A

Manufacturer: Generac Power Systems, Inc.
Engine Family: SGNXB49.02C1
Mobile/Stationary Certification Type: Stationary
Fuel : Natural Gas (CNG/LNG)
Emission Standards :
Part 60 Subpart JJJ Table 1
CO (g/Hp-hr) : 4.0
NOx (g/Hp-hr) : 2.0
VOC (g/Hp-hr) : 1.0
Emergency Use Only : Y

Pursuant to Section 213 of the Clean Air Act (42 U.S.C. section 7547) and 40 CFR Part 60, 1065, 1068, and 60 (stationary only and combined stationary and mobile) and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following nonroad engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and produced in the stated model year.

This certificate of conformity covers only those new nonroad spark-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60. This certificate of conformity does not cover nonroad engines imported prior to the effective date of the certificate.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068.20 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60.

This certificate does not cover large nonroad engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

STATEMENT OF EXHAUST EMISSIONS
2025 Spark-Ignited Generators
Industrial Series - NON-SCAQMD Certified, Stationary Emergency

Model	Engine (L)	EPA Engine Family	Fuel	Catalyst Required	EPA Certification #	Engine Emissions Designation	Grams/bhp-hr.				Rated RPM	BHP	Fuel Flow (lb/hr)
							THC	NMHC	NOx	CO			
SG035, 40, 45, 50NA	4.4	SGNXB04.4MDI	NG	NO	SGNXB04.4MDI-020	A04.5SPN057A0	0.63	0.09	4.42	34.6	1800	75	25.9
SG035, 40, 45, 50NA	4.4	SGNXB04.4MDI	LPV		SGNXB04.4MDI-020	A04.5SPV057A0	0.83	N/A	5.20	63.4	1800	76	29.5
SG050T, 60, 70, 80	4.4	SGNXB04.4MDI	NG		SGNXB04.4MDI-020	A04.5SPN096A0	N/A	0.12	3.32	42.3	1800	129	45.2
SG050T, 60, 70, 80	4.4	SGNXB04.4MDI	LPV		SGNXB04.4MDI-020	A04.5SPV096A0	0.47	N/A	3.23	58.8	1800	129	49.0
SG080	8.9	SGNXB08.9MDA	NG		SGNXB08.9MDA-019	A08.9GSN093A0	0.59	N/A	1.06	91.9	1800	125	62.4
SG080	8.9	SGNXB08.9MDA	LPV		SGNXB08.9MDA-019	A08.9GSV095A0	0.70	N/A	1.52	123	1800	128	61.5
SG080	8.9	SGNXB08.9MDA	LPL		SGNXB08.9MDA-019	A08.9MSL095A0	0.74	N/A	1.31	126	1800	128	60.2
SG080, 100	8.9	SGNXB08.92O1	NG	YES	SGNXB08.92O1-005	E08.9MDL113A1	0.17	0.00	0.01	1.01	1800	151	51.9
SG080, 100 (LPF)	8.9	SGNXB08.92O1	NG		SGNXB08.92O1-005	E08.9MDV113A0	0.11	0.00	0.12	0.03	1800	152	46.9
SG080, 100	8.9	SGNXB08.92O2	LPV		SGNXB08.92O2-001	F08.9MSV106A0	0.01	N/A	0.21	0.22	1800	142	54.8
SG080, 100	8.9	SGNXB08.92O2	LPL		SGNXB08.92O2-001	F08.9MSL106A0	0.03	0.01	0.00	0.36	1800	155	55.3
SG/MG130, 150	8.9	SGNXB08.92O3	NG		SGNXB08.92O3-015	E08.9MSN170A0	0.14	0.00	0.10	0.74	1800	228	84.8
SG/MG130, 150	8.9	SGNXB08.92O4	LPV		SGNXB08.92O4-016	F08.9MSV169A1	0.06	0.00	0.09	0.19	1800	230	85.4
SG/MG150, 200	14.2	SGNXB14.22C1	NG		SGNXB14.22C1-017	E14.2MSN227A3	0.24	0.01	0.12	0.21	1800	304	101
SG/MG230, 250	14.2	SGNXB14.22C1	NG		SGNXB14.22C1-017	E14.2MSN279A3	0.14	0.00	0.35	0.41	1800	374	142
SG/MG275, 300	14.2	SGNXB14.22C1	NG		SGNXB14.22C1-017	E14.2MSN343A3	0.03	0.00	0.04	0.31	1800	460	140
SG/MG350, 400	21.9	SGNXB21.92C1	NG		SGNXB21.92C1-009	E21.9MSN474A4	0.07	0.00	0.26	0.21	1800	651	176
SG/MG350, 400 (LPF)	21.9	SGNXB21.92C1	NG		SGNXB21.92C1-009	E21.9MSN474A5	0.30	0.00	0.06	0.12	1800	621	214
SG/MG350, 400, 450	21.9	SGNXB21.92C3	NG		SGNXB21.92C3-010	E21.9MSN0502A4	0.15	0.00	0.08	0.32	1800	673	223
SG/MG350, 400, 450 (LPF)	21.9	SGNXB21.92C3	NG		SGNXB21.92C3-010	E21.9MSN0502A5	0.19	0.00	0.05	0.17	1800	673	224
SG/MG500	25.8	SGNXB25.82C1	NG		SGNXB25.82C1-008	E25.8MSN580A4	0.16	0.00	0.03	0.59	1800	777	280
SG/MG500 (LPF)	25.8	SGNXB25.82C1	NG		SGNXB25.82C1-008	E25.8MSN580A5	0.19	0.00	0.06	0.57	1800	777	280
SG/MG625	33.9	SGNXB33.92C1	NG		SGNXB33.92C1-035	E33.9MSN677A0	0.13	0.00	0.01	0.21	1800	909	325
SG/MG750	33.9	SGNXB33.92C1	NG		SGNXB33.92C1-035	E33.9MSN803A0	0.18	0.00	0.15	0.91	1800	1077	417
SG/MG1000	49.0	SGNXB49.02C1	NG		SGNXB49.02C1-003	E49.0ASN1100A0	0.12	0.00	0.03	0.64	1800	1475	427

NG/LP: Natural Gas
LPV: Liquid Propane Vapor
LPL: Liquid Propane Liquid

Engine BHP is taken from Engine Emissions Certificate Results
LPG: Liquid Propane Vapor or Liquid Propane Liquid
LPF: Units with Option Low Pressure Fuel System

N/A: Not Applicable
Refer to Page 2 for Definitions and Advisory Notes.

Part No. A006723255
Rev. B 3/14/25

STATEMENT OF EXHAUST EMISSIONS
2025 Spark-Ignited Generators
Industrial Series - NON-SCAQMD Certified, Stationary Emergency

2025 EPA SPARK-IGNITED EXHAUST EMISSIONS DATA

Effective since 2009, the EPA has implemented exhaust emissions regulations on stationary spark-ignited (gaseous) engine generators for emergency applications. All Generac spark-ignited gensets, including SG, MG, QTA, QT and RG series gensets that are built with engines manufactured in 2009 and later meet the requirements of 40CFR part 60 subpart JJJJ and are EPA certified. These generator sets are labeled as EPA Certified with decals affixed to the engines' valve covers.

The attached documents summarize the general information relevant to EPA certification on these generator sets. This information can be used for submittal data and for permitting purposes, if required. These documents include the following information:

EPA Engine Family

The EPA Engine Family is assigned by the Manufacturer under EPA guidelines for certification purposes and appears on the EPA certificate.

Catalyst Required

Indicates whether a three-way catalyst (TWC) and Air/Fuel Ratio control system are required on the generator set to meet EPA certification requirements. Generally, units rated 80kW and smaller do not require a TWC to meet EPA certification requirements. Please note that some units that do not require a TWC to meet EPA requirements do need one if the California SCAQMD option is selected. Please see "California SCAQMD" below for additional information on this option.

Combination Catalyst or Separate Catalyst

SG and MG series generator sets typically utilize a single combination catalyst/silencer as part of meeting EPA certification requirements. Many QT and RG series generator sets use the same engines as SG series units, but have different exhaust configurations that require the use of conventional silencers with additional separate catalysts installed.

EPA Certificate Number

Upon certification by the EPA, a Certificate Number is assigned by the EPA.

Emissions Actuals - Grams/bhp-hr

Actual exhaust emission data for Total Hydrocarbons (THC), Nitrogen Oxides (NOx) and Carbon Monoxide (CO) that were submitted to EPA and are official data of record for certification. This data can be used for permitting if necessary. Values are expressed in grams per brake horsepower-hour; to convert to grams/kW-hr, multiply by 1.341. Please see advisory notes below for further information.

California Units, SCAQMD CEP Number

A separate low-emissions option is available on many Generac gaseous-fueled generator sets to comply with the more stringent South Coast Air Quality Management District requirements that are recognized in certain areas in California. Gensets that include this option are also EPA Certified.

General Advisory Note to Dealers

The information provided here is proprietary to Generac and its' authorized dealers. This information may only be disseminated upon request, to regulatory governmental bodies for emissions permitting purposes or to specifying organizations as submittal data when expressly required by project specifications, and shall remain confidential and not open to public viewing. This information is not intended for compilation or sales purposes and may not be used as such, nor may it be reproduced without the expressed written permission of Generac Power Systems, Inc.

Advisory Notes on Emissions Actuals

- The stated values are actual exhaust emission test measurements obtained from units representative of the generator types and engines described.
- Values are official data of record as submitted to the EPA and SCAQMD for certification purposes. Testing was conducted in accordance with prevailing EPA protocols, which are typically accepted by SCAQMD and other regional authorities.
- No emission values provided are to be construed as guarantees of emissions levels for any given Generac generator unit.
- Generac Power Systems, Inc. reserves the right to revise this information without prior notice.
- Consult state and local regulatory agencies for specific permitting requirements.
- The emissions performance data supplied by the equipment manufacturer is only one element required toward completion of the permitting and installation process. State and local regulations may vary on a case-by-case basis and must be consulted by the permit applicant/equipment owner prior to equipment purchase or installation. The data supplied herein by Generac Power Systems, Inc. cannot be construed as a guarantee of installability of the generator set.
- The emission values provided are the result of multi-mode, weighted scale testing in accordance with EPA testing regulations, and may not be representative of any specific load point.
- The emission values provided are not to be construed as emission limits.

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Emission Certified Engines for Clarke Fire Protection Products Inc.

Nameplate Rating Information							
Clarke Model	Power Rating (BHP / kW)	Certified Speed (RPM)	Engine Rating	Variable Speed (VS) Constant Speed (CS)	EPA Family Name	EPA Certificate Number	Application (PLD, Non-PLD, both)
C13H0-UFAD22	275 / 205	1470	PB9229	VS	TCPXL12.5NYS	TCPXL12.5NYS-012	Both
C13H0-UFAD32	296 / 221	1470	PB9229	VS	TCPXL12.5NYS	TCPXL12.5NYS-012	Both
C13H0-UFAD52	351 / 262	1470	PB9229	VS	TCPXL12.5NYS	TCPXL12.5NYS-012	Both
C13H0-UFAD62	384 / 286	1470	PB9229	VS	TCPXL12.5NYS	TCPXL12.5NYS-012	Both
C13H0-UFAD72	398 / 297	1470	PB9229	VS	TCPXL12.5NYS	TCPXL12.5NYS-012	Both
C13H0-UFAD20	311 / 232	2100	PB9229	CS	TCPXL12.5NYS	TCPXL12.5NYS-012	Non-PLD only
C13H0-UFAD58	280 / 283	1760	PB9229	CS	TCPXL12.5NYS	TCPXL12.5NYS-012	Non-PLD only
C13H0-UFAD28	327 / 244	1760	PB9229	CS	TCPXL12.5NYS	TCPXL12.5NYS-012	Non-PLD only
C13H0-UFAD22	327 / 244	1760	PB9229	VS	TCPXL12.5NYS	TCPXL12.5NYS-012	PLD only
C13H0-UFAD32	350 / 261	1760	PB9229	VS	TCPXL12.5NYS	TCPXL12.5NYS-012	PLD only
C13H0-UFAD38	350 / 261	1760	PB9229	CS	TCPXL12.5NYS	TCPXL12.5NYS-012	Non-PLD only
C13H0-UFAD52	380 / 283	1760	PB9229	VS	TCPXL12.5NYS	TCPXL12.5NYS-012	PLD only
C13H0-UFAD62	422 / 315	1760	PB9229	VS	TCPXL12.5NYS	TCPXL12.5NYS-012	PLD only
C13H0-UFAD68	422 / 315	1760	PB9229	CS	TCPXL12.5NYS	TCPXL12.5NYS-012	Non-PLD only
C13H0-UFAD72	455 / 339	1760	PB9229	VS	TCPXL12.5NYS	TCPXL12.5NYS-012	PLD only
C13H0-UFAD78	455 / 339	1760	PB9229	CS	TCPXL12.5NYS	TCPXL12.5NYS-012	Non-PLD only
C13H0-UFAD22	311 / 232	2100	PB9229	VS	TCPXL12.5NYS	TCPXL12.5NYS-012	PLD only
C13H0-UFAD30	335 / 250	2100	PB9229	CS	TCPXL12.5NYS	TCPXL12.5NYS-012	Non-PLD only
C13H0-UFAD32	335 / 250	2100	PB9229	VS	TCPXL12.5NYS	TCPXL12.5NYS-012	PLD only
C13H0-UFAD40	351 / 262	2100	PB9229	CS	TCPXL12.5NYS	TCPXL12.5NYS-012	Non-PLD only
C13H0-UFAD50	399 / 297.5	2100	PB9229	CS	TCPXL12.5NYS	TCPXL12.5NYS-012	Non-PLD only
C13H0-UFAD52	399 / 297.5	2100	PB9229	VS	TCPXL12.5NYS	TCPXL12.5NYS-012	PLD only
C13H0-UFAD60	425 / 317	2100	PB9229	CS	TCPXL12.5NYS	TCPXL12.5NYS-012	Non-PLD only
C13H0-UFAD62	425 / 317	2100	PB9229	VS	TCPXL12.5NYS	TCPXL12.5NYS-012	PLD only
C13H0-UFAD70	460 / 343	2100	PB9229	CS	TCPXL12.5NYS	TCPXL12.5NYS-012	Non-PLD only
C13H0-UFAD72	460 / 343	2100	PB9229	VS	TCPXL12.5NYS	TCPXL12.5NYS-012	PLD only
C18H0-UFAD12	450 / 335	1470	PQ3060	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	Both
C18H0-FMAD12	450 / 335	1470	PQ3060	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	PLD only
C18H0-UFAD12	460 / 343	1760	PQ3060	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	PLD only
C18H0-FMAD12	460 / 343	1760	PQ3060	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	PLD only
C18H0-UFAD18	460 / 343	1760	C18-600	CS	TCPXL18.1NZS	TCPXL18.1NZS-015	Non-PLD only
C18H0-UFAD22	475 / 354	1470	PQ3060	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	Both
C18H0-FMAD22	475 / 354	1470	PQ3060	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	PLD only
C18H0-UFAD10	488 / 364	1900	C18-600	CS	TCPXL18.1NZS	TCPXL18.1NZS-015	Non-PLD only
C18H0-UFAD10	488 / 364	2100	C18-600	CS	TCPXL18.1NZS	TCPXL18.1NZS-015	Non-PLD only
C18H0-UFAD12	488 / 364	1900	PQ3060	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	PLD only
C18H0-UFAD12	488 / 364	2100	PQ3060	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	PLD only
C18H0-FMAD12	488 / 364	1900	PQ3060	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	PLD only
C18H0-FMAD12	488 / 364	2100	PQ3060	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	PLD only
C18H0-UFAD32	491 / 366	1470	PQ3060	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	Both
C18H0-FMAD32	491 / 366	1470	PQ3060	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	PLD only
C18H0-UFAD28	510 / 380	1760	C18-600	CS	TCPXL18.1NZS	TCPXL18.1NZS-015	Non-PLD only
C18H0-UFAD22	510 / 380	1760	PQ3060	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	PLD only
C18H0-FMAD22	510 / 380	1760	PQ3060	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	PLD only
C18H0-UFAD20	525 / 392	1900	C18-600	CS	TCPXL18.1NZS	TCPXL18.1NZS-015	Non-PLD only
C18H0-UFAD20	525 / 392	2100	C18-600	CS	TCPXL18.1NZS	TCPXL18.1NZS-015	Non-PLD only
C18H0-UFAD22	525 / 392	1900	PQ3060	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	PLD only
C18H0-UFAD22	525 / 392	2100	PQ3060	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	PLD only
C18H0-FMAD22	525 / 392	1900	PQ3060	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	PLD only
C18H0-FMAD22	525 / 392	2100	PQ3060	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	PLD only
C18H0-UFAD32	542 / 404	1760	PQ3060	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	PLD only
C18H0-UFAD38	542 / 404	1760	C18-600	CS	TCPXL18.1NZS	TCPXL18.1NZS-015	Non-PLD only
C18H0-FMAD32	542 / 404	1760	PQ3060	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	PLD only
C18H0-UFAD32	556 / 414	1900	PQ3060	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	PLD only
C18H0-UFAD32	556 / 414	2100	PQ3060	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	PLD only
C18H0-FMAD32	556 / 414	1900	PQ3060	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	PLD only
C18H0-FMAD32	556 / 414	2100	PQ3060	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	PLD only

C18H0-UFAD42	570 / 425	1470	PQ3061	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	Both
C18H0-FMAD42	570 / 425	1470	PQ3061	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	PLD only
C18H0-UFAD30	575 / 429	1900	C18-600	CS	TCPXL18.1NZS	TCPXL18.1NZS-015	Non-PLD only
C18H0-UFAD30	575 / 429	2100	C18-600	CS	TCPXL18.1NZS	TCPXL18.1NZS-015	Non-PLD only
C18H0-UFAD48	600 / 447	1760	C18-600	CS	TCPXL18.1NZS	TCPXL18.1NZS-015	Non-PLD only
C18H0-UFAD40	600 / 447	1900	C18-600	CS	TCPXL18.1NZS	TCPXL18.1NZS-015	Non-PLD only
C18H0-UFAD40	600 / 447	2100	C18-600	CS	TCPXL18.1NZS	TCPXL18.1NZS-015	Non-PLD only
C18H0-UFAD42	614 / 458	1760	PQ3061	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	PLD only
C18H0-FMAD42	614 / 458	1760	PQ3061	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	PLD only
C18H0-UFAD42	618 / 460	1900	PQ3061	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	PLD only
C18H0-UFAD42	618 / 460	2100	PQ3061	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	PLD only
C18H0-FMAD42	618 / 460	1900	PQ3061	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	PLD only
C18H0-FMAD42	618 / 460	2100	PQ3061	VS	TCPXL18.1NZS	TCPXL18.1NZS-015	PLD only
C18H0-UFAD58	650 / 485	1760	C18-700	CS	TCPXL18.1NZS	TCPXL18.1NZS-015	Non-PLD only
C18H0-UFAD50	650 / 485	1900	C18-700	CS	TCPXL18.1NZS	TCPXL18.1NZS-015	Non-PLD only
C18H0-UFAD50	650 / 485	2100	C18-700	CS	TCPXL18.1NZS	TCPXL18.1NZS-015	Non-PLD only
C18H0-UFAD68	687 / 512	1760	C18-700	CS	TCPXL18.1NZS	TCPXL18.1NZS-015	Non-PLD only
C18H0-UFAD78	700 / 522	1760	C18-700	CS	TCPXL18.1NZS	TCPXL18.1NZS-015	Non-PLD only
C18H0-UFAD70	700 / 522	1900	C18-700	CS	TCPXL18.1NZS	TCPXL18.1NZS-015	Non-PLD only
C18H0-UFAD70	700 / 522	2100	C18-700	CS	TCPXL18.1NZS	TCPXL18.1NZS-015	Non-PLD only
C32H0-UFAC12	750 / 559	1470	GP2403	VS	TCPXL32.1NZS	TCPXL32.1NZS-003	PLD only
C32H0-UFAC18	750 / 559	1470	GP2403	CS	TCPXL32.1NZS	TCPXL32.1NZS-003	Non-PLD only
C18H0-UFAC18	755 / 563	1760	C18-800	CS	TCPXL18.1NYS	TCPXL18.1NYS-014	Non-PLD only
C18H0-UFAC10	755 / 563	1900	C18-800	CS	TCPXL18.1NYS	TCPXL18.1NYS-014	Non-PLD only
C18H0-UFAC10	755 / 563	2100	C18-800	CS	TCPXL18.1NYS	TCPXL18.1NYS-014	Non-PLD only
C32H0-UFAC22	760 / 567	1470	GP2403	VS	TCPXL32.1NZS	TCPXL32.1NZS-003	PLD only
C32H0-UFAC28	760 / 567	1470	GP2403	CS	TCPXL32.1NZS	TCPXL32.1NZS-003	Non-PLD only
C18H0-UFAC28	800 / 596.5	1760	C18-800	CS	TCPXL18.1NYS	TCPXL18.1NYS-014	Non-PLD only
C18H0-UFAC20	800 / 596.5	1900	C18-800	CS	TCPXL18.1NYS	TCPXL18.1NYS-014	Non-PLD only
C18H0-UFAC20	800 / 596.5	2100	C18-800	CS	TCPXL18.1NYS	TCPXL18.1NYS-014	Non-PLD only
C32H0-UFAC38	825 / 615	1470	GP2403	CS	TCPXL32.1NZS	TCPXL32.1NZS-003	Non-PLD only
C32H0-UFAC32	825 / 615	1470	GP2403	VS	TCPXL32.1NZS	TCPXL32.1NZS-003	PLD only
C32H0-UFAC12	850 / 634	1760	GP2403	VS	TCPXL32.1NZS	TCPXL32.1NZS-003	PLD only
C32H0-UFAC12	850 / 634	1900	GP2403	VS	TCPXL32.1NZS	TCPXL32.1NZS-003	PLD only
C32H0-UFAC12	850 / 634	2100	GP2403	VS	TCPXL32.1NZS	TCPXL32.1NZS-003	PLD only
C32H0-UFAC18	850 / 634	1760	GP2403	CS	TCPXL32.1NZS	TCPXL32.1NZS-003	Non-PLD only
C32H0-UFAC10	850 / 634	1900	GP2403	CS	TCPXL32.1NZS	TCPXL32.1NZS-003	Non-PLD only
C32H0-UFAC10	850 / 634	2100	GP2403	CS	TCPXL32.1NZS	TCPXL32.1NZS-003	Non-PLD only
C32H0-UFAC48	900 / 671	1470	GP2405	CS	TCPXL32.1NZS	TCPXL32.1NZS-003	Non-PLD only
C32H0-UFAC42	900 / 671	1470	GP2405	VS	TCPXL32.1NZS	TCPXL32.1NZS-003	PLD only
C32H0-UFAC28	925 / 690	1760	GP2403	CS	TCPXL32.1NZS	TCPXL32.1NZS-003	Non-PLD only
C32H0-UFAC20	925 / 690	1900	GP2403	CS	TCPXL32.1NZS	TCPXL32.1NZS-003	Non-PLD only
C32H0-UFAC20	925 / 690	2100	GP2403	CS	TCPXL32.1NZS	TCPXL32.1NZS-003	Non-PLD only
C32H0-UFAC22	925/ 690	1760	GP2403	VS	TCPXL32.1NZS	TCPXL32.1NZS-003	PLD only
C32H0-UFAC22	925/ 690	1900	GP2403	VS	TCPXL32.1NZS	TCPXL32.1NZS-003	PLD only
C32H0-UFAC22	925/ 690	2100	GP2403	VS	TCPXL32.1NZS	TCPXL32.1NZS-003	PLD only
C32H0-UFAC58	980 / 731	1470	GP2405	CS	TCPXL32.1NZS	TCPXL32.1NZS-003	Non-PLD only
C32H0-UFAC52	980 / 731	1470	GP2405	VS	TCPXL32.1NZS	TCPXL32.1NZS-003	PLD only
C32H0-UFAC30	990 / 738	2100	GP2403	CS	TCPXL32.1NZS	TCPXL32.1NZS-003	Non-PLD only
C32H0-UFAC32	990 / 738	2100	GP2403	VS	TCPXL32.1NZS	TCPXL32.1NZS-003	PLD only
C32H0-UFAC32	1000 / 746	1760	GP2403	VS	TCPXL32.1NZS	TCPXL32.1NZS-003	PLD only
C32H0-UFAC32	1000 / 746	1900	GP2403	VS	TCPXL32.1NZS	TCPXL32.1NZS-003	PLD only
C32H0-UFAC38	1000 / 746	1760	GP2403	CS	TCPXL32.1NZS	TCPXL32.1NZS-003	Non-PLD only
C32H0-UFAC30	1000 / 746	1900	GP2403	CS	TCPXL32.1NZS	TCPXL32.1NZS-003	Non-PLD only
C32H0-UFAC68	1079 / 804.5	1470	GP2405	CS	TCPXL32.1NZS	TCPXL32.1NZS-003	Non-PLD only
C32H0-UFAC62	1079 / 804.5	1470	GP2405	VS	TCPXL32.1NZS	TCPXL32.1NZS-003	PLD only
C32H0-UFAC48	1090 / 813	1760	GP2405	CS	TCPXL32.1NZS	TCPXL32.1NZS-003	Non-PLD only
C32H0-UFAC40	1090 / 813	1900	GP2405	CS	TCPXL32.1NZS	TCPXL32.1NZS-003	Non-PLD only
C32H0-UFAC40	1090 / 813	2100	GP2405	CS	TCPXL32.1NZS	TCPXL32.1NZS-003	Non-PLD only
C32H0-UFAC42	1090 / 813	1760	GP2405	VS	TCPXL32.1NZS	TCPXL32.1NZS-003	PLD only
C32H0-UFAC42	1090 / 813	1900	GP2405	VS	TCPXL32.1NZS	TCPXL32.1NZS-003	PLD only
C32H0-UFAC42	1090 / 813	2100	GP2405	VS	TCPXL32.1NZS	TCPXL32.1NZS-003	PLD only
C32H0-UFAC50	1120 / 835	1900	GP2405	CS	TCPXL32.1NZS	TCPXL32.1NZS-003	Non-PLD only
C32H0-UFAC50	1120 / 835	2100	GP2405	CS	TCPXL32.1NZS	TCPXL32.1NZS-003	Non-PLD only
C32H0-UFAC58	1140 / 850	1760	GP2405	CS	TCPXL32.1NZS	TCPXL32.1NZS-003	Non-PLD only
C32H0-UFAC52	1120 / 835	1900	GP2405	VS	TCPXL32.1NZS	TCPXL32.1NZS-003	PLD only

C32H0-UFAC52	1120 / 835	2100	GP2405	VS	TCPXL32.1NZS	TCPXL32.1NZS-003	PLD only
C32H0-UFAC52	1140 / 850	1760	GP2405	VS	TCPXL32.1NZS	TCPXL32.1NZS-003	PLD only
C32H0-UFAC68	1200 / 895	1760	GP2405	CS	TCPXL32.1NZS	TCPXL32.1NZS-003	Non-PLD only
C32H0-UFAC60	1200 / 895	1900	GP2405	CS	TCPXL32.1NZS	TCPXL32.1NZS-003	Non-PLD only
C32H0-UFAC60	1200 / 895	2100	GP2405	CS	TCPXL32.1NZS	TCPXL32.1NZS-003	Non-PLD only
C32H0-UFAC62	1200 / 895	1760	GP2405	VS	TCPXL32.1NZS	TCPXL32.1NZS-003	PLD only
C32H0-UFAC62	1200 / 895	1900	GP2405	VS	TCPXL32.1NZS	TCPXL32.1NZS-003	PLD only
C32H0-UFAC62	1200 / 895	2100	GP2405	VS	TCPXL32.1NZS	TCPXL32.1NZS-003	PLD only

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2026 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: **Caterpillar Inc.**
(U.S. Manufacturer or Importer)

Certificate Number: TCPXL12.5NYS-012-R01

Effective Date: 05/20/2025

Expiration Date: 12/31/2026

Byron J. Bunker, Division Director
Compliance Division

Issue Date: 05/20/2025

Revision Date: 05/20/2025

Model Year: 2026
Manufacturer Type: Original Engine Manufacturer
Engine Family: TCPXL12.5NYS

Mobile/Stationary Indicator: Stationary
Emissions Power Category: 225<=kW<450
Fuel Type: Diesel
After Treatment Devices: No After Treatment Devices Installed
Non-after Treatment Devices: Electronic Control, Smoke Puff Limiter, Engine Design Modification

Pursuant to Section 111 and Section 213 of the Clean Air Act (42 U.S.C. sections 7411 and 7547) and 40 CFR Part 60, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and produced in the stated model year.

This certificate of conformity covers only those new compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60.

This certificate does not cover engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

The actual engine power may lie outside the limits of the Emissions Power Category shown above. See the certificate application for details.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2026 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: **Caterpillar Inc.**
(U.S. Manufacturer or Importer)

Certificate Number: TCPXL18.1NZS-015

Effective Date: 05/02/2025

Expiration Date: 12/31/2026

Byron J. Bunker, Division Director
Compliance Division

Issue Date: 05/02/2025

Revision Date: N/A

Model Year: 2026
Manufacturer Type: Original Engine Manufacturer
Engine Family: TCPXL18.1NZS

Mobile/Stationary Indicator: Stationary
Emissions Power Category: 450<=kW<=560
Fuel Type: Diesel
After Treatment Devices: No After Treatment Devices Installed
Non-after Treatment Devices: Electronic Control, Engine Design Modification

Pursuant to Section 111 and Section 213 of the Clean Air Act (42 U.S.C. sections 7411 and 7547) and 40 CFR Part 60, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and produced in the stated model year.

This certificate of conformity covers only those new compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60.

This certificate does not cover engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

The actual engine power may lie outside the limits of the Emissions Power Category shown above. See the certificate application for details.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2026 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: **Caterpillar Inc.**
(U.S. Manufacturer or Importer)

Certificate Number: TCPXL18.1NYS-014

Effective Date:
05/02/2025

Expiration Date:
12/31/2026

Byron J. Bunker, Division Director
Compliance Division

Issue Date:
05/02/2025

Revision Date:
N/A

Model Year: 2026
Manufacturer Type: Original Engine Manufacturer
Engine Family: TCPXL18.1NYS

Mobile/Stationary Indicator: Stationary
Emissions Power Category: 560<kW<=2237
Fuel Type: Diesel
After Treatment Devices: No After Treatment Devices Installed
Non-after Treatment Devices: Electronic Control, Engine Design Modification

Pursuant to Section 111 and Section 213 of the Clean Air Act (42 U.S.C. sections 7411 and 7547) and 40 CFR Part 60, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and produced in the stated model year.

This certificate of conformity covers only those new compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60.

This certificate does not cover engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2026 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: **Caterpillar Inc.**
(U.S. Manufacturer or Importer)

Certificate Number: TCPXL32.1NZS-003

Effective Date: 03/26/2025

Expiration Date: 12/31/2026

Byron J. Bunker, Division Director
Compliance Division

Issue Date: 03/26/2025

Revision Date: N/A

Model Year: 2026
Manufacturer Type: Original Engine Manufacturer
Engine Family: TCPXL32.1NZS

Mobile/Stationary Indicator: Stationary
Emissions Power Category: 560<kW<=2237
Fuel Type: Diesel
After Treatment Devices: No After Treatment Devices Installed
Non-after Treatment Devices: Electronic Control, Engine Design Modification

Pursuant to Section 111 and Section 213 of the Clean Air Act (42 U.S.C. sections 7411 and 7547) and 40 CFR Part 60, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and produced in the stated model year.

This certificate of conformity covers only those new compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60.

This certificate does not cover engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

SPX COOLING TECHNOLOGIES

Dyna-Tech Sales Corporation

55 Columbia Road
Branchburg, NJ 08876
(215) 225-5036 /
email: cfulbright@dynatechsales.net

Pricing is valid for thirty (30) days from the proposal date.

Proposal to: **Project:** KBR Budgetary **Engineer:**

Opportunity / Quote No. (Ver): CONNOR FULBRIGHT_251028_073404341 / Connor Fulbright_251028_073448720 (1)
Rep Quote No.: MT10391

October 31, 2025

TOWER MODEL	PERFORMANCE CONDITIONS	MOTOR DATA	TOWER DIMENSIONS	WEIGHTS
Quantity of (1) Marley MD model **MD5018UAD2LCBF** factory assembled 2-Cell induced draft counterflow cooling tower	Per 2-cell tower: 2,723 gpm 95.6 °F Hot Water 84.2 °F Cold Water 80.6 °F Entering WB	NEMA 50 HP 1 speed / 1 wind 3 phase / 60 Hz / **230/460v** 1.15sf / TEFC 1800 RPM Premium Efficiency Inverter duty nameplated, 60Hz/120V space heater *Site Voltage; 480*	Each cell: (without options) Length 18' - 1 3/4" Width 11' - 11 15/16" Height 17' - 8 1/2"	Per cell: Shipping: 14,913 lb Operating: 23,489 lb Per 2-cell tower: Shipping: 29,826 lb Operating: 46,978 lb

Quantities shown below are per tower:

Base Tower Construction/Equipment:

Galvanized steel casing and framing with Series 304 stainless steel collection basin
Low Sound fan with aluminum blades
Marley designed belt drive
12 mil PVC modular film fill, 3ft (914mm) depth
Triple-pass 17 mil PVC drift eliminators designed and manufactured by SPX
Factory Mutual Approval
For multi-cell towers Purchaser must ensure that the number of cells includes consideration of cell outage due to fire damage, mechanical failure and preventive maintenance such that sufficient cooling capacity is available to enable normal business and manufacturing operations to continue throughout the year.
HDG steel fan guard

Collection Basin Connections and Accessories:

(2) 8 in (203 mm) pumped flow side suction outlet(s)
(1) 3 inch (76.2mm) diameter drain with separate 3 inch (76.2mm) diameter overflow in each cell
Flumes for equalization between cells are excluded
12 in (305 mm) diameter hole and bolt circle(s) for equalization, One per Cell
1 in (25.4 mm) water Makeup Connection ONLY in all cells with outlets make-up, low-alarm, high-alarm
(2) Slow Closing Solenoid 1 in (25.4 mm) diameter valve(s) for makeup
15 kW per cell 480/3 volt/phase electric immersion heater elements for freeze protection of the collection basin during cold weather system shutdown
INDEECO basin heater control system with control panel/cell and heater elements
Heater system control package
Heater system disconnect switch
Heater Control per Cell

Distribution System and Accessories:

(1) 10 in (254 mm) inlet connection on Face A per cell
Galvanized steel header box and PVC branch arms with polypropylene spray nozzles with grommet connection for ease of removal

Maintenance & Maintenance Access Features:

Tower is designed in accordance with OSHA safety standards
Partial-length external access platform and ladder included for access to mechanical panel
Easy fitting ladder safety cage(s)

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Self closing safety gate(s) included at the top of the access ladder(s)

Control Systems:

(1) IMI 685A Mechanical sw, DPDT, manual reset + 30' cord vibration cutoff switch per cell
(1) Field installed VFD ACH580 Disconnect E-Clipse by-pass outdoor NEMA 3R control panel per cell
RTD temperature sensor for VFD standalone operation
VFD startup expenses included (no vibration test)

Chemical Delivery System:

None

Tower Specials:

Startup

BUDGETARY ..... **(US Dollar)** **$** 380,000.00
(Installation labor not included. Taxes not included.)

Pricing is valid for thirty (30) days from the proposal date and shipment on or before October 1, 2026.

Payment Terms: NET 30 days from date of shipment (subject to credit approval)
Freight Terms: F.O.B. SPX plant(s) Olathe, Kansas, USA with freight prepaid

In the event the Purchaser requests a change from the originally acknowledged date of shipment, SPX Cooling will try to accommodate such request, however, reserves the right to charge for any additional handling, transportation, storage, and mobilization costs.

Orders must have a purchase order at the time of order entry, or received no later than 45 days from order entry date. Any orders without purchase orders after the 45 day period will be subject to price and freight increases and possible delays in scheduling.

Estimated Shipment Lead-Time After Drawing Approval: 55 business days
Lead times are estimates and are subject to change at time of release

The following options are offered for your consideration:

The SPX Cooling Tech, LLC Certification of Limited Warranty ("Warranty Certificate") shall include a 5 year labor warranty. All other terms of the Warranty Certificate remain unchanged and in effect.	$	19,999.00
The SPX Cooling Tech, LLC Certification of Limited Warranty ("Warranty Certificate") shall include an 18 month labor warranty. All other terms of the Warranty Certificate remain unchanged and in effect.	$	6,900.00
The SPX Cooling Tech, LLC Certification of Limited Warranty ("Warranty Certificate") shall include an extended material warranty covering 5 years from date of shipment. All other terms of the Warranty Certificate remain unchanged and in effect.	$	14,500.00

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Pricing is valid for thirty (30) days from the proposal date.

Proposal to: **Project:** KBR Budgetary **Engineer:**

Opportunity / Quote No. (Ver): CONNOR FULBRIGHT_251028_073404341 / Connor Fulbright_251028_080509780 (1)
Rep Quote No.: MT10391

October 31, 2025

TOWER MODEL	PERFORMANCE CONDITIONS	MOTOR DATA	TOWER DIMENSIONS	WEIGHTS
Quantity of (1) Marley MD model **MD5010QAD2BCAF** factory assembled 2-Cell induced draft counterflow cooling tower	Per 2-cell tower: 893 gpm 113.0 °F Hot Water 84.2 °F Cold Water 80.6 °F Entering WB	NEMA 20 HP 1 speed / 1 wind 3 phase / 60 Hz / **230/460v** 1.15sf / TEFC 1800 RPM Premium Efficiency Inverter duty nameplated, 60Hz/120V space heater *Site Voltage; 480*	Each cell: (without options) Length 11' - 11 3/4" Width 8' - 5 1/2" Height 13' - 4 5/16"	Per cell: Shipping: 6,698 lb Operating: 10,675 lb Per 2-cell tower: Shipping: 13,396 lb Operating: 21,350 lb

Quantities shown below are per tower:

Base Tower Construction/Equipment:

Galvanized steel casing and framing with Series 300 stainless steel collection basin
Selection allows for cells arranged in a back-to-back configuration
Low Sound fan with aluminum blades
Marley designed belt drive
Motor outside airstream with Marley designed driveshaft
15 mil PVC modular film fill, 3ft (914mm) depth
Triple-pass 17 mil PVC drift eliminators designed and manufactured by SPX
HDG steel fan guard

Collection Basin Connections and Accessories:

(2) 6 in (152 mm) pumped flow steel sump outlet(s) with screen(s)
(1) 3 inch (76.2mm) diameter drain with separate 3 inch (76.2mm) diameter overflow in each cell
Flumes for equalization between cells are excluded
8 in (203 mm) diameter hole and bolt circle(s) for equalization, One per Cell
1 in (25.4 mm) water Makeup Connection ONLY in all cellsmake-up, low-alarm, high-alarm
(2) Slow Closing Solenoid 3/4 in (19 mm) diameter valve(s) for makeup
6 kW per cell 480/3 volt/phase electric immersion heater elements for freeze protection of the collection basin during cold weather system shutdown
INDEECO basin heater control system with control panel/cell and heater elements
Heater system control package
Heater system disconnect switch
Heater Control per Cell

Distribution System and Accessories:

(1) 8 in (203 mm) inlet connection on Face D Cell 1 and Face B Cell 2 per cell
Galvanized steel header box and PVC branch arms with polypropylene spray nozzles with grommet connection for ease of removal

Maintenance & Maintenance Access Features:

Tower is designed in accordance with OSHA safety standards
Partial-length external access platform and ladder included for access to mechanical panel
Easy fitting ladder safety cage(s)
Self closing safety gate(s) included at the top of the access ladder(s)

Control Systems:

Dyna-Tech Sales Corporation

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(1) IMI 685A Mechanical sw, DPDT, manual reset + 30' cord vibration cutoff switch per cell
(1) Field installed VFD ACH580 Disconnect E-Clipse by-pass outdoor NEMA 3R control panel per cell
RTD temperature sensor for VFD standalone operation
VFD startup expenses included (no vibration test)

Chemical Delivery System:
None

Tower Specials:
Startup

BUDGETARY ..... **(US Dollar)** **$** 180,000.00
(Installation labor not included. Taxes not included.)

Pricing is valid for thirty (30) days from the proposal date and shipment on or before October 1, 2026.

Payment Terms: NET 30 days from date of shipment (subject to credit approval)
Freight Terms: F.O.B. SPX plant(s) Olathe, Kansas, USA with freight prepaid

In the event the Purchaser requests a change from the originally acknowledged date of shipment, SPX Cooling will try to accommodate such request, however, reserves the right to charge for any additional handling, transportation, storage, and mobilization costs.

Orders must have a purchase order at the time of order entry, or received no later than 45 days from order entry date. Any orders without purchase orders after the 45 day period will be subject to price and freight increases and possible delays in scheduling.

Estimated Shipment Lead-Time After Drawing Approval: 55 business days
Lead times are estimates and are subject to change at time of release

The following options are offered for your consideration:

The SPX Cooling Tech, LLC Certification of Limited Warranty ("Warranty Certificate") shall include a 5 year labor warranty. All other terms of the Warranty Certificate remain unchanged and in effect.	$	13,000.00
The SPX Cooling Tech, LLC Certification of Limited Warranty ("Warranty Certificate") shall include an 18 month labor warranty. All other terms of the Warranty Certificate remain unchanged and in effect.	$	4,900.00
The SPX Cooling Tech, LLC Certification of Limited Warranty ("Warranty Certificate") shall include an extended material warranty covering 5 years from date of shipment. All other terms of the Warranty Certificate remain unchanged and in effect.	$	6,400.00

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Clarifications:

- All assembly, installation, structural steel, vibration isolation, piping, electrical, controls integration by others.
- Seismic conditions required a Level 2 structural adder which incurs a significant cost adder.
- No specifications provided. Pricing cannot be held.
- No freight included.
- CTI certification requires an approach (Tcw – Twb design) of 5 degrees. This condition does not satisfy that.
- Prices are budgetary.

Notes:

- **Offer to purchase is valid for thirty (30) days from the proposal date. The proposal price is subject to change if SPX Cooling Tech, LLC does not receive a Customer purchase order within 30 days from the date of the proposal, or if there are any changes to the scope of work or shipment date.**
- It is the responsibility of the purchaser to determine the suitability of this equipment for the specific application and all applicable code requirements. Please reference the supporting steel arrangement drawing for the product windload and seismic capacities. The product is designed, analyzed, and tested in accordance with the requirements of the International Building Code and American Society of Civil Engineers. Design of the anchorage support system is not included in this quote and shall be administered by others.
- **Any purchase orders should be made out to SPX Cooling Tech, LLC.**
- **When this proposal is signed by the Purchaser in the space provided below, this form will be considered a purchase order from the Purchaser to SPX Cooling Tech, LLC ("SPX COOLING").**
- All sales, use or excise taxes payable by SPX Cooling, or to be collected by SPX Cooling from Purchaser, in connection with the sale, installation, or use of the proposed equipment shall be added to the prices quoted above at time of shipment. Any purchase order submitted for a tax exempt project must be accompanied by the Purchaser's valid tax exemption certificate for the state to which the goods are to be delivered. It is the Purchaser's responsibility to provide this documentation. SPX Cooling will not be liable for any failure of Purchaser to pay sales tax without said documentation.
- SPX Cooling's responsibility for delivery is limited to date of shipment. Carrier can be requested to give a maximum of 24 hours notice of delivery. Shipments involving more than one truck may arrive at a job site at different times.
- Purchaser to receive, unload, haul, hoist and set tower(s) in place.
- SPX Cooling hereby warrants the inclusion of labor, when specifically purchased as an option. Labor coverage shall be limited to the specified duration (as indicated by the option purchased) beginning at date of shipment by SPX Cooling to the original installation.
- **This proposal expressly limits acceptance of the terms of the offer, including SPX Cooling's Standard Terms and Conditions and the applicable SPX Cooling Standard Warranty Certificate. These documents are attached. No terms or conditions, including warranty provisions, that are submitted by the Purchaser as part of its acceptance shall be valid, and all such terms are hereby expressly rejected and have no force or effect.**

MARLEY

Connor Fulbright

Accepted by (see note above):

Representative	Purchaser	SPX Cooling Tech, LLC
Printed Name	Printed Name	Printed Name
Title	Title	Title
Date	Date	Date

Please fill in the required information below prior to submitting your order:

TOTAL AMOUNT

Purchaser's Company Name

PO#

Phone

SPX®
COOLING TECHNOLOGIES

Dyna-Tech Sales Corporation

55 Columbia Road
Branchburg, NJ 08876
(215) 225-5036 /
email: cfulbright@dynatechsales.net

Fax

Shipping Address

Billing Address

Requested Delivery Date

Delivery Notify Contact Name

Delivery Notify Contact Phone

MARLEY®

TERMS AND CONDITIONS OF SALE BY SPX Cooling Tech, LLC ("Seller")

1. ACCEPTANCE AND GOVERNING PROVISIONS. Orders shall be binding upon Seller when accepted in writing by an authorized representative of Seller. SELLER'S ACCEPTANCE OF BUYER'S ORDER IS CONDITIONED UPON BUYER'S ACCEPTANCE OF THE TERMS AND CONDITIONS SET FORTH HEREIN (THE "TERMS") AND BUYER'S AGREEMENT TO BE BOUND BY AND COMPLY WITH THESE TERMS. THESE TERMS, **THE TERMS ON THE FACE OF THIS DOCUMENT, AND ALL REFERENCED ATTACHMENTS CONSTITUTE THE ENTIRE AGREEMENT BETWEEN BUYER AND SELLER, AND NO AMENDMENT OR MODIFICATION SHALL BE BINDING ON SELLER UNLESS SIGNED BY AN OFFICER OR AUTHORIZED EMPLOYEE OF SELLER.** THE FAILURE OF SELLER TO OBJECT TO PROVISIONS CONTAINED IN ANY PURCHASE ORDER OR OTHER DOCUMENT OF BUYER SHALL NOT BE CONSTRUED AS A WAIVER BY SELLER OF THESE TERMS OR AN ACCEPTANCE OF ANY OF BUYER'S PROVISIONS. **ANY CONFLICTING OR ADDITIONAL TERMS OR CONDITIONS SET FORTH BY BUYER IN A PURCHASE ORDER OR OTHER DOCUMENT SHALL NOT BE BINDING UPON SELLER, AND SELLER HEREBY EXPRESSLY OBJECTS THERETO.**

2. LIMITED WARRANTY.

(a) Seller warrants to Buyer that the goods manufactured by Seller will be free from defects in material and workmanship and any services performed by Seller will be in accordance with the specifications of Seller's proposal and appropriate industry standards, as more particularly set forth in Seller's Certificate of Limited Warranty ("Warranty Certificate"), as attached hereto and incorporated herein.

(b) Refer to the applicable Warranty Certificate for specific product coverage.

(c) If within such period Buyer gives Seller immediate notice of the discovery of any such defects, and it shall be proven to Seller's reasonable satisfaction that any goods are defective or any services are nonconforming, such goods shall, at Seller's option, be repaired or replaced (F.O.B. Seller's factory, with all removal and installation to be at Buyer's expense unless Buyer has paid for labor to be included in the warranty to be provided) and such services corrected or a substitute obtained.

(d) Warranty on repaired or replaced equipment will be for the time remaining under the terms of the original warranty.

(e) Seller warrants that all services or goods performed, produced, and furnished hereunder will comply with all applicable federal, state, and local laws, regulations, rules and ordinances.

(f) THE FOREGOING WARRANTIES STATE SELLER'S ENTIRE WARRANTY (EXCEPT TITLE) AND BUYER'S SOLE AND EXCLUSIVE REMEDY RELATED TO SUCH GOODS AND SERVICES. EXCEPT AS EXPRESSLY SET FORTH ABOVE, SELLER MAKES NO WARRANTY OF ANY KIND WHATSOEVER, AND SELLER EXPRESSLY DISCLAIMS ANY WARRANTIES IMPLIED BY LAW, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

(g) THIS WARRANTY SHALL NOT APPLY TO ANY LOSS OR DAMAGE RESULTING FROM: (1) NORMAL WEAR AND TEAR; (2) ALTERATION, MISUSE, ABUSE, OR IMPROPER INSTALLATION BY BUYER, POWER FAILURES, OPERATION OR MAINTENANCE BY BUYER OR A THIRD PARTY; (3) ACCIDENT, FIRE, FLOOD, OR ACTS OF GOD; OR (4) INACCURATE OR INCOMPLETE INFORMATION OR DATA SUPPLIED OR APPROVED BY BUYER.

3. LIMITATION OF LIABILITY. SELLER SHALL NOT BE LIABLE UNDER ANY THEORY OF RELIEF, INCLUDING, WITHOUT LIMITATION, BREACH OF WARRANTY, BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE), STRICT LIABILITY, OR OTHERWISE, ARISING OUT OF OR RELATED TO AN ORDER OR SELLER'S ACTS OR OMISSIONS FOR ANY INCIDENTAL, SPECIAL, CONSEQUENTIAL, PUNITIVE, EXEMPLARY, OR LIQUIDATED DAMAGES OF ANY NATURE, INCLUDING, WITHOUT LIMITATION, LOSS OF ANTICIPATED PROFITS OR REVENUES, DAMAGE TO PROPERTY, OR LOSS OF USE. SELLER'S ENTIRE LIABILITY FOR DIRECT DAMAGES RESULTING FROM ANY PERFORMANCE OR FAILURE TO PERFORM, DELAY, BREACH OF CONTRACT, BREACH OF WARRANTY, IMPLIED INDEMNITY OR OTHERWISE UNDER THIS AGREEMENT SHALL NOT EXCEED THE PURCHASE PRICE ACTUALLY PAID BY BUYER TO SELLER. IN ADDITION, IN NO EVENT SHALL SELLER BE LIABLE FOR ANY DAMAGES IF AND TO THE EXTENT SUCH DAMAGES ARE CAUSED BY THE NEGLIGENCE OF BUYER, THE END USER OF THE GOODS, OR ANY OTHER THIRD PARTY WHICH IS NOT UNDER THE DIRECT CONTROL OF THE SELLER.

4. PATENTS AND TRADEMARKS.

(a) If notified promptly by Buyer in writing and provided with authority, information, and assistance, Seller shall defend and indemnify Buyer, or may at any time settle, at Seller's option, any suit or proceeding alleging that any goods used, designed or sold by Buyer pursuant to Seller's proposal infringe any United States patent or trademark. Seller shall pay any direct damages awarded in such suit or proceeding up to the amount of the depreciated purchase price of the goods. In the event any goods are held to constitute such infringement and the use of the goods is enjoined, Seller shall, at its option and expense: (1) procure for Buyer the right to continue using the goods; (2) replace the goods with non-infringing goods; (3) modify the goods so that they become non-infringing; or (4) remove the goods and return the depreciated purchase price. THE FOREGOING CONSTITUTES THE ENTIRE LIABILITY OF SELLER AND THE SOLE AND EXCLUSIVE REMEDY OF BUYER FOR PATENT OR TRADEMARK INFRINGEMENT RELATED TO THE GOODS.

(b) NOTWITHSTANDING THE FOREGOING, SECTION (a) ABOVE SHALL NOT APPLY TO ANY SUIT OR PROCEEDING ALLEGING INFRINGEMENT RESULTING FROM OR RELATED TO SELLER'S COMPLIANCE WITH THE SPECIFICATIONS OR DESIGN OF BUYER OR THE USE OF THE GOODS OF SELLER IN COMBINATION WITH OTHER GOODS OR MATERIALS. Buyer shall defend and pay any damages awarded in such suit or proceeding described in this section (b).

5. DELIVERY AND DELAY.

(a) Unless otherwise agreed to in writing and signed by Seller: (1) goods shall be delivered FOB Seller's Factory (domestic shipments), or FCA Seller's nominated facility (international shipments, not including Canada) (INCOTERMS 2020), Full Freight Allowed to the jobsite (FOR COMPLETE TOWER SHIPMENTS ONLY), with delivery to the initial carrier constituting delivery to Buyer; (2) title to the goods and all risk of damage or loss shall pass to Buyer upon delivery to the initial carrier; (3) transportation costs shall be paid by Buyer; and (4) Buyer shall have sole responsibility for filing any claims with any carrier for delay, loss or damage. FOR CANADA ORDERS, the following shall apply: Title passes to the Buyer at the point of shipment, SPX Plant. Seller has agreed to and has included in the prices here all costs for transportation to Canada, Customs Clearance and all duties.

(b) Dates of delivery or other performance are estimates and are based on, among other things, timely receipt from Buyer of accurate and complete approved drawings, technical data, a fully executed contract or purchase order, and any necessary documents or information required by Seller's credit department. Seller shall have the right to delay shipment of the goods until all required documents or information have been provided by Buyer, and any other requirements, including the payment of any past due amounts, have been fulfilled. Seller shall not be liable for any delay or resulting expense, loss, damage or liquidated damages for any failure to supply materials, labor or supervision as required because of fire, flood, Acts of God, inclement weather, strikes, labor disputes, riots, thefts, accidents, transportation delays, acts or failure to act of Government, Buyer, Owner or any other third party not under Seller's direct control, or any other cause whatsoever, whether similar or dissimilar to the above, beyond the reasonable control of Seller. In the event of such delay, the time of completion will be subject to equitable adjustment, and any additional costs incurred shall be shared between the parties. Seller shall immediately notify Buyer if it expects a delivery to occur earlier or later than the delivery date requested by Buyer. Any claim for missing parts or other items of the goods must be made within sixty (60) days from the date of delivery.

(c) In the event Buyer has not taken title and possession of the goods within six (6) months from the date of the purchase order, freight costs may be subject to adjustment at Seller's discretion.

6. STORAGE. If Buyer's site is not ready to accept goods on the scheduled delivery date, Seller may store the goods at its facility or any other suitable location until such time as Buyer is ready to receive the goods. Buyer shall be liable for any storage fees as determined by Seller. Storage fees will be 1.5% of the PO value per week plus any applicable logistics cancellation costs and crane handling costs. Storage will be assessed weekly. Buyer accepts all risk of damage or loss while the goods are in transit to storage, in storage, or in transit from storage. Buyer shall be responsible for all handling, transportation and storage costs for such goods while they are in transit to storage, in storage, or in transit from storage.

7. CHANGES, SUBSTITUTIONS, AND CANCELLATION.

(a) Any changes requested by Buyer shall be effective upon written acceptance of Seller at Seller's corporate offices. Any changes accepted by Seller which affect the specifications or scope of work or schedule of an order shall entitle Seller, as appropriate, to an adjustment to the price, freight charges, delivery schedule, or other terms affected by such change.

(b) Seller shall be entitled to a change order for an equitable adjustment in the price, completion date, and/or other provisions of this Agreement, in the event Seller is adversely impacted by circumstances beyond Seller's reasonable control, including, but not limited to: (1) any act, delay or omission of Buyer, (2) any error, omission or change in Buyer-provided information, (3) a change in law or permits, (4) a Force Majeure Event, (5) termination, (6) interference from other contractors or Buyer caused delays, (7) suspension, (8) Buyer directed changes, (9) differing site conditions.

(c) Seller may furnish suitable substitutes for materials unobtainable due to regulations of governmental authorities or unavailability of materials from suppliers.

(d) Buyer may cancel an order upon payment of the applicable cancelation fee, calculated as a percentage of the purchase price according to the following schedule. If the order is canceled: (1) more than 10 business days after the order is submitted – 15%; (2) between 60 and 30 days before the ship date provided in the Ship Date Confirmation – 85%; and (3) 30 days or fewer before the ship date provided in the Ship Date Confirmation – 100%. If the ship date is adjusted by mutual agreement, the cancellation fee periods will be adjusted accordingly.

8. APPROVALS, INSPECTION AND ACCEPTANCE:

(a) Buyer's approval, or failure to disapprove, of drawings submitted hereunder constitutes Buyer's acceptance of equipment design, specifications and other data contained therein.

(b) Inspection of goods at Seller's plant by Buyer, or Buyer's representatives, will be permitted insofar as such inspection does not interfere with Seller's production and provided that complete written details of such inspection are submitted to Seller no less than ten (10) days in advance.

(c) The goods and services shall be deemed accepted, and any claim of Buyer against Seller with respect to an order shall be waived and not enforceable, unless: (1) Buyer has promptly inspected the goods and services, and (2) written notice from Buyer of any defect has been received by Seller within forty-eight (48) hours of rejection of any equipment inspected upon delivery or performance of any services.

(d) Buyer must give Seller reasonable advance notice and authorization to attend any tests designed to demonstrate that goods or services are defective, and the test conditions are mutually agreed to by Seller and Buyer.

(e) Goods may not be returned without obtaining written authorization and shipping instructions from an authorized representative of Seller.

9. PRICES, PAYMENT AND CREDIT.

(a) Unless other terms have been expressly stated by Seller in writing, Seller's prices: (1) are valid for thirty (30) days from the proposal date; (2) do not include costs for installation of goods; and (3) do not include costs of any permits, licenses, fees and similar charges required by law or local practice.

(b) Unless otherwise noted on the face hereof, the payment terms shall be one-hundred percent (100%) net thirty (30) days from the date of shipment. Pro-rata payments shall become due with partial shipments of goods or partial delivery of services. Seller shall charge 1 1/2% per month (or such lower percentage as required by applicable law) of the unpaid invoice balance, commencing sixty (60) days following the invoice date.

(c) Seller reserves the right to require cash in advance if, for any reason, Seller reasonably doubts Buyer's financial responsibility.

10. TAXES, DUTIES, & TARIFFS. Prices do not include any sales or use tax, either federal, state, or local, payable on the transaction under any applicable statute, or any duty or tariff imposed on the goods. All such amounts must be paid by the Buyer and will be invoiced as a separate line item on invoices unless Buyer provides Seller with a valid tax exemption for the applicable goods and services.

11. PRICE ADJUSTMENT CLAUSE. Prices are subject to adjustment at any time, in Seller's sole discretion, due to changes in costs associated with or related to raw materials, labor, transportation, import duties, tariffs, taxes, other like fees payable on imported merchandise, or other unforeseen economic factors beyond the seller's control. In the event of a price adjustment, Seller will provide written notice to the customer at least 30 days in advance, and the parties will cooperate and commence negotiations in good faith to modify the terms and conditions of this Agreement and/or any affected purchase order, including without limitation making necessary modifications to price, quantity, delivery date, or shipping schedule. Any such adjustments will apply to any orders which were placed prior to the price adjustment, if the date of shipment of goods is greater than 6 months after the price adjustment.

12. GOODS FOR EXPORT. If the ultimate destination of the goods is outside of the country of origin, Buyer shall provide the ultimate destination country, end-user, and end use on its purchase order or shall complete a U.S. Department of Commerce Form BIS-711 (Statement of Ultimate Consignee and Purchaser). In the event that Buyer provides false information to Seller or purchases goods for export without so notifying Seller, Buyer shall have sole liability and shall defend and indemnify Seller for any loss or damage (including without limitation, claims of governmental authorities) arising from the export from the country of origin or the import into another country of such goods, including, without limitation, those related to packaging, labeling, marking, warranty, contents, use, or documentation of the goods. Buyer shall have sole responsibility for obtaining any required export licenses. Buyer shall neither take, nor solicit Seller to take, any action which would violate any anti-boycott or any export or import statutes or regulations of the United States or other governmental authorities and shall defend and indemnify Seller for any loss or damage arising out of or related to such action. Seller reserves the right to refuse to sell, transfer, assign, or allow for export any goods if, in Seller's reasonable judgment, the goods would be imported into a country in violation of any law, or used in any process in violation of any law.

13. PROPRIETARY INFORMATION. Seller retains title and all intellectual property rights, including, but not limited to, any patent, trademark, copyright, trade secret or otherwise to all engineering and production prints, drawings, technical data, and other information and documents that relate to the goods and services sold to Buyer. Unless advised by Seller in writing to the contrary, all such information and documents disclosed or delivered by Seller to Buyer are to be deemed proprietary to Seller and shall be used by Buyer solely for the purpose of inspection, installation, and maintenance and not used by Buyer for any other purpose.

14. COMPLIANCE WITH LAWS. All goods manufactured and services performed hereunder shall be in compliance with all applicable state and federal laws, rules, regulations, standards and codes including, but not limited to, the Fair Labor Standards Act, occupational health and safety laws and applicable provisions relating to obligations of government contractors and subcontractors, including 41 CFR 60-1, *et. seq.* (including the reporting, record keeping and affirmative action program requirements) incorporating the Equal Opportunity Clause of Executive Order 11246, the maintenance of nonsegregated facilities, the Vietnam Era Veteran's Readjustment Act of 1974, The Rehabilitation Act of 1973 and Executive Order 11701 relating to the employment of veterans.

15. CONFLICT MINERALS. Seller shall comply with Section 1502 of the Dodd-Frank Act (the "Conflict Minerals Law") relating to goods that contain tantalum, tin, tungsten or gold that directly or indirectly finance or benefit armed groups in the Democratic Republic of Congo or the nine adjoining conflict countries, Angola, Burundi, Central African Republic, the Republic of the Congo, Rwanda, South Sudan, Tanzania, Uganda, and Zambia ("Conflict Minerals"). Seller shall promptly and accurately complete surveys and certifications requested by Buyer related to Conflict Minerals. Seller will inform Buyer (a) whether Conflict Minerals are known to be present in any goods provided by Seller to Buyer or whether it is "indeterminable" that Conflict Minerals are present in any goods provided by Seller to Buyer, and (b) at the request of Buyer, the status of Seller's policies and procedures relating to compliance with the Conflict Mineral Law. Upon reasonable notice, Buyer shall be permitted to audit such records as reasonably necessary to confirm Seller's compliance with this Article

16. MISCELLANEOUS. All rights and remedies of each of the parties under these Terms are in addition to its rights at law and in equity, except where specifically disclaimed. Any delegation or assignment by Buyer of any of its responsibilities or rights hereunder without Seller's prior written consent, shall be void. The validity, performance, and interpretation of this document and any referenced attachment thereto shall be governed by the law of the state of Kansas, U.S.A. It is expressly agreed that the United Nations Convention on Contracts for the International Sale of Goods will not apply to this agreement. The invalidity or illegality of any provision of these Terms shall not render invalid or illegal any other provision therein. Seller's failure at any time to require performance by Buyer of any of these Terms shall not serve as a waiver or diminish Seller's right to demand strict compliance with such provision or with other of the Terms.

SPX Cooling Tech, LLC Certification of Limited Warranty
Version 08-1263E

SPX Cooling Tech, LLC ("SPX Cooling") hereby warrants the Marley® MD™ galvanized steel structure cooling tower as follows:

1. This MD galvanized steel structure cooling tower will be free from all defects in material and workmanship for a period of (18) eighteen months from date of shipment by SPX Cooling to the original installation
2. SPX Cooling warrants that the mechanical equipment, which is limited to the fan(s), gearbox(es), shaft(s), coupling(s), sheaves (if applicable), premium efficiency motor(s) and mechanical equipment support(s), [but excluding epact and standard efficiency motors and all motor components, which are warranted by its manufacturer and items such as bearing assemblies and V-belts (if applicable) which are warranted for (18) months and oil seals which are warranted for (18) months with replacement seals furnished through the mechanical warranty] will be free from defects in material and workmanship for a period of (5) five years from the date of shipment by SPX Cooling to the original installation. To obtain the expected life of the Geareducer® and warranty coverage, scheduled maintenance, in accordance with the Marley User Manuals, is required to check oil level, check for leaks in oil plugs, lube line connections, seals and correct as necessary during that time. All other nonstandard purchased equipment, such as electrical equipment, consisting of motor controls, Marley VFD, basin heaters, low water makeup valves, etc. are excluded from this five year warranty and will carry the standard warranty provided by its manufacturer or in accordance with an SPX Cooling warranty certificate for that product. The majority of all nonstandard purchased equipment is shipped either loose or in plastic containers in the basin of the tower. These components must be stored in a dry and secured environment until actual installation. Reported issues stemming from moisture in the components or loss of components will not be warranted. To obtain the expected life of the motor and warranty coverage, motors must be installed and operated following the *Marley Electric Motor User Manual Z0239042.*
3. SPX Cooling further warrants that the standard MD galvanized steel structure cooling tower meets the performance standards set forth in CTI Standard STD-201 Certification Standard for Water Cooling Towers. Performance altering operations such as reduced horsepower or fan speed changes voids CTI Certification.

The obligation under this warranty is limited to the repair or the replacement of defective materials, at SPX Cooling's option, F.O.B. original shipping point or EXWORKS plant. Warranty on repaired or replaced equipment will be for the time remaining under the terms of the original warranty. This warranty is non transferable.

This warranty does not obligate SPX Cooling to bear the cost of labor, transportation charges, or other costs incurred in connection with the repair or replacement of defective parts; nor does this warranty apply to normal wear and tear nor to damage resulting from operations not conforming with the MD's operation and maintenance instructions, accident, alteration, misuse or an abnormally corrosive or abrasive use environment.

Failure of SPX Cooling to exercise or enforce any right or provision under this warranty shall not constitute a waiver of such right or provision.

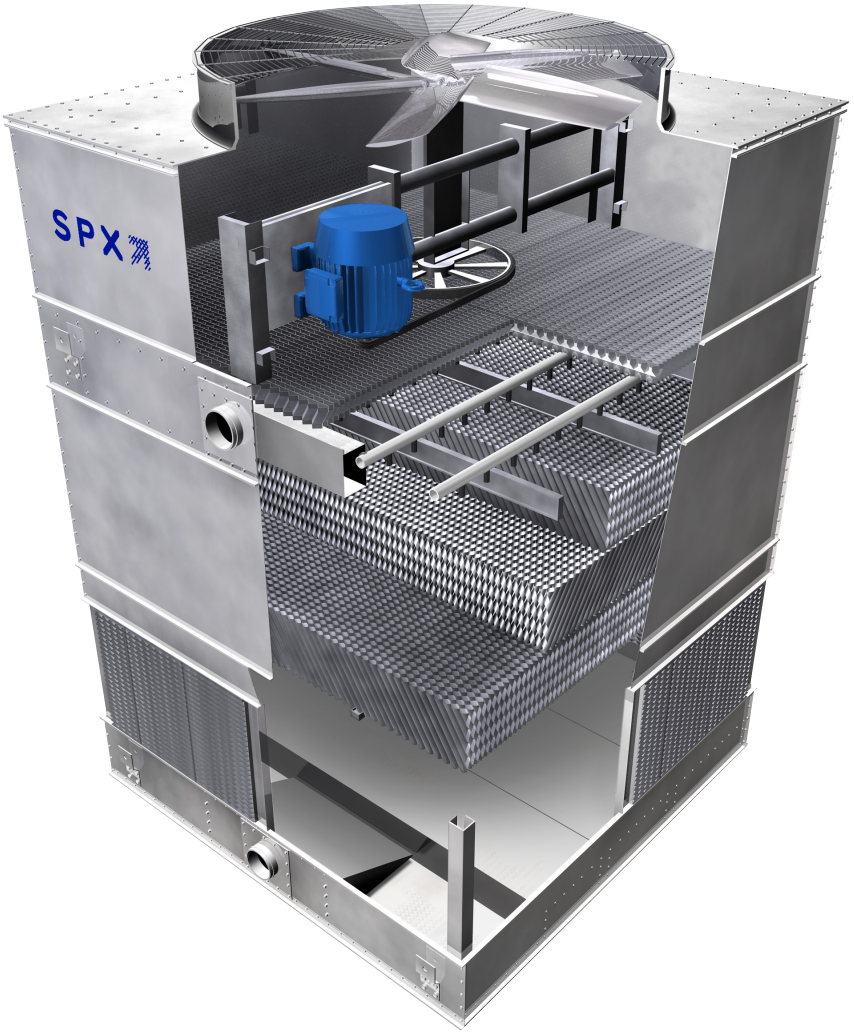
SPX Cooling's total liability for damages related to the performance of or failure to perform shall be limited to the amount of the contract price and in no event shall either party hereto be responsible or held liable to the other for any special, punitive, indirect, incidental, or consequential damages.

The above warranties are in lieu of all other warranties expressed or implied, and all implied warranties of merchantability and fitness for a particular purpose are hereby disclaimed and excluded from this agreement.

Registration of this warranty is required within 90 days of installation of your product to validate the warranty. Registration will also ensure receipt of the latest product information and owner notices. To register go to spxcooling.com/en/registration and complete the form.

MD Cooling Tower

Engineering Data and Specifications



MARLEY®



MD towers are galvanized steel, factory assembled, counterflow cooling towers, designed to serve air conditioning and refrigeration systems as well as light to medium industrial process loads on clean water. The Marley MD evolved from a factory-assembled concept of towers pioneered by Marley some 85 years ago, and incorporates all of the design advancements that our customers have found valuable. MD towers represent the current state of the art in this cooling tower category.

The specifications portion of this publication not only relates the language to use in describing an appropriate MD cooling tower—but also defines why certain items and features are important enough to specify with the intention of insisting upon compliance by all bidders. The left hand column of pages 48 thru 62 provides appropriate text for the various specification paragraphs, whereas the right hand column comments on the meaning of the subject matter and explains its value.

Pages 48 through 54 indicate those paragraphs which will result in the purchase of a basic cooling tower—one that accomplishes the specified thermal performance, but which will lack many operation—and maintenance-enhancing accessories and features that are usually desired by those persons who are responsible for the continuing operation of the system of which the cooling tower is part. It will also incorporate those standard materials which testing and experience has proven to provide acceptable longevity in normal operating conditions.

Pages 55 through 62 provide paragraphs intended to add those features, components, and materials that will customize the cooling tower to meet the user's requirements.

AIR MOVEMENT PACKAGE

- High efficiency fan — wide-chord design for maximum efficiency at low fan tip speeds
- Eased inlet fan cylinder ensures full area, low turbulent airflow through the cylinder
- Spherical roller bearings are rated at an L_{10} life of 100,000 hours
- TEFC Fan Motor — 1.15 service factor, variable torque, and specially insulated for cooling tower duty
- The MD Series air movement package including the structural support is guaranteed against failure for a period of five full years.

WATER DISTRIBUTION SYSTEM

- Pressurized spray system distributes water evenly over the fill
- Low-clog polypropylene nozzles deliver precise distribution of water over the fill area
- Marley MC thermoformed PVC film fill assembled into packs for ease of removal and cleaning
- Marley XCEL TU drift eliminators limit drift losses to no more than .001% of the design flow rate

STRUCTURE

- Induced-draft, counterflow design may require less plan area than crossflow towers typically use
- Series 300 stainless steel, 316 stainless steel or heavy mill galvanized steel construction
- Factory assembled — ensures final field installation will be hassle-free
- Triple-pass PVC inlet louvers limit splash-out and eliminate sunlight from entering the collection basin

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SYSTEM CLEANLINESS

Cooling towers are very effective air washers. Atmospheric dust able to pass through the relatively small louver openings will enter the circulating water system. Increased concentrations can intensify system maintenance by clogging screens and strainers—and smaller particulates can coat system heat transfer surfaces. In areas of low flow velocity—such as the cold water basin—sedimentary deposits can provide a breeding ground for bacteria.

In areas prone to dust and sedimentation, you should consider installing some means for keeping the cold water basin clean. Typical devices include side stream filters and a variety of filtration media.

WATER TREATMENT

To control the buildup of dissolved solids resulting from water evaporation, as well as airborne impurities and biological contaminants including Legionella, an effective consistent water treatment program is required. Simple blowdown may be adequate to control corrosion and scale, but biological contamination can only be controlled with biocides.

An acceptable water treatment program must be compatible with the variety of materials incorporated in a cooling tower—ideally the pH of the circulating water should fall between 6.5 and 9.0. Batch feeding of chemicals directly into the cooling tower is not a good practice since localized damage to the tower is possible. Specific startup instructions and additional water quality recommendations can be found in the MD User Manual which accompanies the tower and also is available from your local Marley sales representative. For complete water treatment recommendations, consult a competent, qualified water treatment supplier.

⚠ CAUTION

The cooling tower must be located at such distance and direction to avoid the possibility of contaminated discharge air being drawn into building fresh air intake ducts. The purchaser should obtain the services of a Licensed Professional Engineer or Registered Architect to certify that the location of the cooling tower is in compliance with applicable air pollution, fire and clean air codes.

TYPICAL APPLICATIONS

The MD tower is an excellent choice for normal applications requiring cold water for the dissipation of heat. This includes condenser water cooling for air conditioning, refrigeration, and thermal storage systems, as well as their utilization for free-cooling in all of those systems. A low-clog fill option provides a high degree of clog resistance and makes the MD tower ideal for dirty water applications. The MD can also be used in the cooling of jacket water for engines and air compressors, and are widely applied to dissipate waste heat in a variety of industrial, power and manufacturing processes.

Choosing the all stainless steel construction option, the MD can be confidently applied in unusually corrosive processes and operating environments. However, no single product line can answer all problems, and selective judgement should be exercised in the following situations

APPLICATIONS REQUIRING ALTERNATIVE COOLING TOWER SELECTIONS

Certain types of applications are incompatible with any cooling tower with film fill — whether MD or a competitive tower of similar manufacture. Film fill is subject to distortion in high water temperatures, and the narrow passages are easily clogged by turbid or debris-laden water. Some of the applications, which call for alternative tower designs are:

- Water temperatures exceeding 135°F—adversely affects the service life and performance of normal counterflow PVC fill. Higher temperature fill materials are available.
- Ethylene glycol content—can plug fill passages as slime and algae accumulate to feed on the available organic materials.
- Fatty acid content—found in processes such as soap and detergent manufacturing and some food processing—fatty acids pose a serious threat for plugging fill passages.
- Particulate carry over—often found in steel mills and cement plants—can both cause fill plugging, and can build up to potentially damaging levels on tower structure.
- Pulp carry over—typical of the paper industry and food processing where vacuum pumps or barometric condensers are used. Causes fill plugging which may be intensified by algae.

ALTERNATIVE SELECTIONS

In addition to the MD, SPX Cooling offers a full scope of products in various designs and capacities to meet the special demands of specific applications.

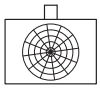
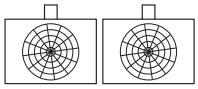
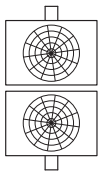
spxcooling.com—visit us on the web for a complete list of products, services, publications and to find your nearest sales representative.

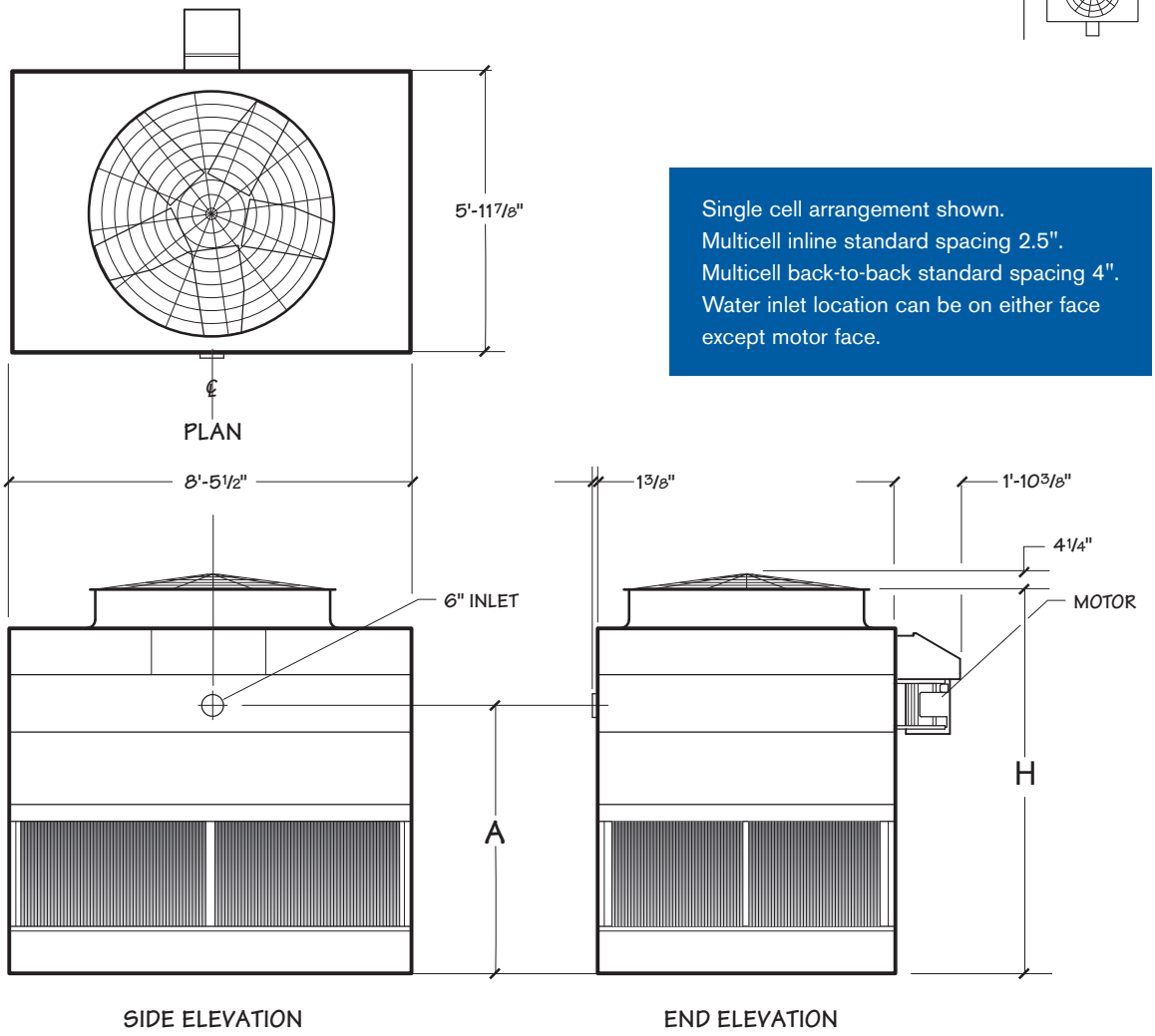
MD5006

6' x 8.5' Nominal Cell Size

Use this data for preliminary layouts only. Obtain current drawing from your Marley sales representative.

CoolSpec™ web-based selection software, available at coolspec.com provides MD model recommendations based on customer's specific design requirements.

DESCRIPTION — MODEL SUFFIX	LAYOUT CONFIGURATION
SINGLE CELL — 1L	
TWO OR MORE INLINE CELLS — 2L+	
TWO CELLS BACK-TO-BACK — 2B	



Single cell arrangement shown.
Multicell inline standard spacing 2.5".
Multicell back-to-back standard spacing 4".
Water inlet location can be on either face except motor face.

MD5006

6' x 8.5' Nominal Cell Size

Table Data Per Cell

Model note 2	Nominal Tons note 3	Motor hp	Dimensions		Design Operating Weight lb	Shipping Weight lb	
			H note 4	A		Weight/Cell	Heaviest Section
MD5006HAC1L	89	3	10'-5⅛"	7'-2⅛"	5103	2880	1631
MD5006KAC1L	108	5					
MD5006MAC1L	120	7.5					
MD5006NAC1L	133	10					
MD5006HAD1L	96	3	11'-5⅛"	8'-2⅛"	5299	3075	1631
MD5006KAD1L	117	5					
MD5006MAD1L	132	7.5					
MD5006NAD1L	145	10					
MD5006HAF1L	100	3	12'-5⅛"	9'-2⅛"	5600	3377	1738
MD5006KAF1L	121	5					
MD5006MAF1L	136	7.5					
MD5006NAF1L	150	10					
MD5006PAF1L	166	15					

Standard Layout Configuration ***Adds*** Per Cell

Description	Model Suffix note 2	Dimensions		Design Operating Weight lb	Shipping Weight lb
		H note 4	A		Weight/Cell
SINGLE CELL	1L	–	–	–	–
TWO OR MORE INLINE CELLS	2L +	4"	4"	29	29
TWO CELLS BACK-TO-BACK	2B	4"	4"	29	29

NOTE

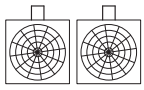
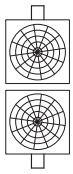
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2 Last two characters of the model number indicate number of cells and cell configuration.
3 Nominal tons are based upon 95°F HW, 85°F CW, 78°F WB and 3 gpm/ton. The Marley CoolSpec web-based selection software provides MD model recommendations based on specific design requirements.
4 Models with an Ultra Quiet Fan option require a taller fan cylinder, add 1'-11½" to this dimension for correct height.

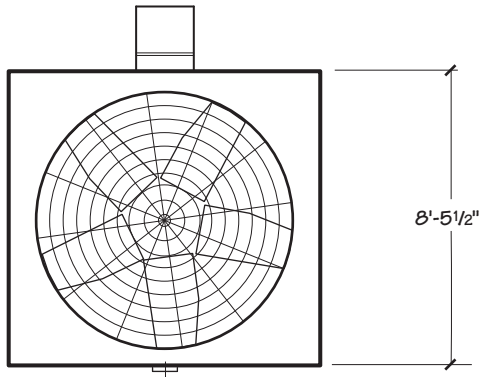
MD5008

8.5' x 9' Nominal Cell Size

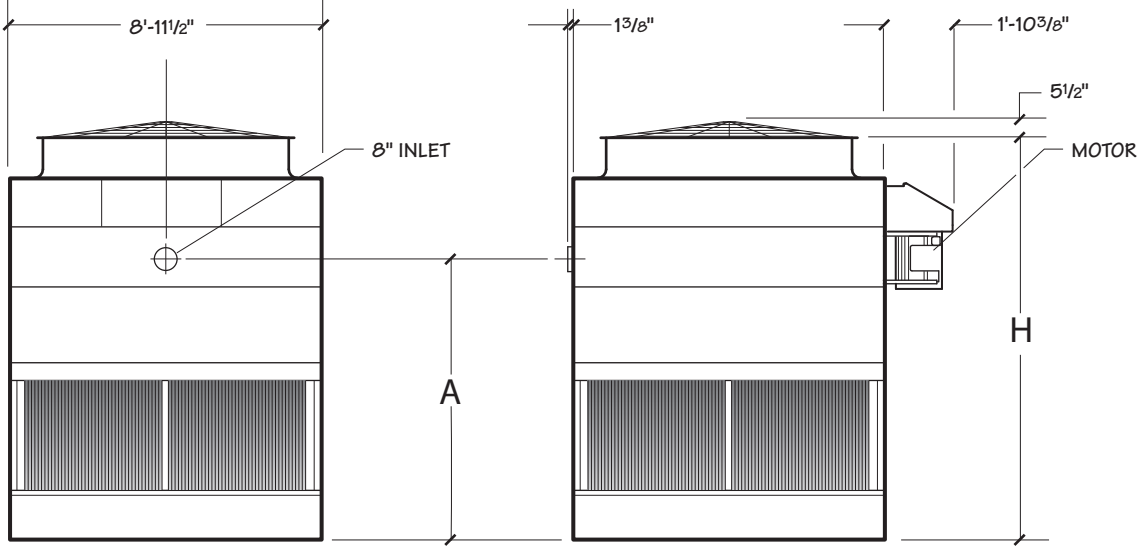
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DESCRIPTION — MODEL SUFFIX	LAYOUT CONFIGURATION
SINGLE CELL — 1L	
TWO OR MORE INLINE CELLS — 2L+	
TWO CELLS BACK-TO-BACK — 2B	



Single cell arrangement shown.
Multicell inline standard spacing 2.5".
Multicell back-to-back standard spacing 4".
Water inlet location can be on either face except motor face.



MD5008

8.5' x 9' Nominal Cell Size

Table Data Per Cell

Model note 2	Nominal Tons note 3	Motor hp	Dimensions		Design Operating Weight lb	Shipping Weight lb	
			H note 4	A		Weight/Cell	Heaviest Section
MD5008KLC1L	149	5	10'-9 1/16"	7'-1 7/8"	6726	3752	1965
MD5008MAC1L	165	7.5					
MD5008NAC1L	179	10					
MD5008PAC1L	202	15					
MD5008QAC1L	216	20					
MD5008KLD1L	161	5	11'-9 1/16"	8'-1 7/8"	7003	4029	2064
MD5008MAD1L	180	7.5					
MD5008NAD1L	197	10					
MD5008PAD1L	223	15					
MD5008QAD1L	239	20					
MD5008KLF1L	166	5	12'-9 1/16"	9'-1 7/8"	7280	4306	2341
MD5008MAF1L	189	7.5					
MD5008NAF1L	207	10					
MD5008PAF1L	234	15					
MD5008QAF1L	255	20					

Standard Layout Configuration ***Adds*** Per Cell

Description	Model Suffix note 2	Dimensions		Design Operating Weight lb	Shipping Weight lb
		H note 4	A		Weight/Cell
SINGLE CELL	1L	–	–	–	–
TWO OR MORE INLINE CELLS	2L +	9 1/8"	9 1/8"	46	46
TWO CELLS BACK-TO-BACK	2B	9 1/8"	9 1/8"	46	46

NOTE

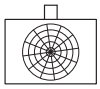
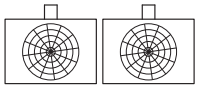
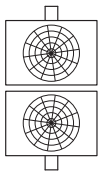
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4 Models with an Ultra Quiet Fan option require a taller fan cylinder, add 1'-11½" to this dimension for correct height.

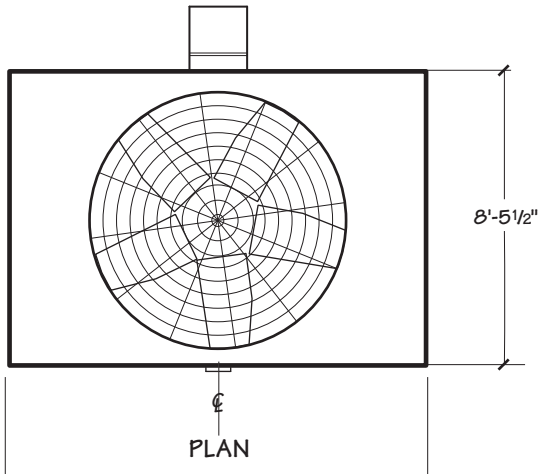
MD5010

8.5' x 12' Nominal Cell Size

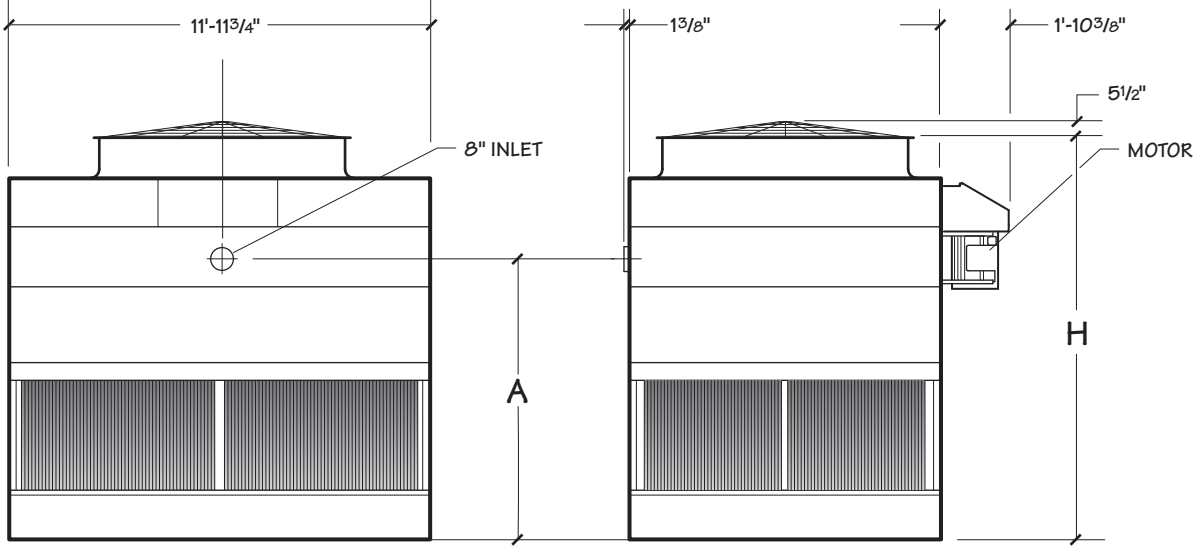
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CoolSpec™ web-based selection software, available at coolspec.com provides MD model recommendations based on customer's specific design requirements.

DESCRIPTION — MODEL SUFFIX	LAYOUT CONFIGURATION
SINGLE CELL — 1L	
TWO OR MORE INLINE CELLS — 2L+	
TWO CELLS BACK-TO-BACK — 2B	



Single cell arrangement shown.
Multicell inline standard spacing 2.5".
Multicell back-to-back standard spacing 4".
Water inlet location can be on either face except motor face.



MD5010

8.5' x 12' Nominal Cell Size

Table Data Per Cell

Model note 2	Nominal Tons note 3	Motor hp	Dimensions		Design Operating Weight lb	Shipping Weight lb	
			H note 4	A		Weight/Cell	Heaviest Section
MD5010NLC1L	220	10	11'-2⁵⁄₁₆"	7'-6½"	8561	4584	2319
MD5010PAC1L	248	15					
MD5010QAC1L	269	20					
MD5010RAC1L	286	25					
MD5010NLD1L	240	10	12'-2⁵⁄₁₆"	8'-6½"	8920	4943	2624
MD5010PAD1L	279	15					
MD5010QAD1L	304	20					
MD5010RAD1L	325	25					
MD5010NLF1L	251	10	13'-2⁵⁄₁₆"	9'-6½"	9334	5357	2983
MD5010PAF1L	293	15					
MD5010QAF1L	317	20					
MD5010RAF1L	341	25					
MD5010SAF1L	360	30					

Standard Layout Configuration ***Adds*** Per Cell

Description	Model Suffix note 2	Dimensions		Design Operating Weight lb	Shipping Weight lb
		H note 4	A		Weight/Cell
SINGLE CELL	1L	–	–	–	–
TWO OR MORE INLINE CELLS	2L +	8½"	8½"	50	50
TWO CELLS BACK-TO-BACK	2B	8½"	8½"	50	50

NOTE

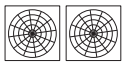
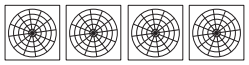
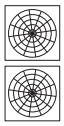
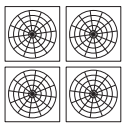
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3 Nominal tons are based upon 95°F HW, 85°F CW, 78°F WB and 3 gpm/ton. The Marley CoolSpec web-based selection software provides MD model recommendations based on specific design requirements.
4 Models with an Ultra Quiet Fan option require a taller fan cylinder, add 1'-11½" to this dimension for correct height.

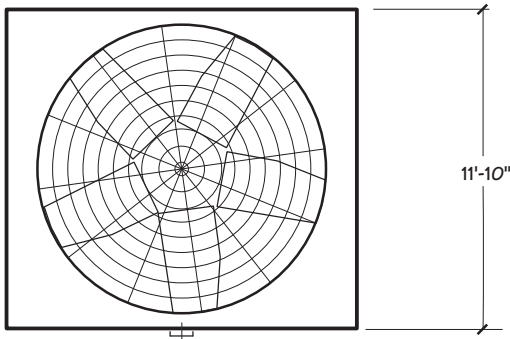
MD5016

12' x 12' Nominal Cell Size

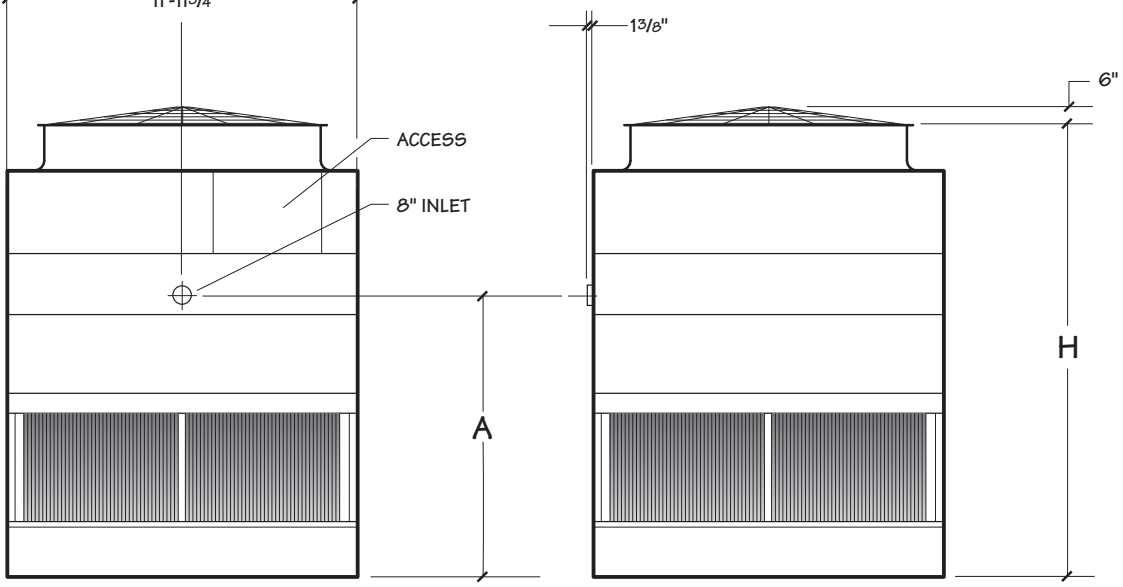
Use this data for preliminary layouts only. Obtain current drawing from your Marley sales representative.

CoolSpec™ web-based selection software, available at coolspec.com provides MD model recommendations based on customer's specific design requirements.

DESCRIPTION — MODEL SUFFIX	LAYOUT CONFIGURATION
SINGLE CELL — 1L	
TWO OR THREE CELLS — 2L 3L	
FOUR OR MORE INLINE CELLS — 4L +	
TWO CELLS BACK-TO-BACK — 2B	
FOUR CELLS BACK-TO-BACK — 4B	



Single cell arrangement shown.
Multicell inline standard spacing 2.5".
Multicell back-to-back standard spacing 4".
Water inlet location can be on either face.



MD5016

12' x 12' Nominal Cell Size

Table Data Per Cell

Model note 2	Nominal Tons note 3	Motor hp	Dimensions		Design Operating Weight lb	Shipping Weight lb	
			H note 4	A		Weight/Cell	Heaviest Section
MD5016NLC1L	284	10	13'-10⅞"	8'-3⁹⁄₁₆"	12798	7109	3771
MD5016PAC1L	317	15					
MD5016QAC1L	345	20					
MD5016RAC1L	369	25					
MD5016SAC1L	390	30					
MD5016NLD1L	310	10	14'-10⅞"	9'-3⁹⁄₁₆"	13423	7734	3886
MD5016PAD1L	350	15					
MD5016QAD1L	383	20					
MD5016RAD1L	410	25					
MD5016SAD1L	436	30					
MD5016TAD1L	475	40					
MD5016NLF1L	324	10	15'-10⅞"	10'-3⁹⁄₁₆"	13933	8244	4358
MD5016PAF1L	368	15					
MD5016QAF1L	403	20					
MD5016RAF1L	431	25					
MD5016SAF1L	460	30					
MD5016TAF1L	500	40					

Standard Layout Configuration ***Adds*** Per Cell

Description	Model Suffix note 2	Dimensions		Design Operating Weight lb	Shipping Weight lb
		H note 4	A		Weight/Cell
SINGLE CELL	1L	–	–	–	–
TWO OR THREE INLINE CELLS	2L 3L	1'-0⅛"	1'-0⅛"	121	121
FOUR OR MORE INLINE CELLS	4L +	1'-10⅛"	1'-10⅛"	283	283
TWO CELLS BACK-TO-BACK	2B	1'-0⅛"	1'-0⅛"	121	121
FOUR CELLS BACK-TO-BACK	4B	1'-10⅛"	1'-10⅛"	283	283

NOTE

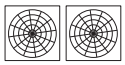
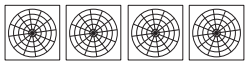
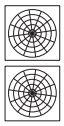
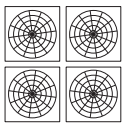
1 **Use this bulletin for preliminary layouts only.** Obtain current drawings from your Marley sales representative. All table data is per cell.
2 Last two characters of the model number indicate number of cells and cell configuration.
3 Nominal tons are based upon 95°F HW, 85°F CW, 78°F WB and 3 gpm/ton. The Marley CoolSpec web-based selection software provides MD model recommendations based on specific design requirements.
4 Models with an Ultra Quiet Fan option require a taller fan cylinder, add 1'-11½" to this dimension for correct height.

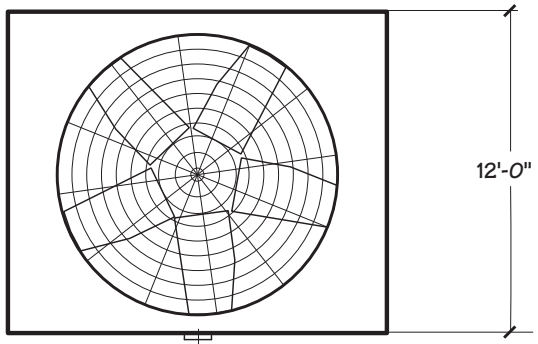
MD5017

12' x 14' Nominal Cell Size

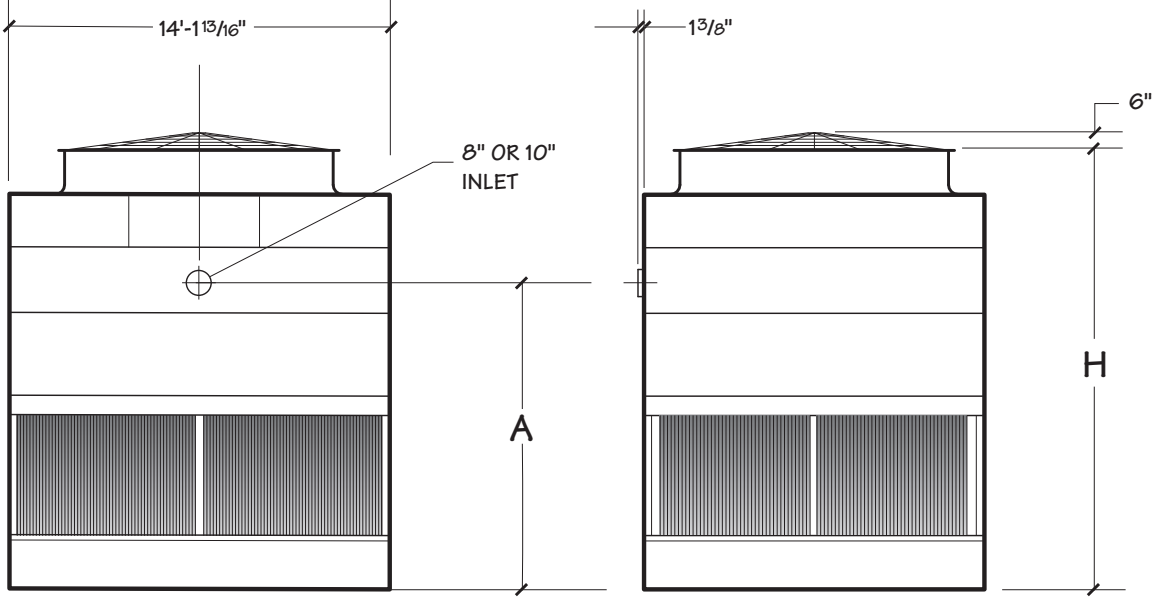
Use this data for preliminary layouts only. Obtain current drawing from your Marley sales representative.

CoolSpec™ web-based selection software, available at coolspec.com provides MD model recommendations based on customer's specific design requirements.

DESCRIPTION — MODEL SUFFIX	LAYOUT CONFIGURATION
SINGLE CELL — 1L	
TWO OR THREE CELLS — 2L 3L	
FOUR OR MORE INLINE CELLS — 4L +	
TWO CELLS BACK-TO-BACK — 2B	
FOUR CELLS BACK-TO-BACK — 4B	



Single cell arrangement shown.
Multicell inline standard spacing 2.5".
Multicell back-to-back standard spacing 4".
Water inlet location can be on either face.



MD5017

12' x 14' Nominal Cell Size

Table Data Per Cell

Model note 2	Nominal Tons note 3	Motor hp	Dimensions		Design Operating Weight lb	Shipping Weight lb	
			H note 4	A		Weight/Cell	Heaviest Section
MD5017NAC1L	324	10	14'-8½"	8'-10 5/16"	15863	9213	6595
MD5017PAC1L	360	15					
MD5017QAC1L	394	20					
MD5017RAC1L	423	25					
MD5017SAC1L	446	30					
MD5017NAD1L	349	10	15'-8½"	9'-10 5/16"	16641	9990	7372
MD5017PAD1L	391	15					
MD5017QAD1L	429	20					
MD5017RAD1L	464	25					
MD5017SAD1L	489	30					
MD5017TAD1L	528	40					
MD5017NAF1L	363	10	16'-8½"	10'-10 5/16"	17227	10577	7959
MD5017PAF1L	407	15					
MD5017QAF1L	449	20					
MD5017RAF1L	485	25					
MD5017SAF1L	510	30					
MD5017TAF1L	554	40					

Standard Layout Configuration ***Adds*** Per Cell

Description	Model Suffix note 2	Dimensions		Design Operating Weight lb	Shipping Weight lb
		H note 4	A		Weight/Cell
SINGLE CELL	1L	–	–	–	–
TWO OR THREE INLINE CELLS	2L 3L	1'-0"	1'-0"	169	169
FOUR OR MORE INLINE CELLS	4L +	2'-0"	2'-0"	339	339
TWO CELLS BACK-TO-BACK	2B	1'-0"	1'-0"	121	121
FOUR CELLS BACK-TO-BACK	4B	2'-0"	2'-0"	339	339

NOTE

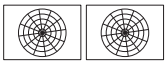
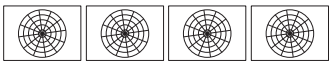
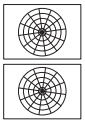
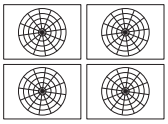
1 **Use this bulletin for preliminary layouts only.** Obtain current drawings from your Marley sales representative. All table data is per cell.
2 Last two characters of the model number indicate number of cells and cell configuration.
3 Nominal tons are based upon 95°F HW, 85°F CW, 78°F WB and 3 gpm/ton. The Marley **CoolSpec** web-based selection software provides MD model recommendations based on specific design requirements.
4 Models with an Ultra Quiet Fan option require a taller fan cylinder, add 1'-11½" to this dimension for correct height.
5 Dimension A shown is for a 8" inlet diameter, add 1¾" to this dimension for a 10" diameter inlet.

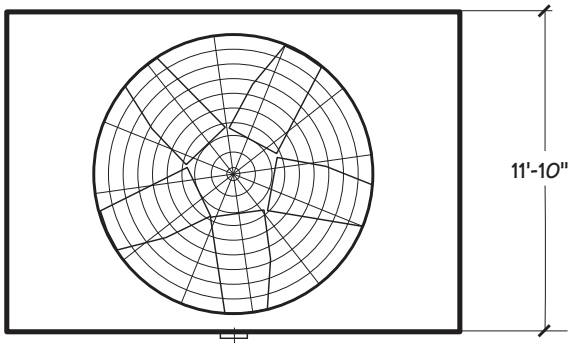
MD5018

12' x 18' Nominal Cell Size

Use this data for preliminary layouts only. Obtain current drawing from your Marley sales representative.

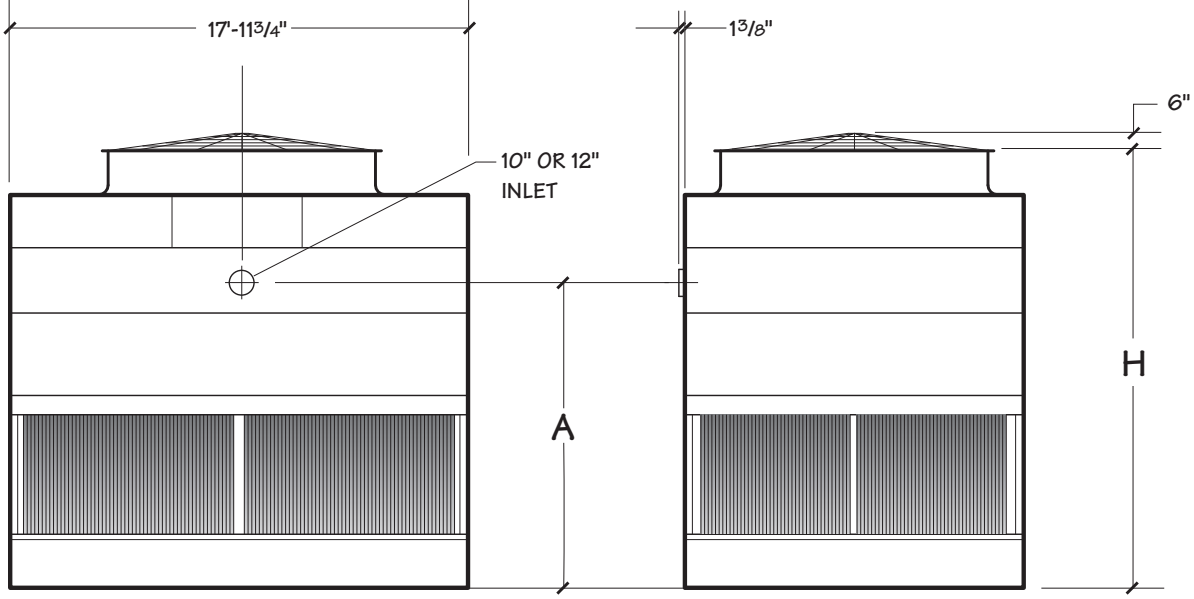
CoolSpec™ web-based selection software, available at coolspec.com provides MD model recommendations based on customer's specific design requirements.

DESCRIPTION — MODEL SUFFIX	LAYOUT CONFIGURATION
SINGLE CELL — 1L	
TWO OR THREE CELLS — 2L 3L	
FOUR OR MORE INLINE CELLS — 4L +	
TWO CELLS BACK-TO-BACK — 2B	
FOUR CELLS BACK-TO-BACK — 4B	



PLAN

Single cell arrangement shown.
Multicell inline standard spacing 2.5".
Multicell back-to-back standard spacing 4".
Water inlet location can be on either face.



SIDE ELEVATION

END ELEVATION

MD5018

12' x 18' Nominal Cell Size

Table Data Per Cell

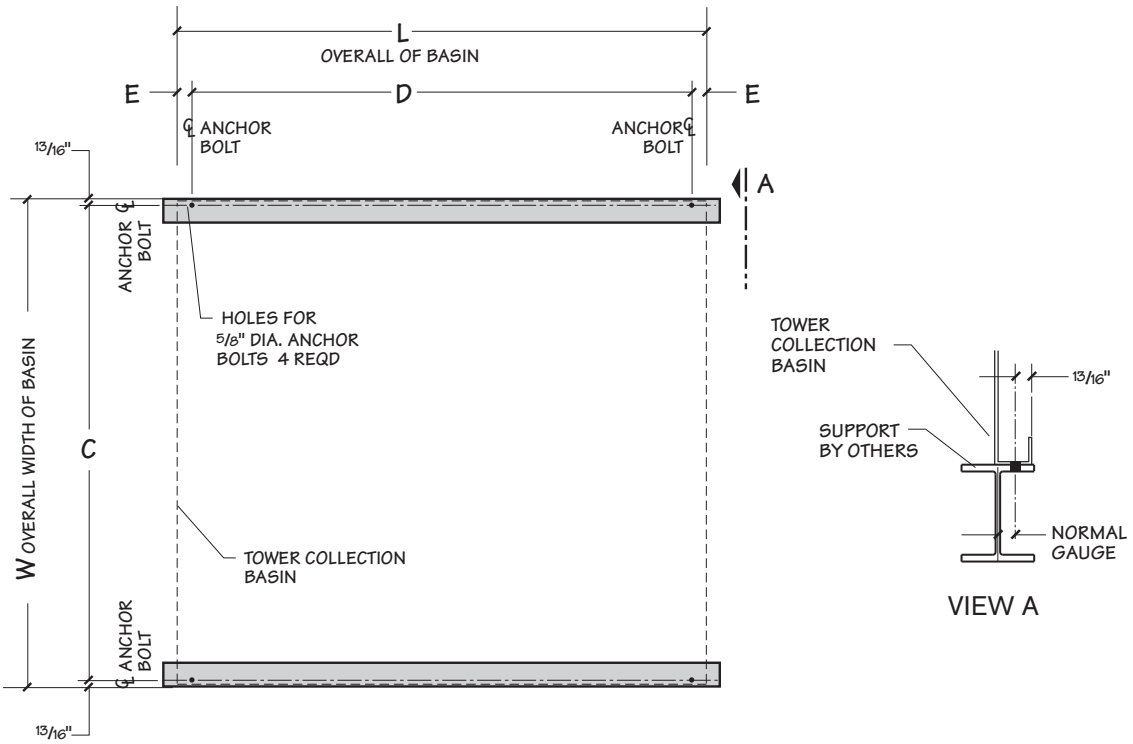
Model note 2	Nominal Tons note 3	Motor hp	Dimensions		Design Operating Weight lb	Shipping Weight lb	
			H note 4	A		Weight/Cell	Heaviest Section
MD5018NLC1L	376	10	15'-2½"	9'-4⁵⁄₁₆"	19996	11419	7729
MD5018PLC1L	428	15					
MD5018QAC1L	470	20					
MD5018RAC1L	500	25					
MD5018SAC1L	528	30					
MD5018TAC1L	580	40					
MD5018NLD1L	406	10	16'-2½"	10'-4⁵⁄₁₆"	20676	12099	8409
MD5018PLD1L	466	15					
MD5018QAD1L	516	20					
MD5018RAD1L	552	25					
MD5018SAD1L	586	30					
MD5018TAD1L	644	40					
MD5018UAD1L	690	50					
MD5018NLF1L	422	10	17'-2½"	11'-4⁵⁄₁₆"	21794	13217	9527
MD5018PLF1L	485	15					
MD5018QAF1L	540	20					
MD5018RAF1L	575	25					
MD5018SAF1L	615	30					
MD5018TAF1L	676	40					
MD5018UAF1L	725	50					
MD5018VAF1L	756	60					

Standard Layout Configuration ***Adds*** Per Cell

Description	Model Suffix note 2	Dimensions		Design Operating Weight lb	Shipping Weight lb
		H note 4	A		Weight/Cell
SINGLE CELL	1L	–	–	–	–
TWO OR THREE INLINE CELLS	2L 3L	1'-0"	1'-0"	159	159
FOUR OR MORE INLINE CELLS	4L +	2'-0"	2'-0"	299	299
TWO CELLS BACK-TO-BACK	2B	1'-0"	1'-0"	159	159
FOUR CELLS BACK-TO-BACK	4B	2'-0"	2'-0"	299	299

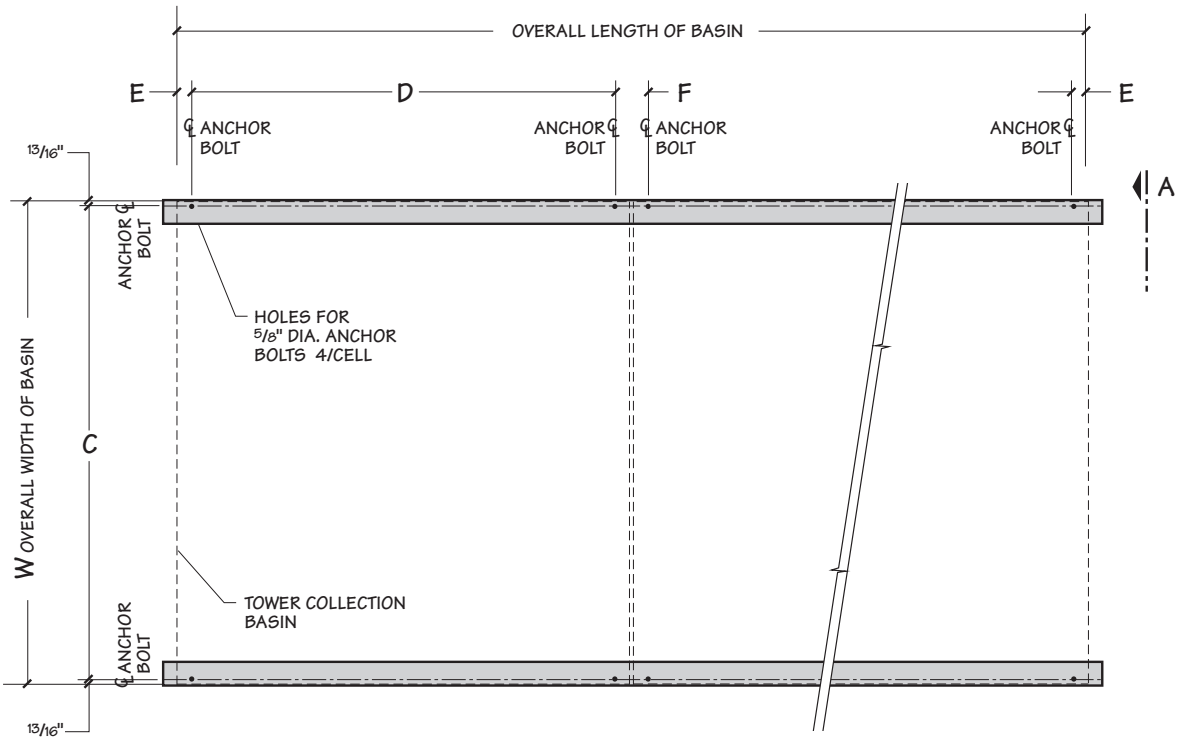
NOTE

1 **Use this bulletin for preliminary layouts only.** Obtain current drawings from your Marley sales representative. All table data is per cell.
2 Last two characters of the model number indicate number of cells and cell configuration.
3 Nominal tons are based upon 95°F HW, 85°F CW, 78°F WB and 3 gpm/ton. The Marley **CoolSpec** web-based selection software provides MD model recommendations based on specific design requirements.
4 Models with an Ultra Quiet Fan option require a taller fan cylinder, add 1'-11½" to this dimension for correct height.
5 Dimension A shown is for a 10" inlet diameter, add 1¾" to this dimension for a 12" diameter inlet.



SUPPORTING STEEL
SINGLE CELL

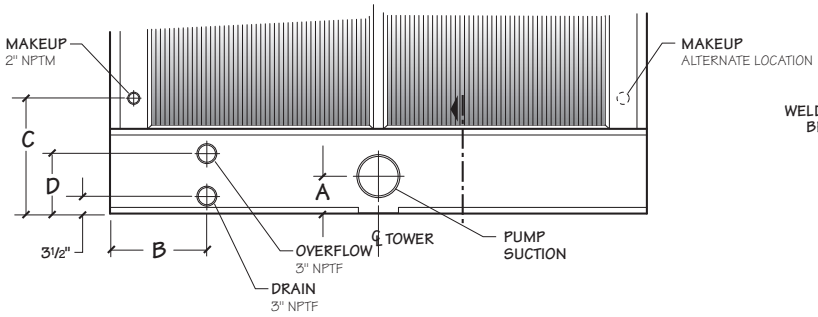
Model	Dimensions						Design Operating Weight per cell lb	Design Operating Load at support beam lb/ft
	W	L	C	D	E	F		
MD5006_C	5'-11⅞"	8'-5½"	5'-10¼"	8'-1½"	2"	6½"	5132	369
MD5006_D	5'-11⅞"	8'-5½"	5'-10¼"	8'-1½"	2"	6½"	5327	380
MD5006_F	5'-11⅞"	8'-5½"	5'-10¼"	8'-1½"	2"	6½"	5629	395
MD5008_C	8'-5½"	8'-11½"	8'- 3⅞"	8'-7½"	2"	6½"	6772	378
MD5008_D	8'-5½"	8'-11½"	8'- 3⅞"	8'-7½"	2"	6½"	7049	394
MD5008_F	8'-5½"	8'-11½"	8'- 3⅞"	8'-7½"	2"	6½"	7326	409
MD5010_C	8'-5½"	11'-11¾"	8'- 3⅞"	11'-7¾"	2"	6½"	8611	369
MD5010_D	8'-5½"	11'-11¾"	8'- 3⅞"	11'-7¾"	2"	6½"	8970	382
MD5010_F	8'-5½"	11'-11¾"	8'- 3⅞"	11'-7¾"	2"	6½"	9384	398
MD5016_C	11'-10"	11'-11¾"	11'-8⅜"	11'-1¾"	5"	12½"	12919	610
MD5016_D	11'-10"	11'-11¾"	11'-8⅜"	11'-1¾"	5"	12½"	13544	639
MD5016_F	11'-10"	11'-11¾"	11'-8⅜"	11'-1¾"	5"	12½"	14054	660
MD5017_C	11'-10"	13'-11¾"	11'-8⅜"	13'-1¾"	5"	12½"	16202	632
MD5017_D	11'-10"	13'-11¾"	11'-8⅜"	13'-1¾"	5"	12½"	16979	660
MD5017_F	11'-10"	13'-11¾"	11'-8⅜"	13'-1¾"	5"	12½"	17566	681
MD5018_C	11'-10"	17'-11¾"	11'-8⅜"	17'-1¾"	5"	12½"	20295	656
MD5018_D	11'-10"	17'-11¾"	11'-8⅜"	17'-1¾"	5"	12½"	20975	675
MD5018_F	11'-10"	17'-11¾"	11'-8⅜"	17'-1¾"	5"	12½"	22093	708



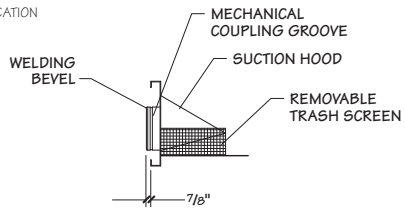
SUPPORTING STEEL
MULTICELL

NOTE

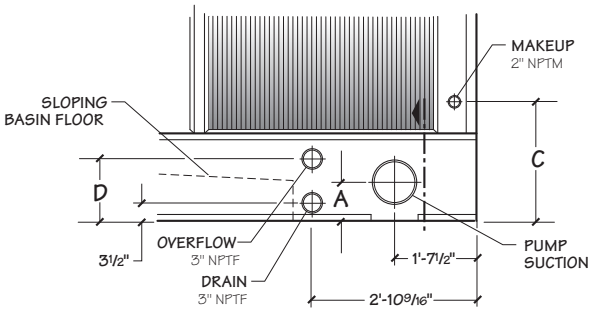
1 **Use this bulletin for preliminary layouts only.** Obtain current drawings from your Marley sales representative for final design.
2 Purchaser to provide tower support complete with holes and anchor bolts. Do not use studs! Anchor points must be framed flush and level at top.
3 Design operating weight occurs with collection basin full to overflow level. Actual operating weight varies with gpm and piping scheme.
4 Tower may be placed on a flat concrete slab. Side outlet and optional side drain and overflow must be specified.



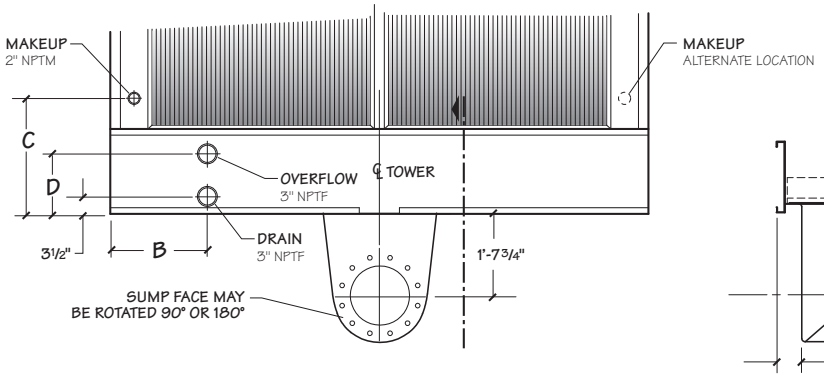
SIDE-OUTLET SUCTION CONNECTION



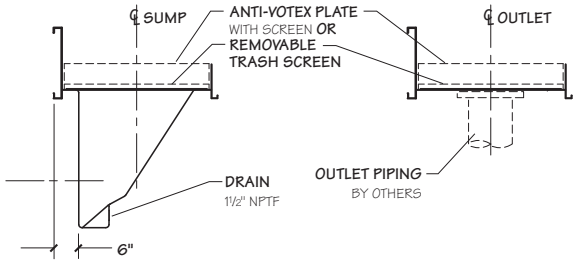
SUCTION SECTION



END-OUTLET SUCTION CONNECTION



SIDE-OUTLET SUMP CONNECTION



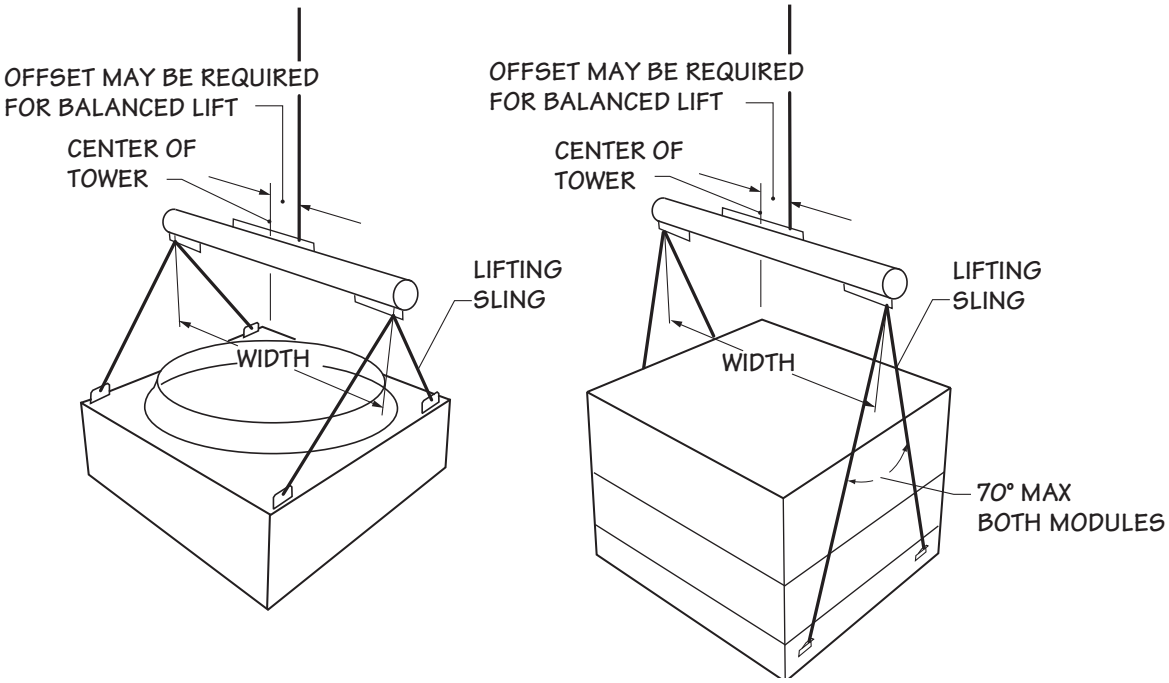
SUMP SECTION

Model	Dimensions				
	Suction Diameter	A	B	C	D
MD5006	4"	—	1'-7 ⅜"	1'-11 ⅛"	1'-0"
	6"	7 ½"	1'-7 ⅜"	1'-11 ⅛"	1'-0"
	8"	—	1'-7 ⅜"	1'-11 ⅛"	1'-0"
MD5008	6"	—	1'-7 ⅜"	1'-11 ⅛"	1'-0"
	8"	7 ½"	1'-7 ⅜"	1'-11 ⅛"	1'-0"
	10"	—	1'-7 ⅜"	1'-11 ⅛"	1'-0"
MD5010	6"	—	1'-6 ¾"	1'-11 ⅛"	1'-0"
	8"	7 ½"	1'-6 ¾"	1'-11 ⅛"	1'-0"
	10"	—	1'-6 ¾"	1'-11 ⅛"	1'-0"
MD5016	6"	—	1'-6 ¾"	2'-1 ⅛"	1'-1"
	8"	7 ½"	1'-6 ¾"	2'-1 ⅛"	1'-1"
	10"	8 ½"	1'-6 ¾"	2'-1 ⅛"	1'-1"
	12"	—	1'-6 ¾"	2'-1 ⅛"	1'-1"

Model	Dimensions				
	Suction Diameter	A	B	C	D
MD5017	6"	—	1'-6 ¾"	2'-1 ⅛"	1'-1"
	8"	7 ½"	1'-6 ¾"	2'-1 ⅛"	1'-1"
	10"	8 ½"	1'-6 ¾"	2'-1 ⅛"	1'-1"
	12"	–	1'-6 ¾"	2'-1 ⅛"	1'-1"
MD5018	14"	—	1'-6 ¾"	2'-1 ⅛"	1'-1"
	8"	7 ½"	1'-6 ¾"	2'-1 ⅛"	1'-1"
	10"	8 ½"	1'-6 ¾"	2'-1 ⅛"	1'-1"
	12"	9 ½"	1'-6 ¾"	2'-1 ⅛"	1'-1"
	14"	—	1'-6 ¾"	2'-1 ⅛"	1'-1"

Maximum gpm per Outlet																		
Outlet Diameter	Side or End Suction pump flow						Sump pump flow without anti-vortex plate						Sump pump flow with anti-vortex plate or gravity flow with or without anti-vortex plate					
	MD 5006	MD 5008	MD 5010	MD 5016	MD 5017	MD 5018	MD 5006	MD 5008	MD 5010	MD 5016	MD 5017	MD 5018	MD 5006	MD 5008	MD 5010	MD 5016	MD 5017	MD 5018
6"	815						630	630	630				815	900	900	900	900	900
8"		1174	1369	1559	1559	1559	815	1091	1091	1091	1091	1091	815	1174	1369	1559	1559	1559
10"				2347	2347	2458		1174	1369	1720	1720	1720		1174	1369	2347	2191	2458
12"						3012				2347	2191	2443				2347	2191	3012
14"												2954						
16"												3012						

Maximum gpm per Outlet												
Outlet Diameter	Bottom Outlet pump flow without anti-vortex plate						Bottom Outlet pump flow with anti-vortex plate or gravity flow with or without anti-vortex plate					
	MD 5006	MD 5008	MD 5010	MD 5016	MD 5017	MD 5018	MD 5006	MD 5008	MD 5010	MD 5016	MD 5017	MD 5018
6"							345					
8"	281						598	598	598			
10"	442	442	442				815	943	943	943	943	943
12"	628	628	628				815	1174	1338	1338	1338	1338
14"	760	760	760	760	760		815	1174	1369	1618	1618	1618
16"	815	991	991	991	991	991	815	1174	1369	2112	2112	2112
18"		1174	1256	1256	1256	1256		1174	1369	2347	2191	2636
20"			1369	1559	1559	1559			1369	2347	2191	2937
24"				2257	2191	2257				2347	2191	3012



Model	Base Module			Top Module		
	Width	Sling Length Minimum	Weight lb	Width	Sling Length Minimum	Weight lb
MD5006	6'-0"	9'-0"	1700	8'-6"	5'-0"	1800
MD5008	8'-6"	10'-0"	2400	9'-0"	8'-0"	2000
MD5010	8'-6"	12'-0"	3100	8'-6"	10'-0"	2400
MD5016	12'-0"	12'-0"	3900	12'-0"	10'-0"	4700
MD5017	12'-0"	12'-0"	3000	12'-0"	12'-0"	8000
MD5018	12'-0"	15'-0"	3700	12'-0"	15'-0"	9600

NOTE

1 Hoisting operations can be dangerous and suitable safety precautions should be taken to protect personnel and the equipment being hoisted.
2 All hoisting equipment should be certified and comply with local and national safety regulations.
3 Ensure that slings are of sufficient length so not to impose bending loads onto the casing—use of spreader bars is essential.
4 For overhead lifts or where additional safety is required, add slings beneath the tower unit

The MD cooling tower can be a very effective air washer. Atmospheric dust able to pass through the relatively small louver openings will enter the recirculating water system. Increased concentrations can intensify systems maintenance by clogging screens and strainers—and smaller particulates can coat system heat transfer surfaces. In areas of low flow velocity—such as the collection basin—sedimentary deposits can provide a breeding ground for bacteria.

In areas prone to dust and sedimentation, you should consider installing some means for keeping the collection basin clean. Typical devices include side stream filters and a variety of filtration media.

BLOWDOWN

Blowdown or Bleedoff is the continuous removal of a small portion of the water from the open recirculating system. Blowdown is used to prevent the dissolved solids from concentrating to the point where they will form scale. The amount of blowdown required depends on the cooling range—the difference between the hot and cold water temperatures of the closed circuit— and the composition of the makeup water.

WATER TREATMENT

To control the buildup of dissolved solids resulting from water evaporation, as well as airborne impurities and biological contaminants including Legionella, an effective consistent water treatment program is required. Simple blowdown may be adequate to control corrosion and scale, but biological contamination can only be controlled with biocides.

An acceptable water treatment program must be compatible with the variety of materials incorporated in a cooling tower—ideally the pH of the recirculating water should fall between 6.5 and 9.0. Batch feeding of the chemicals directly into the cooling tower is not a good practice since localized damage to the cooling tower is possible. Specific startup instructions and additional water quality recommendations can be found in the *MD Cooling Tower User Manual* which accompanies the cooling tower and also is available at spxcooling.com.

FREEZE PREVENTION

When the ambient air temperature falls below 32°F, the water in a cooling tower can freeze. *Marley Technical Report #H-003* "Operating Cooling Towers in Freezing Weather" describes how to prevent freezing during operation. Available at spxcooling.com or ask your Marley sales representative for a copy.

During shutdown, water collects in the cold water basin and may freeze solid. You can prevent freezing by adding heat to the water left in the tower—or, you can drain the tower and all exposed pipework at shutdown.

ELECTRIC BASIN HEATERS

An automatic basin water heater system is available consisting of the following components:

- Stainless steel electric immersion heater(s).

  —Threaded couplings are provided in the side of the collection basin.

- NEMA 4 enclosure containing:

  —Magnetic contactor to energize heater.

  —Transformer to convert power supply to 24 volts for control circuit.

  —Solid state circuit board for temperature and low-water cutoff.

  Enclosure may be mounted on the side of the tower.

- Control probe in the collection basin to monitor water temperature and level.

Heater components are normally shipped separately for installation by others.

Note: any exposed piping that is still filled with water at shutdown—including the makeup water line—should be electrically traced and insulated (by others).

INDOOR STORAGE TANK

With this type of system, water flows from an indoor tank, through the load system, and back to the tower, where it is cooled. The cooled water flows by gravity from the tower to the tank located in a heated space. At shutdown, all exposed water drains into the tank, where it is safe from freezing.

The amount of water needed to successfully operate the system depends on the tower size, gpm and on the volume of water contained in the piping system to and from the tower. You must select a tank large enough to contain those combined volumes—plus a level sufficient to maintain a flooded suction on your pump. Control makeup water according to the level where the tank stabilizes during operation.

Specifications

Specification Value

1.0 **Base:**

1.1 Furnish and install an induced-draft, counterflow-type, factory assembled, film fill, industrial duty, cooling tower. Unit shall consist of _____ cell(s), as shown on plans. The limiting overall dimensions of the tower shall be _____ wide, _____ long, and _____ high. Total operating power of all fans shall not exceed _____ hp, consisting of_____ @ _____ hp motor(s). Tower shall be similar and equal in all aspects to Marley Model _____.

- Your specification base establishes the type, configuration, base material, and physical limitations of the cooling tower to be quoted. During the planning and layout stages of your project, you will have focused your attention on a cooling tower selection that fits your space allotment, and whose power usage is acceptable. Limitations on physical size and total operating horsepower avoid the introduction of unforeseen operational and site-related influences. Specifying the number of cells, and the maximum fan hp/cell will work to your advantage.
  You are specifying a counterflow tower, which is a type noted–and often specified–for its economical use of plan area. It effectively replaces most makes of older towers–both forced-draft and induced-draft–usually without major redesign of the existing site.

1.2 The cooling tower shall be designed for quiet operation and shall produce an overall level of sound not higher than _____ dB(A) measured at _____ ft from the locations in the following table. Sound levels shall adhere to the Cooling Technology Institute (CTI) STD-204 Sound Certification Program when conditionally compliant with the (CTI) STD-201 Thermal Performance Certification Program. Certification must be current and verifiable with a listing in the online CTI Certification Directory. CTI certification documentation shall be submitted with product data and is subject to verification during procurement and commissioning. Equipment not covered by CTI sound and thermal certification programs must be clearly identified as non-conforming by the supplier or manufacturer.

- Recognizing how important sound control is and how difficult it is to measure cooling tower sound at various locations where background noise may interfere with testing, all published sound data for Marley MD cooling towers is CTI Certified so you can trust that the sound from your cooling tower will meet sound levels as specified.

Location	63	125	250	500	1000
Air Inlet Side SPL					
Air Inlet End SPL					
Fan Discharge SPL					

Location	2000	4000	8000	Overall dB(A)
Air Inlet Side SPL				
Air Inlet End SPL				
Fan Discharge SPL				

2.0 **Thermal Performance:**

2.1 The tower shall be capable of cooling _____ gpm of water from ____ °F to _____ °F at a design entering air wet-bulb temperature of _____ °F. The thermal performance rating shall be Certified by the Cooling Technology Institute.



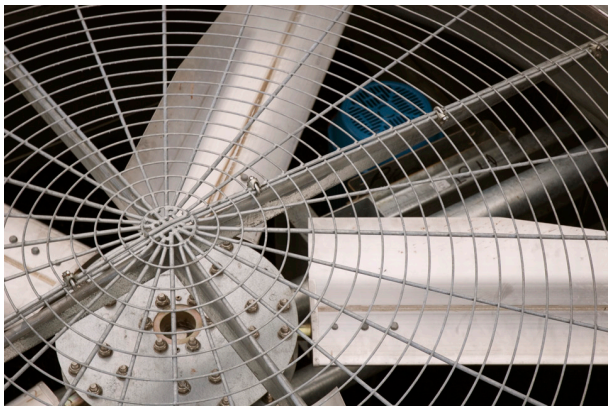


- Certification means that the cooling tower has been tested under operating conditions and found to perform as rated by the manufacturer under those circumstances. It assures the buyer that the tower is not intentionally or inadvertently undersized by the manufacturer. A list of certified cooling towers can be found at ***cti.org***.

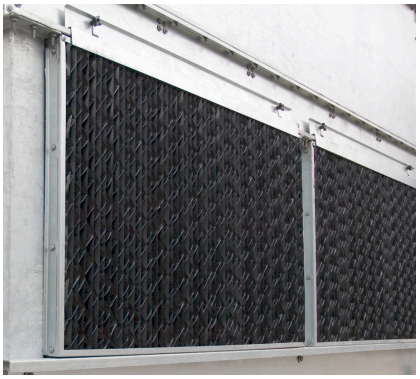
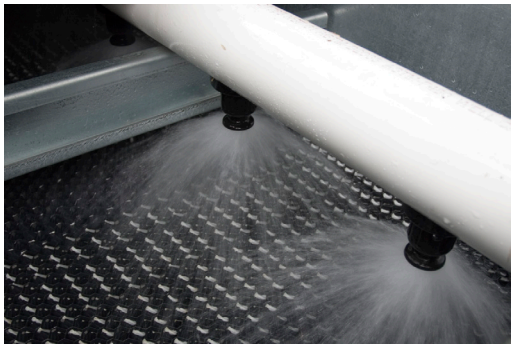
Specifications	Specification Value
2.2 The tower shall be capable of minimum _____ gpm/hp efficiency at 95°F-85°F-75°F, per ASHRAE Standard 90.1.	■ The minimum efficiency per ASHRAE Standard 90.1 for induced draft open cooling towers applied to comfort cooling is 40.2 gpm/hp @ 95/85/75. There are no efficiency requirements for non-comfort cooling applications. If you want greater efficiency you can require it by specifying a higher ASHRAE Standard 90.1 gpm/hp. ***Each model's ASHRAE Standard 90.1 rating can be viewed in our CoolSpec online sizing and selection software at coolspec.com.***
3.0 **Performance Warranty:**	
3.1 CTI certification notwithstanding, the cooling tower manufacturer shall guarantee that the cooling tower supplied will meet the specified performance conditions when the tower is installed as shown on the plans. If, because of a suspected thermal performance deficiency, the owner chooses to conduct an on-site thermal performance test under the supervision of a qualified, disinterested third party in accordance with CTI or ASME standards during the first year of operation; and if the tower fails to perform within the limits of test tolerance; then the cooling tower manufacturer will pay for the cost of the test and will make such corrections as are appropriate and agreeable to the owner to compensate for the performance deficiency.	■ Certification alone is not sufficient to assure you that the cooling tower will perform satisfactorily in your situation. Certification is established under relatively controlled conditions, and cooling towers seldom operate under such ideal circumstances. They are affected by nearby structures, machinery, enclosures, effluent from other sources, etc. Responsible and knowledgeable bidders will take such site-specific effects into consideration in selecting the cooling tower–but the specifier must insist by the written specification that the designer/manufacturer guarantee this “real world” performance. Any reluctance on the part of the bidder should cause you some concern.
4.0 **Design Loading:**	
4.1 The structure and anchorage shall be designed to withstand a wind load of 50 psf while operating, based on International Building Code ASCE7-10, as well as a .3g seismic load. Maintenance platforms and guardrails, where specified shall be capable of withstanding a 200 lb concentrated live load in any direction and shall be designed in accordance with OSHA guidelines.	■ It is important to understand the distinction between ***structure*** and ***anchorage***. Specifying that only the ***anchorage*** meet these requirements means the tower can become non-functional, even fall down, yet remain attached to the foundation. Specifying ***structure*** will require the tower to remain operational. The indicated design values are the minimums allowed under accepted design standards. They give you assurance that the tower can be shipped, handled, hoisted–and ultimately operated in a normal cooling tower environment. Most MD models will withstand significantly higher wind and seismic loads. If your geographic location dictates higher wind load or seismic load values, please make the appropriate changes, after discussion with your Marley sales representative. ***Some countries and states, like Florida, require structure and anchorage to meet a given loading. Check with your local officials.*** **50 psf windload, .3g seismic load**–applicable for most applications but consult the local code official for actual requirements. **60 psf live load, 200 lb concentrated load**–ensures the tower can be safely accessed for routine maintenance when a guardrail is installed as well ensuring the end user complies with government safety laws.

Specifications	Specification Value
5.0 **Construction:**	
5.1 Except where otherwise specified, all components of the cooling tower shall be fabricated of heavy-gauge steel, protected against corrosion by G-235 galvanizing. After passivation of the galvanized steel (8 weeks at pH 7-8, and calcium hardness and alkalinity at 100-300 ppm each), the cooling tower shall be capable of withstanding water having a pH of 6.5 to 9.0; a chloride content up to 500 ppm as NaCl (300 ppm as Cl-); a sulfate content (as SO_4) up to 250 ppm; a calcium content (as $CaCO_3$) up to 500 ppm; silica (as SiO_2) up to 150 ppm; and design hot water temperatures up to 130°F. The circulating water shall contain no oil, grease, fatty acids, or organic solvents. Fiberglass casing, polyurethane barriers, and thermosetting hybrids and the components they are adhered to shall be considered non-recyclable and not allowed.	■ In the history of cooling towers, no other coating for carbon steel has exhibited the success and longevity of galvanization in exposure to the normal cooling tower water quality defined at left. No paints or electrostatically-applied coatings, however exotic they may be, can approach galvanization's history of success. If extended longevity of the cooling tower is required–or unusually harsh operating conditions are expected–consider specifying stainless steel as either the base construction material, or the material utilized for specific components of your choice. See Stainless Steel Options on page 45.
5.2 The specifications, as written, are intended to indicate those materials that will be capable of withstanding the above water quality in continuing service, as well as the loads described in paragraph 4.1. They are to be regarded as minimum requirements. Where component materials unique to individual tower designs are not specified, the manufacturers shall take the above water quality and load carrying capabilities into account in the selection of their materials of manufacture.	
6.0 **Mechanical Equipment**:	
6.1 Fan(s) shall be propeller-type, incorporating aluminum alloy blades attached to galvanized hubs with U-bolts. Blades shall be individually adjustable Fan(s) shall be driven through a one-piece multi-groove, solid back V-type belt, sheaves (pulleys), and tapered roller bearings. Bearings shall be rated at an L_{10} life of 100,000 hours, or greater. Both motor and fan sheaves (pulleys) shall be all cast aluminum to prevent premature corrosion.	■ Propeller-type fans require only half the operating hp of blower-type fans. However, they should be readily adjustable to permit compensation for jobsite conditions. The Marley Power Belt drive system features all-aluminum sheaves, power band belts and long-life bearings for dependable service. TEFC motors offer additional benefits over TEAO motors whose only source of cooling is the flow of air produced by the cooling tower fan. This air rate is not always ideal due to motor position, blockage, variable speed operation, etc. TEFC ensures the motor will always be cooled properly. Unless otherwise specified, motor speed will be 1800 RPM in 60 Hertz areas and 1500 RPM in 50 Hertz areas on standard models. Low sound models will use motor speeds appropriate for the specific model.

Specifications	Specification Value
6.1 (alternate) Fan(s) shall be propeller-type, incorporating aluminum alloy blades attached to galvanized hubs with U-bolts. Blades shall be individually adjustable. Maximum fan tip speed shall be 13,000 ft/min. Fan(s) shall be driven through a right angle, industrial duty, oil lubricated, geared speed reducer that requires no oil changes for the first five (5) years of operation. All gearbox bearings shall be rated at an L_{10A} service life of 100,000 hours or greater and the gear sets shall have AGMA Quality Class of 9 or greater. The gearbox shall include any modifications to enable operation down to 10% of full speed.	The value of a 5 year mechanical equipment warranty speaks for itself. Except for the motor, virtually all of the mechanical equipment on a Marley tower is designed and manufactured by SPX Cooling. Cooling tower vendors who purchase commercial fans, driveshafts, etc. may require that you deal directly with those commercial suppliers for warranty satisfaction.
6.2 Motor(s) shall be ____ hp maximum, NEMA Premium Efficiency, TEFC, 1.15 service factor, variable torque, inverter duty and insulated for cooling tower duty. Speed and electrical characteristics shall be _____ RPM, single-winding, 3 phase, ____ hertz, ____ volts. Motor shall operate shaft-down position for belt drive towers and in the shaft-horizontal position for geardrive towers. Nameplate power shall not be exceeded at design operation. TEAO motors are not acceptable.	
6.3 The complete mechanical equipment assembly for each cell shall be supported by a rigid, hot-dip galvanized steel structural support that resists misalignment between the motor and sheaves (pulleys). For belt-drive towers with motors mounted outside the airstream, a protective cover shall be mounted over the motor and sheave to protect it from the weather and prevent inadvertent contact. The mechanical equipment assembly shall be warranted against any failure caused by defects in materials and workmanship for no less than five (5) years following the date of tower shipment. This warranty shall cover the fan(s), premium efficiency motor(s), speed reducer(s), drive shaft(s) and coupling(s), and the mechanical equipment support. Oil seals shall be warranted for eighteen (18) months with replacement oil seals furnished through the mechanical warranty. The bearing assemblies and V-belts shall be warranted for 18 months.	





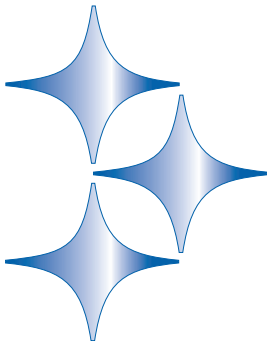
Specifications	Specification Value
7.0 **Fill, Louvers and Drift Eliminators:**	
7.1 Fill shall be cross-corrugated, counterflow film type, thermoformed from 12 mil thick PVC. Fill shall be supported on channel sections supported from the tower structure and have a flame spread rating less than 25.	■ Fill modules can be removed for inspection and cleaning in accordance with local anti Legionella guidelines.
7.2 Drift eliminators shall be 17 mil thick PVC with a minimum of three changes in air direction, and shall limit drift losses to 0.005% or less of the design water flow rate.	■ Drift rate varies with design water loading and air rate, as well as drift eliminator depth and number of directional changes. A drift rate of 0.001% is readily available on many standard models. If a lower rate is required, please discuss with your Marley sales representative.
7.3 Air inlet louvers shall be a minimum of 5" air travel, triple pass PVC to limit water splashout and prevent direct sunlight from entering the collection basin. For ease of service and long life of louvers, PVC louvers shall be enclosed in a removable frame that attaches to the air inlet without tools. Louvers with less than three changes in air direction are unacceptable.	■ Triple-pass inlet louvers 
8.0 **Hot Water Distribution System:**	
8.1 A pressured spray system shall distribute water evenly over the fill. The branch arms shall be corrosion resistant PVC with polypropylene spray nozzles attached to the branch arms with a rubber socket connection for ease of removal and cleaning. To ensure proper spray system operation, nozzles shall seat in branch arms without regard for direction or alignment.	■ The combination of PVC piping and polypropylene nozzles is very resistant to the build-up of scale and slime. 
9.0 **Casing and Fan Guard:**	
9.1 The casing shall be heavy gauge G-235 galvanized steel and shall be capable of withstanding the loads described in paragraph 4.1. Casing panels shall encase the fill on all four sides of the tower. The top of the fan cylinder shall be equipped with a conical, non-sagging, removable fan guard, fabricated of welded 5/16" and 7 gauge rods, and hot dip galvanized after fabrication.	
10.0 **Access:**	
10.1 A large rectangular access door shall be located in the plenum on the motor side of the tower.	

Specifications	Specification Value
11.0 **Cold Water Collection Basin**:	
11.1 The collection basin shall be heavy-gauge galvanized steel and shall include the number and type of suction connections required to accommodate the outflow piping system shown on the plans. Suction connections shall be equipped with debris screens. A factory installed, float operated, mechanical make-up valve shall be included. An overflow and drain connection shall be provided in each cell of the tower. The basin floor shall slope toward the drain to allow complete flush out of debris and silt which may accumulate. Towers of more than one cell shall include steel flumes for flow and equalization between cells.	
13.0 **Warranty**:	
13.1 The MD cooling tower shall be free from defects in materials and workmanship for a period of eighteen (18) months from the date of shipment.	

■ The MD tower design offers side-suction as standard. Bottom outlets may be supplied to accommodate a variety of piping schemes. Unless so specified, the tower you may be asked to approve may only be available with one type of suction connection requiring you to redesign your piping layout.

The sloping floor and low-level drain is valuable because it provides a way to achieve flush-out cleanability.

Specifications	Specification Value
Stainless Steel Options	
Stainless Steel Collection Basin:	
11.1 *Replace paragraph 11.1 with the following:* The collection basin shall be welded 301L stainless steel construction. Only low-carbon stainless steel alloys will be accepted in order to minimize the risk of intergranular corrosion in the weld zones. The basin shall include the number and type of suction connections required to accommodate the out-flow piping system shown on the plans. Basin suction connections shall be equipped with debris screens. A factory installed, float operated, mechanical make-up valve shall be included. An overflow and drain connection shall be provided in each cell of the tower. The basin floor shall slope toward the drain to allow complete flush out of debris and silt which may accumulate.	■ The cold water basin is the only part of the tower that is subject to periods of stagnant water, concentrated with treatment chemicals and customary contaminants. It is also the most expensive and difficult part of any tower to repair or replace. For these reasons, many customers–particularly those who are replacing older towers–choose to specify stainless steel cold water basins. ■ The 316 alloy was designed to increase resistance to chlorides. Generally, cooling towers in HVAC service utilize water sources, which do not approach the limits of 300 series stainless, even up to several cycles of concentration. Industrial cooling towers, generally circulating more aggressive water, use 300 series stainless as standard metallurgy, upgrading to 316 for situations such as estuary water or other significant source of chlorides. The vast majority of cooling tower water sources result in an acceptable environment for 300 series stainless steel, with HVAC systems typically being on the mild end of the spectrum. If you have one of the rare instances where water quality exceeds 900 ppm Cl, talk to you Marley sales representative about 316SS.
All Stainless Cooling Tower:	
5.1 *Replace paragraph 5.1 with the following:* Except where otherwise specified, all components of the cooling tower shall be fabricated of heavy-gauge, series 301L stainless steel. Only low-carbon stainless steel alloys will be accepted in order to minimize the risk of intergranular corrosion in the weld zones. The tower shall be capable of withstanding water having a chloride content (NaCl) up to 750 ppm; a sulfate content (SO_4) up to 1200 ppm; a calcium content ($CaCO_3$) up to 800 ppm; silica (SiO_2) up to 150 ppm; and design hot water temperatures up to 135°F. The circulating water shall contain no oil, grease, fatty acids, or organic solvents.	■ Where water quality falls outside the limits indicated in Paragraph 5.1, an all-stainless tower is worthy of your consideration. For pure resistance to corrosion–coupled with the capability to meet stringent fire and building codes–there is no substitute for stainless steel. No paints or electostatically-applied coatings, however exotic they may be, can match stainless steel's ability to withstand adverse operating conditions.



Specifications	Specification Value
Convenience and Safety Options	
Mechanical Access Platform:	
10.2 *Add the following paragraph in the Access section:* There shall be a mechanical access platform at the mechanical access door allowing access to the mechanical system, drift eliminators, distribution system and fill. The platform shall be galvanized steel bar grating, supported by galvanized steel framework attached to the tower. The platform shall be surrounded by a guardrail, kneerail, and toeboard designed according to OSHA guidelines and shall be capable of withstanding a 200 lb concentrated live load in any direction. A ladder shall be permanently attached to the platform and to the casing of the tower, rising from the base of the tower to the top of the handrail.	■ Periodic inspection and maintenance of a cooling tower distribution system is fundamental to preserving maximum cooling system efficiency. All cooling towers–crossflow or counterflow–are subject to clogging to varying degrees by waterborne contaminants such as pipe scale and sediment. Therefore, safe and easy access to these components is of significant value to the operator. Access can be provided in a number of ways, including portable ladders or scaffolding, but for maximum safety and convenience, a field installed Marley access platform with guardrails is available to make this task as safe and user-friendly as possible. Further, its location on the side of the tower does not add to the height of the unit, preserving architectural integrity. It also saves the owner time and money, in that maintenance personnel may devote their time to inspection rather than searching for ladders or erection of portable scaffolding.
Ladder Extension:	
10.2 *Add the following to the end of paragraph 10.2:* Provide a ladder extension for connection to the foot of the ladder. This extension shall be long enough to rise from the roof (grade) level to the base of the cooling tower. The installing contractor shall be responsible for cutting the ladder to length; attaching it to the foot of the cooling tower ladder; and anchoring it at its base.	■ Many cooling towers are installed such that the base of the unit is 2'-0" or more above the roof or grade level. This makes it difficult to get up to the foot of the attached ladder. The ladder extension alleviates this problem. Marley ladder extensions are available in standard 5'-0" and 11'-0" lengths.
Ladder Safety Cage:	
10.2 *Add the following to the end of paragraph 10.2:* A welded aluminum safety cage shall surround the ladder, extending from a point approximately 7'-0" above the foot of the ladder to the top of the handrail. Maximum weight of welded subassemblies shall not exceed 20 lb for ease of installation.	
Ladder Safety Gate:	
10.2 *Add the following to the end of paragraph 10.2:* A steel, self-closing gate shall be provided at the guardrail level of the ladder.	■ A galvanized steel self-closing gate located at the guardrail level of the fan deck, exterior motor access platform and access door platform. Stainless steel is available with the stainless guardrail option.

Specifications	Specification Value
Motor Davit: 10.4 *Add the following paragraph in the Access section:* A powder coated davit crane with hot dipped galvanized mounting base shall be field installed on the motor face of the cooling tower and shall have a maximum capacity of 500 lb.	■ Simplify the removal of the fan motor when required. If you would prefer stainless steel construction change powder coated and hot dipped galvanized to stainless steel in the description. Available with this option is a zinc plated hand crank winch with 45'-0 of 3/16" diameter galvanized aircraft cable with swivel hook with swaged ball fitting.
Motor and Fan Davit: 10.4 *Add the following paragraph in the Access section:* A powder coated davit crane with hot dipped galvanized mounting base shall be field installed on the motor face of the cooling tower. The davit shall have maximum capacity of 500 lb at a 5"-6 boom extension and 1000 lb at a 3'-0 boom extension.	■ Simplify the removal of the fan motor or fan assemble when required. If you would prefer stainless steel construction change powder coated and hot dipped galvanized to stainless steel in the description. Available with this option is a zinc plated hand crank winch with 60'-0 of 1/4" diameter galvanized aircraft cable with swivel hook and swaged ball fitting. Also available with this options is a 115V electric winch with a 6'-0 pendant control. Includes 60'-0 of 1/4" diameter galvanized aircraft cable with swivel hook with swaged ball fitting.
Control Options **Fan Motor Starter Control Panel:** 6.4 *Add the following paragraph in the Mechanical Equipment section:* Each cell of the cooling tower shall be equipped with a UL / CUL 508 listed control panel in a NEMA 3R or 4X outdoor enclosure capable of controlling single-speed or two-speed motors as required, and designed specifically for cooling tower applications. The panel shall include a main circuit breaker or main fused disconnect with an external operating handle, lockable in the off position for safety. Full voltage non-reversing magnetic starter shall be controlled with a thermostatic or solid-state temperature controller. Door mounted selector switches shall be provided to enable automatic or manual control and wired for 120VAC control. Control circuit to be wired out to terminal blocks for field connection to a remote vibration switch, overload trip alarms and remote temperature control devices. The temperature controller shall be adjustable for the required cold-water temperature. If a thermostatic controller is used it shall be mounted on the side of the tower with the temperature sensing bulb installed in the cold water basin using a suspension mounting bracket. If a solid-state temperature controller is used the controller will be door mounted on the control panel. The solid-state temperature controller will display two temperatures,	■ If it is your opinion that the control system for the cooling tower be part of the cooling tower manufacturer's responsibility, we are in wholehearted agreement with you. Who better to determine the most efficient mode and manner of a cooling tower's operation–and to apply a system most compatible with it–than the designer and manufacturer of the cooling tower? Marley variable speed drives are also available for the ultimate in temperature control, energy management, and mechanical equipment longevity. 

Specifications	Specification Value

one for outgoing water and the other for set point. Water temperature input shall be obtained using a three-wire RTD with dry well in the outlet water piping and wired back to the solid-state temperature controller in the control panel.

Vibration Limit Switch:

6.5 *Add the following paragraph in the Mechanical Equipment section:* A vibration limit switch in a NEMA 4X housing shall be installed on the mechanical equipment support and wired to the shutdown circuit of the fan motor starter or VFD. The purpose of this switch will be to interrupt control power voltage to a safety circuit in the event of excessive vibration causing the starter or VFD equipment to de-energize the motor. It shall be adjustable for sensitivity and include a means to reset the switch.

■ Unless specified otherwise, an IMI Sensors mechanical vibration switch will be provided. The requirement for manual reset assures that the cooling tower will be visited to determine the cause of excessive vibration.



Basin Heater:

11.2 *Add the following paragraph in the Cold Water Basin section:* Provide a system of electric immersion heaters and controls for each cell of the tower to prevent freezing of water in the collection basin during periods of shutdown. The system shall consist of one or more stainless steel electric immersion heaters installed in threaded couplings provided in the side of the basin. A NEMA 4 enclosure shall house a magnetic contactor to energize heaters; a transformer to provide 24-volt control circuit power; and a solid-state circuit board for temperature and low water cut-off. A control probe shall be located in the basin to monitor water level and temperature. The system shall be capable of maintaining 40°F water temperature at an ambient air temperature of _____ °F.

■ The Marley basin heater components described at left represent our recommendation for a reliable automatic system for the prevention of basin freezing. They are normally shipped separately for installation at the jobsite by the installing contractor. When purchased in conjunction with the enhanced Control System option, however, they are customarily factory-mounted and tested.



Submerged in basin water, in which zinc ions are present, copper immersion heaters must not be used. Insist upon stainless steel.

The ambient air temperature that you insert in the specifications should be the lowest 1% level of winter temperature prevalent at site.

Water Level Control System:

11.2 *Add the following paragraph to the Cold Water Basin section:* Provide a water level control system including a NEMA 4X control panel, water level probes and probe stilling chamber. The control system shall monitor the water level in the cold-water basin to determine level events used for cold-water make-up, high

■ Solid-state liquid level controls provide you with state-of-the-art systems to control and monitor the water level in your cooling tower collection basin. Relays operating in conjunction with suspended stainless steel electrode probes monitor basin water levels, providing simple solenoid-valve water makeup or discrete on/off signals to more sophisticated automation controls. Optional configurations might include makeup along with high and low water level alarm and cutoff, or pump cutoff. Packaged systems including any of these variations are available. Consult your Marley sales representative or download literature number ACC-NC-9D from spxcooling.com for additional information.

Specifications	Specification Value

and low alarms or pump shut down. The control panel shall use electromechanical relays providing power for the make-up solenoid and electrical contacts for alarm and pump shutdown control circuits. Probes shall be contained in a vertical stilling chamber to stabilize the water in the cold-water basin. Probes shall have replaceable stainless steel tips and level height shall be field adjustable.

Fan Motor Variable Speed Drive

ACH550 VFD System:

6.4 *Add the following paragraph in the Mechanical Equipment section when VFD is used with customers Building Management System:* For fan control a complete UL listed variable speed drive system in a NEMA 1 indoor, NEMA 12 indoor or NEMA 3R outdoor enclosure shall be provided. The VFD shall use PWM technology with IGBT switching. VFD output switching signal shall be programmed to not cause mechanical vibration issues with backlash in gear-box teeth or vibration issues associated with long driveshafts. The VFD shall be programmed for variable torque applications and shall catch a fan spinning in the forward or reverse direction without tripping. VFD panel construction shall include a main disconnect with short circuit and thermal overload protection with external operating handle, lockable in the off position for lock-out tag-out safety procedures. A service switch directly ahead of the VFD shall be provided for voltage isolation during VFD maintenance. An integrated full voltage non-reversing bypass starter shall be furnished allowing fan motor operation if VFD has failed. The VFD system shall receive a speed reference signal from the building management system monitoring the cooling tower cold-water temperature. As an option to receiving the speed reference signal from a building management system, the drive must have the capability to receive a 4-20 mA temperature signal from an RTD transmitter. When using an RTD for temperature monitoring and speed control the VFD shall have an internal PI regulator to modulate fan speed maintaining set point temperature. The drive's panel shall display the set-point temperature and

- Marley VFD drive systems are designed to combine absolute temperature control with ideal energy management. The cooling tower user selects a cold water temperature and the drive system will vary the fan speed to maintain that temperature. Precise temperature control is accomplished with far less stress to the mechanical equipment components. The improved energy management provides fast payback.

  Motors operated on a VFD shall carry a service factor of 1.0. When operating on a VFD, the drive parameters should be programmed to limit the current to motor nameplate hp. Adjust the Motor specification accordingly.



Specifications

cold-water temperature on two separate lines. The bypass shall include a complete electromechanical magnetic bypass circuit with the capability to isolate the VFD when in the bypass mode. Transfer to the bypass mode shall be manual in the event of VFD failure. Once the motor is transferred to the bypass circuit the fan motor will run at constant full speed. Operator controls shall be mounted on the front of the enclosure and shall consist of Start and Stop control, Bypass/VFD selection, Auto/Manual selections and manual speed control. To prevent heating problems in the fan motor the VFD system shall de-energize the motor once 25% motor speed is reached and cooling is no longer required. The cooling tower manufacturer shall offer VFD start-up assistance to assure proper VFD programming for cooling tower operation.

Miscellaneous Options

Equalizer Flume Weir Gates:

11.2 *Add the following paragraph under Cold Water Collection Basin:* The interconnecting flume between cells shall be equipped with a removable cover plate to permit the shutdown of one cell for maintenance purposes, or to permit independent cell operation.

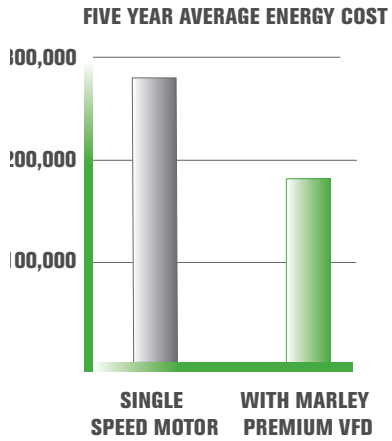
Fan Cylinder Extensions:

9.1 *Insert the following before the last sentence:* Fan cylinder extensions shall be provided to elevate the fan discharge to a height of ___ ft above the fan deck level.

Basin Sweeper Piping:

11.2 *Add the following paragraph to the Cold Water Collection Basin section:* The cold water basin shall be equipped with factory installed corrosion resistant PVC sweeper piping with plastic nozzles. The sweeper piping system shall be designed to force dirt and debris towards a dedicated drain in the depressed section of the collection basin.

Specification Value



20% reduction in fan speed will typically save 50% of electrical energy

- Where it is your intention to be able to operate both cells of the tower while the flume cover plate is installed, separate outlet connections, float valves and overflows must be provided for each cell. Likewise, this would require separate sensors and controls for basin heater systems, if installed.

- Extensions are available in nominal 1'-0" increments to a maximum height that varies by model. Such extensions may be considered necessary in order to elevate the discharge beyond the bounds of an enclosure. Discuss applicability with your local Marley sales representative.

Specifications	Specification Value
Splash Attenuation:	
1.3 *Insert the following paragraph in the Base section:* The cooling tower shall be equipped with polypropylene splash attenuation media factory installed in the collection basin to reduce falling water noise.	
Outlet Sound Attenuation:	
1.3 *Add the following paragraph to the Base section:* The cooling tower shall be equipped with outlet sound attenuation baffles positioned and spaced horizontally across the entire fan opening. The baffles shall be constructed of perforated sheet metal filled with sound absorbing material, and contained within a steel box that is self-supporting.	
Ultra Quiet Fan:	
6.1 *Replace paragraph 6.1 with the following:* Fan(s) shall be propeller-type, incorporating wide-chord acoustic geometry, corrosion and fire resistant marine grade aluminum blades and aluminum hubs. Blades shall be resiliently mounted to fan hub and individually adjustable. Fan blades shall be open cavity with suitable drainage to avoid accumulation of moisture. Foam filled blades are not allowed due to potential moisture contamination of the foam core causing an imbalance of the fan leading to vibration issues. Maximum fan tip speed shall be 10,000 ft/min. Fan(s) shall be driven through a one-piece multi-groove, solid back V-type belt, sheaves (pulleys), and tapered roller bearings. Bearings shall be rated at an L_{10} life of 100,000 hours, or greater. Both motor and fan sheaves (pulleys) shall be all cast aluminum to prevent premature corrosion.	■ For more severe cases requiring the lowest possible fan sound levels the Marley "Ultra Quiet" fan option is now available on all MD models. Tower height may increase slightly–obtain current sales drawings from your Marley sales representative for accurate dimensions. If your requirement calls for outlet attenuation, you might consider the Ultra Quiet fan in lieu of attenuation. Outlet attenuators are not available with the Ultra Quiet Fan option.
6.1 (alternate) *Replace paragraph 6.1 with the following:* Fan(s) shall be propeller-type, incorporating wide-chord acoustic geometry, corrosion and fire resistant marine grade aluminum blades and aluminum hubs. Blades shall be resiliently mounted to fan hub and individually adjustable. Fan blades shall be open cavity with suitable drainage to avoid accumulation of moisture. Foam filled blades are not allowed due to potential moisture contamination of the foam core causing an imbal-	 *Marley "Ultra Quiet" fan*

Specifications	Specification Value
ance of the fan leading to vibration issues. Maximum fan tip speed shall be 10,000 ft/min. Fan(s) shall be driven through a right angle, industrial duty, oil lubricated, geared speed reducer that requires no oil changes for the first five (5) years of operation. The gearbox bearings shall be rated at an L_{10A} service life of 100,000 hours or greater. The gear sets to have AGMA Quality Class of 9 or greater.	
FM Approval:	
Available only on multi-cell towers.	
5.3 *Add the following paragraph in the Construction section:* For applications of two or more cells, the tower shall be listed in the current FM Approval Guide (approvalguide.com) and conform to the FM Approval Standard for Cooling Towers, Class Number 4930 that is approved for use without sprinkler systems. The tower shall have successfully passed full scale fire testing, static and cyclic wind pressure testing, large missile impact testing (for Zone HM), and structural design evaluation as administered by FM Approvals. The tower shall be capable of +70/-140 psf for Zone H as defined by FM Global. A copy of the FM Approval Certificate of Compliance dated November 2013 or later shall be available upon request.	■ This could have a very beneficial effect upon your fire insurance premiums. Towers not able to meet FM requirements may require the inclusion of a fire protection sprinkler system to achieve a comparable level of insurance premium cost. Even if you are not insured by FM, this requirement ensures that each cell will contain any fire that may occur without losing the ability of limited operations and capacity.
Low-Clog Film Fill:	
7.1 *Replace paragraph 7.1 with the following:* Fill shall be vertical-fluted, counterflow film type, thermoformed PVC, with no greater than 15 sheets/ft of fill across the cross section of the tower. Fill shall be supported on channel sections connected to the tower structure and have a flame spread rating less than 25.	■ Low-clog fill provides a higher degree of clog resistance for dirty water applications. Allows substances to migrate through it, while maintaining thermal efficiency. Large orifice, low-clog nozzles develop uniform water distribution over a wide range of operating water pressures. The combination of PVC piping and polypropylene nozzles is very resistant to the build-up of scale and slime. Typical applications include: • Reclaimed or recycled water source • River or lake water source • Scaling well-water source • Elevated oil or grease • Poor control of biological growth or mineral scale • Moderate product contamination (non-fibrous) • Dusty, nutrient laden, agricultural, or mining environment
8.1 *Replace paragraph 8.1 with the following:* A pressured low-clog spray system shall distribute water evenly over the fill. The branch arms shall be corrosion resistant PVC with polypropylene spray nozzles attached to the branch arms with a threaded connection for ease of removal and cleaning. Branch arms are connected to a common internal header box using a grommet connection. Spray system shall provide uniform distribution within the nozzle operating pressure range.	

MD cooling tower

ENGINEERING DATA AND SPECIFICATIONS

SPX COOLING TECH, LLC
7401 WEST 129 STREET
OVERLAND PARK, KS 66213 USA
913 664 7400 | spxcooling@spx.com
spxcooling.com

MD-TS-26 | ISSUED 3/2026

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In the interest of technological progress, all products are subject to design and/or material change without notice.

MARLEY
An SPX Technologies Brand

Appendix 6

Applicability Evaluation for U.S. EPA NSPS and NESHAP Regulations

NEW SOURCE PERFORMANCE STANDARDS

APPLICABILITY DETERMINATION

The table below includes a list of potentially applicable New Source Performance Standards (NSPS) regulations. A number of the NSPS apply to the Dyno Nobel TNT Plant.

Code of Federal Regulations	Standards of Performance	Evaluated for Potential Applicability for Dyno Nobel? [a]	Applicable to Dyno Nobel?	Justification for Determination
40 CFR 60 Subpart Dc	Small Industrial-Commercial-Institutional Steam Generating Units	Yes	Yes	The natural gas-fired boiler is an affected source.
40 CFR 60 Subpart E	Standards of Performance for Incinerators	Yes	No	This applies to municipal solid waste incinerators per the definitions in 40 CFR 60.51
40 CFR 60 Subpart Ea	Municipal Waste Combustors for Which Construction Is Commenced After December 20, 1989 and On or Before September 20, 1994	No	No	The TDU is not a Municipal Waste Combustor

Code of Federal Regulations	Standards of Performance	Evaluated for Potential Applicability for Dyno Nobel? [a]	Applicable to Dyno Nobel?	Justification for Determination
40 CFR 60 Subpart Eb	Large Municipal Waste Combustors for Which Construction is Commenced After September 20, 1994 or for Which Modification or Reconstruction is Commenced After June 19, 1996	No	No	The TDU is not a Municipal Waste Combustor
40 CFR 60 Subpart Ec	New Stationary Sources: Hospital/Medical/Infectious Waste Incinerators	No	No	The TDU is not a Medical Waste Incinerator
40 CFR 60 Subpart Ga	Nitric Acid Plants for Which Construction, Reconstruction, or Modification Commenced After October 14, 2011	Yes	No	Affected facilities produce weak nitric acid by either the “pressure or atmospheric pressure process: (i.e., a three-step high-temperature catalytic ammonia oxidation process). The TNT acid recovery unit does not produce nitric acid via either the pressure or atmospheric pressure process.
40 CFR 60 Subpart H	Sulfuric Acid Plants	Yes	No	The TNT plant does not produce sulfuric acid by

Code of Federal Regulations	Standards of Performance	Evaluated for Potential Applicability for Dyno Nobel? [a]	Applicable to Dyno Nobel?	Justification for Determination
				burning sulfur containing material.
40 CFR 60 Subpart Kc	Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After October 4, 2023	Yes	Yes	The Toluene Tank is an affected vessel.
40 CFR 60 Subpart GG	Stationary Gas Turbines	Yes	No	The TNT plant does not include a gas turbine
40 CFR 60 Subpart VVb	Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry for Which Construction, Reconstruction, or Modification Commenced After April 25, 2023	Yes	Yes	Equipment in Toluene service is subject to the LDAR requirements
40 CFR 60 Subpart IIIa	Volatile Organic Compound (VOC) Emissions From the Synthetic Organic Chemical Manufacturing Industry (SOCMI) Air Oxidation Unit Processes for Which Construction, Reconstruction, or Modification Commenced After April 25, 2023	Yes	No	The TNT Plant does not include an air oxidation unit process
40 CFR 60 Subpart NNNa	Organic Compound (VOC) Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Operations for Which Construction, Reconstruction, or Modification Commenced After April 25, 2023	No	No	The TNT Plant does not include any distillation operations
40 CFR 60 Subpart RRRa	Volatile Organic Compound Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Reactor Processes for	Yes	Yes	The nitration reactors are an affected source

Code of Federal Regulations	Standards of Performance	Evaluated for Potential Applicability for Dyno Nobel? [a]	Applicable to Dyno Nobel?	Justification for Determination
	Which Construction, Reconstruction, or Modification Commenced After April 25, 2023			
40 CFR 60 Subpart CCCC	Commercial and Industrial Solid Waste Incineration Units	No	No	The TDU is not a commercial and industrial solid waste incineration unit
40 CFR 60 Subpart DDDD	Emissions Guidelines and Compliance Times for Commercial and Industrial Solid Waste Incineration Units	No	No	The TDU is not a commercial and industrial solid waste incineration unit
40 CFR 60 Subpart EEEE	Other Solid Waste Incineration Units	No	No	The TDU is not a solid waste incineration unit
40 CFR 60 Subpart FFFF	Emission Guidelines and Compliance Times for Other Solid Waste Incineration Units	No	No	The TDU is not a solid waste incineration unit
40 CFR 60 Subpart IIII	Stationary Compression Ignition Internal Combustion Engines	Yes	Yes	Diesel Firewater Pump is an affected unit
40 CFR 60 Subpart JJJJ	Stationary Spark Ignition Internal Combustion Engines	Yes	Yes	Natural gas-fired Emergency Generators are affected Units
40 CFR 60 Subpart KKKK	Stationary Combustion Turbines	Yes	No	The TNT plant does not include a gas turbine
40 CFR 60 Subpart LLLL	New Sewage Sludge Incineration Units	No	No	The TDU is not a sewage sludge incinerator
40 CFR 60 Subpart MMMM	Emission Guidelines and Compliance Times for Existing Sewage Sludge Incineration Units	No	No	The TDU is not a sewage sludge incinerator

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

APPLICABILITY DETERMINATION

The table below includes a list of potentially applicable Part 63 National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations. Only 40 CFR 63, Subpart EEE for Hazardous Wasyte Combustors applies to the Dyno Nobel TNT Plant.

Code of Federal Regulations	National Emission Standards for Hazardous Air Pollutants	Evaluated for Potential Applicability for Dyno Nobel?	Applicable to Dyno Nobel?	Justification for Determination
40 CFR 63 Subpart F	Synthetic Organic Chemical Manufacturing Industry	Yes	No	The TNT Plant is not a major source of HAP
40 CFR 63 Subpart G	Synthetic Organic Chemical Manufacturing Industry for Process Vents, Storage Vessels, Transfer Operations, and Wastewater	Yes	No	The TNT Plant is not a major source of HAP
40 CFR 63 Subpart H	Equipment Leaks and Fenceline Monitoring for All Emission Sources	Yes	No	The TNT Plant is not a major source of HAP
40 CFR 63 Subpart I	Certain Processes Subject to the Negotiated Regulation for Equipment Leaks	Yes	No	The TNT Plant is not a major source of HAP
40 CFR 63 Subpart Q	Hazardous Air Pollutants for Industrial Process Cooling Towers	Yes	No	The TNT Plant is not a major source of HAP
40 CFR 63 Subpart OO	Tanks—Level 1	Yes	No	The TNT Plant is not subject to another subpart that references Subpart OO
40 CFR 63 Subpart PP	Containers	Yes	No	The TNT Plant is not subject to another subpart that references Subpart PP

Code of Federal Regulations	National Emission Standards for Hazardous Air Pollutants	Evaluated for Potential Applicability for Dyno Nobel?	Applicable to Dyno Nobel?	Justification for Determination
40 CFR 63 Subpart SS	Closed Vent Systems, Control Devices, Recovery Devices and Routing to a Fuel Gas System or a Process	Yes	No	The TNT Plant is not subject to another subpart that references Subpart SS
40 CFR 63 Subpart TT	Equipment Leaks—Control Level 1	Yes	No	The TNT Plant is not subject to another subpart that references Subpart TT
40 CFR 63 Subpart UU	Equipment Leaks—Control Level 2 Standards	Yes	No	The TNT Plant is not subject to another subpart that references Subpart UU
40 CFR 63 Subpart WW	Storage Vessels (Tanks)—Control Level 2	Yes	No	The TNT Plant is not subject to another subpart that references Subpart WW
40 CFR 63 Subpart YY	Generic Maximum Achievable Control Technology Standards	Yes	No	The TNT Plant does not include any of the listed processes
40 CFR 63 Subpart EEE	Hazardous Waste Combustors	Yes	Yes	The TDU is a Hazardous Waste Combustor
40 CFR 63 Subpart EEEE	Organic Liquids Distribution (Non-Gasoline)	Yes	No	The TNT Plant is not a major source of HAP
40 CFR 63 Subpart FFFF	Miscellaneous Organic Chemical Manufacturing	Yes	No	The TNT Plant is not a major source of HAP
40 CFR 63 Subpart JJJJJJ	Industrial, Commercial, and Institutional Boilers Area Sources	Yes	No	Gas-fired boilers are exempt from Subpart JJJJJJ
40 CFR 63 Subpart VVVVVV	Chemical Manufacturing Area Sources	Yes	No	The TNT Plant does not process, use, or produce the listed HAPs

Code of Federal Regulations	National Emission Standards for Hazardous Air Pollutants	Evaluated for Potential Applicability for Dyno Nobel?	Applicable to Dyno Nobel?	Justification for Determination
40 CFR 63 Subpart BBBBBBB	Chemical Preparations Industry	Yes	No	The TNT Plant does not process, use, or produce the target HAPs

Division for Air Quality

300 Sower Boulevard

Frankfort, KY 40601

(502) 564-3999

DEP7007AI

Administrative Information

___ Section AI.1: Source Information

___ Section AI.2: Applicant Information

___ Section AI.3: Owner Information

___ Section AI.4: Type of Application

___ Section AI.5: Other Required Information

___ Section AI.6: Signature Block

___ Section AI.7: Notes, Comments, and Explanations

Additional Documentation

___ Additional Documentation attached

Source Name: **Dyno Nobel Inc.**

KY EIS (AFS) #: **21-** **177-00067**

Permit #: **S-25-064**

Agency Interest (AI) ID: **3241**

Date: **1-Jun-26**

Section AI.1: Source Information

Physical Location Address:	**Street:**	400 Bickford Rd. (State Route 175)				
	City:	Graham	**County:**	Muhlenburg	**Zip Code:**	42344
Mailing Address:	**Street or P.O. Box:**	PO Box 130				
	City:	Graham	**State:**	Kentucky	**Zip Code:**	42344

Standard Coordinates for Source Physical Location

Longitude: -87.283333 (decimal degrees) **Latitude:** 37.241667 (decimal degrees)

Primary (NAICS) Category: Explosives Manufacturing **Primary NAICS #:** 325920

#

Classification (SIC) Category: Explosives **Primary SIC #:** 2892

Briefly discuss the type of business conducted at this site: This facility manufactures explosive compounds (PETN, TNT) and detonating cord.

Description of Area Surrounding Source: ☑ Rural Area ☐ Industrial Park ☐ Residential Area ☐ Urban Area ☐ Industrial Area ☐ Commercial Area

Is any part of the source located on federal land? ☐ Yes ☑ No

Number of Employees: 65

Approximate distance to nearest residence or commercial property: *2300 feet*

Property Area: **617 acres**

Is this source portable? ☐ Yes ☑ No

What other environmental permits or registrations does this source currently hold or need to obtain in Kentucky?

NPDES/KPDES:	☑ Currently Hold	☐ Need	☐ N/A
Solid Waste:	☐ Currently Hold	☐ Need	☑ N/A
RCRA:	☑ Currently Hold	☑ Need	☐ N/A
UST:	☐ Currently Hold	☐ Need	☑ N/A

Type of Regulated Waste Activity:

☐ Mixed Waste Generator ☑ Generator ☐ Recycler ☐ Other: _____

☐ U.S. Importer of Hazardous Waste ☐ Transporter ☑ Treatment/Storage/Disposal Facility ☐ N/A

Section AI.2: Applicant Information

Applicant Name: Dyno Nobel Inc.

Title: (if individual)

Mailing Address:
Street or P.O. Box: PO Box 130
City: Graham **State:** Kentucky **Zip Code:** 42344

Email: (if individual)

Phone:

Technical Contact

Name: Tina Maniatis

Title: Sr. Environmental Director

Mailing Address:
Street or P.O. Box: 6440 S. Millrock Drive, Suite 150
City: Salt Lake City **State:** UT **Zip Code:** 84121

Email: tina.maniatis@dynonobel.com

Phone: 801-922-0913

Air Permit Contact for Source

Name: Thamara Novak

Title: Environmental Manager

Mailing Address:
Street or P.O. Box: 400 Bickford Road
City: Graham **State:** KY **Zip Code:** 42344

Email: thamara.novak@dynonobel.com

Phone: 618-697-6727

Section AI.3: Owner Information

☑ **Owner same as applicant**

Name:

Title:

Mailing Address: **Street or P.O. Box:**

City: **State:** **Zip Code:**

Email:

Phone:

List names of owners and officers of the company who have an interest in the company of 5% or more.

Name	Position
Dyno Nobel Holdings IV LLC	100% Owner

Section AI.4: Type of Application

Current Status: ☐ Title V ☐ Conditional Major ☑ State-Origin ☐ General Permit ☐ Registration ☐ None

Requested Action: *(check all that apply)*

☐ Name Change	☐ Initial Registration	Significant Revision	☐ Administrative Permit Amendment
☐ Renewal Permit	☐ Revised Registration	Minor Revision	☑ Initial Source-wide OperatingPermit
☐ 502(b)(10)Change	☐ Extension Request	Addition of New Facility	☐ Portable Plant Relocation Notice
☐ Revision	☐ Off Permit Change	Landfill Alternate Compliance Submittal	☐ Modification of Existing Facilities
☐ Ownership Change	☐ Closure		

Requested Status: ☑ Title V ☐ Conditional Major ☐ State-Origin P☐ NSI☐ ☐ Other: _____

Is the source requesting a limitation of potential emissions? ☑ Yes ☐ No

Pollutant:	Requested Limit:	Pollutant:	Requested Limit:
☑ Particulate Matter	90 TPY	☐ Single HAP	
☑ Volatile Organic Compounds (VOC)	90 TPY	☐ Combined HAPs	
☑ Carbon Monoxide	90 TPY	☐ Air Toxics (40 CFR 68, Subpart F)	
☑ Nitrogen Oxides	90 TPY	☐ Carbon Dioxide	
☑ Sulfur Dioxide	90 TPY	☐ Greenhouse Gases (GHG)	
☐ Lead		☐ Other	

For New Construction:

Proposed Start Date of Construction: *(MM/YYYY)* 12/2026

Proposed Operation Start-Up Date: *(MM/YYYY)* 08/2028

For Modifications:

Proposed Start Date of Modification: *(MM/YYYY)*

Proposed Operation Start-Up Date: *(MM/YYYY)*

Applicant is seeking coverage under a permit shield. ☑ **Yes** ☐ **No**

Identify any non-applicable requirements for which permit shield is sought on a separate attachment to the application.

Section AI.5 Other Required Information

Indicate the documents attached as part of this application:

- [x] DEP7007A Indirect Heat Exchangers and Turbines
- [x] DEP7007B Manufacturing or Processing Operations
- [x] DEP7007C Incinerators and Waste Burners
- [ ] DEP7007F Episode Standby Plan
- [x] DEP7007J Volatile Liquid Storage
- [ ] DEP7007K Surface Coating or Printing Operations
- [ ] DEP7007L Mineral Processes
- [ ] DEP7007M Metal Cleaning Degreasers
- [x] DEP7007N Source Emissions Profile
- [ ] DEP7007P Perchloroethylene Dry Cleaning Systems
- [ ] DEP7007R Emission Offset Credit
- [ ] DEP7007S Service Stations
- [ ] DEP7007T Metal Plating and Surface Treatment Operations
- [x] DEP7007V Applicable Requirements and Compliance Activities
- [x] DEP7007Y Good Engineering Practice and Stack Height Determination
- [ ] DEP7007AA Compliance Schedule for Non-complying Emission Units
- [ ] DEP7007BB Certified Progress Report
- [ ] DEP7007CC Compliance Certification
- [x] DEP7007DD Insignificant Activities
- [x] DEP7007EE Internal Combustion Engines
- [ ] DEP7007FF Secondary Aluminum Processing
- [x] DEP7007GG Control Equipment
- [x] DEP7007HH Haul Roads
- [ ] Confidentiality Claim
- [ ] Ownership Change Form
- [ ] Secretary of State Certificate
- [x] Flowcharts or diagrams depicting process
- [ ] Digital Line Graphs (DLG) files of buldings, roads, etc.
- [x] Site Map
- [x] Map or drawing depicting location of facility
- [ ] Safety Data Sheet (SDS)
- [ ] Emergency Response Plan
- [ ] Other: _____

Section AI.6: Signature Block

I, the undersigned, hereby certify under penalty of law, that I am a responsible official*, and that I have personally examined, and am familiar with, the information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the information is on knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false or incomplete information, including the possibility of fine or imprisonment.

Todd Meunier	5/30/2026
Authorized Signature	**Date**
Todd Meunier	Vice President Operations
Type or Printed Name of Signatory	**Title of Signatory**

*Responsible official as defined by 401 KAR 52:001.

Section AI.7: Notes, Comments, and Explanations

Division for Air Quality

300 Sower Boulevard
Frankfort, KY 40601
(502) 564-3999

DEP7007B

Manufacturing or Processing Operations

___ Section B.1: Process Information
___ Section B.2: Materials and Fuel Information
___ Section B.3: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI, DEP7007N, DEP7007V, and DEP7007GG.
___ Attach a flow diagram
___ Attach SDS

Source Name: Dyno Nobel Inc.
KY EIS (AFS) #: 21- 177-00067
Permit #: S-25-064
Agency Interest (AI) ID: 3241
Date: 6/1/2026

Section B.1: Process Information

Emission Unit #	Emission Unit Name	Describe Emission Unit	Process ID	Process Name	Manufacturer	Model No.	Proposed/Actual Date of Construction Commencement *(MM/YYYY)*	Is the Process Continuous or Batch?	Number of Batches per 24 Hours *(if applicable)*	Hours per Batch *(if applicable)*
TNT-1	Nitration + Washers 1 & 2	Nitration reactors and Acid washer vessels (1 & 2)	TNT	TNT Manufacturing	CWR	TBD	12/2026	Continuous	N/A	N/A
TNT-2	Washers 3-5	Sellite washer vessels (3-5)	TNT	TNT Manufacturing	CWR	TBD	12/2026	Continuous	N/A	N/A
TNT-3	Drying + Flaking	Dryer and TNT solidification and flaking	TNT	TNT Manufacturing	CWR	TBD	12/2026	Continuous	N/A	N/A
TNT-4	Packaging	Packaging of flaked TNT	TNT	TNT Manufacturing	CWR	TBD	12/2026	Continuous	N/A	N/A

Section B.2: Materials and Fuel Information

**Maximum yearly fuel usage rate only applies if applicant request operating restrictions through federally enforceable limitations.*

Emission Unit #	Emission Unit Name	Name of Raw Materials Input	Maximum Quantity of Each Raw Material Input	(Specify Units/hr)	Total Process Weight Rate for Emission Unit (tons/hr)	Name of Finished Materials	Maximum Quantity of Each Finished Material Output	(Specify Units/hr)	Fuel Type	Maximum Hourly Fuel Usage Rate	(Specify Units)	Maximum Yearly Fuel Usage Rate	(Specify Units)	Sulfur Content (%)	Ash Content (%)
TNT-1	Nitration + Washers 1 & 2	Toluene, Nitric Acid and Oleum	8139	lb/hr	4.07	1. TNT 2. Spent Acid to ARU	1. 2459 2. 6818	lb/hr	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TNT-2	Washers 3-5	TNT, Sellite Solution, and Sulfuric Acid	2459	lb/hr	1.23	1. Purified TNT 2. Red water	1.2234 2.2002	lb/hr	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TNT-3	Drying & Flaking	Purified TNT	2234	lb/hr	1.12	Product TNT	2212	lb/hr	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TNT-4	Packaging	Product TNT	2212	lb/hr	1.11	Packaged TNT	2212	lb/hr	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Section B.3: Notes, Comments, and Explanations

Division for Air Quality
300 Sower Boulevard
Frankfort, KY 40601
(502) 564-3999

DEP7007DD

Insignificant Activities

___ Section DD.1: Table of Insignificant Activities
___ Section DD.2: Signature Block
___ Section DD.3: Notes, Comments, and Explanations

Source Name: **Dyno Nobel Inc.**
KY EIS (AFS) #: **21- 177-00067**
Permit #: **S-25-064**
Agency Interest (AI) ID: **3241**
Date: **6/1/2026**

Section DD.1: Table of Insignificant Activities

*Identify each activity with a unique Insignificant Activity number (IA #); for example: 1, 2, 3… etc.

Insignificant Activity #	Description of Activity including Rated Capacity	Serial Number or Other Unique Identifier	Applicable Regulation(s)	Calculated Emissions
1	Washers 3-5 (2459 lb/hr)	Emission Unit #TNT-2	N/A	<5 tons/yr PM
2	Drying	Emission Unit #TNT-3	N/A	1.45 tons/yr PM (uncontrolled)
3	Flaking	Emission Unit #TNT-4	N/A	1.45 tons/yr PM (uncontrolled)
4	Packaging	Emission Unit #TNT-5	N/A	1.45 tons/yr PM (uncontrolled)
5	Sodium Sulfite Bag Unloading (1000 kg bag/hr)	Emission Unit #TNT-6	N/A	3.64 tons/yr PM

Insignificant Activity #	Description of Activity including Rated Capacity	Serial Number or Other Unique Identifier	Applicable Regulation(s)	Calculated Emissions
6	Sodium Bisulfite Bag Unloading (100 kg bag/hr)	Emission Unit #TNT-7	N/A	1.80E-03 tons/yr PM

Section DD.2: Signature Block

I, THE UNDERSIGNED, HEREBY CERTIFY UNDER PENALTY OF LAW, THAT I AM A RESPONSIBLE OFFICIAL, AND THAT I HAVE PERSONALLY EXAMINED, AND AM FAMILIAR WITH, THE INFORMATION SUBMITTED IN THIS DOCUMENT AND ALL ITS ATTACHMENTS. BASED ON MY INQUIRY OF THOSE INDIVIDUALS WITH PRIMARY RESPONSIBILITY FOR OBTAINING THE INFORMATION, I CERTIFY THAT THE INFORMATION IS ON KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE OR INCOMPLETE INFORMATION, INCLUDING THE POSSIBILITY OF FINE OR IMPRISONMENT.

	Todd Meunier	June 1, 2026
	Authorized Signature	**Date**
By:		
	Todd Meunier	Vice President Operations
	Type/Print Name of Siguatory	**Title of Siguatory**

Section DD.3: Notes, Comments, and Explanations

1. No emissions are expected from Washers 3-5.

Division for Air Quality

300 Sower Boulevard

Frankfort, KY 40601

(502) 564-3999

DEP7007GG

Control Equipment

Additional Documentation

___ Complete Sections GG.1 through GG.12, as applicable

___ Attach manufacturer's specifications for each control device

___ Complete DEP7007AI

Source Name: Dyno Nobel Inc.

KY EIS (AFS) #: 21- 177-00067

Permit #: S-25-064

Agency Interest (AI) ID: 3241

Date: 6/1/2026

Section GG.1: General Information - Control Equipment

Control Device ID #	Control Device Name	Cost	Manufacturer	Model Name/ Serial #	Date Installed	Inlet Gas Stream Data For All Control Devices					Inlet Gas Stream Data For Condensers, Adsorbers, Afterburners, Incinerators, Oxidizers Only			Equipment Operational Data For All Control Devices		
						Temperature (°F)	Flowrate (scfm @ 68 °F)	Average Particle Diameter (μm)	Particle Density (lb/ft³) or Specific Gravity	Gas Density (lb/ft³)	Gas Moisture Content (%)	Gas Composition	Fan Type	Pressure Drop Range (in. H_2O)	Pollutants Collected/ Controlled	Pollutant Removal (%)
TNT-S-1	Dryer Scrubber/ HEPA	TBD	Sly or equivalent	*See GG.12*	12/2026	212	997	TBD	1.654	0.065	-	-	-	TBD	PM	90.3%
TNT-S-2	Flaker Scrubber/HEPA	TBD	Sly or equivalent	*See GG.12*	12/2026	68	1675	TBD	1.654	0.065	-	-	-	TBD	PM	90.0%
TNT-S-3	Packaging Scrubber/ HEPA	TBD	Sly or equivalent	*See GG.12*	12/2026	68	2,477	TBD	1.654	0.065	-	-	-	TBD	PM	89.2%

Control Device ID #	Control Device Name	Cost	Manufacturer	Model Name/ Serial #	Date Installed	Inlet Gas Stream Data For All Control Devices					Inlet Gas Stream Data For Condensers, Adsorbers, Afterburners, Incinerators, Oxidizers Only			Equipment Operational Data For All Control Devices		
						Temperature *(°F)*	Flowrate *(scfm @ 68°F)*	Average Particle Diameter *(μm)*	Particle Density *(lb/ft^3)* or Specific Gravity	Gas Density *(lb/ft^3)*	Gas Moisture Content *(%)*	Gas Composition	Fan Type	Pressure Drop Range *(in. H_2O)*	Pollutants Collected/ Controlled	Pollutant Removal *(%)*

Section GG.5: Scrubber

Control Device ID #	Identify all Emission Units and Control Devices that Feed to Scrubber	Identify Type of Scrubber: Venturi, Packed Bed, Spray Tower, or Other (specify)	For Venturi Scrubbers:	For Packed Bed Scrubbers:		For Spray Towers:		Identify Type of Flow: Concurrent, Countercurrent, or Crossflow	Length in Direction of Gas Flow *(ft)*	Cross-Sectional Area *(ft^2)*	Venturi Throat Velocity *(ft/s)*	Mist Eliminator			Scrubbing Liquid			
			Identify Throat Type: Fixed or Adjustable	Identify Packing Type	Packing Height *(in)*	Number of Nozzles	Nozzle Pressure *(psig)*					Identify Type: Mesh or Vane	Cross-Sectional Area *(ft^2)*	Pressure Drop *(in. H_2O)*	Chemical Composition	Flowrate *(gal/min)*	Fresh Liquid Makeup Rate *(gal/min)*	Describe Disposal Method of Scrubber Effluent
TNT-S-1	Dryer Venturi	Venturi	Adjustible	-	-	-	-	Cocurrent	TBD	9.6	TBD	-	9.6	-	Water	30	TBD	Water treatment system
TNT-S-1	Dryer Packed Bed	Packed Bed	-	TBD	36	-	-	Countercurrent	3 (packing height)	9.6	-	Mesh	9.6	TBD	Water	45	TBD	Water treatment system
TNT-S-2	Flaker Venturi	Venturi	Adjustible	-	-	-	-	Cocurrent	TBD	4.9	TBD	-	4.9	-	Water	15	TBD	Water treatment system
TNT-S-2	Flaker Packed Bad	Packed Bed	-	TBD	36	-	-	Countercurrent	3 (packing height)	4.9	-	Mesh	4.9	TBD	Water	25	TBD	Water treatment system
TNT-S-3	Packaging Venturi	Venturi	Adjustible	-	-	-	-	Cocurrent	TBD	7.1	TBD	-	7.1	-	Water	30	TBD	Water treatment system
TNT-S-3	Packaging Packed Bed	Packed Bed	-	TBD	36	-	-	Countercurrent	3 (packing height)	7.1	-	Mesh	7.1	TBD	Water	45	TBD	Water treatment system

Control Device ID #	Identify all Emission Units and Control Devices that Feed to Scrubber	Identify Type of Scrubber: Venturi, Packed Bed, Spray Tower, or Other (specify)	For Venturi Scrubbers:	For Packed Bed Scrubbers:		For Spray Towers:		Identify Type of Flow: Concurrent, Countercurrent, or Crossflow	Length in Direction of Gas Flow *(ft)*	Cross-Sectional Area *(ft^2)*	Venturi Throat Velocity *(ft/s)*	Mist Eliminator			Scrubbing Liquid			
			Identify Throat Type: Fixed or Adjustable	Identify Packing Type	Packing Height *(in)*	Number of Nozzles	Nozzle Pressure *(psig)*					Identify Type: Mesh or Vane	Cross-Sectional Area *(ft^2)*	Pressure Drop *(in. H_2O)*	Chemical Composition	Flowrate *(gal/min)*	Fresh Liquid Makeup Rate *(gal/min)*	Describe Disposal Method of Scrubber Effluent

Section GG.6: Filter

Control Device ID #	Identify all Emission Units and Control Devices that Feed to Filter	Identify Type of Filter Unit: Baghouse, Cartridge Collector, or Other (specify)	Identify Type of Filtering Material: Fabric, Paper, Synthetic, or Other (specify)	Total Filter Area *(ft²)*	Effective Air-to-Filter Ratio *(acfm/ft²)*	Continuous Monitoring Instrumentation (e.g. COMS, BLDS, none)	Additional Materials Introduced into the Control System (e.g. lime, carbon)		Identify Cleaning Method: Shaker, Pulse Air, Reverse Air, Pulse Jet, or Other (specify)	Identify Gas Cooling Method: Ductwork, Heat Exchanger, Bleed-in Air, Water Spray, or Other (specify)	For Ductwork:		For Bleed-in Air:	For Water Spray:
							Material	Injection Rate *(lb/hr)*			Length *(ft)*	Diameter *(ft)*	Flowrate *(scfm @ 68°F)*	Flowrate *(gal/min)*
TNT-S-1	Dryer Scrubber	HEPA Cartridge	TBD	4	625	None	n/a	n/a	n/a	n/a	TBD	TBD	n/a	n/a
TNT-S-2	Flaker Scrubber	HEPA Cartridge	TBD	4	423	None	n/a	n/a	n/a	n/a	TBD	TBD	n/a	n/a
TNT-S-3	Packaging Scrubber	HEPA Cartridge	TBD	4	1207	None	n/a	n/a	n/a	n/a	TBD	TBD	n/a	n/a

Section GG.12: Notes, Comments, and Explanations

Each TNT scrubber control device (Dryer, Flaker, and Packaging) is a package venturi, packed bed, and HEPA

1. Dryer Venturi Model No. 1

2. Dryer Packed Tower 42-36

3. Dryer HEPA

1. Flaker Venturi Model No. 0.5

2. Flaker Packed Tower 30-36

3. Flaker HEPA

1. Packaging Venturi Model No. 1

2. Packaging Packed Tower 36-36

3. Packaging HEPA

Division for Air Quality

300 Sower Boulevard
Frankfort, KY 40601
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DEP7007N

Source Emissions Profile

__ Section N.1: Emission Summary
__ Section N.2: Stack Information
__ Section N.3: Fugitive Information
__ Section N.4: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI

Source Name: **Dyno Nobel Inc.**
KY EIS (AFS) #: **21- 177-00067**
Permit #: **S-25-064**
Agency Interest (AI) ID: **3241**
Date: **6/1/2026**

N.1: Emission Summary

Emission Unit #	Emission Unit Name	Process ID	Process Name	Control Device Name	Control Device ID	Stack ID	Maximum Design Capacity *(SCC Units/hour)*	Pollutant	Uncontrolled Emission Factor *(lb/SCC Units)*	Emission Factor Source (e.g. AP-42, Stack Test, Mass Balance)	Capture Efficiency *(%)*	Control Efficiency *(%)*	Hourly Emissions		Annual Emissions	
													Uncontrolled Potential *(lb/hr)*	Controlled Potential *(lb/hr)*	Uncontrolled Potential *(tons/yr)*	Controlled Potential *(tons/yr)*
TNT-1	Nitration + Washers 1 & 2	TNT	TNT Manufacturing	NOx Absorber & Thermal Oxidizer	TBD	ARU-1	8139 lb/hr	CO	0.01138	Technology Provider Process Model	100.00%	99.8%	92.61	0.185	405.63	0.811
TNT-1	Nitration + Washers 1 & 2	TNT	TNT Manufacturing	NOx Absorber & Thermal Oxidizer	04C8010	ARU-1	8139 lb/hr	NOx	0.01273	Technology Provider Process Model	100.00%	99.8%	103.64	0.207	453.94	0.908
TNT-1	Nitration + Washers 1 & 2	TNT	TNT Manufacturing	NOx Absorber & Thermal Oxidizer	04C8010	ARU-1	2205 lb/hr	VOC (TNM)*	0.5 lb/100 lb TNT produced	Literature Data	100.00%	98.0%	11.0	0.22	48.3	1.0
TNT-1	Nitration + Washers 1 & 2	TNT	TNT Manufacturing	-	-	-	8139 lb/hr	CO_2	0.01219	Technology Provider Process Model	-	-	99.2	99.23	434.6	434.6
TNT-2	Washers 3-5	TNT	TNT Manufacturing	-	-	TNT-1	2459 lb/hr	PM	0.00046	Technology Provider Process Model	-	-	<1.14	<1.14	<5	<5
TNT-3	Drying	TNT	TNT Manufacturing	Dryer Scrubber/HEPA	TNT-S-1	TNT-2	2234 lb/hr	PM	0.00015	Technology Provider Process Model	100%	>90%	0.33	0.033	1.45	0.145
TNT-4	Flaking	TNT	TNT Manufacturing	Flaker Scrubber/HEPA	TNT-S-2	TNT-3	2234 lb/hr	PM	0.00015	Technology Provider Process Model	100%	>90%	0.33	0.033	1.45	0.145

Emission Unit #	Emission Unit Name	Process ID	Process Name	Control Device Name	Control Device ID	Stack ID	Maximum Design Capacity *(SCC Units/hour)*	Pollutant	Uncontrolled Emission Factor *(lb/SCC Units)*	Emission Factor Source (e.g. AP-42, Stack Test, Mass Balance)	Capture Efficiency *(%)*	Control Efficiency *(%)*	Hourly Emissions		Annual Emissions	
													Uncontrolled Potential *(lb/hr)*	Controlled Potential *(lb/hr)*	Uncontrolled Potential *(tons/yr)*	Controlled Potential *(tons/yr)*
TNT-5	Packaging	TNT	TNT Manufacturing	Packaging Scrubber/HEPA	TNT-S-3	TNT-4	2212 lb/hr	PM	0.00015	Technology Provider Process Model	100%	89%	0.33	0.036	1.45	0.160
TNT-6	Sodium Sulfite Loading	TNT	TNT Manufacturing	-	-	TNT-5	1000 kg bag /hr	PM	11.03 lb/ 1000 kg bag	Vendor estimate	100%	-	11.025	11.025	3.64	3.64
TNT-7	Sodium Bisulfite Loading	TNT	TNT Manufacturing	-	-	TNT-6	100 kg bag /hr	PM	0.011 lb/ 100 kg bag	Vendor estimate	100%	-	0.011	0.011	0.0018	0.0018
U5-EF-1	TNT Production Building Vent	TNT	TNT Manufacturing	-	-	U5-EF-1	TBD	Fugitive PM	TBD	Fugitive Dust Estimate	-	-	< 0.11	< 0.11	<5	<5
U5-EF-2	TNT Production Building Vent	TNT	TNT Manufacturing	-	-	U5-EF-2	TBD	Fugitive PM	TBD	Fugitive Dust Estimate	-	-	< 0.11	< 0.11	<5	<5
U5-EF-3	TNT Production Building Vent	TNT	TNT Manufacturing	-	-	U5-EF-3	TBD	Fugitive PM	TBD	Fugitive Dust Estimate	-	-	< 0.11	< 0.11	<5	<5
U5-EF-4	TNT Production Building Vent	TNT	TNT Manufacturing	-	-	U5-EF-4	TBD	Fugitive PM	TBD	Fugitive Dust Estimate	-	-	< 0.11	< 0.11	<5	<5
U8-EF-1	TNT Packaging Building Vent	TNT	TNT Manufacturing	-	-	U8-EF-1	TBD	Fugitive PM	TBD	Fugitive Dust Estimate	-	-	< 0.11	< 0.11	<5	<5
U8-EF-2	TNT Packaging Building Vent	TNT	TNT Manufacturing	-	-	U8-EF-2	TBD	Fugitive PM	TBD	Fugitive Dust Estimate	-	-	< 0.11	< 0.11	<5	<5
U6-EF-1	Sellite Preperation Building Vent	TNT	TNT Manufacturing	-	-	U6-EF-1	TBD	Fugitive PM	TBD	Fugitive Dust Estimate	-	-	< 0.11	< 0.11	<5	<5
U6-EF-2	Sellite Preperation Building Vent	TNT	TNT Manufacturing	-	-	U6-EF-2	TBD	Fugitive PM	TBD	Fugitive Dust Estimate	-	-	< 0.11	< 0.11	<5	<5

Section N.2: Stack Information

UTM Zone:

Stack ID	Identify all Emission Units (with Process ID) and Control Devices that Feed to Stack	Stack Physical Data			Stack UTM Coordinates		Stack Gas Stream Data		
		Equivalent Diameter *(ft)*	Height *(ft)*	Base Elevation *(ft)*	Northing *(m)*	Easting *(m)*	Flowrate *(acfm)*	Temperature *(° F)*	Exit Velocity *(ft/sec)*
TNT-2	Washers 3-5 vent	N/A	N/A				N/A	N/A	N/A
TNT-3	Drying, Dryer Scrubber	1.1	30				2826	93	50
TNT-4	Flaking, Flaker Scrubber	0.83	30				1719	68	53
TNT-5	Packaging, Packaging Scrubber	1	30				2541	68	52
TNT-6	Sodium Sulfite Loading	0.25	38				147	68	50
TNT-7	Sodium Bisulfite Loading	0.17	38				65	68	50

Stack ID	Identify all Emission Units (with Process ID) and Control Devices that Feed to Stack	Stack Physical Data			Stack UTM Coordinates		Stack Gas Stream Data		
		Equivalent Diameter *(ft)*	Height *(ft)*	Base Elevation *(ft)*	Northing *(m)*	Easting *(m)*	Flowrate *(acfm)*	Temperature *(° F)*	Exit Velocity *(ft/sec)*

Section N.3: Fugitive Information

UTM Zone:

Emission Unit #	Emission Unit Name	Process ID	Area Physical Data		Area UTM Coordinates		Area Release Data	
			Length of the X Side *(ft)*	Length of the Y Side *(ft)*	Northing *(m)*	Easting *(m)*	Release Temperature *(°F)*	Release Height *(ft)*
U5-EF-1	TNT Production Building Vent	TNT	TBD	TBD			80	23
U5-EF-2	TNT Production Building Vent	TNT	TBD	TBD			80	23
U5-EF-3	TNT Production Building Vent	TNT	TBD	TBD			80	23
U5-EF-4	TNT Production Building Vent	TNT	TBD	TBD			80	23
U8-EF-1	TNT Packaging Building Vent	TNT	TBD	TBD			75	24
U8-EF-2	TNT Packaging Building Vent	TNT	TBD	TBD			75	24
U6-EF-1	Sellite Preperation Building Vent	TNT	TBD	TBD			75	30
U6-EF-2	Sellite Preperation Building Vent	TNT	TBD	TBD			75	30

Section N.4: Notes, Comments, and Explanations

1. Nitrogen oxide (NOX) and carbon monoxide (CO) Fumes from TNT nitration are controlled by the NOx Absorber & Thermal Oxidizer in the Acid Recovery Unit area.

2. The Nitrators and Washers 1 & 2 are vented to the NOx Absorber & Thermal Oxidizer in the Acid Recovery Unit area.

3. Stated removal efficiencies are based on emission rates estimated by the TNT Production Unit process technology provider, based on a proprietary design simulation model.

4. TNM is trinitromethane generated from nitration. TNM is a VOC.

5. No emissions are expected from Washers 3-5.

Division for Air Quality

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DEP7007V

Applicable Requirements and Compliance Activities

___ Section V.1: Emission and Operating Limitation(s)
___ Section V.2: Monitoring Requirements
___ Section V.3: Recordkeeping Requirements
___ Section V.4: Reporting Requirements
___ Section V.5: Testing Requirements
___ Section V.6: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI

Source Name: **Dyno Nobel Inc.**
KY EIS (AFS) #: **21- 177-00067**
Permit #: **S-25-064**
Agency Interest (AI) ID: **3241**
Date: **6/1/2026**

Section V.1: Emission and Operating Limitation(s)

Emission Unit #	Emission Unit Description	Applicable Regulation or Requirement	Pollutant	Emission Limit (if applicable)	Voluntary Emission Limit or Exemption (if applicable)	Operating Requirement or Limitation (if applicable)	Method of Determining Compliance with the Emission and Operating Requirement(s)
TNT-1	Nitration + Washers 1 & 2	PSD Avoidance	CO	<90 TPY	Sourcewide	TBD	TBD
TNT-1	Nitration + Washers 1 & 2	PSD Avoidance	NOx	<90 TPY	Sourcewide	TBD	TBD

Emission Unit #	**Emission Unit Description**	**Applicable Regulation or Requirement**	**Pollutant**	**Emission Limit** (if applicable)	**Voluntary Emission Limit or Exemption** (if applicable)	**Operating Requirement or Limitation** (if applicable)	**Method of Determining Compliance with the Emission and Operating Requirement(s)**
TNT-1	Nitration + Washers 1 & 2	PSD Avoidance	VOC (TNM)*	<90 TPY	Sourcewide	98 weight-percent destruction efficiency or TOC (minus methane and ethane) concentration of 20 ppmv on a dry basis corrected to 3% oxygen	Performance Test
TNT-2	Washers 3-5	PSD Avoidance	PM	<90 TPY	Sourcewide	TBD	TBD
TNT-3	Drying	PSD Avoidance	PM	<90 TPY	Sourcewide	TBD	TBD
TNT-4	Flaking	PSD Avoidance	PM	<90 TPY	Sourcewide	TBD	TBD
TNT-5	Packaging	PSD Avoidance	PM	<90 TPY	Sourcewide	TBD	TBD
TNT-6	Sodium Sulfite Loading	PSD Avoidance	PM	<90 TPY	Sourcewide	TBD	TBD
TNT-7	Sodium Bisulfite Loading	PSD Avoidance	PM	<90 TPY	Sourcewide	TBD	TBD

Section V.2: Monitoring Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Monitored	Description of Monitoring
TNT-1	Nitration + Washers 1 & 2	CO	PSD Avoidance	TBD	TBD
TNT-1	Nitration + Washers 1 & 2	NOx	PSD Avoidance	TBD	TBD
TNT-1	Nitration + Washers 1 & 2	VOC (TNM)*	PSD Avoidance	Gas flowrate Gas flowrate TO firebox temperature	40 CFR 60.710a Initial and annual inspection of closed vent system for leaks using Method 21 (LDAR) 40 CFR 60.710a(e) Install, calibrate, maintain, and operate a flow indicator that determines whether vent stream flow is present at least once every 15 minutes Table 2 to Subpart RRRa of Part 60 Presence of flow diverted to the atmosphere from the control and recovery device Table 2 to Subpart RRRa of Part 60 Thermal oxidizer firebox temperature, continuously, recorded every 15 minutes, on a 3-hour block average Continuous Paramneter Monitoring Systems (CPMS) are subject to the Calibration and Quality Control Requirements in Table 4 to Subpart RRRa of Part 60
TNT-2	Washers 3-5	PM	PSD Avoidance	TBD	TBD
TNT-3	Drying	PM	PSD Avoidance	TBD	TBD
TNT-4	Flaking	PM	PSD Avoidance	TBD	TBD

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Monitored	Description of Monitoring
TNT-5	Packaging	PM	PSD Avoidance	TBD	TBD
TNT-6	Sodium Sulfite Loading	PM	PSD Avoidance	TBD	TBD
TNT-7	Sodium Bisulfite Loading	PM	PSD Avoidance	TBD	TBD

Section V.3: Recordkeeping Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Recorded	Description of Recordkeeping
TNT-1	Nitration + Washers 1 & 2	CO	PSD Avoidance	TBD	TBD
TNT-1	Nitration + Washers 1 & 2	NOx	PSD Avoidance	TBD	TBD
TNT-1	Nitration + Washers 1 & 2	VOC (TNM)*	PSD Avoidance	See monitoring requirements	40 CFR 60.705a(u) A schematic diagram of the affected vent streams, collection system(s), fuel systems, control devices, and bypass systems 40 CFR 60.710a(h) Records required by subparagraph (h)
TNT-2	Washers 3-5	PM	PSD Avoidance	TBD	TBD
TNT-3	Drying	PM	PSD Avoidance	TBD	TBD
TNT-4	Flaking	PM	PSD Avoidance	TBD	TBD
TNT-5	Packaging	PM	PSD Avoidance	TBD	TBD
TNT-6	Sodium Sulfite Loading	PM	PSD Avoidance	TBD	TBD
TNT-7	Sodium Bisulfite Loading	PM	PSD Avoidance	TBD	TBD

Section V.4: Reporting Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Reported	Description of Reporting
TNT-1	Nitration + Washers 1 & 2	CO	PSD Avoidance	TBD	TBD
TNT-1	Nitration + Washers 1 & 2	NOx	PSD Avoidance	TBD	TBD

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Reported	Description of Reporting
TNT-1	Nitration + Washers 1 & 2	VOC (TNM)*	PSD Avoidance	See description to the right	40 CFR 60.705a(a) Initial notification of startup and applicable provisions 40 CFR 60.705a(b) Data measured during performance tests 40 CFR 60.705a(b)(1) Performance test results 40 CFR 60.705a(c) Records of exceedances of required operating parameter limits 40 CFR 60.705a(c)(7) Required OPL is firebox tenmperature for the thermal oxidizer over a 3-hour block period 40 CFR 60.705a(d) Records of flow indication, periods of time the flow is diverted from the control device, and periods of time when there is no flow rate 40 CFR 60.705a(d)(1) Estimate of the volume of gas, the concentration of TOC in the gas and the resulting emissions of TOC during relief valve discharge 40 CFR 60.705a(k) and 40 CFR 60.710a(i)(1) Semi-annual reports for exceedances, vent stream diversion/relief device discharge, identifcation of the closed vent system 40 CFR 60.705a(u) A schematic diagram of the affected vent streams, collection system(s), fuel systems, control devices, and bypass systems as part of the initial report
TNT-2	Washers 3-5	PM	PSD Avoidance	TBD	TBD
TNT-3	Drying	PM	PSD Avoidance	TBD	TBD

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Reported	Description of Reporting
TNT-4	Flaking	PM	PSD Avoidance	TBD	TBD
TNT-5	Packaging	PM	PSD Avoidance	TBD	TBD
TNT-6	Sodium Sulfite Loading	PM	PSD Avoidance	TBD	TBD
TNT-7	Sodium Bisulfite Loading	PM	PSD Avoidance	TBD	TBD

Section V.5: Testing Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Tested	Description of Testing
TNT-1	Nitration + Washers 1 & 2	CO	PSD Avoidance	TBD	TBD
TNT-1	Nitration + Washers 1 & 2	NOx	PSD Avoidance	TBD	TBD
TNT-1	Nitration + Washers 1 & 2	VOC (TNM)*	PSD Avoidance	TNM (VOC)	US EPA Methods 1,2, 3A, & 18
TNT-2	Washers 3-5	PM	PSD Avoidance	TBD	TBD
TNT-3	Drying	PM	PSD Avoidance	TBD	TBD
TNT-4	Flaking	PM	PSD Avoidance	TBD	TBD
TNT-5	Packaging	PM	PSD Avoidance	TBD	TBD
TNT-6	Sodium Sulfite Loading	PM	PSD Avoidance	TBD	TBD
TNT-7	Sodium Bisulfite Loading	PM	PSD Avoidance	TBD	TBD

Section V.6: Notes, Comments, and Explanations
An initial performance test for TNM (VOC) must be performed and repeated at least every 60 months per 40 CFR 60.704a(a).

Division for Air Quality

300 Sower Boulevard
Frankfort, KY 40601
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DEP7007Y

Good Engineering Practice and Stack Height Determination

___ Section Y.1: Building Dimension Information
___ Section Y.2: Exhaust Point Information
___ Section Y.3: Notes, Comments, and Explanations

Additional Documentation

___ Attach Flow Diagram for Exhaust Points

___ Complete DEP7007AI

Source Name: **Dyno Nobel, Inc.**
KY EIS (AFS) #: **21- 177-00067**
Permit #: **S-25-064**
Agency Interest (AI) ID: **3241**
Date: **6/1/2026**

Section Y.1: Building Dimension Information

Exhaust Point #	Exhaust Point Name	Description of Exhaust Point *(stack, vent, roof monitor, indoors, etc.)*		List all processes and control devices serviced by the exhaust point:		Building dimensions where exhaust point is located:			Distance to nearest building *(ft)*	Dimensions of this nearest building:		
				Name	Flow Diagram Designation	Length *(ft)*	Width *(ft)*	Height *(ft)*		Length *(ft)*	Width *(ft)*	Height *(ft)*
TNT-3	Dryer Scrubber	stack		Drying	Drying	118	40	23	175.8	50	26	16
TNT-4	Flaker Scrubber	stack		Flaking	Flaking	118	40	23	175.8	50	26	16
TNT-5	Packaging Scrubber	stack		Packaging	Packaging	100	40	24	236.9	55	35	16
TNT-6	Sodium Sulfite Unloading	vent		Sodium Sulfite Unloading	Sodium Sulfite Unloading	100	35	30	37.1	Cylindrical Tank	10	27.1
TNT-7	Sodium Bisulfite Unloading	vent		Sodium Bisulfite Unloading	Sodium Bisulfite Unloading	100	35	30	37.1	Cylindrical Tank	10	27.1

Section Y.2: Exhaust Point Information

Exhaust Point	Distance to nearest plant boundary from exhaust point discharge *(ft)*	Good engineering practice (GEP) height, if known *(ft)*	Diameter of exhaust point *(ft)*	Direction of Exhaust	Geographical Coordinates *(in decimal degrees)*		UTM Coordinates		Exit Gas Flow Rate *(acfm)*		Exit Gas Temperature *(°F)*	
					Latitude	Longitude	Northing	Easting	Minimum	Maximum	At Minimum Flow Rate	At Maximum Flow Rate
TNT-3	540		1.1	Vertical					2826	2826	93	93
TNT-4	540		0.83	Vertical					1719	1719	68	68
TNT-5	577		1	Vertical					2541	2541	68	68
TNT-6	670		0.25	Vertical					147	147	68	68
TNT-7	675		0.17	Vertical					65	65	68	68

Exhaust Point	Distance to nearest plant boundary from exhaust point discharge *(ft)*	Good engineering practice (GEP) height, if known *(ft)*	Diameter of exhaust point *(ft)*	Direction of Exhaust	Geographical Coordinates *(in decimal degrees)*		UTM Coordinates		Exit Gas Flow Rate *(acfm)*		Exit Gas Temperature *(°F)*	
					Latitude	Longitude	Northing	Easting	Minimum	Maximum	At Minimum Flow Rate	At Maximum Flow Rate

Section Y.3: Notes, Comments, and Explanations

Division for Air Quality

300 Sower Boulevard
Frankfort, KY 40601
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DEP7007B

Manufacturing or Processing Operations

___ Section B.1: Process Information
___ Section B.2: Materials and Fuel Information
___ Section B.3: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI, DEP7007N, DEP7007V, and DEP7007GG.
___ Attach a flow diagram
___ Attach SDS

Source Name: **Dyno Nobel Inc.**
KY EIS (AFS) #: **21-** **177-00067**
Permit #: **S-25-064**
Agency Interest (AI) ID: **3241**
Date: **6/1/2026**

Section B.1: Process Information

Emission Unit #	Emission Unit Name	Describe Emission Unit	Process ID	Process Name	Manufacturer	Model No.	Proposed/Actual Date of Construction Commencement *(MM/YYYY)*	Is the Process Continuous or Batch?	Number of Batches per 24 Hours *(if applicable)*	Hours per Batch *(if applicable)*
ARU-1	Acid Recovery Unit	Acid stripper units and concentrator units	ARU-1	ARU	De Dietrich	Custom Equipment	12/2026	Continuous	N/A	N/A
ARU-2	Solvent Extraction Unit	MNT/DNT extraction & stripper column	ARU-1	ARU	De Dietrich	Custom Equipment	12/2026	Continuous	N/A	N/A

Section B.2: Materials and Fuel Information

**Maximum yearly fuel usage rate only applies if applicant request operating restrictions through federally enforceable limitations.*

Emission Unit #	Emission Unit Name	Name of Raw Materials Input	Maximum Quantity of Each Raw Material Input	(Specify Units/hr)	Total Process Weight Rate for Emission Unit (tons/hr)	Name of Finished Materials	Maximum Quantity of Each Finished Material Output	(Specify Units/hr)	Fuel Type	Maximum Hourly Fuel Usage Rate	(Specify Units)	Maximum Yearly Fuel Usage Rate	(Specify Units)	Sulfur Content (%)	Ash Content (%)
ARU-1	Acid Recovery Unit	Spent Acid	8180	lb/hr	4.05	1. Acidic Condensate 2. Sulfuric Acid 3. Nitric Acid + Organics 4. Organic Condensate	1. *See B.3* 2. 5574 3. 393 4. *See B.3*	lb/hr	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ARU-2	Solvent Extraction Unit	1. Organic Condensate from ARU 2. Toluene	1. *See B.3* 2. 580	lb.hr	1.33	1. Condensate 2. Toluene and Organics	1. *See B.3* 2. 586	lb/hr	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Section B.3: Notes, Comments, and Explanations

1. Material processing rates are based on the technology provider's proprietary design simulation model.

2. The ARU includes denitration, DNT removal, sulfuric acid concentrators, and the nitric acid concentrator.

3. Condensate generation and processing rates are not shown due to proprietary vendor information.

Division for Air Quality

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DEP7007GG

Control Equipment

Additional Documentation

___ Complete Sections GG.1 through GG.12, as applicable

___ Attach manufacturer's specifications for each control device

___ Complete DEP7007AI

Source Name: Dyno Nobel Inc.

KY EIS (AFS) #: 21- 177-00067

Permit #: S-25-064

Agency Interest (AI) ID: 3241

Date: 6/1/2026

Section GG.1: General Information - Control Equipment

Control Device ID #	Control Device Name	Cost	Manufacturer	Model Name/ Serial #	Date Installed	Inlet Gas Stream Data For All Control Devices					Inlet Gas Stream Data For Condensers, Adsorbers, Afterburners, Incinerators, Oxidizers Only			Equipment Operational Data For All Control Devices		
						Temperature (°F)	Flowrate (scfm @ 68 °F)	Average Particle Diameter (μm)	Particle Density (lb/ft^3) or Specific Gravity	Gas Density (lb/ft^3)	Gas Moisture Content (%)	Gas Composition	Fan Type	Pressure Drop Range ($in. H_2O$)	Pollutants Collected/ Controlled	Pollutant Removal (%)
04C8010	NO_x Absorption Column	TBD	De Dietrich	Custom Equipment	Dec-26	131	1105	-	-	0.069	-	-	-	200.7	NOx Organics	>99% 100%
TO-1	Thermal Oxidizer	TBD	UOP Honeywell	TBD	Dec-26	68	682	<1	unknown	0.019	< 1%	Air and ~2% CO	Forced draft	n/a	CO	99.8%

Section GG.5: Scrubber

Control Device ID #	Identify all Emission Units and Control Devices that Feed to Scrubber	Identify Type of Scrubber: Venturi, Packed Bed, Spray Tower, or Other (specify)	For Venturi Scrubbers:	For Packed Bed Scrubbers:		For Spray Towers:		Identify Type of Flow: Concurrent, Countercurrent, or Crossflow	Length in Direction of Gas Flow *(ft)*	Cross-Sectional Area *(ft^2)*	Venturi Throat Velocity *(ft/s)*	Mist Eliminator			Scrubbing Liquid			
			Identify Throat Type: Fixed or Adjustable	Identify Packing Type	Packing Height *(in)*	Number of Nozzles	Nozzle Pressure *(psig)*					Identify Type: Mesh or Vane	Cross-Sectional Area *(ft^2)*	Pressure Drop *(in. H_2O)*	Chemical Composition	Flowrate *(gal/min)*	Fresh Liquid Makeup Rate *(gal/min)*	Describe Disposal Method of Scrubber Effluent
04C8010	TNT-1 DEN DNT SAC NAC	Packed bed scrubber with trayed section	-	Random packing and bubble cap trays	60-80	-	-	Countercurrent	100	18	-	-	-	-	Water demineralized	1.67	1.67	NA50 effluent is recycled to the process

Section GG.7: Afterburner/Incinerator/Oxidizer

Control Device ID #	Identify all Emission Units and Control Devices that Feed to Afterburner/Incinerator/ Oxidizer	Identify Type: Afterburner, Incinerator, Oxidizer, or Other (specify)	Number of Burners	Burner Rating *(BTU/hr)*	Dimensions of Combustion Chamber *(specify units)*	Residence Time *(sec)*	Combustion Chamber Temperature *(°F)*	Type of Catalyst (if applicable)	Type of Heat Exchanger (if applicable)	Auxiliary Fuel							Composition and Quantities of Combusted Waste
										Identify Fuel Type	Higher Heating Value *(MMBtu/scf)*	Hourly Fuel Usage *(scf/hr)*	% Sulfur (Maximum)	% Sulfur (Average)	% Ash (Maximum)	% Ash (Average)	
TO-1	NOx Absorber	Thermal Oxidizer	1	2.4	TBD	TBD	1634	N/A	N/A	Natural Gas	0.00102	830	-	-	-	-	Air with ~2% CO, TNM, trace DNT, and trace NOx

Section GG.12: Notes, Comments, and Explanations

1. The NO_X Absorber controls emissions from the Nitration Area, the Weak Nitric Acid Tank, and the Acid Recovery Unit. The exhaust from the NO_X Absorber is routed to the Thermal Oxidizer for CO and organics destruction.

Division for Air Quality

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DEP7007N

Source Emissions Profile

__ Section N.1: Emission Summary
__ Section N.2: Stack Information
__ Section N.3: Fugitive Information
__ Section N.4: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI

Source Name: Dyno Nobel Inc.
KY EIS (AFS) #: 21- 177-00067
Permit #: S-25-064
Agency Interest (AI) ID: 3241
Date: 6/1/2026

N.1: Emission Summary

Emission Unit #	Emission Unit Name	Process ID	Process Name	Control Device Name	Control Device ID	Stack ID	Maximum Design Capacity *(SCC Units/hour)*	Pollutant	Uncontrolled Emission Factor *(lb/SCC Units)*	Emission Factor Source (e.g. AP-42, Stack Test, Mass Balance)	Capture Efficiency *(%)*	Control Efficiency *(%)*	Hourly Emissions		Annual Emissions	
													Uncontrolled Potential *(lb/hr)*	Controlled Potential *(lb/hr)*	Uncontrolled Potential *(tons/yr)*	Controlled Potential *(tons/yr)*
ARU-1	Acid Recovery Unit	ARU-1	Acid Recovery Unit	NOx Absorption	04C8010	ARU-1	8180 lb/hr	DNT	9E-05 lb emitted/lb fed	Technology Provider Process Model	100%	99.96%	0.75	3.00E-04	3.3	1.31E-03
ARU-1	Acid Recovery Unit	ARU-1	Acid Recovery Unit	NOx Absorption	04C8010	ARU-1	8180 lb/hr	NO	2E-02 lb emitted/lb fed	Technology Provider Process Model	100%	99.89%	124.1	0.14	543.6	0.6
ARU-1	Acid Recovery Unit	ARU-1	Acid Recovery Unit	NOx Absorption	04C8010	ARU-1	8180 lb/hr	NO_2	6E-04 lb emitted/lb fed	Technology Provider Process Model	100%	97.39%	4.99	0.13	21.9	0.6
ARU-2	Solvent Extraction	ARU-1	Acid Recovery Unit	-	-	ARU-2	580 lb toluene/hr	Toluene	8E-04 lb emitted/lb toluene fed	Technology Provider Process Design Simulation	100%	-	0.48	0.48	2.12	2.12
ARU-6	Thermal Oxidizer Burner	ARU-1	Acid Recovery Unit	-	-	ARU-1	2.4 MMBtu/scf	NO_X from nat gas combustion	100 lb/MMscf	AP-42, Table 1.4.1	100%	-	0.24	0.24	1.03	1.03
ARU-6	Thermal Oxidizer Burner	ARU-1	Acid Recovery Unit	-	-	ARU-1	11.025 lb TNM/hr	NO2 from TNM combustion	0.96 lb emitted/lb fed	Mass balance	100%	-	10.6	10.6	46.3	46.31
ARU-6	Thermal Oxidizer Burner	ARU-1	Acid Recovery Unit	-	-	ARU-1	2.4 MMBtu/scf	SO_2	0.6 lb/MMscf	AP-42, Table 1.4.2	100%	-	1.41E-03	1.41E-03	0.01	0.01
ARU-6	Thermal Oxidizer Burner	ARU-1	Acid Recovery Unit	-	-	ARU-1	2.4 MMBtu/scf	CO	84 lb/MMscf	AP-42, Table 1.4.1	100%	-	0.20	0.20	0.87	0.87
ARU-6	Thermal Oxidizer Burner	ARU-1	Acid Recovery Unit	-	-	ARU-1	2.4 MMBtu/scf	PM (filterable)	1.9 lb/MMscf	AP-42, Table 1.4.2	100%	-	4.47E-03	4.47E-03	0.02	0.02
ARU-6	Thermal Oxidizer Burner	ARU-1	Acid Recovery Unit	-	-	ARU-1	2.4 MMBtu/scf	VOC	5.5 lb/MMscf	AP-42, Table 1.4.2	100%	-	1.29E-02	1.29E-02	0.06	0.06
ARU-6	Thermal Oxidizer Burner	ARU-1	Acid Recovery Unit	-	-	ARU-1	2.4 MMBtu/scf	Lead	0.0005 lb/MMscf	AP-42, Table 1.4.2	100%	-	1.18E-06	1.18E-06	5.16E-06	5.16E-06
ARU-6	Thermal Oxidizer Burner	ARU-1	Acid Recovery Unit	-	-	ARU-1	2.4 MMBtu/scf	Toluene	3E-03 lb/MMscf	AP-42, Table 1.4.3	100%	-	8.00E-06	8.00E-06	3.50E-05	3.50E-05

Emission Unit #	Emission Unit Name	Process ID	Process Name	Control Device Name	Control Device ID	Stack ID	Maximum Design Capacity *(SCC Units/hour)*	Pollutant	Uncontrolled Emission Factor *(lb/SCC Units)*	Emission Factor Source (e.g. AP-42, Stack Test, Mass Balance)	Capture Efficiency *(%)*	Control Efficiency *(%)*	Hourly Emissions		Annual Emissions	
													Uncontrolled Potential *(lb/hr)*	Controlled Potential *(lb/hr)*	Uncontrolled Potential *(tons/yr)*	Controlled Potential *(tons/yr)*
ARU-6	Thermal Oxidizer Burner	ARU-1	Acid Recovery Unit	-	-	ARU-1	2.4 MMBtu/scf	CO_2	117 lb/MMBtu	CFR 98 Table C-1	100%	-	281.00	281.00	1230.78	1230.78
ARU-6	Thermal Oxidizer Burner	ARU-1	Acid Recovery Unit	-	-	ARU-1	2.4 MMBtu/scf	N_2O	2.21E-04 lb/MMBtu	CFR 98 Table C-2	100%	-	5.29E-04	5.29E-04	2.32E-03	2.32E-03
ARU-6	Thermal Oxidizer Burner	ARU-1	Acid Recovery Unit	-	-	ARU-1	2.4 MMBtu/scf	CH_4	2.21E-03 lb/MMBtu	CFR 98 Table C-2	100%	-	5.29E-03	5.29E-03	2.32E-02	2.32E-02

Section N.2: Stack Information

UTM Zone:

Stack ID	Identify all Emission Units (with Process ID) and Control Devices that Feed to Stack	Stack Physical Data			Stack UTM Coordinates		Stack Gas Stream Data		
		Equivalent Diameter *(ft)*	Height *(ft)*	Base Elevation *(ft)*	Northing *(m)*	Easting *(m)*	Flowrate *(acfm)*	Temperature *(° F)*	Exit Velocity *(ft/sec)*
ARU-1	ARU-1, NO_X Absorber, Thermal Oxidizer	0.5	118.1				849.2	86	60 ft/s
ARU-2	ARU-2	0.26	65.6				1.80	60	0.55

Section N.3: Fugitive Information

UTM Zone:

Emission Unit #	Emission Unit Name	Process ID	Area Physical Data		Area UTM Coordinates		Area Release Data	
			Length of the X Side *(ft)*	Length of the Y Side *(ft)*	Northing *(m)*	Easting *(m)*	Release Temperature *(°F)*	Release Height *(ft)*

Section N.4: Notes, Comments, and Explanations

1. Emissions from the Acid Recovery Unit area are controlled by the NOx Absorber & Thermal Oxidizer in the Acid Recovery Unit area.

2. Line item for the Sulfuric Acid Concentrator vent is included for completeness. The technology provider does not expect any regulated pollutant emissions from the Sulfuric Acid Concentrators to the NO_X Absorber.

3. Stated removal efficiencies are based on emission rates estimated by the Acid Recovery Unit process technology provider, based on a proprietary design simulation model.

4. Carbon monoxide emissions from TNT Production (Nitration Unit) are controlled by the Thermal Oxidizer in Acid Recovery Area. The CO emission rate is shown on Form N.1 for the TNT area, as this is the location of the emission source.

5. DNT emissions are controlled by the NOx Absorber and the Thermal Oxidizer in the ARU, with an estimated combined removal efficiency of 99.96%

Division for Air Quality

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DEP7007V
Applicable Requirements and Compliance Activities

___ Section V.1: Emission and Operating Limitation(s)
___ Section V.2: Monitoring Requirements
___ Section V.3: Recordkeeping Requirements
___ Section V.4: Reporting Requirements
___ Section V.5: Testing Requirements
___ Section V.6: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI

Source Name: **Dyno Nobel Inc.**
KY EIS (AFS) #: **21-177-00067**
Permit #: **S-25-064**
Agency Interest (AI) ID: **3241**
Date: **6/1/2026**

Section V.1: Emission and Operating Limitation(s)

Emission Unit #	Emission Unit Description	Applicable Regulation or Requirement	Pollutant	Emission Limit (if applicable)	Voluntary Emission Limit or Exemption (if applicable)	Operating Requirement or Limitation (if applicable)	Method of Determining Compliance with the Emission and Operating Requirement(s)
Acid Recovery Unit	ARU-1	N/A	Non-VOC Organics	N/A	N/A	N/A	N/A
Acid Recovery Unit	ARU-1	PSD Avoidance	NO	<90 TPY	Sourcewide	TBD	TBD
Acid Recovery Unit	ARU-1	PSD Avoidance	NO_2	<90 TPY	Sourcewide	TBD	TBD

Emission Unit #	**Emission Unit Description**	**Applicable Regulation or Requirement**	**Pollutant**	**Emission Limit** (if applicable)	**Voluntary Emission Limit or Exemption** (if applicable)	**Operating Requirement or Limitation** (if applicable)	**Method of Determining Compliance with the Emission and Operating Requirement(s)**
Solvent Extraction	ARU-2	N/A	Toluene	N/A	N/A	TBD	TBD
Thermal Oxidizer Burner	TO-1	PSD Avoidance	NO_X from nat gas combustion	<90 TPY	Sourcewide	TBD	TBD
Thermal Oxidizer Burner	TO-1	PSD Avoidance	NO_2 from TNM combustion	<90 TPY	Sourcewide	TBD	TBD
Thermal Oxidizer Burner	TO-1	PSD Avoidance	SO_2	<90 TPY	Sourcewide	TBD	TBD
Thermal Oxidizer Burner	TO-1	PSD Avoidance	CO	<90 TPY	Sourcewide	TBD	TBD
Thermal Oxidizer Burner	TO-1	PSD Avoidance	PM (filterable)	<90 TPY	Sourcewide	TBD	TBD
Thermal Oxidizer Burner	TO-1	PSD Avoidance	VOC	<90 TPY	Sourcewide	TBD	TBD
Thermal Oxidizer Burner	TO-1	N/A	Lead	N/A	N/A	TBD	TBD
Thermal Oxidizer Burner	TO-1	N/A	Toluene	N/A	N/A	TBD	TBD

Emission Unit #	**Emission Unit Description**	**Applicable Regulation or Requirement**	**Pollutant**	**Emission Limit** (if applicable)	**Voluntary Emission Limit or Exemption** (if applicable)	**Operating Requirement or Limitation** (if applicable)	**Method of Determining Compliance with the Emission and Operating Requirement(s)**

Section V.2: Monitoring Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Monitored	Description of Monitoring
Acid Recovery Unit	ARU-1	NO	PSD Avoidance	TBD	TBD
Acid Recovery Unit	ARU-1	NO_2	PSD Avoidance	TBD	TBD
Thermal Oxidizer Burner	TO-1	NO_X from nat gas combustion	PSD Avoidance	Natural gas consumption	Flowmeter on natural gas line
Thermal Oxidizer Burner	TO-1	NO_2 from TNM combustion	PSD Avoidance	TBD	TBD
Thermal Oxidizer Burner	TO-1	SO_2	PSD Avoidance	Natural gas consumption	Flowmeter on natural gas line
Thermal Oxidizer Burner	TO-1	CO	PSD Avoidance	Natural gas consumption	Flowmeter on natural gas line
Thermal Oxidizer Burner	TO-1	PM (filterable)	PSD Avoidance	Natural gas consumption	Flowmeter on natural gas line
Thermal Oxidizer Burner	TO-1	VOC	PSD Avoidance	Natural gas consumption	Flowmeter on natural gas line

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Monitored	Description of Monitoring

Section V.3: Recordkeeping Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Recorded	Description of Recordkeeping
Acid Recovery Unit	ARU-1	NO	PSD Avoidance	TBD	TBD
Acid Recovery Unit	ARU-1	NO_2	PSD Avoidance	TBD	TBD
Thermal Oxidizer Burner	TO-1	NO_X from nat gas combustion	PSD Avoidance	Natural gas consumption	Natural gas consumption record
Thermal Oxidizer Burner	TO-1	NO_2 from TNM combustion	PSD Avoidance	TBD	TBD
Thermal Oxidizer Burner	TO-1	SO_2	PSD Avoidance	Natural gas consumption	Natural gas consumption record
Thermal Oxidizer Burner	TO-1	CO	PSD Avoidance	Natural gas consumption	Natural gas consumption record
Thermal Oxidizer Burner	TO-1	PM (filterable)	PSD Avoidance	Natural gas consumption	Natural gas consumption record
Thermal Oxidizer Burner	TO-1	VOC	PSD Avoidance	Natural gas consumption	Natural gas consumption record

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Recorded	Description of Recordkeeping

Section V.4: Reporting Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Reported	Description of Reporting
Acid Recovery Unit	ARU-1	NO	PSD Avoidance	TBD	TBD
Acid Recovery Unit	ARU-1	NO_2	PSD Avoidance	TBD	TBD
Thermal Oxidizer Burner	TO-1	NO_X from nat gas combustion	PSD Avoidance	Natural gas consumption	Natural gas consumption records
Thermal Oxidizer Burner	TO-1	NO_2 from TNM combustion	PSD Avoidance	TBD	TBD
Thermal Oxidizer Burner	TO-1	SO_2	PSD Avoidance	Natural gas consumption	Natural gas consumption records
Thermal Oxidizer Burner	TO-1	CO	PSD Avoidance	Natural gas consumption	Natural gas consumption records
Thermal Oxidizer Burner	TO-1	PM (filterable)	PSD Avoidance	Natural gas consumption	Natural gas consumption records
Thermal Oxidizer Burner	TO-1	VOC	PSD Avoidance	Natural gas consumption	Natural gas consumption records

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Reported	Description of Reporting

Section V.5: Testing Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Tested	Description of Testing
Acid Recovery Unit	ARU-1	NO	PSD Avoidance	NO	TBD
Acid Recovery Unit	ARU-1	NO_2	PSD Avoidance	NO2	TBD
Thermal Oxidizer Burner	TO-1	NO_X from nat gas combustion	PSD Avoidance	N/A	N/A
Thermal Oxidizer Burner	TO-1	NO_2 from TNM combustion	PSD Avoidance	NO_2 from TNM combustion	TBD
Thermal Oxidizer Burner	TO-1	SO_2	PSD Avoidance	N/A	N/A
Thermal Oxidizer Burner	TO-1	CO	PSD Avoidance	N/A	N/A
Thermal Oxidizer Burner	TO-1	PM (filterable)	PSD Avoidance	N/A	N/A
Thermal Oxidizer Burner	TO-1	VOC	PSD Avoidance	N/A	N/A

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Tested	Description of Testing

Section V.6: Notes, Comments, and Explanations

Division for Air Quality

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DEP7007Y

Good Engineering Practice and Stack Height Determination

___ Section Y.1: Building Dimension Information
___ Section Y.2: Exhaust Point Information
___ Section Y.3: Notes, Comments, and Explanations

Additional Documentation

___ Attach Flow Diagram for Exhaust Points

___ Complete DEP7007AI

Source Name: **Dyno Nobel, Inc.**
KY EIS (AFS) #: **21- 177-00067**
Permit #: **S-25-064**
Agency Interest (AI) ID: **3241**
Date: **6/1/2026**

Section Y.1: Building Dimension Information

Exhaust Point #	Exhaust Point Name	Description of Exhaust Point *(stack, vent, roof monitor, indoors, etc.)*		List all processes and control devices serviced by the exhaust point:		Building dimensions where exhaust point is located:			Distance to nearest building *(ft)*	Dimensions of this nearest building:		
				Name	Flow Diagram Designation	Length *(ft)*	Width *(ft)*	Height *(ft)*		Length *(ft)*	Width *(ft)*	Height *(ft)*
ARU-1	NOx Absorber/ Thermal Oxidizer	Stack		Acid Recovery Unit	ARU	20	20	115	52.2	cylindrical tank	17.8	19.9
				NOx Absorber	NOx Absorber							
				Thermal Oxidizer	Thermal Oxidizer							
ARU-2	Solvent Extraction	Vent		Acid Recovery Unit	ARU	23	235	45	50.1	50	26	16
				Solvent Extraction Unit	Solvent Extraction							

Section Y.2: Exhaust Point Information

Exhaust Point	Distance to nearest plant boundary from exhaust point discharge *(ft)*	Good engineering practice (GEP) height, if known *(ft)*	Diameter of exhaust point *(ft)*	Direction of Exhaust	Geographical Coordinates *(in decimal degrees)*		UTM Coordinates		Exit Gas Flow Rate *(acfm)*		Exit Gas Temperature *(°F)*	
					Latitude	Longitude	Northing	Easting	Minimum	Maximum	At Minimum Flow Rate	At Maximum Flow Rate
ARU-1	835		0.5	Vertical					849.2	849.2	86	86
ARU-2	710		0.26	Vertical					1.8	1.8	60	60

Section Y.3: Notes, Comments, and Explanations

Division for Air Quality

300 Sower Boulevard
Frankfort, KY 40601
(502) 564-3999

DEP7007C

Incinerators and Waste Burners

___ Section C.1: General Description
___ Section C.2: Operating Information
___ Section C.3: Design Information
___ Section C.4: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI, DEP7007N, DEP7007V, and DEP7007GG

___ Submit a manufacturer's drawing illustrating dimensions and construction details of the unit.

Source Name: Dyno Nobel Inc.

KY EIS (AFS) #: 21- 177-00067

Permit #: S-25-064

Agency Interest (AI) ID: 3241

Date: 6/1/2026

Section C.1: General Description

Emission Unit #: TDU-1

Emission Unit Name: TDU

Manufacturer: Honeywell UOP Callidus

Model/Serial No.: UOP Honeywell nViro

Proposed/Actual Date of Construction Commencement *(MM/YYYY)* **:** 12/2026

Identify Type: ☑ Incinerator ☐ Waste Burner

Incinerator: ☑ Single Chamber ☐ Multiple Chamber

Waste Burner: ☐ Teepee ☐ Truncated ☐ Silo ☑ Other

Describe Emission Unit:
If Type is indicated as "other," describe.

Thermal Destruction Unit with Air Pollution Control System

List Applicable Regulations:

40 CFR 63 Subpart EEE (HWC MACT)

401 KAR 59:020. New Incinerators

Indicate if applicable: ☑ Stack Test ☑ Siting Requirements ☑ Operator Training

Indicate if have been completed: ☐ Stack Test ☐ Siting Requirements ☐ Operator Training

Section C.2: Operating Information

SCC Code:

SCC Units: MMBTU/hr

Design Capacity of Waste Burned: 2800 *lbs/hr*

33.6 *tons/day*

Charging Rate: 2800 *lbs/hr*

33.6 *tons/day*

Type of Waste Burned: *(%)*

Municipal	Industrial	Hazardous	Medical	Other
		100%		

Description of Waste Burned: Red water from TNT production

Section C.3: Design Information

Combustion Air

Draft: ☐ Natural ☑ Forced ☐ Induced

Air Distribution: ☐ Overfire ☐ Underfire ☐ Secondary

Air Flow 2120 scfm

Pressure: 27 in. H_2O

Type of Incinerator

☐ Mass Burn Waterfall ☐ Refuse-Derived Fuel Spreader Stoker

☐ Mass Burn Rotary Waterfall ☐ Bubbling Fluidized Bed Incinerator

☐ Mass Burn Refractory ☐ Circulating Fluidized Bed Incinerator

☐ Modular Starved Air ☐ RDF Co-fired Incinerator

☐ Modular Excess Air ☑ Other Technologies: Liquid Waste Oxidizer

Burner Specifications

Burner (Combustion Chamber)	Fuel	Rated Capacity Heat Input *(MMBTU/hr)*	Temperature		SCC Code	SCC Units
				(°C or °F)		
Primary Burner	Natural Gas	11	77	F		MMBTU/hr
Secondary Burner						
Other: (Specify)	SCR Preheat Burner	0.7	77	F		MMBTU/hr

Section C.4: Notes, Comments, and Explanations

1. The SCR burner is a reheater prior to the Selective Catalytic Reductor.

Division for Air Quality

300 Sower Boulevard

Frankfort, KY 40601

(502) 564-3999

DEP7007GG

Control Equipment

Additional Documentation

___ Complete Sections GG.1 through GG.12, as applicable

___ Attach manufacturer's specifications for each control device

___ Complete DEP7007AI

Source Name: Dyno Nobel Inc.

KY EIS (AFS) #: 21- 177-00067

Permit #: S-25-064

Agency Interest (AI) ID: 3241

Date: 6/1/2026

Section GG.1: General Information - Control Equipment

Control Device ID #	Control Device Name	Cost	Manufacturer	Model Name/ Serial #	Date Installed	Inlet Gas Stream Data For All Control Devices					Inlet Gas Stream Data For Condensers, Adsorbers, Afterburners, Incinerators, Oxidizers Only			Equipment Operational Data For All Control Devices		
						Temperature (°F)	Flowrate (scfm @ 68 °F)	Average Particle Diameter (μm)	Particle Density (lb/ft^3) or Specific Gravity	Gas Density (lb/ft^3)	Gas Moisture Content (%)	Gas Composition	Fan Type	Pressure Drop Range ($in. H_2O$)	Pollutants Collected/ Controlled	Pollutant Removal (%)
DSI	Dry Sorbent Injection				Dec-26	450	9990	10	88	0.04	N/A	N/A	N/A	11	SO2/SO3	90%
BAG	Baghouse				Dec-26	450	9990	30		0.04	N/A	N/A	N/A	8-12	Particulate Metals	>99% PM ~50% Metals
HEP	HEPA Filter				Dec-26	450	9990	<3		0.04	N/A	N/A	N/A	0.5-3	Particulate Metals	>99% PM ~50% Metals
SCR	SCR				Dec-26	520	10200	N/A	N/A	0.04	N/A	N/A	N/A	5-8	NOx	90%

Section GG.6: Filter

Control Device ID #	Identify all Emission Units and Control Devices that Feed to Filter	Identify Type of Filter Unit: Baghouse, Cartridge Collector, or Other (specify)	Identify Type of Filtering Material: Fabric, Paper, Synthetic, or Other (specify)	Total Filter Area (ft^2)	Effective Air-to-Filter Ratio ($acfm/ft^2$)	Continuous Monitoring Instrumentation (e.g. COMS, BLDS, none)	Additional Materials Introduced into the Control System (e.g. lime, carbon)		Identify Cleaning Method: Shaker, Pulse Air, Reverse Air, Pulse Jet, or Other (specify)	Identify Gas Cooling Method: Ductwork, Heat Exchanger, Bleed-in Air, Water Spray, or Other (specify)	For Ductwork:		For Bleed-in Air:	For Water Spray:
							Material	Injection Rate (lb/hr)			Length (ft)	Diameter (ft)	Flowrate (scfm @ 68°F)	Flowrate (gal/min)
BAG	Thermal Destruction Unit DSI Reactor	Baghouse	PTFE Scrim Supported with PTFE Membrane	4977	3.8	Bag Leak Detector	Sodium Bicarbonate	105	Pulse Air	N/A	N/A	N/A	N/A	N/A
HEP	Thermal Destruction Unit DSI Reactor Baghouse	HEPA Cartridge Filter	PTFE	64	293.3	N/A	Sodium Bicarbonate	105	Replacement	N/A	N/A	N/A	N/A	N/A

Section GG.10: Selective Catalytic Reduction (SCR) / Selective Non-catalytic Reduction (SNCR)

Control Device ID #	Identify all Emission Units and Control Devices that Feed to SCR/SNCR	Type (SCR/SNCR)	Gas Composition	Injection Grid Design (e.g. honeycomb)	Design Temperature Range		Reagent			Maximum Design Ammonia Slip *(ppm)*	SCR Only			
											Catalyst			
					Min *(°F)*	Max *(°F)*	Type	Injection Rate			Composition	Volume *(ft^3)*	Weight *(lb)*	Replacement Schedule
								Min *(lb/hr)*	Max *(lb/hr)*					
SCR	Thermal Destruction Unit DSI Reactor Baghouse HEPA Filter SCR Burner	SCR	CO2, O2, N2, H2O, SO2, SO3, NO2	Duct injection leading to a perforated plate	500	716	19wt% Ammonia	25.9	30.5	10 ppm	V2O5-WO3-TiO2	85.46	2,425	24,000 hr or 3 yrs

Section GG.11: Other Control Equipment

Control Device ID #	**Identify all Emission Units and Control Devices that Feed to Control Equipment**	**Type of Control Equipment** (provide description and a diagram with dimensions)
DSI	Thermal Destruction Unit	Dry Sorbent Injection Reaction Chamber

Section GG.12: Notes, Comments, and Explanations

Division for Air Quality

300 Sower Boulevard
Frankfort, KY 40601
(502) 564-3999

DEP7007N

Source Emissions Profile

__ Section N.1: Emission Summary
__ Section N.2: Stack Information
__ Section N.3: Fugitive Information
__ Section N.4: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI

Source Name: Dyno Nobel Inc.
KY EIS (AFS) #: 21- 177-00067
Permit #: S-25-064
Agency Interest (AI) ID: 3241
Date: 6/1/2026

N.1: Emission Summary

Emission Unit #	Emission Unit Name	Process ID	Process Name	Control Device Name	Control Device ID	Stack ID	Maximum Design Capacity *(SCC Units/hour)*	Pollutant	Uncontrolled Emission Factor *(lb/SCC Units)*	Emission Factor Source (e.g. AP-42, Stack Test, Mass Balance)	Capture Efficiency *(%)*	Control Efficiency *(%)*	Hourly Emissions		Annual Emissions	
													Uncontrolled Potential *(lb/hr)*	Controlled Potential *(lb/hr)*	Uncontrolled Potential *(tons/yr)*	Controlled Potential *(tons/yr)*
TDU-1	Thermal Destruction Unit (TDU)	TDU-1	Thermal Destruction Unit	N/A	N/A	07-STA0003	2800 lb/hr (Red water)	Dioxin/Furan	2.0E-13 lb emitted/lb fed	Vendor Performance Guarantee	100.00%	N/A	5.6E-10	5.6E-10	2.5E-09	2.5E-09
TDU-1	Thermal Destruction Unit (TDU)	TDU-1	Thermal Destruction Unit	Baghouse HEPA Cartridge Filter	BAG HEP	07-STA0003	2800 lb/hr (Red water)	Particulate Matter	8.2E-02 lb emitted/lb fed	Vendor Performance Guarantee	100.00%	>99%	229	0.019	1004	0.080
TDU-1	Thermal Destruction Unit (TDU)	TDU-1	Thermal Destruction Unit	Baghouse HEPA Cartridge Filter	BAG HEP	07-STA0003	2800 lb/hr (Red water)	Low Volatile Metals (LVM, sum of As, Be, and Cr)	6.8E-06 lb emitted/lb fed	Vendor Performance Guarantee	100.00%	>50%	0.019	0.00012	0.082	0.00052
TDU-1	Thermal Destruction Unit (TDU)	TDU-1	Thermal Destruction Unit	Baghouse HEPA Cartridge Filter	BAG HEP	07-STA0003	2800 lb/hr (Red water)	Semi-volatile Metals (SVM, sum of Cd and Pb)	1.4E-06 lb emitted/lb fed	Vendor Performance Guarantee	100.00%	>50%	0.0039	5.1E-05	0.017	0.00022
TDU-1	Thermal Destruction Unit (TDU)	TDU-1	Thermal Destruction Unit	Baghouse HEPA Cartridge Filter	BAG HEP	07-STA0003	2800 lb/hr (Red water)	Mercury	2.0E-08 lb emitted/lb fed	Vendor Performance Guarantee	100.00%	0%	5.6E-05	5.6E-05	2.5E-04	2.5E-04
TDU-1	Thermal Destruction Unit (TDU)	TDU-1	Thermal Destruction Unit	Dry Sorbent Injection System	DSI	07-STA0003	2800 lb/hr (Red water)	Hydrogen Chloride/Chlorine (HCl/Cl_2)	5.7E-04 lb emitted/lb fed	Vendor Performance Guarantee	100.00%	>90%	1.6	0.16	7.1	0.71
TDU-1	Thermal Destruction Unit (TDU)	TDU-1	Thermal Destruction Unit	N/A	N/A	07-STA0003	2800 lb/hr (Red water)	Carbon Monoxide (CO)	3.3E-04 lb emitted/lb fed	AP-42, Table 1.4.1	100.00%	N/A	0.91	0.91	3.99	3.99
TDU-1	Thermal Destruction Unit (TDU)	TDU-1	Thermal Destruction Unit	N/A	N/A	07-STA0003	2800 lb/hr (Red water)	Total Hydrocarbons (THC)	3.4E-04 lb emitted/lb fed	Vendor Performance Guarantee	100.00%	N/A	0.94	0.094	0.41	0.41
TDU-1	Thermal Destruction Unit (TDU)	TDU-1	Thermal Destruction Unit	SCR System	SCR	07-STA0003	2800 lb/hr (Red water)	Oxides of Nitrogen (NO_X)	5.4E-03 lb emitted/lb fed	Vendor proprietary estimate	100.00%	90%	15.078	1.508	66.04	6.60
TDU-1	Thermal Destruction Unit (TDU)	TDU-1	Thermal Destruction Unit	Dry Sorbent Injection System	DSI	07-STA0003	2800 lb/hr (Red water)	Sulfur Dioxide / Sulfur Trioxide (SO_2/SO_3)	1.4E-02 lb emitted/lb fed	Vendor proprietary estimate	100.00%	90%	39.7	3.96	174	17.3

Emission Unit #	Emission Unit Name	Process ID	Process Name	Control Device Name	Control Device ID	Stack ID	Maximum Design Capacity *(SCC Units/hour)*	Pollutant	Uncontrolled Emission Factor *(lb/SCC Units)*	Emission Factor Source (e.g. AP-42, Stack Test, Mass Balance)	Capture Efficiency *(%)*	Control Efficiency *(%)*	Hourly Emissions		Annual Emissions	
													Uncontrolled Potential *(lb/hr)*	Controlled Potential *(lb/hr)*	Uncontrolled Potential *(tons/yr)*	Controlled Potential *(tons/yr)*
TDU-1	Thermal Destruction Unit (TDU)	TDU-1	Thermal Destruction Unit	N/A	N/A	07-STA0003	2800 lb/hr (Red water)	Ammonia (NH_3)	9.6E-05 lb emitted/lb fed	Vendor estimates based on proprietary modeling	100.00%	N/A	0.27	0.27	1.19	1.19
TDU-1	Thermal Destruction Unit (TDU)	TDU-1	Thermal Destruction Unit	N/A	N/A	07-STA0003	2800 lb/hr (Red water)	Carbon Dioxide (CO_2)	5.7E-01 lb emitted/lb fed	Vendor estimates based on proprietary modeling	100.00%	N/A	1,604	1,604	7,026	7,026

Section N.2: Stack Information

UTM Zone:

Stack ID	Identify all Emission Units (with Process ID) and Control Devices that Feed to Stack	Stack Physical Data			Stack UTM Coordinates		Stack Gas Stream Data		
		Equivalent Diameter *(ft)*	Height *(ft)*	Base Elevation *(ft)*	Northing *(m)*	Easting *(m)*	Flowrate *(acfm)*	Temperature *(° F)*	Exit Velocity *(ft/sec)*
TDU-1	Emission Units: TDU-1, TDU-2 (SCR Reheat Burner) Process ID: TDU-1	2.67	68.901				19000	510	60

Section N.3: Fugitive Information

UTM Zone:

Emission Unit #	Emission Unit Name	Process ID	Area Physical Data		Area UTM Coordinates		Area Release Data	
			Length of the X Side *(ft)*	Length of the Y Side *(ft)*	Northing *(m)*	Easting *(m)*	Release Temperature *(°F)*	Release Height *(ft)*
TDU-1	DSI Handling	TDU-1					68	
TDU-1	Baghouse Residue	TDU-1					68	

Section N.4: Notes, Comments, and Explanations
1. Natural gas emission estimates were calculated using AP-42, Table 1.4.1 values for Small Boilers (<100 MMBtu/hr heat input).

Division for Air Quality

300 Sower Boulevard
Frankfort, KY 40601
(502) 564-3999

DEP7007V

Applicable Requirements and Compliance Activities

___ Section V.1: Emission and Operating Limitation(s)
___ Section V.2: Monitoring Requirements
___ Section V.3: Recordkeeping Requirements
___ Section V.4: Reporting Requirements
___ Section V.5: Testing Requirements
___ Section V.6: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI

Source Name: **Dyno Nobel Inc.**
KY EIS (AFS) #: **21- 177-00067**
Permit #: **S-25-064**
Agency Interest (AI) ID: **3241**
Date: **6/1/2026**

Section V.1: Emission and Operating Limitation(s)

Emission Unit #	Emission Unit Description	Applicable Regulation or Requirement	Pollutant	Emission Limit (if applicable)	Voluntary Emission Limit or Exemption (if applicable)	Operating Requirement or Limitation (if applicable)	Method of Determining Compliance with the Emission and Operating Requirement(s)
TDU-1	Thermal Destruction Unit	40 CFR §63.1219(b)(1)(i)	Dioxins /Furans	0.11 ng/dscm, 7%O2	N/A	See Monitoriing Requirements	Emission Test (HWC MACT Comprehensive Performance Test)
TDU-1	Thermal Destruction Unit	40 CFR §63.1219(b)(2)	Mercury	8.1 µg/dscm, 7%O2	N/A	See Monitoriing Requirements	Emission Test (HWC MACT Comprehensive Performance Test)
TDU-1	Thermal Destruction Unit	40 CFR §63.1219(b)(3)	Semi-volatile Metals (Cd+Pb)	10 µg/dscm, 7%O2	N/A	See Monitoriing Requirements	Emission Test (HWC MACT Comprehensive Performance Test)
TDU-1	Thermal Destruction Unit	40 CFR §63.1219(b)(4)	Low Volatile Metals (As+Be+Cr)	23 µg/dscm, 7%O2	N/A	See Monitoriing Requirements	Emission Test (HWC MACT Comprehensive Performance Test)
TDU-1	Thermal Destruction Unit	40 CFR §63.1219(b)(5)(i)	Carbon Monoxide	100 ppmdv, 7%O2	N/A	See Monitoriing Requirements	Emission Test (HWC MACT Comprehensive Performance Test)

Emission Unit #	**Emission Unit Description**	**Applicable Regulation or Requirement**	**Pollutant**	**Emission Limit** (if applicable)	**Voluntary Emission Limit or Exemption** (if applicable)	**Operating Requirement or Limitation** (if applicable)	**Method of Determining Compliance with the Emission and Operating Requirement(s)**
TDU-1	Thermal Destruction Unit	40 CFR §63.1219(b)(5)(ii)	Total hydrocarbons (as propane)	10 ppmdv, 7%O2	N/A	See Monitoriing Requirements	Emission Test (HWC MACT Comprehensive Performance Test)
TDU-1	Thermal Destruction Unit	40 CFR §63.1219(b)(6)	Hydrogen Chloride /Chlorine (HCl/Cl2)	21 ppmdv, 7%O2	N/A	See Monitoriing Requirements	Emission Test (HWC MACT Comprehensive Performance Test)
TDU-1	Thermal Destruction Unit	40 CFR §63.1219(b)(7)	Particulate Matter (PM)	0.0016 gr/dscf, 7%O2	N/A	See Monitoriing Requirements	Emission Test (HWC MACT Comprehensive Performance Test)
TDU-1	Thermal Destruction Unit	40 CFR §63.1219(c)(1)	Destruction & Removal Efficiency	99.99%	N/A	See Monitoriing Requirements	Emission Test (HWC MACT Comprehensive Performance Test)
TDU-1	Thermal Destruction Unit	PSD Avoidance	Oxides of Nitrogen (NOx)	<90 TPY	Sourcewide	See Monitoriing Requirements	Emission Test
TDU-1	Thermal Destruction Unit	PSD Avoidance	Oxides of Sulfur (SOx)	<90 TPY	Sourcewide	See Monitoriing Requirements	Emission Test
TDU-1	Thermal Destruction Unit	TBD	Ammonia	10 ppm	From TDU Ammonia Slip	TBD	TBD
TDU-1	Thermal Destruction Unit	401 KAR 59:020	Opacity	20%	N/A	N/A, see Notes Page	N/A, see Notes Page
TDU-1	Thermal Destruction Unit	401 KAR 59:020	Particulate Matter (PM)	23 g/dscm, 12% CO2 (0.1 gr/dscf, 12% CO2)	N/A, see Notes Page	N/A, see Notes Page	N/A, see Notes Page

Section V.2: Monitoring Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Monitored	Description of Monitoring
TDU-1	Thermal Destruction Unit with Air Pollution Control System	DRE of Principal Hazardous Organic Constituents (POHCs)	40 CFR §63.1209(j)(1)	Minimum Combustion Chamber Temperature	Measure the temperature of each combustion chamber at a location that best represents the bulk gas temperature in the combusion zone.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	DRE of POHCs	40 CFR §63.1209(j)(2)	Maximum Flue Gas Flowrate	Establish a limit on the maximum stack gas flowrate.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	DRE of POHCs	40 CFR §63.1209(j)(3)	Maximum Hazardous Waste Feedrate	Establish limits on the maximum hazardous waste feedrate
TDU-1	Thermal Destruction Unit with Air Pollution Control System	DRE of POHCs	40 CFR §63.1209(j)(4)	Operation of Waste Firing System	Establish a limit on minimum waste atomization pressure
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Dioxins/Furans	40 CFR §63.1209(k)(1)	Maximum Baghouse Inlet Temperature	Establish a limit on the maximum temperature of the gas at the inlet to the device.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Dioxins/Furans	41 CFR §63.1209(k)(2)	Minimum Combustion Chamber Temperature	Measure the temperature of each combustion chamber at a location that best represents the bulk gas temperature in the combusion zone.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Dioxins/Furans	42 CFR §63.1209(k)(3)	Maximum Flue Gas Flowrate	Establish a limit on the maximum stack gas flowrate.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Dioxins/Furans	43 CFR §63.1209(k)(4)	Maximum Hazardous Waste Feedrate	Establish limits on the maximum hazardous waste feedrate
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Dioxins/Furans	43 CFR §63.1209(k)(8)(i)	Minimum SCR Inlet Temperature	Establish a limit on minimum flue gas temperature at the entrance of the catalyst.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Dioxins/Furans	43 CFR §63.1209(k)(8)(ii)	Maximum SCR Operating Hours	Replace a catalytic oxidizer with a new catalytic oxidizer when it has reached the maximum service time specified by the manufacturer.

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Monitored	Description of Monitoring
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Dioxins/Furans	43 CFR §63.1209(k)(8)(iv)	Maximum SCR Inlet Temperature	Establish a maximum flue gas temperature limit at the entrance of the catalyst.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Mercury	44 CFR §63.1207(m)(1)(iii)	Maximum Mercury Feedrate	Maximum theoretical emission concentration (MTEC) does not exceed the emission standard over the averaging period.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Mercury	43 CFR §63.1207(m)(1)(iii)	MTEC Minimum Stack Gas Flowrate	Maximum theoretical emission concentration (MTEC) does not exceed the emission standard over the averaging period.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Particulate Matter	43 CFR §63.1209(m)(1)(iv)	Maximum Pressure Drop (Baghouse)	Establish a maximum pressure drop across the baghouse.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Particulate Matter	43 CFR §63.1206(c)(8)(i)(A)	Baghouse Leak Indication	Indication of Baghouse Leak via Triboelectric Detector
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Particulate Matter	43 CFR §63.1209(m)(1)(iv)	Minimum Pressure Drop (HEPA)	Establish a minimum pressure drop across HEPA.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Particulate Matter	43 CFR §63.1209(m)(1)(iv)	Maximum Pressure Drop (HEPA)	Establish a maximum pressure drop across HEPA.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Particulate Matter	43 CFR §63.1209(m)(2)	Maximum Flue Gas Flowrate	Establish a limit on the maximum flue gas flowrate.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Particulate Matter	43 CFR §63.1209(m)(3)	Maximum Ash Feedrate	Establish a maximum ash feedrate limit. (calculated based on redwater feedrate and analytical data)
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Semivolatile Metals & Low Volatile Metals	43 CFR §63.1209(n)(1)	Maximum Baghouse Inlet Temperature	Establish a limit on the maximum inlet temperature to the primary dry metals emissions control device.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Semivolatile Metals & Low Volatile Metals	43 CFR §63.1209(n)(2)(ii)	Maximum SVM Feedrate	Establish a limit for feedrate of semivolatile metals in the feedstreem. (calculated based on redwater feedrate and analytical data)

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Monitored	Description of Monitoring
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Semivolatile Metals & Low Volatile Metals	43 CFR §63.1209(n)(2)(ii)	Maximum LVM Feedrate	Establish a limit for feedrate of low volatile metals in the feedstreem. (calculated based on redwater feedrate and analytical data)
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Semivolatile Metals & Low Volatile Metals	43 CFR §63.1209(n)(2)(vi)	Maximum Feedrate of Pumpable LVM	Establish a limit for feedrate of low volatile metals in the feedstreem. (calculated based on redwater feedrate and analytical data)
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Semivolatile Metals & Low Volatile Metals	43 CFR §63.1209(n)(3)	Control Device OPL	Establish operating parameter limits consistent with the PM operating paranmeter limits above
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Semivolatile Metals & Low Volatile Metals	43 CFR §63.1209(n)(4)	Maximum Total Chlorine and Chloride Feedrate.	Establish a maximum feedrate of total chlorine and chloride in the feedstream. (calculated based on redwater feedrate and analytical data)
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Semivolatile Metals & Low Volatile Metals	43 CFR §63.1209(n)(5)	Maximum Flue Gas Flowrate	Establish a limit on the maximum stack gas flowrate.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Hydrochloric Acid (HCl) & Chlorine (Cl_2)	44 CFR §63.1209(o)(1)	Maximum Total Chlorine and Chloride Feedrate.	Establish a maximum feedrate of total chlorine and chloride in the feedstream. (calculated based on redwater feedrate and analytical data)
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Hydrochloric Acid (HCl) & Chlorine (Cl_2)	45 CFR §63.1209(o)(2)	Maximum Flue Gas Flowrate	Establish a limit on the maximum stack gas flowrate.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Hydrochloric Acid (HCl) & Chlorine (Cl_2)	47 CFR §63.1209(o)(4)(i)	Minimum Sorbent Feedrate.	Establish a limit on minimum DSI feedrate.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Hydrochloric Acid (HCl) & Chlorine (Cl_2)	47 CFR §63.1209(o)(4)(ii)	Minimum Carrier Fluid Flowrate or Nozzle Pressure Drop	Establish a limit on minimum carrier fluid flowrate or nozzle pressure drop based on manufacturer's specifications.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Carbon Monoxide	48 CFR §63.1219(b)(5)(i)	Carbon Monoxide	Measure stack CO & O2 emissions using CEMS
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Oxides of Nitrogen	TBD	NOx	Measure NOx in flue gas downstream of SCR

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Monitored	Description of Monitoring
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Oxides of Sulfur	TBD	SOx	Measure SO2 in flue gas downstream of DSI system
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Ammonia	TBD	NH3	TBD

Section V.3: Recordkeeping Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Recorded	Description of Recordkeeping
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Subpart EEE Pollutants	63.1200, 63.10(b) and (c)	All CMS Parameters	Data recorded by continuous monitoring systems (CMS)
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Subpart EEE Pollutants	63.1200, 63.10(b) and (c)	N/A	Copies of all notifications, reports, plans, and other documents submitted to the administrator.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Subpart EEE Pollutants	63.9(b)	N/A	Notification: Initial notifications that facility is subject to Subpart EEE of this part.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Subpart EEE Pollutants	63.9(j)	N/A	Notification: Notification and documentation of any change in information already provided under §63.9.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	N/A	63.1206(b)(5)(i)	N/A	Notification: Notification of changes in design, operation, or maintenance.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	N/A	63.1206(c)(8)(iv)	Bag Leak Detection	Notification: Notification of excessive bag leak detection system exceedances.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Subpart EEE Pollutants	63.1207(e), 63.9(e), 63.9(g)(1) and (3)	N/A	Notification: Notification of performance test and continuous monitoring system evaluation, including the performance test plan and CMS performance evaluation plan.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	N/A	63.1210(b)	N/A	Notification: Notification of intent to comply.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Subpart EEE Pollutants	63.1210(d), 63.1207(j), 63.1207(k), 63.1207(l), 63.9(h), 63.10(d)(2), 63.10(e)(2)	N/A	Notification: Notification of compliance, including results of performance tests and continuous monitoring system performance evaluations.

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Recorded	Description of Recordkeeping
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Subpart EEE Pollutants	63.1206(b)(5)(ii)	N/A	Documentation that a change will not adversely affect compliance with the emission standards or operating requirements.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	N/A	63.1206(b)(11)	N/A	Calculation of hazardous waste residence time.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Subpart EEE Pollutants	63.1206(c)(2)	N/A	Startup, shutdown, and malfunction plan.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Subpart EEE Pollutants	63.1206(c)(2)(v)(A)	N/A	Documentation of investigation and evaluation of excessive exceedances during malfunctions.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Subpart EEE Pollutants	63.1206(c)(3)(v)	N/A	Corrective mesaures for any automatic waste feed cutoff that results in an exceedance of an emission standard or operating parameter limit.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Subpart EEE Pollutants	63.1206(c)(3)(vii)	N/A	Documentation and results of the automatic waste feed cutoff operability testing.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Fugitives	63.1206(c)(5)(ii)	N/A (system is sealed)	Method used for control of combustion system leaks.

Section V.4: Reporting Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Reported	Description of Reporting
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Subpart EEE Pollutants	§63.10(d)(5)(i)	N/A	Periodic startup, shutdown, and malfunction reports.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Subpart EEE Pollutants	§63.10(d)(5)(ii)	N/A	Immediate startup, shutdown, and malfunction reports.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Subpart EEE Pollutants	§63.10(e)(3)	N/A	Excessive emissions and continuous monitoring system performance report and summary report.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Subpart EEE Pollutants	§63.1206(c)(2)(ii)(B)	N/A	Startup, shutdown, and malfunction plan.
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Subpart EEE Pollutants	§63.1206(c)(3)(vi)	N/A	Excessive exceedances reports.

Section V.5: Testing Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Tested	Description of Testing
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Dioxins /Furans	40 CFR §63.1219(b)(1)(i)	Dioxins /Furans	US EPA Method 23
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Mercury	40 CFR §63.1219(b)(2)	Mercury	US EPA Method 29
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Semi-volatile Metals (Cd+Pb)	40 CFR §63.1219(b)(3)	Semi-volatile Metals (Cd+Pb)	US EPA Method 29
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Low Volatile Metals (As+Be+Cr)	40 CFR §63.1219(b)(4)	Low Volatile Metals (As+Be+Cr)	US EPA Method 29
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Carbon Monoxide	40 CFR §63.1219(b)(5)(i)	Carbon Monoxide	US EPA Method 10
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Total hydrocarbons (as propane)	40 CFR §63.1219(b)(5)(ii)	Total hydrocarbons (as propane)	US EPA Method 25A
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Hydrogen Chloride /Chlorine (HCl/Cl2)	40 CFR §63.1219(b)(6)	Hydrogen Chloride /Chlorine (HCl/Cl2)	US EPA Method 26A
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Particulate Matter (PM)	40 CFR §63.1219(b)(7)	Particulate Matter (PM)	US EPA Method 5
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Destruction & Removal Efficiency	40 CFR §63.1219(c)(1)	Destruction & Removal Efficiency	US EPA SW-846 Methods 0010, 0030, or 0031 (TBD as part of CPT Plan)

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Tested	Description of Testing
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Oxides of Nitrogen (NOx)	TBD	Oxides of Nitrogen (NOx)	US EPA Method 7E
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Oxides of Sulfur (SOx)	TBD	Oxides of Sulfur (SOx)	US EPA Method 6C and/or US EPA Method 8
TDU-1	Thermal Destruction Unit with Air Pollution Control System	Ammonia (NH3)	TBD	Ammonia (NH3)	US EPA Conditional Test Method 027 (CTM-027)

Section V.6: Notes, Comments, and Explanations

401 KAR 59:020. New Incinerators applies and imposes a 20% opacity limit and a particulate matter emission limit of 0.1 gr/dscf@12%O2, which is approximately equivalent to 1 gr/dscf@7%O2. This is well above the HWC MACT emission limit of 0.0016 gr/dscf@7%O2. Therefore 401 KAR 59:020 particulate limit is superceded by the HWC MACT limit of 0.0016 gr/dscf @7% O2.

Division for Air Quality

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DEP7007Y

Good Engineering Practice and Stack Height Determination

___ Section Y.1: Building Dimension Information
___ Section Y.2: Exhaust Point Information
___ Section Y.3: Notes, Comments, and Explanations

Additional Documentation

___ Attach Flow Diagram for Exhaust Points

___ Complete DEP7007AI

Source Name: **Dyno Nobel Inc.**
KY EIS (AFS) #: **21- 177-00067**
Permit #: **S-25-064**
Agency Interest (AI) ID: **3241**
Date: **6/1/2026**

Section Y.1: Building Dimension Information

Exhaust Point #	Exhaust Point Name	Description of Exhaust Point *(stack, vent, roof monitor, indoors, etc.)*		List all processes and control devices serviced by the exhaust point:		Building dimensions where exhaust point is located:			Distance to nearest building *(ft)*	Dimensions of this nearest building:		
				Name	Flow Diagram Designation	Length *(ft)*	Width *(ft)*	Height *(ft)*		Length *(ft)*	Width *(ft)*	Height *(ft)*
07-STA0003	TDU Stack	Stack		Thermal Destruction Unit	Exhaust Stack	N/A	N/A	N/A	33.6	Cylindrical Tank	10.2	20
				Dry Sorbent Injection	Dry Sorbent Injection							
				Baghouse	Baghouse							
				HEPA Filter	HEPA Filter							
				Selective Catalytic Reduction	Selective Catalytic							

Section Y.2: Exhaust Point Information

Exhaust Point	Distance to nearest plant boundary from exhaust point discharge *(ft)*	Good engineering practice (GEP) height, if known *(ft)*	Diameter of exhaust point *(ft)*	Direction of Exhaust	Geographical Coordinates *(in decimal degrees)*		UTM Coordinates		Exit Gas Flow Rate *(acfm)*		Exit Gas Temperature *(°F)*	
					Latitude	Longitude	Northing	Easting	Minimum	Maximum	At Minimum Flow Rate	At Maximum Flow Rate
07-STA0003	530		2.67	Vertical					13600	19000	510	530

Section Y.3: Notes, Comments, and Explanations
1. TDU Stack is located outdoors.

Division for Air Quality

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DEP7007B

Manufacturing or Processing Operations

___ Section B.1: Process Information
___ Section B.2: Materials and Fuel Information
___ Section B.3: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI, DEP7007N, DEP7007V, and DEP7007GG.
___ Attach a flow diagram
___ Attach SDS

Source Name: **Dyno Nobel Inc.**
KY EIS (AFS) #: **21- 144-00067**
Permit #: **S-25-064**
Agency Interest (AI) ID: **3241**
Date: **6/1/2026**

Section B.1: Process Information

Emission Unit #	Emission Unit Name	Describe Emission Unit	Process ID	Process Name	Manufacturer	Model No.	Proposed/Actual Date of Construction Commencement *(MM/YYYY)*	Is the Process Continuous or Batch?	Number of Batches per 24 Hours *(if applicable)*	Hours per Batch *(if applicable)*
TNT-6	Sellite Unloading	Sodium Sulfite Bag Unloading	RMH	Sellite Unloading	TBD	TBD	12/2026	Batch	1	2
TNT-7	Bisulfite Unloading	Sodium Bisulfite Bag Unloading	RMH	Sellite Unloading	TBD	TBD	12/2026	Batch	1	1

Section B.2: Materials and Fuel Information

**Maximum yearly fuel usage rate only applies if applicant request operating restrictions through federally enforceable limitations.*

Emission Unit #	Emission Unit Name	Name of Raw Materials Input	Maximum Quantity of Each Raw Material Input		Total Process Weight Rate for Emission Unit *(tons/hr)*	Name of Finished Materials	Maximum Quantity of Each Finished Material Output		Fuel Type	Maximum Hourly Fuel Usage Rate		Maximum Yearly Fuel Usage Rate		Sulfur Content *(%)*	Ash Content *(%)*
				(Specify Units/hr)				*(Specify Units/hr)*			*(Specify Units)*		*(Specify Units)*		
TNT-6	Sellite Unloading	Sodium Sulfite	2200	lb/hr	1.1 ton/hr	Sodium Sulfite	2200	lb/hr	-	-	-	-	-	-	-
TNT-7	Bisulfite Unloading	Sodium Bisulfite	220	lb/hr	0.11 ton/hr	Sodium Bisulfite	220	lb/hr	-	-	-	-	-	-	-

Section B.3: Notes, Comments, and Explanations

1. Sodium sulfite and sodium bisulfite are dissolved in water in the Sellite Mixing Tank for use in the TNT Production process.

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DEP7007DD

Insignificant Activities

___ Section DD.1: Table of Insignificant Activities
___ Section DD.2: Signature Block
___ Section DD.3: Notes, Comments, and Explanations

Source Name: **Dyno Nobel, Inc.**
KY EIS (AFS) #: **21- 177-00067**
Permit #: **S-25-064**
Agency Interest (AI) ID: **3241**
Date: **6/1/2026**

Section DD.1: Table of Insignificant Activities

*Identify each activity with a unique Insignificant Activity number (IA #); for example: 1, 2, 3… etc.

Insignificant Activity #	Description of Activity including Rated Capacity	Serial Number or Other Unique Identifier	Applicable Regulation(s)	Calculated Emissions
1	Oleum Tank (271.2 gal/hr)	Emission Unit #RMH-2A	N/A	<2.56 tons/yr SO_3 (controlled)
2	Oleum Truck	Emission Unit #RMH-2B	N/A	<2.56 tons/yr SO_3 (controlled)
3	Oleum Surge Blending Vessel	Emission Unit #RMH-2C	N/A	<2.56 tons/yr SO_3 (controlled)
4	97% Sulfuric Acid Tank (369.6 gal/hr)	Emission Unit #RMH-3	N/A	3.00E-04 tons/yr H_2SO_4
5	98% Nitric Acid Tank	Emission Unit #RMH-4A	N/A	4.1 tons/yr NO_2 (uncontrolled) 4E-06 tons/yr NO (uncontrolled)

Insignificant Activity #	Description of Activity including Rated Capacity	Serial Number or Other Unique Identifier	Applicable Regulation(s)	Calculated Emissions
6	Weak Nitric Acid Tank	Emission Unit #RMH-4B	N/A	0.1 tons/yr NO_2 (uncontrolled)
7	NA50 Tank (92.4 gal/hr)	Emission Unit #RMH-5	N/A	3.00E-03 tons/yr NO_2
8	Diesel Tank for fire water pump (6.85E-03 gal/hr)	Emission Unit #RMH-10	N/A	3.97E-05 tons/yr VOC

Section DD.2: Signature Block

I, THE UNDERSIGNED, HEREBY CERTIFY UNDER PENALTY OF LAW, THAT I AM A RESPONSIBLE OFFICIAL, AND THAT I HAVE PERSONALLY EXAMINED, AND AM FAMILIAR WITH, THE INFORMATION SUBMITTED IN THIS DOCUMENT AND ALL ITS ATTACHMENTS. BASED ON MY INQUIRY OF THOSE INDIVIDUALS WITH PRIMARY RESPONSIBILITY FOR OBTAINING THE INFORMATION, I CERTIFY THAT THE INFORMATION IS ON KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE OR INCOMPLETE INFORMATION, INCLUDING THE POSSIBILITY OF FINE OR IMPRISONMENT.

	Todd Meunier	June 1, 2026
	Authorized Signature	**Date**
By:		
	Todd Meunier	Vice President Operations
	Type/Print Name of Siguatory	**Title of Siguatory**

Section DD.3: Notes, Comments, and Explanations

Division for Air Quality

300 Sower Boulevard

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DEP7007GG

Control Equipment

Additional Documentation

___ Complete Sections GG.1 through GG.12, as applicable

___ Attach manufacturer's specifications for each control device

___ Complete DEP7007AI

Source Name: Dyno Nobel, Inc.

KY EIS (AFS) #: 21- 177-00067

Permit #: S-25-064

Agency Interest (AI) ID: 3241

Date: 6/1/2026

Section GG.1: General Information - Control Equipment

Control Device ID #	Control Device Name	Cost	Manufacturer	Model Name/ Serial #	Date Installed	Inlet Gas Stream Data For All Control Devices					Inlet Gas Stream Data For Condensers, Adsorbers, Afterburners, Incinerators, Oxidizers Only			Equipment Operational Data For All Control Devices		
						Temperature (°F)	Flowrate (scfm @ 68 °F)	Average Particle Diameter (μm)	Particle Density (lb/ft^3) or Specific Gravity	Gas Density (lb/ft^3)	Gas Moisture Content (%)	Gas Composition	Fan Type	Pressure Drop Range ($in. H_2O$)	Pollutants Collected/ Controlled	Pollutant Removal (%)
02-Z0006	Oleum Scrubber		S & K or equivalent	12" Fig 7055	Dec-26	107	56.4	N/A	N/A	0.07	N/A	N/A	N/A	1.25	SO_3 H_2SO_4	>99%
02-Z0060	Nitric Acid Scrubber		S & K or equivalent	12" Fig 7055	Dec-26	75	90.5	N/A	N/A	0.075	N/A	N/A	N/A	1	HNO_3 H_2SO_4	>99%

Section GG.5: Scrubber

Control Device ID #	Identify all Emission Units and Control Devices that Feed to Scrubber	Identify Type of Scrubber: Venturi, Packed Bed, Spray Tower, or Other (specify)	For Venturi Scrubbers:	For Packed Bed Scrubbers:		For Spray Towers:		Identify Type of Flow: Concurrent, Countercurrent, or Crossflow	Length in Direction of Gas Flow (ft)	Cross-Sectional Area (ft^2)	Venturi Throat Velocity (ft/s)	Mist Eliminator			Scrubbing Liquid			
			Identify Throat Type: Fixed or Adjustable	Identify Packing Type	Packing Height (in)	Number of Nozzles	Nozzle Pressure (psig)					Identify Type: Mesh or Vane	Cross-Sectional Area (ft^2)	Pressure Drop (in. H_2O)	Chemical Composition	Flowrate (gal/min)	Fresh Liquid Makeup Rate (gal/min)	Describe Disposal Method of Scrubber Effluent
02-Z0006	Oleum Tank Oleum Truck Oleum Surge Tank	Packed Tower	-	Hipack or equal	1	-	-	Countercurrent	16	0.79	-	Mesh	0.79	included in overall scrubber dP	93-97% Sulfuric Acid	~3.5 gpm of 97% H2SO4	~0.02 gpm of Demin Water	Recycled to 97% Sulfuric Acid Tank
02-Z0060	Spent Acid Tank 98% Nitric Acid Tank Weak Nitric Acid Tank	Packed Tower	-	Hipack or equal	1	-	-	Countercurrent	16	0.79	-	Mesh	0.79	included in overall scrubber dP	Demin Water	~0.8 gpm of Demin Water	~0.004 gpm Demin Water	Recycled to Process

Section GG.12: Notes, Comments, and Explanations

1. Information is taken from Shuttle & Koerting (S&K). An equivalent scrubber supplier may be chosen during final design.

Division for Air Quality

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DEP7007J

Volatile Liquid Storage

___ Section J.1: General Information

___ Section J.2: Tank Description

___ Section J.3: Gasoline Plants and Terminals

___ Section J.4: Loading Rack(s)

___ Section J.5: Equipment Leaks

___ Section J.6: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI, DEP7007N, DEP7007V, and DEP7007GG.

___ SDS attached

Source Name: **Dyno Nobel Inc.**

KY EIS (AFS) #: **21- 177-00067**

Permit #: **S-25-064**

Agency Interest (AI) ID: **3241**

Date: **6/1/2026**

Section J.1: General Information

Emission Unit #	Emission Unit Name	Emission Unit Description	Proposed/Actual Date of Construction Commencement *(MM/YYYY)*	Date of modification/ reconstruction	Control Device ID	Stack ID
RMH-1	01-T0001	Toluene Tank	12/2026	N/A	-	RMH-1
RMH-2A	02-T0001	Oleum Tank	12/2026	N/A	02-Z0006	RMH-2
RMH-3	02-T0010	97% Sulfuric Acid Tank	12/2026	N/A	-	RMH-3
RMH-4C	T404-1	Spent Acid Tank	12/2026	N/A	02-Z0060	RMH-4
RMH-4A	02-T0030	98% Nitric Acid Tank	12/2026	N/A	02-Z0060	RMH-4
RMH-4B	02-T0042	Weak Nitric Acid Tank	12/2026	N/A	02-Z0060	RMH-4
RMH-5	02-T0040	NA50 Acid Tank	12/2026	N/A	NOx Absorber	ARU-1
RMH-10	TBD	Diesel Tank	12/2026	N/A	-	RMH-5

Emission Unit #	Emission Unit Name	Emission Unit Description	Proposed/Actual Date of Construction Commencement *(MM/YYYY)*	Date of modification/ reconstruction	Control Device ID	Stack ID

Section J.2: Tank Description

Emission Point #: RMH-1

Emission Point Name: Toluene Tank

Tank ID#: 01-T0001

Date Installed: Dec-26

List Applicable Regulations: 40 CFR 60 Subpart Kc

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
Toluene	1,219,392	7.250	92.14	100%	68	79.7	0.4243	0.5991

J.2B: Tank Data:

Tank Capacity: *(gallons)* 32400 **Shell Height/ Length:** *(ft)* 20.5 **Shell Diameter:** *(ft)* 18 **Tank Turnovers per Year:** 51.3

Tank Orientation: ☐ Horizontal ☑ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* 17.056 Average Liquid Height: *(ft)* 9.84

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☐ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** 10.7 ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☐ Good ☐ Poor **Vacuum Setting:** -0.6 psig

Is Tank Heated?: ☐ Yes ☑ No **Shell Condition:** ☐ Good ☐ Poor **Pressure Setting:** 1.0 psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting: ☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker ☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield ☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting: ☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker ☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
RMH-1	Toluene	Working	0.01595	Intermittent	U.S. EPA AP-42 Chapter 7.1.7
RMH-1	Toluene	Standing (Breathing)	0.0794	Intermittent	U.S. EPA AP-42 Chapter 7.1.7

Section J.2: Tank Description

Emission Point #: **RMH-2A**

Emission Point Name: Oleum Tank

Tank ID#: 02-T0001

Date Installed: **26-Dec**

List Applicable Regulations:

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
Oleum	2,375,712	15.990	93.85	SO3 dissolved in H2SO4	104	104	0.0696	0.0696

J.2B: Tank Data:

Tank Capacity: *(gallons)* 58677 **Shell Height/ Length:** *(ft)* 24.1 **Shell Diameter:** *(ft)* 22 **Tank Turnovers per Year:** **52**

Tank Orientation: ☐ Horizontal ☑ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* 20.664 Average Liquid Height: *(ft)* 11.644

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☐ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** 12.5 ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☐ Good ☐ Poor **Vacuum Setting:** -0.6 psig

Is Tank Heated?: ☑ Yes ☐ No **Shell Condition:** ☐ Good ☐ Poor **Pressure Setting:** 1.0 psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
RMH-2A	Oleum	*See RMH Form N.1 for Oleum Tank Emissions*	*See RMH Form N.1 for Oleum Tank Emissions*	N.1 for Oleum Tank Emissions	See RMH Form N.1 for Oleum Tank Emissions

Section J.2: Tank Description

Emission Point #: **RMH-3**

Emission Point Name: 97% Sulfuric Acid Tank

Tank ID#: 02-T0010

Date Installed: **26-Dec**

List Applicable Regulations:

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
97% wt Sulfuric Acid	3,237,696	15.105	93.85	97% Sulfuric Acid	48	104	1.45E-07	6.18E-06

J.2B: Tank Data:

Tank Capacity: *(gallons)* 78307 **Shell Height/ Length:** *(ft)* 24.76 **Shell Diameter:** *(ft)* 25 **Tank Turnovers per Year:** 52.6

Tank Orientation: ☐ Horizontal ☑ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* 21.32 Average Liquid Height: *(ft)* 12.0

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☐ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** 12.8 ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☐ Good ☐ Poor **Vacuum Setting:** -0.6 psig

Is Tank Heated?: ☐ Yes ☐ No **Shell Condition:** ☐ Good ☐ Poor **Pressure Setting:** 1.0 psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
RMH-3	Sulfuric Acid	*See RMH Form N.1 for 97% Sulfuric Acid Tank Emissions*	See RMH Form N.1 for 97% Sulfuric Acid Tank Emissions	See RMH Form N.1 for 97% Sulfuric Acid Tank Emissions	See RMH Form N.1 for 97% Sulfuric Acid Tank Emissions

Section J.2: Tank Description

Emission Point #: **RMH-4C**

Emission Point Name: Spent Acid Tank

Tank ID#: T404-1

Date Installed: **26-Dec**

List Applicable Regulations:

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
Spent Acid	2,264,327	13.186	46.8	Sulfuric Acid / Nitric Acid / Nitrous Acid / Water Trace Organics	86	86	1.58	1.58

J.2B: Tank Data:

Tank Capacity: *(gallons)* 38772 **Shell Height/ Length:** *(ft)* 23.78 **Shell Diameter:** *(ft)* 18 **Tank Turnovers per Year:** 75.2

Tank Orientation: ☐ Horizontal ☑ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* 20.336 Average Liquid Height: *(ft)* 11.5

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☐ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** 12.3 ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☑ Good ☐ Poor **Vacuum Setting:** -0.6 psig

Is Tank Heated?: ☐ Yes ☑ No **Shell Condition:** ☑ Good ☐ Poor **Pressure Setting:** 1.0 psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
RMH-4C	Spent Acid	*See RMH Form N.1 for Spent Acid Tank Emissions*	See RMH Form N.1 for Spent Acid Tank Emissions	See RMH Form N.1 for Spent Acid Tank Emissions	See RMH Form N.1 for Spent Acid Tank Emissions

Attach SDS/Composition Analysis for Each Component Listed					
Process ID	**Component Name**	**Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))**	**Lost Emissions** *(lb/1000 gal)*	**Frequency of Occurrence**	**Determination Methodology for Each Type of Loss***

Section J.2: Tank Description

Emission Point #: **RMH-4A**

Emission Point Name: 98% Nitric Acid Tank

Tank ID#: 02-T0030

Date Installed: **12/236**

List Applicable Regulations:

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
Nitric Acid	2,401,992	12.184	60.01	98% Nitric Acid	68	68	0.928	0.928

J.2B: Tank Data:

Tank Capacity: *(gallons)* 42575 **Shell Height/ Length:** *(ft)* 22.14 **Shell Diameter:** *(ft)* 19.68 **Tank Turnovers per Year:** 74.5

Tank Orientation: ☐ Horizontal ☑ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* 18.696 Average Liquid Height: *(ft)* 10.7

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☐ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** 11.5 ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☑ Good ☐ Poor **Vacuum Setting:** -0.6 psig

Is Tank Heated?: ☐ Yes ☑ No **Shell Condition:** ☑ Good ☐ Poor **Pressure Setting:** 1.0 psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
RMH-4A	98% Nitric Acid	*See RMH Form N.1 for 98% Nitric Acid Tank Emissions*	See RMH Form N.1 for 98% Nitric Acid Tank Emissions	See RMH Form N.1 for 98% Nitric Acid Tank Emissions	See RMH Form N.1 for 98% Nitric Acid Tank Emissions

Section J.2: Tank Description

Emission Point #: **RMH-4B**

Emission Point Name: Weak Nitric Acid Tank

Tank ID#: 02-T0042

Date Installed: **26-Dec**

List Applicable Regulations:

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
Nitric Acid	1,282,464	10.490	29.67	Diluted Nitric Acid	156	156	8.843	8.843

J.2B: Tank Data:

Tank Capacity: *(gallons)* 8338 **Shell Height/ Length:** *(ft)* 13.284 **Shell Diameter:** *(ft)* 12 **Tank Turnovers per Year:** 285.6

Tank Orientation: ☐ Horizontal ☑ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* 9.84 Average Liquid Height: *(ft)* 6.2

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☐ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** 7.1 ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☑ Good ☐ Poor **Vacuum Setting:** -0.6 psig

Is Tank Heated?: ☐ Yes ☑ No **Shell Condition:** ☑ Good ☐ Poor **Pressure Setting:** 1.0 psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
RMH-4B	55% Nitric Acid	*See RMH Form N.1 for Weak Nitric Acid Tank Emissions*	See RMH Form N.1 for Weak Nitric Acid Tank Emissions	See RMH Form N.1 for Weak Nitric Acid Tank Emissions	See RMH Form N.1 for Weak Nitric Acid Tank Emissions

Section J.2: Tank Description

Emission Point #: **RMH-5**

Emission Point Name: NA50 Tank

Tank ID#: 02-T0040

Date Installed: **26-Dec**

List Applicable Regulations:

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
Nitric Acid (~50%)	809,424	10.816	28.02	~50% Nitric Acid	48	86	0.487	1.58

J.2B: Tank Data:

Tank Capacity: *(gallons)* 8616 **Shell Height/ Length:** *(ft)* 13.612 **Shell Diameter:** *(ft)* 12 **Tank Turnovers per Year:** 170.2

Tank Orientation: ☐ Horizontal ☑ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* 10.168 Average Liquid Height: *(ft)* 6.4

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☐ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** 7.2 ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☑ Good ☐ Poor **Vacuum Setting:** -0.6 psig

Is Tank Heated?: ☐ Yes ☑ No **Shell Condition:** ☑ Good ☐ Poor **Pressure Setting:** 1.0 psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
RMH-5	Nitric Acid (50%)	*See RMH Form N.1 for NA50 Tank Emissions*	See RMH Form N.1 for NA50 Tank Emissions	See RMH Form N.1 for NA50 Tank Emissions	See RMH Form N.1 for NA50 Tank Emissions

Section J.2: Tank Description

Emission Point #: **RMH-10**

Emission Point Name: Diesel Tank

Tank ID#: TBD

Date Installed: **26-Dec**

List Applicable Regulations:

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
Diesel fuel	60	6.84-7.05		100%	0	125	0.042	0.042

J.2B: Tank Data:

Tank Capacity: *(gallons)* 550 **Shell Height/ Length:** *(ft)* 6.25 **Shell Diameter:** *(ft)* 4 **Tank Turnovers per Year:** 1

Tank Orientation: ☑ Horizontal ☐ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* _____ Average Liquid Height: *(ft)* 3.80

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☐ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** _____ ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☑ Good ☐ Poor **Vacuum Setting:** _____ psig

Is Tank Heated?: ☐ Yes ☑ No **Shell Condition:** ☑ Good ☐ Poor **Pressure Setting:** _____ psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
RMH-10	Diesel	Working	0.02	Firewater pump testing (non-emergency)	U.S. EPA TANKS 5.2
RMH-10	Diesel	Standing	1.3	Firewater pump testing (non-emergency)	U.S. EPA TANKS 5.2

Section J.5: Equipment Leaks

Emission Point #: RMH-1

Emission Point Name: Equipment associated with Toluene Tank

This section is to be completed for all components of Volatile Liquid Storage Systems that may have leaks.

Equipment Type	Indicate the number of each type of equipment for this emission point		Emission Factor *(lb/SCC units)*		Source of Emission Factor	Total Emissions *(lb/yr)*
	Gasoline	Other (diesel, kerosene, etc.)	Gasoline	Other		
Valves	N/A	58	N/A	0.0089 lb/hr/source	EPA's Protocol for Equipment Leak Emission Estimates (EPA 453/R-95-017), Table 2-1 SOCMI Average Emission Factors	4514.9
Pumps	N/A	4	N/A	0.0439 lb/hr/source	EPA's Protocol for Equipment Leak Emission Estimates (EPA 453/R-95-017), Table 2-1 SOCMI Average Emission Factors	1537.5
Connectors	N/A	111	N/A	0.0040 lb/hr/source	EPA's Protocol for Equipment Leak Emission Estimates (EPA 453/R-95-017), Table 2-1 SOCMI Average Emission Factors	3923.6
Risers/Loading-Arm Valves	N/A	0	N/A	N/A	N/A	0
Open-ended Lines	N/A	2	N/A	0.0037 lb/hr/source	EPA's Protocol for Equipment Leak Emission Estimates (EPA 453/R-95-017), Table 2-1 SOCMI Average Emission Factors	65.7
Other	N/A	4 2	N/A	0.229 lb/hr/source 0.331 lb/hr/source	EPA's Protocol for Equipment Leak Emission Estimates (EPA 453/R-95-017), Table 2-1 SOCMI Average Emission Factors	1381.9 579.47

Section J.6: Notes, Comments, and Explanations

1. See Toluene Tank Emission Calculations.

2. Toluene Tank incorporates a vapor balancing system with the toluene tanker truck unloading system, so there are no working losses during filling with fresh toluene.

3. Preliminary determination is that 40 CFR 60 Subpart VVb for equipment leaks (LDAR) will apply to equipment in toluene service.

4. Equipment count on J.5 includes equipment from TNT Production, Raw Material Handling, and Solvent Extraction Unit.

5. The diesel tank feeds the emergency firewater pump. The maximum annual throughput is 60 gallons per year for non-emergency use (e.g. maintenance and testing of the firewater pump).

6. "Other" equipment in toluene service includes pressure relief valves (2) and sampling connection systems (4).

Division for Air Quality

300 Sower Boulevard

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DEP7007N

Source Emissions Profile

__ Section N.1: Emission Summary

__ Section N.2: Stack Information

__ Section N.3: Fugitive Information

__ Section N.4: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI

Source Name: **Dyno Nobel Inc.**

KY EIS (AFS) #: **21- 177-00067**

Permit #: **S-25-064**

Agency Interest (AI) ID: **3241**

Date: **6/1/2026**

N.1: Emission Summary

Emission Unit #	Emission Unit Name	Process ID	Process Name	Control Device Name	Control Device ID	Stack ID	Maximum Design Capacity *(SCC Units/hour)*	Pollutant	Uncontrolled Emission Factor *(lb/SCC Units)*	Emission Factor Source (e.g. AP-42, Stack Test, Mass Balance)	Capture Efficiency *(%)*	Control Efficiency *(%)*	Hourly Emissions		Annual Emissions	
													Uncontrolled Potential *(lb/hr)*	Controlled Potential *(lb/hr)*	Uncontrolled Potential *(tons/yr)*	Controlled Potential *(tons/yr)*
RMH-1A	01-T0001	RMH-1	Toluene Tank	-	-	RMH-1	139.2 gal/hr	Toluene	9.34E-05 lb/gal	AP-42 Section 7.1.7	-	-	0.013	0.013	0.058	0.058
RMH-1B	Devices in Toluene Service	RMH-1	Equipment in Toluene Service	-	-	-	139.2 gal/hr	Toluene	9.84E-03 lb/gal	EPA 453/R-95-017, Table 2-1 SOCMI Emission Factors	-	-	1.37	1.37	6.0	6.0
RMH-2A RMH-2B RMH-2C	02-T0001 Oleum Truck 02-V0009	RMH-2A, B, C	Oleum Tank Oleum Truck Oleum Blending Surge Vessel	Oleum Scrubber	02-Z0006	RMH-2	271.2 gal/hr TBD TBD	SO_3	TBD	Mass Balance/Vapor Liquid Equilibrium	100%	>99%	58.5	0.58	256	2.56
RMH-3	02-T0010	RMH-3	97% Sulfuric Acid Tank	-	-	RMH-3	369.6 gal/hr	H_2SO_4	1.71E-07 lb/gal	Mass Balance/Vapor Liquid Equilibrium	-	-	6.85E-05	6.85E-05	3.00E-04	3.00E-04
RMH-4A RMH-4B RMH-4C	02-T0030 02-T0042 T404-1	RMH-4A, B, C	98% Nitric Acid Tank Weak Nitric Acid Tank Spent Acid Tank	Nitric Acid Scrubber	02-Z0060	RMH-4	641.7 gal/hr 274.2 gal/hr 146.4 gal/hr	H_2SO_4	2.09E-08 lb/gal	Mass Balance/Vapor Liquid Equilibrium	100%	>99%	2.22E-05	2.22E-07	9.72E-05	9.72E-07
RMH-4A RMH-4B RMH-4C	02-T0030 02-T0042 T404-1	RMH-4A, B, C	98% Nitric Acid Tank Weak Nitric Acid Tank Spent Acid Tank	Nitric Acid Scrubber	02-Z0060	RMH-4	641.7 gal/hr 274.2 gal/hr 146.4 gal/hr	NO_2	2.42E-03 lb/gal	Mass Balance/Vapor Liquid Equilibrium	100%	-	2.6	2.6	11.2	11.2
RMH-9	02-T0040	RMH-5	NA50 Tank	NOx Absorber	NOx Absorber	ARU-1	92.4 gal/hr	NO_2	7.41E-04 lb/gal	Mass Balance/Vapor Liquid Equilibrium	100%	>99%	0.07	0.0007	0.30	0.003
RMH-10	TBD	RMH-10	Diesel Tank	-	-	RMH-10	6.85E-03 gal/hr	VOC	1.32E-03 lb/gal	U.S. EPA TANKS 5.2	-	-	9.06E-06	9.06E-06	3.97E-05	3.97E-05

Emission Unit #	Emission Unit Name	Process ID	Process Name	Control Device Name	Control Device ID	Stack ID	Maximum Design Capacity *(SCC Units/hour)*	Pollutant	Uncontrolled Emission Factor *(lb/SCC Units)*	Emission Factor Source (e.g. AP-42, Stack Test, Mass Balance)	Capture Efficiency *(%)*	Control Efficiency *(%)*	Hourly Emissions		Annual Emissions	
													Uncontrolled Potential *(lb/hr)*	Controlled Potential *(lb/hr)*	Uncontrolled Potential *(tons/yr)*	Controlled Potential *(tons/yr)*

Section N.2: Stack Information

UTM Zone:

Stack ID	Identify all Emission Units (with Process ID) and Control Devices that Feed to Stack	Stack Physical Data			Stack UTM Coordinates		Stack Gas Stream Data		
		Equivalent Diameter *(ft)*	Height *(ft)*	Base Elevation *(ft)*	Northing *(m)*	Easting *(m)*	Flowrate *(acfm)*	Temperature *(° F)*	Exit Velocity *(ft/sec)*
RMH-1	Toluene Tank	0.33	22.30				0.043	68	0.5
RMH-2	Oleum Tank Oleum Truck Oleum Blending Surge Vessel Oleum Scrubber	0.13	33				53.88	113	50
RMH-3	97% Sulfuric Acid Tank	0.5	28.21				24.63	104	2.1
RMH-4	98% Nitric Acid Tank Weak Nitric Acid Tank Spent Acid Tank Nitric Acid Scrubber	0.21	33				99.85	75	50
RMH-10	Diesel Tank	0.5	10				-	68	-

Stack ID	Identify all Emission Units (with Process ID) and Control Devices that Feed to Stack	Stack Physical Data			Stack UTM Coordinates		Stack Gas Stream Data		
		Equivalent Diameter *(ft)*	Height *(ft)*	Base Elevation *(ft)*	Northing *(m)*	Easting *(m)*	Flowrate *(acfm)*	Temperature *(°F)*	Exit Velocity *(ft/sec)*

Section N.3: Fugitive Information

UTM Zone:

Emission Unit #	Emission Unit Name	Process ID	Area Physical Data		Area UTM Coordinates		Area Release Data	
			Length of the X Side *(ft)*	Length of the Y Side *(ft)*	Northing *(m)*	Easting *(m)*	Release Temperature *(°F)*	Release Height *(ft)*

Section N.4: Notes, Comments, and Explanations

1. The conservation vent for the Toluene tank is a horizontal discharge.

2. The vent for the Sulfuric Acid Tank is a vertical discharge.

3. RMH-1B is devices in toluene liquid or vapor service (valves, fitting, etc.) shown on form J.5

Division for Air Quality

300 Sower Boulevard
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DEP7007V
Applicable Requirements and Compliance Activities

___ Section V.1: Emission and Operating Limitation(s)
___ Section V.2: Monitoring Requirements
___ Section V.3: Recordkeeping Requirements
___ Section V.4: Reporting Requirements
___ Section V.5: Testing Requirements
___ Section V.6: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI

Source Name: **Dyno Nobel Inc.**
KY EIS (AFS) #: **21-177-00067**
Permit #: **S-25-064**
Agency Interest (AI) ID: **3241**
Date: **6/1/2026**

Section V.1: Emission and Operating Limitation(s)

Emission Unit #	Emission Unit Description	Applicable Regulation or Requirement	Pollutant	Emission Limit (if applicable)	Voluntary Emission Limit or Exemption (if applicable)	Operating Requirement or Limitation (if applicable)	Method of Determining Compliance with the Emission and Operating Requirement(s)
RMH-1A	Toluene Tank	40 CFR 60 Subpart Kc	Toluene	N/A	N/A	N/A	N/A
RMH-1B	Equipment in Toluene Service	40 CFR 60 Subpart VVb	Toluene	N/A	N/A	N/A	LDAR Program
RMH-2	Oleum Tank Oleum Truck Oleum Blending Surge Vessel	PSD Avoidance	SO_3	<90 TPY	Sourcewide	TBD	TBD
RMH-3	97% Sulfuric Acid Tank	PSD Avoidance	H_2SO_4	<90 TPY	Sourcewide	TBD	TBD

Emission Unit #	**Emission Unit Description**	**Applicable Regulation or Requirement**	**Pollutant**	**Emission Limit** (if applicable)	**Voluntary Emission Limit or Exemption** (if applicable)	**Operating Requirement or Limitation** (if applicable)	**Method of Determining Compliance with the Emission and Operating Requirement(s)**
RMH-4	98% Nitric Acid Tank Weak Nitric Acid Tank Spent Acid Tank	PSD Avoidance	H_2SO_4	<90 TPY	Sourcewide	TBD	TBD
RMH-4	98% Nitric Acid Tank Weak Nitric Acid Tank Spent Acid Tank	PSD Avoidance	NO_2	<90 TPY	Sourcewide	TBD	TBD
RMH-5	NA50 Tank	PSD Avoidance	NO_3	<90 TPY	Sourcewide	TBD	TBD
RMH-10	Diesel Tank	N/A	VOC	N/A	N/A	N/A	N/A

Section V.2: Monitoring Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Monitored	Description of Monitoring
RMH-1B	Equipment in Toluene Service	Toluene (HAP)	40 CFR 60 Subpart VVb	Toluene Leaks	LDAR program requirements per 40 CFR 60.485b(a) - 60.485b(g)
RMH-2	Oleum Tank Oleum Truck Oleum Blending Surge Vessel	SO_3	TBD	TBD	TBD
RMH-3	97% Sulfuric Acid Tank	H_2SO_4	TBD	TBD	TBD
RMH-4	98% Nitric Acid Tank Weak Nitric Acid Tank Spent Acid Tank	H_2SO_4	TBD	TBD	TBD
RMH-4	98% Nitric Acid Tank Weak Nitric Acid Tank Spent Acid Tank	NO_2	TBD	TBD	TBD
RMH-5	NA50 Tank	NO_3	TBD	TBD	TBD

Section V.3: Recordkeeping Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Recorded	Description of Recordkeeping
RMH-1A	Toluene Tank	Toluene (HAP)	60.115c(b)	Design details	Maintain records of dimensions of the storage vessel and an analysis showing the capacity of the storage vessel.
RMH-1B	Equipment in Toluene Service	Toluene (HAP)	40 CFR 60.486b	Toluene Leaks	LDAR program requirements per 40 CFR 60.486b(a) - 60.486b(l)

Section V.4: Reporting Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Reported	Description of Reporting
RMH-1B	Equipment in Toluene Service	Toluene (HAP)	40 CFR 60.487b	Toluene Leaks	LDAR program requirements per 40 CFR 60.487b(a) - 60.487b(i)

Section V.5: Testing Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Tested	Description of Testing
RMH-2	Oleum Tank Oleum Truck Oleum Blending Surge Vessel	SO_3	TBD	SO_3	TBD
RMH-3	97% Sulfuric Acid Tank	H_2SO_4	TBD	H_2SO_4	TBD
RMH-4	98% Nitric Acid Tank Weak Nitric Acid Tank Spent Acid Tank	H_2SO_4	TBD	H_2SO_4	TBD
RMH-4	98% Nitric Acid Tank Weak Nitric Acid Tank Spent Acid Tank	NO_2	TBD	NO_2	TBD
RMH-5	NA50 Tank	NO_3	TBD	NO_3	TBD

Section V.6: Notes, Comments, and Explanations
The Toluene Tank is subject to 40 CFR 60 Subpart Kc, but the control requirements do not apply, as the maximum true vapor pressure of toluene is below the threshold for the requirements to apply.
The "Equipment in Toluene" Service covers ALL valves, fittings, connectors, pumps, etc. that are in toluene service sitewide (including the toleune storage/handling, the TNT production area, and the Acid Recovery Unit area.

Division for Air Quality

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DEP7007Y

Good Engineering Practice and Stack Height Determination

___ Section Y.1: Building Dimension Information
___ Section Y.2: Exhaust Point Information
___ Section Y.3: Notes, Comments, and Explanations

Additional Documentation

___ Attach Flow Diagram for Exhaust Points

___ Complete DEP7007AI

Source Name: Dyno Nobel, Inc.
KY EIS (AFS) #: 21- 177-00067
Permit #: S-25-064
Agency Interest (AI) ID: 3241
Date: 6/1/2026

Section Y.1: Building Dimension Information

Exhaust Point #	Exhaust Point Name	Description of Exhaust Point *(stack, vent, roof monitor, indoors, etc.)*		List all processes and control devices serviced by the exhaust point:		Building dimensions where exhaust point is located:			Distance to nearest building *(ft)*	Dimensions of this nearest building:		
				Name	Flow Diagram Designation	Length *(ft)*	Width *(ft)*	Height *(ft)*		Length *(ft)*	Width *(ft)*	Height *(ft)*
RMH-1	Toluene Tank	Vent		Toluene Tank	Toluene Tank	Cylindrical Tank	0.33	18.2	47.4	23	235	45
RMH-2	Oleum Scrubber	Stack		Oleum Tank Oleum Truck Oleum Surge Vessel Oleum Scrubber	Oleum Tank Oleum Truck Oleum Surge Vessel Oleum Scrubber	N/A	N/A	N/A	9.1	Cylindrical Tank	20	22.3
RMH-3	97% Sulfuric Acid Tank	Vent		97% Sulfuric Acid Tank	97% Sulfuric Acid Tank	Cylindrical Tank	25	24.6	21.6	Cylindrical Tank	20	22.3
RMH-4	Nitric Acid Scrubber	Stack		98% Nitric Acid Tank Weak Acid Tank Spent Acid Tank Nitric Acid Scrubber	98% Nitric Acid Tank Weak Acid Tank Spent Acid Tank Nitric Acid Scrubber	N/A	N/A	N/A	9.4	Cylindrical Tank	20	18.9
RMH-10	Diesel Tank	Vent		Diesel Tank	Diesel Tank	40	19	13	16.7	Cylindrical Tank	36.4	35

Section Y.2: Exhaust Point Information

Exhaust Point	Distance to nearest plant boundary from exhaust point discharge *(ft)*	Good engineering practice (GEP) height, if known *(ft)*	Diameter of exhaust point *(ft)*	Direction of Exhaust	Geographical Coordinates *(in decimal degrees)*		UTM Coordinates		Exit Gas Flow Rate *(acfm)*		Exit Gas Temperature *(°F)*	
					Latitude	Longitude	Northing	Easting	Minimum	Maximum	At Minimum Flow Rate	At Maximum Flow Rate
RMH-1	730		0.33	Horizontal					0.043	0.043	68	68
RMH-2	800		0.13	Vertical					53.88	53.88	113	113
RMH-3	790		0.5	Vertical					24.63	24.63	104	104
RMH-4	920		0.21	Vertical					99.85	99.85	75	75
RMH-10	1180		0.5	Vertical					-	-	68	68

Section Y.3: Notes, Comments, and Explanations

1. RMH-2 and RMH-4 scrubbers are located outdoors.

Division for Air Quality

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DEP7007A

Indirect Heat Exchangers and Turbines

___ Section A.1: General Information
___ Section A.2: Operating and Fuel Information
___ Section A.3: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI, DEP7007N, DEP7007V, and DEP7007GG.

____ Manufacturer's specifications

Source Name: **Dyno Nobel Inc.**
KY EIS (AFS) #: **21- 177-00067**
Permit #: **S-25-064**
Agency Interest (AI) ID: **3241**
Date: **6/1/2026**

Section A.1: General Information

Emission Unit #	Emission Unit Name	Process ID	Process Name	Identify General Type: Indirect Heat Exchanger, Gas Turbine, or Combustion Turbine	Indirect Heat Exchanger Configuration	Manufacturer	Model No./ Serial No.	Proposed/Actual Date of Construction Commencement *(MM/YYYY)*	SCC Code	SCC Units	Control Device ID	Stack ID
UTIL-1	Boiler Package	20-B0030	Boiler	Gas Fired Steam Generating Boiler	D Type Boiler	Rentech (or equivalent)	TRD-1-40 (or equivalent)	12/2026	10200602	lb/MMscf	-	UTIL-1

Section A.2: Operating and Fuel Information

Emission Unit #	If multipurpose unit, identify the percentage of use by purpose				Rated Capacity Heat Input *(MMBTU/hr)*	Rated Capacity Power Output		Describe Operating Scenario (only if this unit will be used in different configurations)	Classify Fuel as Primary or Secondary	Identify Fuel Type: Coal, Natural Gas, Wood, Biomass, Landfill/Digester Gas, Fuel Oil # (specify 1-6), or Other	Heat Content (HHV)		Maximum Operating Hours	Ash Content *(%)*	Sulfur Content *(%)*
	Space Heat	Process Heat	Power	Emergency			*(Specify units: hp, MW, or lb steam/hr)*					*(Specify units: Btu/lb, Btu/gal, or Btu/scf)*			
UTIL-1	27%	73%	-	-	36.3	30,000	lb steam/hr	N/A	Primary	Natural Gas	1020	Btu/scf	8760	-	-

Section A.3: Notes, Comments, and Explanations

Division for Air Quality
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DEP7007DD

Insignificant Activities

___ Section DD.1: Table of Insignificant Activities
___ Section DD.2: Signature Block
___ Section DD.3: Notes, Comments, and Explanations

Source Name: **Dyno Nobel, Inc.**
KY EIS (AFS) #: **21- 177-00067**
Permit #: **S-25-064**
Agency Interest (AI) ID: **3241**
Date: **6/1/2026**

Section DD.1: Table of Insignificant Activities

*Identify each activity with a unique Insignificant Activity number (IA #); for example: 1, 2, 3… etc.

Insignificant Activity #	Description of Activity including Rated Capacity	Serial Number or Other Unique Identifier	Applicable Regulation(s)	Calculated Emissions
1	Diesel Fire Water Pump (404 kW-h)	Emission Unit #UTIL-2	40 CFR 60, Subpart IIII	*See Utility Form N.1*
2	Emergency Generator	Emission Unit #UTIL-3	40 CFR 60, Subpart JJJJ	*See Utility Form N.1*
3	Emergency Generator	Emission Unit #UTIL-4	40 CFR 60, Subpart JJJJ	*See Utility Form N.1*
4	Cooling Tower 1 Drift Emissions	Emission Unit #UTIL-5	N/A	0.095 tons/yr PM
5	Cooling Tower 2 Drift Emissions	Emission Unit #UTIL-6	N/A	0.017 tons/yr PM

Insignificant Activity #	Description of Activity including Rated Capacity	Serial Number or Other Unique Identifier	Applicable Regulation(s)	Calculated Emissions

Section DD.2: Signature Block

I, THE UNDERSIGNED, HEREBY CERTIFY UNDER PENALTY OF LAW, THAT I AM A RESPONSIBLE OFFICIAL, AND THAT I HAVE PERSONALLY EXAMINED, AND AM FAMILIAR WITH, THE INFORMATION SUBMITTED IN THIS DOCUMENT AND ALL ITS ATTACHMENTS. BASED ON MY INQUIRY OF THOSE INDIVIDUALS WITH PRIMARY RESPONSIBILITY FOR OBTAINING THE INFORMATION, I CERTIFY THAT THE INFORMATION IS ON KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE OR INCOMPLETE INFORMATION, INCLUDING THE POSSIBILITY OF FINE OR IMPRISONMENT.

	Todd Meunier	June 1, 2026
	Authorized Signature	**Date**
By:		
	Todd Meunier	Vice President Operations
	Type/Print Name of Siguatory	**Title of Siguatory**

Section DD.3: Notes, Comments, and Explanations

2. The diesel firewater pump and emergency generators are subject to 40 CFR 63, Subpart ZZZZ, but per 40 CFR 63.6590(c)(1), no further requirements apply if the requirements of 40 CFR 60, Subparts IIII and JJJJ are met.

Division for Air Quality

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DEP7007EE

Internal Combustion Engines

___ Section EE.1: General Information
___ Section EE.2: Operating Information
___ Section EE.3: Design Information
___ Section EE.4: Fuel Information
___ Section EE.5: Emission Factor Information
___ Section EE.6: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI, DEP7007N, DEP7007V, and DEP7007GG

___ Attach EPA certification of the engine

Source Name: **Dyno Nobel Inc.**
KY EIS (AFS) #: **21- 177-00067**
Permit #: **S-25-064**
Agency Interest (AI) ID: **3241**
Date: **6/1/2026**

Section EE.1: General Information

Emission Unit #	Emission Unit Name	Control Device ID	Stack ID	Manufacturer	Model Number	Model Year	Date of Manufacture	Proposed/Actual Date of Construction Commencement *(MM/YYYY)*	Date Reconstructed/ Modified	List Applicable Regulations
UTIL-2	Firewater Pump	N/A	UTIL-2	Clarke, or similar	C18H0-UFAD38, or similar	2025 or newer	TBD	12/2026	N/A	40 CFR 60 Subpart IIII
UTIL-3	Emergency Generator	N/A	UTIL-3	Generac, or similar	MG1000, or similar	2025 or newer	TBD	12/2026	N/A	40 CFR 60 Subpart JJJJ
UTIL-4	Emergency Generator	N/A	UTIL-4	Generac, or similar	MG1000, or similar	2025 or newer	TBD	12/2026	N/A	40 CFR 60 Subpart JJJJ

Section EE.2: Operating Information

Emission Unit #	Engine Purpose (Identify if Non-Emergency, Emergency,Fire/Water Pump, Black-start engine for combustion turbine, Engine Testing)	Hours Operated	Is this engine a rental? *(Yes/No)*	Rental Time Period *(hrs)*	Alternate Operating Scenarios (Describe any operating scenarios in which the engine may be used in a different configuration)
UTIL-2	Firewater Pump	500	No	N/A	N/A
UTIL-3	Emergency/Power Supply Loss	500	No	N/A	N/A
UTIL-4	Emergency/Power Supply Loss	500	No	N/A	N/A

Section EE.3: Design Information

Emission Unit #	Engine Type (Identify all that apply: Commercial, Institutional, Stationary, Non-Road)	Ignition Type (Identify if either Compression or Spark Ignition)	Engine Family (Identify all that apply: 2-stroke, 4-stroke, Rich Burn, Lean Burn)	Maximum Engine Power *(bhp)*	Maximum Engine Speed *(rpm)*	Total Displacement *(L)*	Number of Cylinders
UTIL-2	Stationary	Compression	4-Stroke	542	1760	18.1	6
UTIL-3	Stationary	Spark Ignition	4-Stroke Rich Burn	1475	1800	49	12
UTIL-4	Stationary	Spark Ignition	4-Stroke Rich Burn	1475	1800	49	12

Section EE.4: Fuel Information

Emission Unit #	Identify if Primary, Secondary, or Tertiary Fuel	Fuel Type (Identify if Diesel, Gasoline, Natural Gas, Liquefied Petroleum Gas (LPG), Landfill/Digester Gas, or Other)	Fuel Grade	Percent Time Used *(%)*	Maximum Fuel Consumption	Heat Content	Sulfur Content *(%)*	SCC Code	SCC Units
UTIL-2	Primary	Diesel		100	~10.1 gal/hr	137,000 Btu/gal		20200102	lb/1000 gal burned
UTIL-3	Primary	Natural Gas		100	11,243 scfh	1020 Btu/scf		20200253	lb/MMBtu
UTIL-4	Primary	Natural Gas		100	11,243 scfh	1020 Btu/scf		20200253	lb/MMBtu

Section EE.5: Emission Factor Information

Emission factors expressed here are based on the potential to emit.

Emission Unit #	Fuel	Pollutant	Emission Factor	Emission Factor Units	Source of Emission Factor
UTIL-2	Diesel	NOx	3.48	g/kW-hr	Vendor Cut Sheet
		HC	0.1	g/kW-hr	Vendor Cut Sheet
		PM / PM10 / PM 2.5	0.09	g/kW-hr	Vendor Cut Sheet
		CO	0.46	g/kW-hr	Vendor Cut Sheet
		SO2	39.7	lb/1000 gal used	US EPA AP-42
		CO2	22600	lb/1000 gal used	US EPA AP-42
		benzene	0.000933	lb/1000 gal used	US EPA AP-42
		toluene	0.000409	lb/1000 gal used	US EPA AP-42
		xylene	0.000285	lb/1000 gal used	US EPA AP-42

Emission Unit #	Fuel	Pollutant	Emission Factor	Emission Factor Units	Source of Emission Factor
UTIL-3 & UTIL-4	Natural Gas	NOx	0.03	g/bhp-hr	Vendor Cut Sheet
		CO	0.64	g/bhp-hr	Vendor Cut Sheet
		THC (non-methane)	0.00	g/bhp-hr	Vendor Cut Sheet
		PM / PM10 / PM 2.5	0.01	lb/MMBtu	US EPA AP-42
		SO2	0.00	lb/MMBtu	US EPA AP-42
		CO2	110.00	lb/MMBtu	US EPA AP-42
		formaldehyde	0.02	lb/MMBtu	US EPA AP-42

Section EE.6: Notes, Comments, and Explanations

1. Firewater pump is subject to 40 CFR 60,Subpart IIII—Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

2. Emergency Generators are subject to 40 CFR 60, Subpart JJJJ—Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

Division for Air Quality

300 Sower Boulevard
Frankfort, KY 40601
(502) 564-3999

DEP7007N

Source Emissions Profile

__ Section N.1: Emission Summary
__ Section N.2: Stack Information
__ Section N.3: Fugitive Information
__ Section N.4: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI

Source Name: **Dyno Nobel Inc.**
KY EIS (AFS) #: **21- 177-00067**
Permit #: **S-25-064**
Agency Interest (AI) ID: **3241**
Date: **6/1/2026**

N.1: Emission Summary

Emission Unit #	Emission Unit Name	Process ID	Process Name	Control Device Name	Control Device ID	Stack ID	Maximum Design Capacity *(SCC Units/hour)*	Pollutant	Uncontrolled Emission Factor *(lb/SCC Units)*	Emission Factor Source (e.g. AP-42, Stack Test, Mass Balance)	Capture Efficiency *(%)*	Control Efficiency *(%)*	Hourly Emissions		Annual Emissions	
													Uncontrolled Potential *(lb/hr)*	Controlled Potential *(lb/hr)*	Uncontrolled Potential *(tons/yr)*	Controlled Potential *(tons/yr)*
UTIL-1	Boiler Package	20-B0030	Boiler	-	-	UTIL-1	0.036 MMscf/hr (~36.3 MMBtu/hr)	NO_x	50 lb/MMscf	AP-42	-	-	1.8	1.8	7.884	7.884
UTIL-1	Boiler Package	20-B0031	Boiler	-	-	UTIL-1	0.036 MMscf/hr	SO_x	0.6 lb/MMscf	AP-42	-	-	0.022	0.022	0.095	0.095
UTIL-1	Boiler Package	20-B0032	Boiler	-	-	UTIL-1	0.036 MMscf/hr	CO	84 lb/MMscf	AP-42	-	-	3.02	3.02	13.245	13.245
UTIL-1	Boiler Package	20-B0033	Boiler	-	-	UTIL-1	0.036 MMscf/hr	VOC	5.5 lb/MMscf	AP-42	-	-	0.20	0.20	0.867	0.867
UTIL-1	Boiler Package	20-B0034	Boiler	-	-	UTIL-1	0.036 MMscf/hr	PM 2.5	7.6 lb/MMscf	AP-42	-	-	0.27	0.27	1.198	1.198
UTIL-1	Boiler Package	20-B0034	Boiler	-	-	UTIL-1	36.3 MMBtu/hr	CO_2	117 lb/MMbtu	CFR 98 Table C-1	-	-	4247.10	4247.10	18602.298	18602.298
UTIL-1	Boiler Package	20-B0034	Boiler	-	-	UTIL-1	36.3 MMBtu/hr	N_2O	0.00022 lb/MMBtu	CFR 98 Table C-2	-	-	8.00E-03	8.00E-03	3.50E-02	3.50E-02

Emission Unit #	Emission Unit Name	Process ID	Process Name	Control Device Name	Control Device ID	Stack ID	Maximum Design Capacity *(SCC Units/hour)*	Pollutant	Uncontrolled Emission Factor *(lb/SCC Units)*	Emission Factor Source (e.g. AP-42, Stack Test, Mass Balance)	Capture Efficiency *(%)*	Control Efficiency *(%)*	Hourly Emissions		Annual Emissions	
													Uncontrolled Potential *(lb/hr)*	Controlled Potential *(lb/hr)*	Uncontrolled Potential *(tons/yr)*	Controlled Potential *(tons/yr)*
UTIL-1	Boiler Package	20-B0034	Boiler	-	-	UTIL-1	36.3 MMBtu/hr	CH_4	0.0022 lb/MMBtu	CFR 98 Table C-2	-	-	8.00E-02	8.00E-02	3.50E-01	3.50E-01
UTIL-2	Diesel Fire Water Pump	31-P0022	Diesel Fire Water Pump	-	-	UTIL-2	404 kW-h	NOx	3.48 g/ kW-hr	Vendor data for similar unit	-	-	3.1	3.1	0.775	0.775
UTIL-2	Diesel Fire Water Pump	31-P0022	Diesel Fire Water Pump	-	-	UTIL-2	404 kW-h	HC	0.1 g/kW-hr	Vendor data for similar unit	-	-	0.089	0.089	0.022	0.022
UTIL-2	Diesel Fire Water Pump	31-P0022	Diesel Fire Water Pump	-	-	UTIL-2	404 kW-h	PM / PM10 / PM 2.5	0.09 g/kW-hr	Vendor data for similar unit	-	-	0.080	0.080	0.020	0.020
UTIL-2	Diesel Fire Water Pump	31-P0022	Diesel Fire Water Pump	-	-	UTIL-2	404 kW-h	CO	0.46 g/kW-hr	Vendor data for similar unit	-	-	0.41	0.41	0.102	0.102
UTIL-2	Diesel Fire Water Pump	31-P0022	Diesel Fire Water Pump	-	-	UTIL-2	10.1 gal/hr	SO2	39.7 lb/1000 gal used	AP-42	-	-	0.40	0.40	0.100	0.100
UTIL-2	Diesel Fire Water Pump	31-P0022	Diesel Fire Water Pump	-	-	UTIL-2	10.1 gal/hr	CO2	163.0818 lb/MMBtu	CFR 98 Table C-1	-	-	225	225	56.22	56.22
UTIL-2	Diesel Fire Water Pump	31-P0022	Diesel Fire Water Pump	-	-	UTIL-2	10.1 gal/hr	N_2O	0.001323 lb/MMBtu	CFR 98 Table C-2	-	-	1.82E-03	1.82E-03	4.56E-04	4.56E-04
UTIL-2	Diesel Fire Water Pump	31-P0022	Diesel Fire Water Pump	-	-	UTIL-2	10.1 gal/hr	CH_4	0.006615 lb/MMBtu	CFR 98 Table C-2	-	-	9.12E-03	9.12E-03	2.28E-03	2.28E-03
UTIL-2	Diesel Fire Water Pump	31-P0022	Diesel Fire Water Pump	-	-	UTIL-2	1.38 MMBtu/hr	benzene	0.000933 lb/MMBtu	AP-42	-	-	0.0013	0.0013	0.0003	0.0003
UTIL-2	Diesel Fire Water Pump	31-P0022	Diesel Fire Water Pump	-	-	UTIL-2	1.38 MMBtu/hr	toluene	0.000409 lb/MMBtu	AP-42	-	-	0.00056	0.00056	0.0001	0.0001
UTIL-2	Diesel Fire Water Pump	31-P0022	Diesel Fire Water Pump	-	-	UTIL-2	1.38 MMBtu/hr	xylene	0.000285 lb/MMBtu	AP-42	-	-	0.00039	0.00039	0.0001	0.0001
UTIL-3	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-3	1475 BHP	NO_x	0.03 g/BHP-hr	Vendor data for similar unit	-	-	0.0976	0.0976	0.024	0.024
UTIL-3	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-3	9.5 MMBtu/hr	SO_x	0.000588 lb/MMBtu	AP-42	-	-	0.0056	0.0056	0.0014	0.0014
UTIL-3	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-3	1475 BHP	CO	0.64 g/BHP-hr	Vendor data for similar unit	-	-	2.0812	2.0812	0.5203	0.5203
UTIL-3	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-3	1475 BHP	VOC	0 g/BHP-hr	Vendor data for similar unit	-	-	0	0	0	0
UTIL-3	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-3	9.5 MMBtu/hr	PM / PM10 / PM 2.5	0.0095 lb/MMBtu	AP-42	-	-	0.090	0.090	0.0226	0.0226
UTIL-3	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-3	9.5 MMBtu/hr	Formaldehyde	0.0205 lb/MMBtu	AP-42	-	-	0.19	0.19	0.0482	0.0482
UTIL-3	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-3	9.5 MMBtu/hr	CO_2	117 lb/MMBtu	CFR 98 Table C-1	-	-	1112.62	1112.62	278	278
UTIL-3	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-3	9.5 MMBtu/hr	N_2O	0.00022 lb/MMBtu	CFR 98 Table C-2			2.10E-03	2.10E-03	5.24E-04	5.24E-04
UTIL-3	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-3	9.5 MMBtu/hr	CH_4	0.0022 lb/MMBtu	CFR 98 Table C-2			2.10E-02	2.10E-02	5.24E-03	5.24E-03

Emission Unit #	Emission Unit Name	Process ID	Process Name	Control Device Name	Control Device ID	Stack ID	Maximum Design Capacity *(SCC Units/hour)*	Pollutant	Uncontrolled Emission Factor *(lb/SCC Units)*	Emission Factor Source (e.g. AP-42, Stack Test, Mass Balance)	Capture Efficiency *(%)*	Control Efficiency *(%)*	Hourly Emissions		Annual Emissions	
													Uncontrolled Potential *(lb/hr)*	Controlled Potential *(lb/hr)*	Uncontrolled Potential *(tons/yr)*	Controlled Potential *(tons/yr)*
UTIL-4	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-4	1475 BHP	NO_x	0.03 g/BHP-hr	Vendor data for similar unit	-	-	0.0976	0.0976	0.0244	0.0244
UTIL-4	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-4	9.5 MMBtu/hr	SO_x	0.000588 lb/MMBtu	AP-42	-	-	0.0056	0.0056	0.0014	0.0014
UTIL-4	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-4	1475 BHP	CO	0.64 g/BHP-hr	Vendor data for similar unit	-	-	2.0812	2.0812	0.5203	0.5203
UTIL-4	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-4	1475 BHP	VOC	0 g/BHP-hr	Vendor data for similar unit	-	-	0	0	0	0
UTIL-4	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-4	9.5 MMBtu/hr	PM / PM10 / PM 2.5	0.0095 lb/MMBtu	AP-42	-	-	0.090	0.090	0.0226	0.0226
UTIL-4	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-4	9.5 MMBtu/hr	Formaldehyde	0.0205 lb/MMBtu	AP-42			0.19	0.19	0.0487	0.0487
UTIL-4	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-4	9.5 MMBtu/hr	CO_2	117 lb/MMBtu	AP-42	-	-	1112.62	1112.62	278	278
UTIL-4	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-4	9.5 MMBtu/hr	N_2O	0.00022 lb/MMBtu	CFR 98 Table C-2			2.10E-03	2.10E-03	5.24E-04	5.24E-04
UTIL-4	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-4	9.5 MMBtu/hr	CH_4	0.0022 lb/MMBtu	CFR 98 Table C-2			2.10E-02	2.10E-02	5.24E-03	5.24E-03
UTIL-5	Cooling Tower 1	20-ZCT0001	Cooling Tower 1	-	-	UTIL-5	3382 gpm recirc rate	PM / PM10 / PM 2.5	255.4 mg/L	0.005% Maximum drift based on vendor data, TDS of 255.4 in makeup water	-	-	0.022	0.022	0.095	0.095
UTIL-6	Cooling Tower 2	21-ZCT0001	Cooling Tower 2	-	-	UTIL-6	590 gpm recirc rate	PM / PM10 / PM 2.5	255.4 mg/L	0.005% Maximum drift based on vendor data, TDS of 255.4 in makeup water	-	-	0.0038	0.0038	0.017	0.017

Section N.2: Stack Information

UTM Zone:

Stack ID	Identify all Emission Units (with Process ID) and Control Devices that Feed to Stack	Stack Physical Data			Stack UTM Coordinates		Stack Gas Stream Data		
		Equivalent Diameter *(ft)*	Height *(ft)*	Base Elevation *(ft)*	Northing *(m)*	Easting *(m)*	Flowrate *(acfm)*	Temperature *(° F)*	Exit Velocity *(ft/sec)*
UTIL-1	Boiler (20-B0030)	2.1667	52.5				10560	310	48
UTIL-2	Diesel Fire Water Pump (31-P0022)	0.67	13.2				3350	924	151.67
UTIL-3	Emergency Generator	0.83	11.06				8500	1458	250
UTIL-4	Emergency Generator	0.83	11.06				8500	1458	250
UTIL-5	Cooling Tower 1 (20-ZCT0001)	16.7	26.6				180000	81	13.68
UTIL-6	Cooling Tower 2 (21-ZCT0001)	12	21.8				102000	81	15

Section N.3: Fugitive Information

UTM Zone:

Emission Unit #	Emission Unit Name	Process ID	Area Physical Data		Area UTM Coordinates		Area Release Data	
			Length of the X Side *(ft)*	Length of the Y Side *(ft)*	Northing *(m)*	Easting *(m)*	Release Temperature *(°F)*	Release Height *(ft)*

Section N.4: Notes, Comments, and Explanations
1. Low NOX burner information is located on page 9 of the Industrial Boiler & Mechanical Company, Inc. vendor sheet.

Division for Air Quality

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Frankfort, KY 40601
(502) 564-3999

DEP7007V

Applicable Requirements and Compliance Activities

___ Section V.1: Emission and Operating Limitation(s)
___ Section V.2: Monitoring Requirements
___ Section V.3: Recordkeeping Requirements
___ Section V.4: Reporting Requirements
___ Section V.5: Testing Requirements
___ Section V.6: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI

Source Name: **Dyno Nobel Inc.**
KY EIS (AFS) #: **21-177-00067**
Permit #: **S-25-064**
Agency Interest (AI) ID: **3241**
Date: **6/1/2026**

Section V.1: Emission and Operating Limitation(s)

Emission Unit #	Emission Unit Description	Applicable Regulation or Requirement	Pollutant	Emission Limit (if applicable)	Voluntary Emission Limit or Exemption (if applicable)	Operating Requirement or Limitation (if applicable)	Method of Determining Compliance with the Emission and Operating Requirement(s)
UTIL-1	Boiler Package	40 CFR 60 Subpart Dc	N/A (see notes)	N/A	N/A	N/A	N/A

Emission Unit #	Emission Unit Description	Applicable Regulation or Requirement	Pollutant	Emission Limit (if applicable)	Voluntary Emission Limit or Exemption (if applicable)	Operating Requirement or Limitation (if applicable)	Method of Determining Compliance with the Emission and Operating Requirement(s)
UTIL-2	Diesel Fire Water Pump	40 CFR 60 Subpart IIII	1. NMHC+ NOX 2. CO. 3. PM	1. 4.0 g/KW-hr 2. 3.5 g/KW-hr 3. 0.20 g/KW-hr	N/A	1. 40 CFR 60.4207 Diesel fuel maximum sulfur content is limited to 15 ppm. Diesel fuel must meet one of the following standards: (1) Minimum cetane index of 40. (2) Maximum aromatic content of 35 volume percent 2. Operations are limited to 100 hr/yr for maintenance and readiness testing, including up to 50 hr/yr for non-emergency use.	40 CFR 60.4211(c) Engine must be certfied per 40 CFR 60.4205(c).
UTIL-2	Diesel Fire Water Pump	40 CFR 63 Subpart ZZZZ	N/A (see notes)	N/A	N/A	N/A	N/A
UTIL-3	Emergency Generator	40 CFR 60 Subpart JJJJ	Table 1 to Subpart JJJJ 1. NO_X 2. CO 3. VOC	1. 160 ppmdv 2. 540 ppmdv 3. 86 ppmdv *all at @15%O2	N/A	40 CFR 60.4243(d) Operations are limited to 100 hr/yr for maintenance and readiness testing, including up to 50 hr/yr for non-emergency use.	40 CFR 60.4245(a)(3) Maintain records of manufacturer certification.
UTIL-3	Emergency Generator	40 CFR 63 Subpart ZZZZ	N/A (see notes)	N/A	N/A	N/A	N/A

Emission Unit #	**Emission Unit Description**	**Applicable Regulation or Requirement**	**Pollutant**	**Emission Limit** (if applicable)	**Voluntary Emission Limit or Exemption** (if applicable)	**Operating Requirement or Limitation** (if applicable)	**Method of Determining Compliance with the Emission and Operating Requirement(s)**
UTIL-4	Emergency Generator	40 CFR 60 Subpart JJJJ	Table 1 to Subpart JJJJ 1. NO_X 2. CO 3. VOC	1. 160 ppmdv 2. 540 ppmdv 3. 86 ppmdv *all at @15%O2	N/A	40 CFR 60.4243(d) Operations are limited to 100 hr/yr for maintenance and readiness testing, including up to 50 hr/yr for non-emergency use.	40 CFR 60.4245(a)(3) Maintain records of manufacturer certification.
UTIL-4	Emergency Generator	40 CFR 63 Subpart ZZZZ	N/A (see notes)	N/A	N/A	N/A	N/A

Section V.2: Monitoring Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Monitored	Description of Monitoring
UTIL-1	Boiler Package	N/A	40 CFR 60.48c(g)	Natural gas usage	Maintain records of natural gas usage on a monthly basis
UTIL-2	Diesel Fire Water Pump	N/A	40 CFR 60.4211(f)	Operating hours	Hours of operation in non-emergency mode
UTIL-3	Emergency Generator	N/A	40 CFR 60.4243(d)	Operating hours	Hours of operation in non-emergency mode
UTIL-4	Emergency Generator	N/A	40 CFR 60.4243(d)	Operating hours	Hours of operation in non-emergency mode

Section V.3: Recordkeeping Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Recorded	Description of Recordkeeping
UTIL-1	Boiler Package	N/A	40 CFR 60.48c(g)	Natural gas usage	(f)(4)(i) Maintain records for the natural gas supplier, (f)(4)(ii) Maintain records for the potential sulfur emissions rate or maximum potential sulfur emisison rate of the fuel in ng/J heat input (f)(4)(ii) Maintain records for the method used to determine the potential sulfur emissions rate of the fuel (g)(2) Maintain records of natural gas usage on a monthly basis
UTIL-2	Diesel Fire Water Pump	N/A	40 CFR 60.4211(f)	Operating hours	Record hours of operation in non-emergency mode
UTIL-2	Diesel Fire Water Pump	N/A	40 CFR 60.4207(b)	Diesel fuel requirements	Maintain records on diesel fuel specification: 1) sulfur content and 2) cetane index or maximum aromatic content
UTIL-3	Emergency Generator	N/A	40 CFR 60.4243(d)	Operating hours	Hours of operation in non-emergency mode
UTIL-3	Emergency Generator	N/A	40 CFR 60.4245(a)(2)	Operating hours	Maintain maintenance records
UTIL-4	Emergency Generator	N/A	40 CFR 60.4243(d)	Operating hours	Hours of operation in non-emergency mode
UTIL-4	Emergency Generator	N/A	40 CFR 60.4245(a)(2)	Operating hours	Maintain maintenance records

Section V.4: Reporting Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Reported	Description of Reporting
UTIL-1	Boiler Package	N/A	40 CFR 60.48c	N/A	(a) Notification of construction and startup (a)(1) Notification of design heat input capacity and identification of fuels used (a)(3) Notification of the annual capacity factor at which the owner or operator anticipates operating the affected facility based on all fuels fired and based on each individual fuel fired
UTIL-2	Diesel Fire Water Pump	N/A	N/A	N/A	N/A
UTIL-3	Emergency Generator	N/A	N/A	N/A	N/A
UTIL-4	Emergency Generator	N/A	N/A	N/A	N/A

Section V.5: Testing Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Tested	Description of Testing
UTIL-1	Boiler Package	N/A	N/A	N/A	N/A
UTIL-2	Diesel Fire Water Pump	N/A	N/A	N/A	N/A
UTIL-3	Emergency Generator	N/A	N/A	N/A	N/A
UTIL-4	Emergency Generator	N/A	N/A	N/A	N/A

Section V.6: Notes, Comments, and Explanations
1. The natural gas-fired boiler is subject to 40 CFR 60 Subpart Dc, Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units, based on the size of the boiler (~36.3 MMBtu.hr). There are no emission limitations that apply because the fuel is natural gas. Recordkeeping, monitoring and report requirmeents apply.
2. The natural gas-fired boiler is not subject to the requirements of 40 CFR 63, Subpart JJJJJJ. Gas-fired boilers are exempt per 40 CFR 63.11195(e).
3. The diesel firewater pump and emergency generators are subject to 40 CFR 63, Subpart ZZZZ, but per 40 CFR 63.6590(c)(1), no further requirements apply if the requirements of 40 CFR 60, Subparts IIII and JJJJ are met.

Division for Air Quality

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DEP7007Y

Good Engineering Practice and Stack Height Determination

___ Section Y.1: Building Dimension Information
___ Section Y.2: Exhaust Point Information
___ Section Y.3: Notes, Comments, and Explanations

Additional Documentation

___ Attach Flow Diagram for Exhaust Points

___ Complete DEP7007AI

Source Name: Dyno Nobel, Inc.
KY EIS (AFS) #: 21- 177-00067
Permit #: S-25-064
Agency Interest (AI) ID: 3241
Date: 6/1/2026

Section Y.1: Building Dimension Information

Exhaust Point #	Exhaust Point Name	Description of Exhaust Point *(stack, vent, roof monitor, indoors, etc.)*		List all processes and control devices serviced by the exhaust point:		Building dimensions where exhaust point is located:			Distance to nearest building *(ft)*	Dimensions of this nearest building:		
				Name	Flow Diagram Designation	Length *(ft)*	Width *(ft)*	Height *(ft)*		Length *(ft)*	Width *(ft)*	Height *(ft)*
UTIL-1	Boiler	Stack		Boiler	Boiler	78	70	20	7.2	Cylindrical Tank	13.9	13
UTIL-2	Diesel Fire Water Pump	Stack		Diesel Fire Water Pump	Diesel Fire Water Pump	40	19	13	19	60	25	16
UTIL-3	Emergency Generator	Stack		Emergency Generator	Emergency Generator	N/A	N/A	N/A	10.2	50	26	16
UTIL-4	Emergency Generator	Stack		Emergency Generator	Emergency Generator	N/A	N/A	N/A	10.2	50	26	16
UTIL-5	Cooling Tower 1	Drift		Cooling Tower 1	Cooling Tower 1	N/A	N/A	N/A	9.9	Cylindrical Tank	13.9	13
UTIL-6	Cooling Tower 2	Drift		Cooling Tower 1	Cooling Tower 1	N/A	N/A	N/A	27.6	80	55	20

Section Y.2: Exhaust Point Information

Exhaust Point	Distance to nearest plant boundary from exhaust point discharge *(ft)*	Good engineering practice (GEP) height, if known *(ft)*	Diameter of exhaust point *(ft)*	Direction of Exhaust	Geographical Coordinates *(in decimal degrees)*		UTM Coordinates		Exit Gas Flow Rate *(acfm)*		Exit Gas Temperature *(°F)*	
					Latitude	Longitude	Northing	Easting	Minimum	Maximum	At Minimum Flow Rate	At Maximum Flow Rate
UTIL-1	1110		2.1667	Vertical					10560	10560	310	310
UTIL-2	1180		0.67	Vertical					3350	3350	924	924
UTIL-3	1260		0.83	Vertical					8500	8500	1458	1458
UTIL-4	1260		0.83	Vertical					8500	8500	1458	1458
UTIL-5	1130		16.7	Vertical					180000	180000	81	81
UTIL-6	700		12	Vertical					102000	102000	81	81

Section Y.3: Notes, Comments, and Explanations
1. UTIL-3 and UTIL-4 Emergency generator stacks are located outdoors.
2. UTIL-5 and UTIL-6 Cooling towers are located outdoors.

Division for Air Quality

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Frankfort, KY 40601
(502) 564-3999

DEP7007HH

Haul Roads

_____ Section HH.1: Haul Roads

_____ Section HH.2: Yard Area

_____ Section HH.3: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI, DEP7007N and DEP7007V

___ SDS for dust suppressant

Source Name: **Dyno Nobel, Inc.**

KY EIS (AFS) #: **21-** **177-00067**

Permit #: **S-25-064**

Agency Interest (AI) ID: **3241**

Date: **6/1/2026**

Section HH.1: Haul Roads

HH.1A Unpaved Haul Roads:

Average Number of Days in a Year with 0.01 inches of Precipitation (P): N/A Days

Mean Vehicle Weight (W): N/A Tons

Surface Material Silt Content (s): N/A %

Haul Road Length: N/A Miles

Maximum Vehicle Miles Traveled in a Year: N/A Miles

Describe the dust control method for unpaved haul road(s):
(If dust control suppressants will be utilized, attach the approved Safety Data Sheet(s), as applicable.)

N/A

Emission factor: N/A

HH.1 Paved Haul Roads:

Average Number of Days in a Year with 0.01 inches of Precipitation (P): 110 Days

Mean Vehicle Weight (W): 3.8 Tons

Road Surface Silt Loading (sL): 0.4 (G/M^2)

Haul Road Length: 3.4 Miles

Maximum Vehicle Miles Traveled in a Year: 507.2 Miles

Describe the dust control method for paved haul road(s):
(If dust control suppressants will be utilized, attach the approved Safety Data Sheet(s), as applicable.)

N/A

Section HH.2: Yard Area (Aggregate Handling And Storage Piles):

Average Number of Days in a Year with 0.01 inches of Precipitation (P): N/A Days

Mean Wind Speed (U): N/A MPH

Material Moisture Content (M): N/A %

Describe the dust control method for yard area:
(If dust control suppressants will be utilized, attach the approved Safety Data Sheet(s), as applicable.)

N/A

Section HH.3: Notes, Comments, and Explanations

Division for Air Quality

300 Sower Boulevard
Frankfort, KY 40601
(502) 564-3999

DEP7007N

Source Emissions Profile

__ Section N.1: Emission Summary
__ Section N.2: Stack Information
__ Section N.3: Fugitive Information
__ Section N.4: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI

Source Name: Dyno Nobel Inc.
KY EIS (AFS) #: 21- 177-00067
Permit #: S-25-064
Agency Interest (AI) ID: 3241
Date: 6/1/2026

N.1: Emission Summary

Emission Unit #	Emission Unit Name	Process ID	Process Name	Control Device Name	Control Device ID	Stack ID	Maximum Design Capacity *(SCC Units/hour)*	Pollutant	Uncontrolled Emission Factor *(lb/SCC Units)*	Emission Factor Source (e.g. AP-42, Stack Test, Mass Balance)	Capture Efficiency *(%)*	Control Efficiency *(%)*	Hourly Emissions		Annual Emissions	
													Uncontrolled Potential *(lb/hr)*	Controlled Potential *(lb/hr)*	Uncontrolled Potential *(tons/yr)*	Controlled Potential *(tons/yr)*
N/A	Haul Roads	N/A	N/A	N/A	N/A	N/A	N/A	PM	9.5 g/VKT	AP-42	0%	0%	6238	6238	3.1	3.1
N/A	Haul Roads	N/A	N/A	N/A	N/A	N/A	N/A	PM 10	1.8 g/VKT	AP-42	0%	0%	1196	1196	0.60	0.6
N/A	Haul Roads	N/A	N/A	N/A	N/A	N/A	N/A	PM 2.5	0.44 g/VKT	AP-42	0%	0%	286	286	0.14	0.14

Section N.2: Stack Information

UTM Zone:

Stack ID	Identify all Emission Units (with Process ID) and Control Devices that Feed to Stack	Stack Physical Data			Stack UTM Coordinates		Stack Gas Stream Data		
		Equivalent Diameter *(ft)*	Height *(ft)*	Base Elevation *(ft)*	Northing *(m)*	Easting *(m)*	Flowrate *(acfm)*	Temperature *(° F)*	Exit Velocity *(ft/sec)*
N/A									

Section N.3: Fugitive Information

UTM Zone:

Emission Unit #	Emission Unit Name	Process ID	Area Physical Data		Area UTM Coordinates		Area Release Data	
			Length of the X Side *(ft)*	Length of the Y Side *(ft)*	Northing *(m)*	Easting *(m)*	Release Temperature *(°F)*	Release Height *(ft)*
N/A								

Section N.4: Notes, Comments, and Explanations

Freeman, Colby (EEC)

From: Duncan Kimbro <dkimbro@franklinengineering.com>
Sent: Friday, June 19, 2026 6:19 PM
To: Tina Maniatis; Freeman, Colby (EEC); Thamara Novak
Cc: Ross, Dakota D (EEC); Bittner, Zachary P (EEC); Pieter Haverkamp
Subject: RE: AI 3241: Dyno Nobel Inc. - Additional Information Required for 40 CFR 60, Subpart NNNa

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Good afternoon, Colby.

I just submitted a revised DEP 7007V form via the EEC eForms portal to add the applicable requirements of Subpart NNNa to the ARU, which includes the DNT/MNT Stripping Unit.

We will provide additional detail about the operation of the Solvent Extraction Unit and the toluene emissions next week.

Regards,



Duncan F. Kimbro
Business Development Manager | Principal
Franklin Engineering Group, Inc.
Phone: 615-591-0058 ext. 236
Mobile: 615-478-1386
Email: dkimbro@franklinengineering.com
381 Riverside Drive, Suite 200
Franklin, TN 37064

www.franklinengineering.com

From: Tina Maniatis <tina.maniatis@dynonobel.com>
Sent: Wednesday, June 17, 2026 4:22 AM
To: Freeman, Colby (EEC) <colby.freeman@ky.gov>; Thamara Novak <thamara.novak@dynonobel.com>
Cc: Ross, Dakota D (EEC) <dakota.ross@ky.gov>; Bittner, Zachary P (EEC) <Zachary.Bittner@ky.gov>; Duncan Kimbro <dkimbro@franklinengineering.com>; Pieter Haverkamp <Pieter.Haverkamp@dynonobel.com>
Subject: Re: AI 3241: Dyno Nobel Inc. - Additional Information Required for 40 CFR 60, Subpart NNNa

Hi Colby. Thank you for your quick review. We will respond this week on the NNNa applicability. I'll discuss your second question on ARU with consultant and get back to you.

Regards,
Tina
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From: Freeman, Colby (EEC) <colby.freeman@ky.gov>
Sent: Monday, 15 June 2026 19:49:52
To: Tina Maniatis <tina.maniatis@dynonobel.com>; Thamara Novak <thamara.novak@dynonobel.com>
Cc: Ross, Dakota D (EEC) <dakota.ross@ky.gov>; Bittner, Zachary P (EEC) <Zachary.Bittner@ky.gov>
Subject: Re: AI 3241: Dyno Nobel Inc. - Additional Information Required for 40 CFR 60, Subpart NNNa

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Good afternoon,

I am following up to see when we can expect a response on the applicability of Subpart NNNa to the MNT/DNT stripping unit.

I also have a question regarding the downstream Solvent Extraction Unit. As I understand from the description of the MNT/DNT stripping unit, "condensate containing organics (MNT/DNT)... is sent to the Extraction Unit." In the Extraction Unit, fresh toluene is used to strip the organics. Section 3 of the Emission Calculation Methodologies indicates "Emissions from the Solvent Extraction Unit in the ARU consist of short, infrequent emissions of toluene when pressure is relieved." Can you provide any additional context as to the conditions that would necessitate a pressure relief event and why there are no DNT emissions represented from such events?

Thanks,

Colby Freeman

Environmental Engineer Technologist I

Chemical Section

Division for Air Quality

300 Sower Blvd

Frankfort, KY 40601

(502) 782 - 1467

From: Freeman, Colby (EEC)
Sent: Wednesday, June 3, 2026 12:22 PM
To: tina.maniatis@dynonobel.com <tina.maniatis@dynonobel.com>; thamara.novak@dynonobel.com <thamara.novak@dynonobel.com>
Cc: Ross, Dakota D (EEC) <dakota.ross@ky.gov>; Bittner, Zachary P (EEC) <Zachary.Bittner@ky.gov>
Subject: AI 3241: Dyno Nobel Inc. - Additional Information Required for 40 CFR 60, Subpart NNNa

Hello,

The Division requires additional information to support the requested non-applicability determination for 40 CFR 60, Subpart NNNa. This regulation applies to a "distillation unit" and the recovery system into which its vent stream is discharged, or each combination of distillation units and the common recovery system into which their vent streams are discharged that produces any of the chemicals listed in 40 CFR 60.667a as a product, co-product, by-product, or intermediate, except as provided in 40 CFR 60.660a(c) [40 CFR 60.660a(a) and (b)]. The application attempts to justify the non-applicability of Subpart NNNa by stating the TNT plant does not include any distillation operations. However, it appears the MNT/DNT Stripping Unit meets the definition of a distillation operation under 40 CFR 60.661a.

My understanding is that the MNT/TNT Stripping Unit separates a feed stream (spent acid) into two or more exit streams (organic condensate and acidic condensate) with different component concentrations than the feed stream by redistributing between liquid and vapor-phase. In this case, this is achieved by the addition of steam to strip the organics. The EPA appears to have contemplated this type of distillation unit by including "steam jet" as an example in the of accessories integral to a distillation unit in the definition. 2-4(and 2,6)-dinitrotoluene is a chemical listed in 40 CFR 60.667a, and it appears DNT produced by the MNT/DNT stripping unit is an intermediate used in the nitration process.

If you maintain that Subpart NNNa does not apply, please provide reasoning specifically addressing how the relevant definitions and potential exemptions apply to the MNT/DNT stripping unit. Otherwise, please provide a DEP 7007V form addressing the applicable requirements of Subpart NNNa.

Thanks,

Colby Freeman
Environmental Engineer Technologist I
Chemical Section
Division for Air Quality
300 Sower Blvd
Frankfort, KY 40601
(502) 782 - 1467

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Freeman, Colby (EEC)

From: Duncan Kimbro <dkimbro@franklinengineering.com>
Sent: Tuesday, June 30, 2026 6:13 PM
To: Freeman, Colby (EEC); Ross, Dakota D (EEC); Bittner, Zachary P (EEC)
Cc: Tina Maniatis; Pieter Haverkamp; Thamara Novak; Chloe Trinh
Subject: RE: AI 3241: Dyno Nobel Inc. - Additional Information Required for 40 CFR 60, Subpart NNNa

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Good afternoon, Colby. I noticed that the revised DEP 7007V form submitted on June 19 did not print to PDF correctly and only one of the Excel tabs was captured. I will be submitting the corrected from via the submittal portal.

Regards,



Duncan F. Kimbro
Business Development Manager | Principal
Franklin Engineering Group, Inc.
Phone: 615-591-0058 ext. 236
Mobile: 615-478-1386
Email: dkimbro@franklinengineering.com
381 Riverside Drive, Suite 200
Franklin, TN 37064

www.franklinengineering.com

From: Tina Maniatis <tina.maniatis@dynonobel.com>
Sent: Wednesday, June 3, 2026 1:17 PM
To: Duncan Kimbro <dkimbro@franklinengineering.com>; Pieter Haverkamp <Pieter.Haverkamp@dynonobel.com>
Subject: Fw: AI 3241: Dyno Nobel Inc. - Additional Information Required for 40 CFR 60, Subpart NNNa

Hi Duncan. KDEP is requiring more info on the determination for SOCMI distillation.

Thanks
Tina

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From: Freeman, Colby (EEC) <colby.freeman@ky.gov>
Sent: Wednesday, June 3, 2026 10:22:05 AM
To: Tina Maniatis <tina.maniatis@dynonobel.com>; Thamara Novak <thamara.novak@dynonobel.com>
Cc: Ross, Dakota D (EEC) <dakota.ross@ky.gov>; Bittner, Zachary P (EEC) <Zachary.Bittner@ky.gov>
Subject: AI 3241: Dyno Nobel Inc. - Additional Information Required for 40 CFR 60, Subpart NNNa

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Hello,

The Division requires additional information to support the requested non-applicability determination for 40 CFR 60, Subpart NNNa. This regulation applies to a "distillation unit" and the recovery system into which its vent stream is discharged, or each combination of distillation units and the common recovery system into which their vent streams are discharged that produces any of the chemicals listed in 40 CFR 60.667a as a product, co-product, by-product, or intermediate, except as provided in 40 CFR 60.660a(c) [40 CFR 60.660a(a) and (b)]. The application attempts to justify the non-applicability of Subpart NNNa by stating the TNT plant does not include any distillation operations. However, it appears the MNT/DNT Stripping Unit meets the definition of a distillation operation under 40 CFR 60.661a.

My understanding is that the MNT/TNT Stripping Unit separates a feed stream (spent acid) into two or more exit streams (organic condensate and acidic condensate) with different component concentrations than the feed stream by redistributing between liquid and vapor-phase. In this case, this is achieved by the addition of steam to strip the organics. The EPA appears to have contemplated this type of distillation unit by including "steam jet" as an example in the of accessories integral to a distillation unit in the definition. 2-4(and 2,6)-dinitrotoluene is a chemical listed in 40 CFR 60.667a, and it appears DNT produced by the MNT/DNT stripping unit is an intermediate used in the nitration process.

If you maintain that Subpart NNNa does not apply, please provide reasoning specifically addressing how the relevant definitions and potential exemptions apply to the MNT/DNT stripping unit. Otherwise, please provide a DEP 7007V form addressing the applicable requirements of Subpart NNNa.

Thanks,

Colby Freeman
Environmental Engineer Technologist I
Chemical Section
Division for Air Quality
300 Sower Blvd
Frankfort, KY 40601
(502) 782 - 1467

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Division for Air Quality

300 Sower Boulevard
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DEP7007V

Applicable Requirements and Compliance Activities

___ Section V.1: Emission and Operating Limitation(s)
___ Section V.2: Monitoring Requirements
___ Section V.3: Recordkeeping Requirements
___ Section V.4: Reporting Requirements
___ Section V.5: Testing Requirements
___ Section V.6: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI

Source Name: **Dyno Nobel Inc.**
KY EIS (AFS) #: **21-177-00067**
Permit #: **S-25-064**
Agency Interest (AI) ID: **3241**
Date: **6/1/2026**

Section V.1: Emission and Operating Limitation(s)

Emission Unit #	Emission Unit Description	Applicable Regulation or Requirement	Pollutant	Emission Limit (if applicable)	Voluntary Emission Limit or Exemption (if applicable)	Operating Requirement or Limitation (if applicable)	Method of Determining Compliance with the Emission and Operating Requirement(s)
Acid Recovery Unit	ARU-1	PSD Avoidance	NO	<90 TPY	Sourcewide	TBD	TBD
Acid Recovery Unit	ARU-1	PSD Avoidance	NO_2	<90 TPY	Sourcewide	TBD	TBD

Emission Unit #	**Emission Unit Description**	**Applicable Regulation or Requirement**	**Pollutant**	**Emission Limit** (if applicable)	**Voluntary Emission Limit or Exemption** (if applicable)	**Operating Requirement or Limitation** (if applicable)	**Method of Determining Compliance with the Emission and Operating Requirement(s)**
Acid Recovery Unit	ARU-1	40 CFR 60, Subpart NNNa	Total Organic Compounds (TOC)	See Operating Limit to the Right	N/A	98 weight-percent destruction efficiency or TOC (minus methane and ethane) concentration of 20 ppmv on a dry basis corrected to 3% oxygen	Perfromance Test
Solvent Extraction	ARU-2	N/A	Toluene	N/A	N/A	TBD	TBD
Thermal Oxidizer Burner	TO-1	PSD Avoidance	NO_X from nat gas combustion	<90 TPY	Sourcewide	TBD	TBD
Thermal Oxidizer Burner	TO-1	PSD Avoidance	NO_2 from TNM combustion	<90 TPY	Sourcewide	TBD	TBD
Thermal Oxidizer Burner	TO-1	PSD Avoidance	SO_2	<90 TPY	Sourcewide	TBD	TBD
Thermal Oxidizer Burner	TO-1	PSD Avoidance	CO	<90 TPY	Sourcewide	TBD	TBD

Emission Unit #	**Emission Unit Description**	**Applicable Regulation or Requirement**	**Pollutant**	**Emission Limit** (if applicable)	**Voluntary Emission Limit or Exemption** (if applicable)	**Operating Requirement or Limitation** (if applicable)	**Method of Determining Compliance with the Emission and Operating Requirement(s)**
Thermal Oxidizer Burner	TO-1	PSD Avoidance	PM (filterable)	<90 TPY	Sourcewide	TBD	TBD
Thermal Oxidizer Burner	TO-1	PSD Avoidance	VOC	<90 TPY	Sourcewide	TBD	TBD
Thermal Oxidizer Burner	TO-1	N/A	Lead	N/A	N/A	TBD	TBD
Thermal Oxidizer Burner	TO-1	N/A	Toluene	N/A	N/A	TBD	TBD

Section V.2: Monitoring Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Monitored	Description of Monitoring
Acid Recovery Unit	ARU-1	NO	PSD Avoidance	TBD	TBD
Acid Recovery Unit	ARU-1	NO_2	PSD Avoidance	TBD	TBD
Acid Recovery Unit	ARU-1	TOC	40 CFR 60, Subpart NNNa	Gas flowrate Gas flowrate TO firebox temperature	40 CFR 60.670a Initial and annual inspection of closed vent system for leaks using Method 21 (LDAR) 40 CFR 60.670(e) Install, calibrate, maintain, and operate a flow indicator that determines whether vent stream flow is present at least once every 15 minutes Table 2 to Subpart NNNa of Part 60 Presence of flow diverted to the atmosphere from the control and recovery device Table 2 to Subpart NNNa of Part 60 Thermal oxidizer firebox temperature, continuously, recorded every 15 minutes, on a 3-hour block average Continuous Paramneter Monitoring Systems (CPMS) are subject to the Calibration and Quality Control Requirements in Table 4 to Subpart NNNa of Part 60
Thermal Oxidizer Burner	TO-1	NO_X from nat gas combustion	PSD Avoidance	Natural gas consumption	Flowmeter on natural gas line
Thermal Oxidizer Burner	TO-1	NO_2 from TNM combustion	PSD Avoidance	TBD	TBD

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Monitored	Description of Monitoring
Thermal Oxidizer Burner	TO-1	SO_2	PSD Avoidance	Natural gas consumption	Flowmeter on natural gas line
Thermal Oxidizer Burner	TO-1	CO	PSD Avoidance	Natural gas consumption	Flowmeter on natural gas line
Thermal Oxidizer Burner	TO-1	PM (filterable)	PSD Avoidance	Natural gas consumption	Flowmeter on natural gas line
Thermal Oxidizer Burner	TO-1	VOC	PSD Avoidance	Natural gas consumption	Flowmeter on natural gas line

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Monitored	Description of Monitoring

Section V.3: Recordkeeping Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Recorded	Description of Recordkeeping
Acid Recovery Unit	ARU-1	NO	PSD Avoidance	TBD	TBD
Acid Recovery Unit	ARU-1	NO_2	PSD Avoidance	TBD	TBD
Acid Recovery Unit	ARU-1	TOC	40 CFR 60, Subpart NNNa	See monitoring requirements	40 CFR 60.665a Records required by subparagraphs (b), (c), (c)(7), and (d)
Thermal Oxidizer Burner	TO-1	NO_X from nat gas combustion	PSD Avoidance	Natural gas consumption	Natural gas consumption record
Thermal Oxidizer Burner	TO-1	NO_2 from TNM combustion	PSD Avoidance	TBD	TBD
Thermal Oxidizer Burner	TO-1	SO_2	PSD Avoidance	Natural gas consumption	Natural gas consumption record
Thermal Oxidizer Burner	TO-1	CO	PSD Avoidance	Natural gas consumption	Natural gas consumption record
Thermal Oxidizer Burner	TO-1	PM (filterable)	PSD Avoidance	Natural gas consumption	Natural gas consumption record
Thermal Oxidizer Burner	TO-1	VOC	PSD Avoidance	Natural gas consumption	Natural gas consumption record

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Recorded	Description of Recordkeeping

Section V.4: Reporting Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Reported	Description of Reporting
Acid Recovery Unit	ARU-1	NO	PSD Avoidance	TBD	TBD
Acid Recovery Unit	ARU-1	NO_2	PSD Avoidance	TBD	TBD
Acid Recovery Unit	ARU-1	TOC	40 CFR 60, Subpart NNNa	See description to the right	40 CFR 60.665a(a) Initial notification of startup and applicable provisions 40 CFR 60.665a(b) Data measured during performance tests 40 CFR 60.665a(b)(1) Performance test results 40 CFR 60.665a(j) and 40 CFR 60.767a(i)(1)-(3) Semi-annual reports for exceedances, vent stream diversion/relief device discharge, identifcation of the closed vent system
Thermal Oxidizer Burner	TO-1	NO_X from nat gas combustion	PSD Avoidance	Natural gas consumption	Natural gas consumption records
Thermal Oxidizer Burner	TO-1	NO_2 from TNM combustion	PSD Avoidance	TBD	TBD
Thermal Oxidizer Burner	TO-1	SO_2	PSD Avoidance	Natural gas consumption	Natural gas consumption records
Thermal Oxidizer Burner	TO-1	CO	PSD Avoidance	Natural gas consumption	Natural gas consumption records
Thermal Oxidizer Burner	TO-1	PM (filterable)	PSD Avoidance	Natural gas consumption	Natural gas consumption records

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Reported	Description of Reporting
Thermal Oxidizer Burner	TO-1	VOC	PSD Avoidance	Natural gas consumption	Natural gas consumption records

Section V.5: Testing Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Tested	Description of Testing
Acid Recovery Unit	ARU-1	NO	PSD Avoidance	NO	TBD
Acid Recovery Unit	ARU-1	NO_2	PSD Avoidance	NO2	TBD
Acid Recovery Unit	ARU-1	TOC	40 CFR 60, Subpart NNNa	TOC	US EPA Methods 1,2, 3A, & 18
Thermal Oxidizer Burner	TO-1	NO_X from nat gas combustion	PSD Avoidance	N/A	N/A
Thermal Oxidizer Burner	TO-1	NO_2 from TNM combustion	PSD Avoidance	NO_2 from TNM combustion	TBD
Thermal Oxidizer Burner	TO-1	SO_2	PSD Avoidance	N/A	N/A
Thermal Oxidizer Burner	TO-1	CO	PSD Avoidance	N/A	N/A
Thermal Oxidizer Burner	TO-1	PM (filterable)	PSD Avoidance	N/A	N/A
Thermal Oxidizer Burner	TO-1	VOC	PSD Avoidance	N/A	N/A

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Tested	Description of Testing

Section V.6: Notes, Comments, and Explanations

Freeman, Colby (EEC)

From: Tina Maniatis <tina.maniatis@dynonobel.com>
Sent: Thursday, July 9, 2026 8:37 PM
To: Freeman, Colby (EEC); Thamara Novak
Cc: Ross, Dakota D (EEC); Bittner, Zachary P (EEC); Pieter Haverkamp; Duncan Kimbro
Subject: RE: AI 3241: Dyno Nobel Inc. - Additional Information Required for 40 CFR 60, Subpart NNNa

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Hi Colby, please see our response below to your question on the solvent extraction unit:

Organic condensate from the Acid Recovery Unit (ARU) is fed to Solvent Extraction Unit (SEU). This unit uses toluene to extract MNT/DNT from the condensate stream. It then feeds the combined toluene / MNT / DNT steam as a feedstock to the TNT Plant.

The SEU is blanketed with nitrogen to prevent existence of an explosive atmosphere. The vent system on the SEU includes a pressure control valve with a downstream toluene guard condenser. The guard condenser significantly reduces any toluene present in the vent stream to atmosphere.

Several infrequent events can occur that require the vent pressure control valve to briefly open to release pressure of vent stream which includes mostly nitrogen with some toluene. Scenarios include:

- *Start-up*
- *Shutdown*
- *Level changes inside vessels or columns*
- *Process interruptions*
- *Emergency shutdowns*

Additionally, to ensure oxygen can't diffuse into the vent header which is open to atmosphere there is continuous small stream of nitrogen added, at the liquid discharge nozzle of the guard condenser, to achieve a positive flow during normal operation. This stream discharging to atmosphere usually has a very small partial pressure of toluene.

We have conservatively estimated toluene emissions to atmosphere at 2.12 tons per annum based on the expected partial pressure of toluene in the main vent line (not the lower partial pressure at discharge of guard condenser), 8,760 hours per annum (not the duration of infrequent release events) and release rates typical of stated events (not the much lower continuous nitrogen addition rate). This can be seen as a worst case scenario and can be refined based on real operating data once plant is commissioned.

Under the range of operating conditions for the SEU, no MNT / DNT is expected in the vent stream. MNT / DNT is stripped from the condensate by the toluene. The vapour pressure of DNT / MNT is several orders of magnitude lower than toluene, so it is effectively all removed by the toluene stream that is recycled.

Please let us know if you have any other questions.

Regards,
Tina

Tina Maniatis, PE
Sr. Environmental Director
Tina.maniatis@dynonobel.com
M: +1 801-922-0913

Dyno Nobel Inc.
6440 S Millrock Drive, Suite 150, Salt Lake City, UT 84121
dynonobel.com

From: Freeman, Colby (EEC) <colby.freeman@ky.gov>
Sent: Monday, June 15, 2026 11:50 AM
To: Tina Maniatis <tina.maniatis@dynonobel.com>; Thamara Novak <thamara.novak@dynonobel.com>
Cc: Ross, Dakota D (EEC) <dakota.ross@ky.gov>; Bittner, Zachary P (EEC) <Zachary.Bittner@ky.gov>
Subject: Re: AI 3241: Dyno Nobel Inc. - Additional Information Required for 40 CFR 60, Subpart NNNa

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Good afternoon,

I am following up to see when we can expect a response on the applicability of Subpart NNNa to the MNT/DNT stripping unit.

I also have a question regarding the downstream Solvent Extraction Unit. As I understand from the description of the MNT/DNT stripping unit, "condensate containing organics (MNT/DNT)... is sent to the Extraction Unit." In the Extraction Unit, fresh toluene is used to strip the organics. Section 3 of the Emission Calculation Methodologies indicates "Emissions from the Solvent Extraction Unit in the ARU consist of short, infrequent emissions of toluene when pressure is relieved." Can you provide any additional context as to the conditions that would necessitate a pressure relief event and why there are no DNT emissions represented from such events?

Thanks,

Colby Freeman

Environmental Engineer Technologist I

Chemical Section

Division for Air Quality

Freeman, Colby (EEC)

From: Freeman, Colby (EEC)
Sent: Wednesday, July 15, 2026 12:02 PM
To: Duncan Kimbro; Ross, Dakota D (EEC); Bittner, Zachary P (EEC)
Cc: Tina Maniatis; Pieter Haverkamp; Thamara Novak; Chloe Trinh
Subject: Re: AI 3241: Dyno Nobel Inc. - Additional Information Required for 40 CFR 60, Subpart NNNa

Duncan,

Thank you for providing the updated V form. In our review of Subpart NNNa as it relates to the ARU, the Division identified that the NOx absorber appears to meet the definition of a recovery device, as it is "capable of and used for the purpose of recovering chemicals" (DNT) for reuse. Absorbers used as a recovery device must monitor exit temperature of the absorbing liquid and exit specific gravity (see Table 2 of Subpart NNNa). Testing establishes a maximum limit for exit temperature and a range of 0.1 specific gravity units from the average of the performance test (see 40 CFR 60.665a(c)(1)). We intend to include these requirements in the permit, so I wanted to bring your attention to this as it was not included in the updated V form.

Separately, the Division is concerned that 40 CFR 64, Compliance Assurance Monitoring (CAM), may be applicable to the TDU (for SO_2) and the ARU (for NOx and for CO from the TNT area). My understanding is that the NOx absorber would meet the definition of a control device for NOx under 40 CFR 64 regardless of its status as a recovery device under 40 CFR 60, Subparts NNNa and RRRa, as it is evaluated for the pollutant-specific emission unit. Please provide an applicability analysis for CAM for these units and propose monitoring to ensure compliance prior to the CAM plan submittal date.

Although CAM is likely not applicable for NOx from the TDU, we will also need to determine appropriate monitoring of the SCR for demonstrating sufficient control for the source wide limits.

Thanks,

Colby Freeman
Environmental Engineer Technologist I
Chemical Section
Division for Air Quality
300 Sower Blvd
Frankfort, KY 40601
(502) 782 - 1467

From: Duncan Kimbro <dkimbro@franklinengineering.com>
Sent: Tuesday, June 30, 2026 6:12 PM
To: Freeman, Colby (EEC) <colby.freeman@ky.gov>; Ross, Dakota D (EEC) <dakota.ross@ky.gov>; Bittner, Zachary P (EEC) <Zachary.Bittner@ky.gov>
Cc: Tina Maniatis <tina.maniatis@dynonobel.com>; Pieter Haverkamp <Pieter.Haverkamp@dynonobel.com>; Thamara Novak <thamara.novak@dynonobel.com>; Chloe Trinh <ctrinh@franklinengineering.com>
Subject: RE: AI 3241: Dyno Nobel Inc. - Additional Information Required for 40 CFR 60, Subpart NNNa

Freeman, Colby (EEC)

From: Ross, Dakota D (EEC)
Sent: Friday, July 24, 2026 8:59 AM
To: Duncan Kimbro
Cc: Tina Maniatis; Pieter Haverkamp; Thamara Novak; Chloe Trinh; Freeman, Colby (EEC); Luma, Johnson (EEC); Bittner, Zachary P (EEC)
Subject: AI 3241 Dyno Nobel Additional Information Required

Good Morning,

In addition to the follow up questions sent by Colby on 7/15, below are several more areas where the Division needs additional information/ clarification in order to draft the Initial Title V permit:

1. Please explain how an emission rate of 0.7 tpy (1381.9 lb/yr) was calculated for PRVs in toluene service (pgs. 69/216 & 139/193). The Division finds the emission rate should be 4.01 tpy, pushing source-wide toluene emissions over 10 tpy, necessitating a source wide single HAP (toluene) limitation if the source wishes to maintain status as an area source.
2. For RMH-2 Oleum Operations:
    a. Please confirm that the Oleum Tanker Truck (RMH-2B) will operate with a vapor balancing system (pg. 7/216) and will not vent emission to the Oleum Scrubber (pgs. 12/216 & 141/193).
    b. Please explain the discrepancy in emissions for the Oleum Scrubber. The DEP 7007N form (pg. 141/193) shows uncontrolled SO3 emissions of 256 tpy, while the emissions calculation attachment (pg. 51/216) shows 40.8 tpy from oleum blending and the oleum tank combined.
    c. Please provide basic parameters for the Oleum Blending Surge Vessel (RMH-2C) to be listed in the permit description (capacity, max annual throughput, etc.).
3. For the TDU:
    a. Please provide additional information on startup and shutdown for the TDU, such as expected duration, frequency, and emissions.
    b. The N form for the TDU lists annual uncontrolled PM emissions of 1004 tpy and controlled emissions of 0.08 tpy. These values are also listed in the source wide emission summaries for PM on pg. 19-20/216 and align with the vendor performance guarantee provided on pg. 59/216 of the narrative application. However, the source wide emission summary shows 630 tpy uncontrolled for PM10 and PM2.5 and 0.052 tpy controlled. Please provide additional information on the fractionation of PM to justify lower PM10/PM2.5 emission values.
4. Please provide additional clarification on the toluene emission estimate for the Solvent Extraction Unit (ARU-2). Pg. 25/216 states “The average uncontrolled emissions of 0.48 lb/hr of toluene were provided by the equipment technology provider based on proprietary process modelling and *a schedule of operating scenarios under which emissions may occur*.” The email response received 7/9/2026 appeared to indicate the emission estimate was in fact based on “release rates typical of stated events” and 8,760 hours per annum. These appear to be conflicting statements.
5. Please provide additional information on the 550 gallon gasoline storage tank currently permitted as EP IA6. Is or should this unit be subject to 40 CFR 63 subpart CCCCCC?

The Division appreciates your continued cooperation. We will continue drafting the permit while we await your responses.

Thanks,

Dakota Ross, P.E.
Environmental Engineer
Permit Review Branch
Division for Air Quality
300 Sower Blvd
Frankfort, KY 40601
(502) 782 - 6479

Freeman, Colby (EEC)

From: Freeman, Colby (EEC)
Sent: Wednesday, August 19, 2026 8:58 AM
To: Freeman, Colby (EEC)
Subject: FW: Draft Air Permit Language to KDEP
Attachments: Dyno Nobel TNT Plant Draft Permit Language 08-11-2026.docx

---

From: Pieter Haverkamp <Pieter.Haverkamp@dynonobel.com>
Sent: Wednesday, August 12, 2026 2:41 PM
To: Johnson, Kari (EEC) <Kari.Johnson@ky.gov>
Cc: Shewekah, Rick S (EEC) <Rick.Shewekah@ky.gov>; Wilhoite, Jessica L (EEC) <Jessica.Wilhoite@ky.gov>; Tina Maniatis <tina.maniatis@dynonobel.com>; Duncan Kimbro <dkimbro@franklinengineering.com>; Chloe Trinh <ctrinh@franklinengineering.com>
Subject: FW: Draft Air Permit Language to KDEP

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Hi Kari,

As discussed, please find attached some suggested content for draft air permit for TNT that Franklin Engineering has put together to review and use as you please.

Additionally, we expect to have answer back on questions from Johnson and Colby in the next few days. We would value a chance to talk the team though equipment design of the Acid Recovery Plant regarding DNT recovery and applicability of Table 2 of Subpart NNNa. Could you support a short meeting in the next week? We could also use this to cover any clarifications on suggested draft content or answers to other questions we will send shortly.

Thanks,

Pieter

From: Chloe Trinh <ctrinh@franklinengineering.com>
Date: Tuesday, 11 August 2026 at 3:20 pm
To: Pieter Haverkamp <Pieter.Haverkamp@dynonobel.com>; Tina Maniatis <tina.maniatis@dynonobel.com>
Cc: Duncan Kimbro <dkimbro@franklinengineering.com>
Subject: Draft Air Permit Language to KDEP

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This message came from outside your organization.
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Hi Pieter –

Please forward the draft air permit and the following message to KDEP along with any additional language you would like to add.

We have prepared proposed language for several sections of the draft air permit for the Dyno Nobel TNT Plant. The draft includes operating requirements, emission limitations, monitoring and recordkeeping requirements, and other permit conditions that we anticipate to be applicable based on our current understanding.

Thanks,

Chloe Trinh
Franklin Engineering Group, Inc.
381 Riverside Drive, Suite 200
Franklin, TN 37064
Cell Phone (336) 609-4955
Office Phone (615) 591-0058 ext. 271
Website: FranklinEngineering.com

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Permit Number:

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Permit	**Permit Type**	**Activity #**	**Complete Date**	**Issuance Date**	**Summary of Action**

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Permit Number:

	Thermal Oxidizer	
Thermal Destruction Unit	Thermal Destruction Unit	

Permit Number:

SECTION A – PERMIT AUTHORIZATION

Pursuant to

The permittee shall not construct, reconstruct, or modify any affected facilities without first submitting a complete application and receiving a permit for the planned activity from the permitting authority, except as provided in this permit or in 401 KAR 52:020, Title V Permits.

Permit Number:

SECTION B – EMISSION POINTS, EMISSION UNITS, APPLICABLE REGULATIONS, AND OPERATING CONDITIONS

Utility Area

EMISSION POINT	PROCESS UNIT	NAME AND DESCRIPTION	
UTIL-1		**Boiler**	
		Description:	Natural Gas Boiler
		Primary Fuel:	Natural Gas
		Rated Capacity:	36.3 mmBtu/hr
		Commenced:	2026
	01	**Natural Gas Combustion**	
		Controls:	None

APPLICABLE REGULATIONS:

401 KAR 60:005 Section 2(2)(d), 40 CFR 60.40c through 60.48c (Subpart Dc), Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units.

PRECLUDED REGULATIONS:

40 CFR 63 Subpart JJJJJJ, National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources

1. **Operating Limitations:**
   None.
2. **Emission Limitations:**
   a. See **Section D**, 4.
3. **Testing Requirements:**
   None.
4. **Specific Monitoring Requirements:**
   a. The permittee shall record and maintain records of the amount of natural gas combusted during each operating day. [40 CFR 60.48c(g)(1)]
5. **Specific Recordkeeping Requirements:**
   a. For natural gas, the permittee shall maintain records for the name of the supplier, potential sulfur emissions rate or maximum potential sulfur emissions rate of the fuel in ng/J heat input, and the method used to determine the potential sulfur emissions rate of the fuel. [40 CFR 60.48c(f)(i),(ii),(iii)]
   b. The permittee shall record and maintain records of natural gas usage on a monthly basis [40 CFR 60.48c(g)(2)]
6. **Specific Reporting Requirements:**

a. The permittee shall submit notification of the date of construction or reconstruction and actual startup. [40 CFR 60.48c(a)]
b. The permittee shall submit notification of the design heat input capacity of the facility and identification of the fuels to be combusted in the facility. [40 CFR 60.48c(a)(1)]
c. The permittee shall submit notification of the annual capacity factor at which the permittee anticipates operating the facility based on all fuels fired and based on each individual fuel fired. [40 CFR 60.48c(a)(3)]

Permit Number:

SECTION B – EMISSION POINTS, EMISSION UNITS, APPLICABLE REGULATIONS, AND OPERATING CONDITIONS

Raw Material Handling Area

EMISSION POINT	PROCESS UNIT	NAME AND DESCRIPTION
RMH-1A		**Toluene Tank** Description: Vertical fixed-roof tank, unloaded from truck 01-T0001 (32,400 gal) Vapor balance routed to delivery truck Commenced: 2026
	01	**Working losses vented to delivery truck** Controls: None
	02	**Breathing losses vented to atmosphere** Controls: None

APPLICABLE REGULATIONS:

40 CFR 60 Subpart Kc, Standards of Performance for Volatile Organic Liquid Storage Vessels for Which Construction, Reconstruction, or Modification Commenced After October 4, 2023

PRECLUDED REGULATIONS:

1. **Operating Limitations:**
   None.
2. **Emission Limitations:**
   a. See **Section D**, 4.
3. **Testing Requirements:**
   a. None.
4. **Specific Monitoring Requirements:**
   a. None
5. **Specific Recordkeeping Requirements:**
   a. The permittee shall maintain records of dimensions of the storage vessel and an analysis showing the capacity of the storage vessel. [40 CFR 60.115c(b)]
6. **Specific Reporting Requirements:**
   a. None

Permit Number:

SECTION B – EMISSION POINTS, EMISSION UNITS, APPLICABLE REGULATIONS, AND OPERATING CONDITIONS

Raw Material Handling Area

EMISSION POINT	PROCESS UNIT	NAME AND DESCRIPTION
RMH-1B		**Fugitive Emissions for Equipment in Toluene Service** Description: Fugitive equipment leaks Commenced: 2026 Controls: Leak detection and repair

Service	Components	
	Type – service	**Count**
Toluene Handling Equipment	Valves – light liquid	58
	Pump seals – light liquid	4
	Flanges and connectors – all	111
	Open-ended lines – all	2
	Sampling Connections	4
	Pressure Relief Valves	2

NOTE: The equipment count listed above reflects an approximate count of the equipment as of the date of issuance of this permit but is not intended to limit the permittee to the exact numbers specified. The permittee may add or remove pipeline equipment without a permit revision as long as the equipment continues to comply with the applicable requirements listed below and the changes do not have a significant impact on emissions or potential to emit.

APPLICABLE REGULATIONS:

40 CFR 60 Subpart VVb, Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry for Which Construction, Reconstruction, or Modification Commenced After April 25, 2023.

PRECLUDED REGULATIONS:

None.

1. **Operating Limitations:**
   None.
2. **Emission Limitations:**
   a. See **Section D**, 4.

3. **Testing Requirements:**

None.

4. **Specific Monitoring Requirements:**
   a. The permittee shall follow the Leak Detection and Repair program requirements per 40 CFR 60.485b(a)-60.485b(g).
5. **Specific Recordkeeping Requirements:**
   a. The permittee shall follow the Leak Detection and Repair program recordkeeping requirements per 40 CFR 60.486b(a)-60.486b(l).
6. **Specific Reporting Requirements:**
   a. The permittee shall follow the Leak Detection and Repair program reporting requirements per 40 CFR 60.487b(a)-60.487b(i).

Permit Number:

SECTION B – EMISSION POINTS, EMISSION UNITS, APPLICABLE REGULATIONS, AND OPERATING CONDITIONS

Raw Material Handling Area

EMISSION POINT	PROCESS UNIT	NAME AND DESCRIPTION	
RMH-4C		**Spent Acid Tank**	
		Description:	Vertical fixed-roof tank T404-1 (38,772 gal) Spent acid collected from the TNT Nitration process
		Commenced:	2026
	01	**Working losses**	
		Controls:	Nitric Acid Scrubber
	02	**Breathing losses**	
		Controls:	Nitric Acid Scrubber

APPLICABLE REGULATIONS:

PSD Avoidance

PRECLUDED REGULATIONS:

1. **Operating Limitations:**
   TBD
2. **Emission Limitations:**
   a. See **Section D**, 4.
3. **Testing Requirements:**
   TBD
4. **Specific Monitoring Requirements:**
   a. TBD
5. **Specific Recordkeeping Requirements:**
   a. TBD
6. **Specific Reporting Requirements:**
   a. TBD

Permit Number:

SECTION B – EMISSION POINTS, EMISSION UNITS, APPLICABLE REGULATIONS, AND OPERATING CONDITIONS

TNT Production Area

EMISSION POINT	PROCESS UNIT	NAME AND DESCRIPTION
TNT-1		**Nitration + Washers 1&2** Description: Emissions from the nitration and washing processes in the TNT production area.
	01	**Nitration + Washers 1&2** Controls: NO_X Absorber and Thermal Oxidizer (TO-1)

APPLICABLE REGULATIONS:

PSD Avoidance

40 CFR 60, Subpart RRRa, Standards of Performance for Volatile Organic Compound Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Reactor Processes for Which Construction, Reconstruction, or Modification Commenced After April 25, 2023

PRECLUDED REGULATIONS:

1. **Operating Limitations:**
   None.
2. **Emission Limitations:**
   a. See **Section D**, 4.
3. **Testing Requirements:**
   a. A performance test shall be conducted to meet the operating requirements for VOCs.
   b. An initial performance test for tetranitromethane (TNM, a VOC) shall be performed and repeated at least every 60 months. [40 CFR 60.704a(a)]
4. **Specific Monitoring Requirements:**
   a. The closed vent system shall be inspected for leaks using Method 21 (LDAR) upon start-up and annually. [40 CFR 60.710a]
   b. A flow indicator shall be installed, calibrated, maintained, and operated to determine whether vent stream flow is present at least once every 15 minutes. [40 CFR 60.710a(e)].
   c. The presence of flow diverted to the atmosphere from the control and recovery device shall be monitored. [40 CFR 60 Subpart RRRa, Table 2]

d. The thermal oxidizer firebox temperature shall be continuously monitored and recorded every 15 minutes, on a 3-hour block average. [40 CFR 60 Subpart RRRa, Table 2]
e. Continuous Parameter Monitoring Systems (CPMS) are subject to the Calibration and Quality Control Requirements in Table 4 to Subpart RRRa of Part 60.

5. Specific Recordkeeping Requirements:

a. The permittee shall maintain records of a schematic diagram of the affected vent streams, collection system(s), fuel systems, control devices, and bypass systems. [40 CFR 60.705a(u)]
b. Records shall be maintained per 40 CFR 60.710a(h).

6. Specific Reporting Requirements:

a. See **Section F**.

Permit Number:

SECTION B – EMISSION POINTS, EMISSION UNITS, APPLICABLE REGULATIONS, AND OPERATING CONDITIONS

Acid Recovery Area

EMISSION POINT	PROCESS UNIT	NAME AND DESCRIPTION
ARU-1		**Acid Recovery Unit** Description: Emissions from the denitration, stripping, and concentration processes in the acid recovery area.
	01	**Acid Recovery Unit** Controls: NO_X Absorber and Thermal Oxidizer (TO-1)

APPLICABLE REGULATIONS:

PSD Avoidance

40 CFR 60, Subpart NNNa—Standards of Performance for Volatile Organic Compound (VOC) Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Operations for Which Construction, Reconstruction, or Modification Commenced After April 25, 2023

PRECLUDED REGULATIONS:

1. **Operating Limitations:**
   None.
2. **Emission Limitations:**
   a. See **Section D**, 4.
3. **Testing Requirements:**
   TBD

4. **Specific Monitoring Requirements:**
   a. The permittee shall conduct an initial and annual inspection of the closed vent system for leaks using Method 21 (LDAR). [40 CFR 60.670(a)]
   b. The permittee shall install, calibrate, maintain and operate a flow indicator that determines whether vent stream flow is present at least once every 15 minutes. [40 CFR 60.670(e)]

c. The permittee shall monitor the presence of flow diverted to the atmosphere from the control and recovery device. [40 CFR 60, Subpart NNNa, Table 2]
d. The permittee shall continuously monitor the temperature of the Thermal Oxidizer firebox, and record every 15 minutes on a 3-hour block average. [40 CFR 60, Subpart NNNa, Table 2]
e. The permittee must operate the Thermal Oxidizer firebox temperature monitoring device in accordance with the Calibration and Quality Control Requirements for Continuous Parameter Monitoring System (CPMS). [40 CFR 60, Subpart NNNa, Table 4]

5. <u>Specific Recordkeeping Requirements:</u>

a. The permittee shall keep records in accordance with 40 CFR 60.665a(b), (c), (c)(7), and (d).

6. <u>Specific Reporting Requirements:</u>

a. The permittee shall submit to the Division the following information:
   i. Initial notification of startup and applicable provisions. [40 CFR 60.665a(a)]
   ii. Data measured during performance tests. [40 CFR 60.665a(b)]
   iii. Results of performance tests. [40 CFR 60.665a(b)(1)]
   iv. Semi-annual reports for exceedances, vent stream diversion or relief device discharge, identification of the closed vent system. [40 CFR 60.665a(j) and 40 CFR 60.767a(i)(1)-(3)]

Permit Number:

SECTION B – EMISSION POINTS, EMISSION UNITS, APPLICABLE REGULATIONS, AND OPERATING CONDITIONS

Acid Recovery Area

EMISSION POINT	PROCESS UNIT	NAME AND DESCRIPTION
ARU-2		**Solvent Extraction Unit** Description: Extraction unit that uses toluene to strip organics from the organic condensate stream to be reused in the TNT Nitration process

APPLICABLE REGULATIONS:

PSD Avoidance

PRECLUDED REGULATIONS:

1. **Operating Limitations:**
   TBD
2. **Emission Limitations:**
   a. See **Section D**, 4.
3. **Testing Requirements:**
   TBD
4. **Specific Monitoring Requirements:**
   a. TBD
5. **Specific Recordkeeping Requirements:**
   a. TBD
6. **Specific Reporting Requirements:**
   a. TBD

Permit Number:

SECTION B – EMISSION POINTS, EMISSION UNITS, APPLICABLE REGULATIONS, AND OPERATING CONDITIONS

Acid Recovery Area

EMISSION POINT	PROCESS UNIT	NAME AND DESCRIPTION
TO-1		**Thermal Oxidizer** Description: Thermal oxidizer following NO_X Absorber in the Acid Recovery Unit Fuels: Natural Gas Capacity: 2.4 MMBtu/hr burner rating Commenced: 2026
	01	**Natural Gas Combustion**

APPLICABLE REGULATIONS:

PSD Avoidance

PRECLUDED REGULATIONS:

1. **Operating Limitations:**
   a. TBD

2. **Emission Limitations:**
   a. See **Section D**, 4.
   b. The permittee shall reduce emissions of TOC by 98 weight-percent destruction efficiency or to a TOC (minus methane and ethane) concentration of 20 ppmv on a dry basis corrected to 3% oxygen. [40 CFR 60 Subpart NNNa]

3. **Testing Requirements:**
   TBD

4. **Specific Monitoring Requirements:**
   a. The permittee shall install, calibrate (as applicable), operate, and maintain the following monitoring devices and an automated data acquisition and handling system to determine

compliance with the operating limitations for the Thermal Oxidizer [401 KAR 52:020, Section 10 and 40 CFR 63.996(c)]:

i. A flow meter on the natural gas line to measure the natural gas consumption.

5. Specific Recordkeeping Requirements:

a. The permittee shall maintain records of the following information [401 KAR 52:020, Section 10]:

i. A copy of the natural gas consumption record.

6. Specific Reporting Requirements:

a. The permittee shall submit to the Division a copy of the natural gas consumption record.

Permit Number:

SECTION B – EMISSION POINTS, EMISSION UNITS, APPLICABLE REGULATIONS, AND OPERATING CONDITIONS

Thermal Destruction Unit

EMISSION POINT	PROCESS UNIT	NAME AND DESCRIPTION	
TDU-1		**Hazardous Waste Incinerator**	
		Description:	Single Chamber Incinerator
		Primary Fuel:	Natural Gas
		Supplemental Fuel:	N/A
		Capacity:	2,800 lb/hr hourly rolling average total waste feed
		Commenced:	2026
	01	**Liquid Hazardous Waste Combustor**	
		Controls:	Dry-Sorbent Injection Baghouse HEPA Filter Selective Catalytic Reduction
	02	**Natural Gas Reheater**	
		Controls:	None

APPLICABLE REGULATIONS:

401 KAR 59:020, New incinerators.

401 KAR 63:002 Section 2(4)(rr), 40 CFR 64.1200 through 63.1221, Table 1, and Appendix (Subpart EEE), National Emissions Standards for Hazardous Air Pollutants from Hazardous Waste Combustors.

NON-APPLICABLE REGULATIONS:

401 KAR 59:021, New Municipal Solid Waste Incinerators.

40 CFR 60, Subpart Cb, Emissions Guidelines and Compliance Times for Large Municipal Waste Combustors that are constructed on or before September 20, 1994.

40 CFR 60, Subpart Ce, Emissions Guidelines and Compliance Times for Hospital/Medical/Infectious Waste Incinerators.

401 KAR 60:005, Section 2(2)(e), 40 CFR 60.50 through 60.54 (Subpart E), Standards of Performance for Incinerators.

Permit Number:

401 KAR 60:005, Section 2(2)(g), 40 CFR 60.50b through 60.59b (Subpart Eb), Standards of Performance for Large Municipal Waste Combustors for Which Construction is Commenced After September 20, 1994 or for Which Modification or Reconstruction is Commenced After June 19, 1996.

40 CFR 61, Subpart C, National Emission Standard for Beryllium.

1. **Operating Limitations:**
   a. The incinerator shall operate within the following established operating limits. [40 CFR 63, Subpart EEE as established in the Notification of Compliance]
      i. Whenever a Comprehensive Performance Test is conducted, the operating requirements specified in the Notification of Compliance will be incorporated in the Title V permit and will replace the operating limits stated below upon submittal of the Notification of Compliance.

Operating Parameter	Permitting Units	Established Operating Limit Value	Unit
Minimum Combustion Chamber Temperature (measured as Flame Temp.)	Hourly Rolling Average	TBD	°F
Maximum Stack Gas Flowrate	Hourly Rolling Average	TBD	scfm
Maximum Hazardous Wate Feed Rate	Hourly Rolling Average	TBD	lb/hr
Operation of Waste Firing System Minimum Waste Feed Nozzle Atomization Pressure	Instantaneous	TBD	psig
Maximum Baghouse Inlet Temperature	Hourly Rolling Average	TBD	°F
Maximum Combustion Air Flowrate	Hourly Rolling Average	TBD	scfm
Minimum SCR Inlet Temperature	Hourly Rolling Average	TBD	°F
Maximum SCR Operating Hours	N/A	TBD	
Maximum SCR Inlet Temperature	Hourly Rolling Average	TBD	°F
Maximum Feed Rate of Mercury	12-Hour Rolling Average	TBD	lb/hr
Minimum Stack Gas Flowrate of MTEC	12-Hourly Rolling Average	TBD	scfm
Maximum Pressure Drop Across the Baghouse	Hourly Rolling Average	TBD	in. H_2O
Baghouse Leak Detection via Triboelectric Detector	30-min Average	TBD	(% indication)
Minimum Pressure Drop Across the HEPA	Hourly Rolling Average	TBD	in. H_2O

Maximum Pressure Drop Across the HEPA	Hourly Rolling Average	TBD	in. H_2O
Maximum Ash Feedrate (calculated based on red water feedrate and analytical data)	12-Hourly Rolling Average	TBD	lb/hr
Maximum Feed Rate of SVM[1] (Pb, Cd)	12-Hour Rolling Average	TBD	lb/hr
Maximum Feed Rate of LVM[2] (As, Be, Cr)	12-Hour Rolling Average	TBD	lb/hr
OPLs on the PM control device as specified by §63.1209(m)(1)	Hourly Rolling Average	TBD	
Maximum Feed Rate of Total Chlorine/Chloride	12-Hour Rolling Average	TBD	lb/hr
Maximum Feed Rate of Total Chlorine/Chloride (calculated based on red water feedrate and analytical data)	12-Hour Rolling Average	TBD	lb/hr
Minimum DSI Feedrate	Hourly Rolling Average	TBD	lb/hr
Minimum carrier fluid flowrate or nozzle pressure drop	Instantaneous	TBD	in. H_2O

1. *SVM – Semi volatile metal; sum of cadmium and lead*
2. *LVM – Low volatile metal; sum of arsenic, beryllium and chromium*

Compliance Demonstration Method:
The incinerator shall be equipped with an automatic waste feed cutoff (AWFCO) system operated in accordance with 40 CFR 63.1206(c)(3).

b. The incinerator shall be operated in accordance with the Startup, Shutdown, and Malfunction Plan required by 40 CFR 63.1206(c)(2).

c. The incinerator shall be operated in accordance with the Operating and Maintenance Plan required by 40 CFR 63.1206(c)(7).

d. The incinerator shall be equipped with a baghouse leak detection system that meets the specification and requirements of 40 CFR 63.1206(c)(8)(ii).

e. The permittee shall ensure that the source is operated and maintained at all times by persons who are trained and certified to perform these and any other duties that may affect emissions of hazardous air pollutants. A certified control room operator shall be on duty at the site at all times the source is in operation. [40 CFR 63.1206(c)(6)]

Permit Number:

2. Emission Limitations:

a. The permittee shall not exceed the emission limitations specified below. [40 CFR 63.1219(b)].

HAP or HAP Surrogate	Emission Limitation	Regulation
Dioxins/Furans	0.11 ng/dscm, 7% O_2, on a Toxic Equivalence basis	40 CFR 63.1219(b)(1)(i)
Mercury	8.1 µg/dscm, 7% O_2	40 CFR 63.1219(b)(2)
SVM (Semi Volatile Metals) -- Cd, Pb	10 µg/dscm, 7% O_2	40 CFR 63.1219(b)(3)
LVM (Low Volatile Metals) -- As, Be, Cr	23 µg/dscm, 7% O_2	40 CFR 63.1219(b)(4)
Carbon Monoxide (CO)	100 ppmv, 7% O_2	40 CFR 63.1219(b)(5)(i)
Total Hydrocarbons (THC)	10 ppmv, 7% O_2	40 CFR 63.1219(b)(5)(ii)
HCl + Cl_2	21 ppmv, 7% O_2	40 CFR 63.1219(b)(6)
Particulate Matter (PM)	0.0016 gr/dscf, 7% O_2	40 CFR 63.1219(b)(7)
Ammonia	10 ppm, 7% O_2	TBD

Compliance Demonstration Method:

1. Comprehensive Performance Test conducted per 40 CFR 63.1207.
2. Operation of incinerator as specified in **1. Operating Limitations**, Condition a. above.

b. Particulate emissions shall not exceed 0.23 g/dscm (0.1 gr/dscf), corrected to 12 percent carbon dioxide excluding the contribution of carbon dioxide from auxiliary fuel. [401 KAR 59:020, Section 3(2)(a)]

Compliance Demonstration Method:

1. Compliance with the 40 CFR 63, Subpart EEE particulate matter emission limit listed in the table above.
2. Operation of incinerator as specified in **1. Operating Limitations**, Condition a. above.

c. The permittee shall achieve a destruction and removal efficiency (DRE) of 99.99% for each principle organic hazardous constituent (POHC) specified in the Comprehensive Performance Test Plan. [40 CFR 63.1219(c)]

Compliance Demonstration Method:

1. Comprehensive Performance Test conducted per 40 CFR 63.1207.

2. Operation of incinerator as specified in **1. Operating Limitations**, Condition a. above. For each compliance performance test, as referred to in **1. Operating Limitations**, Condition a. above, calculate DRE for each POHC from the following equation:

$$DRE = [1 – (W_{out}/W_{in})] \times 100\%$$

Where:
W_{in}= mass feedrate of one POHC in a waste feedstream; and
W_{out}= mass emission rate of the same POHC present in exhaust emissions prior to release to the atmosphere.

3. <u>Testing Requirements:</u>

a. The permittee shall comply with the applicable testing requirements in 40 CFR 63.1207, and by the frequency described under 40 CFR 63.1207(d).

b. The permittee shall conduct a minimum of three runs of a performance test required under 40 CFR 63.1207 to document compliance with the emission standards of 40 CFR 63, Subpart EEE. [40 CFR 63.1206(b)(12)]

c. See **4. Specific Monitoring Requirements** below.

4. <u>Specific Monitoring Requirements:</u>

a. The permittee shall comply with the applicable monitoring requirements in 40 CFR 63.1209.

b. Quality assurance procedures for the monitoring systems shall be conducted in accordance with the Continuous Monitoring Performance Evaluation Plan required by 40 CFR 63.1209(b) and (d)(1).

c. Waste shall be analyzed in accordance with the Feedstream Analysis Plan required by 40 CFR 63.1209(c)(2).

5. <u>Specific Recordkeeping Requirements:</u>

a. The incinerator shall have a nameplate installed in a conspicuous place on the unit giving the manufacturer’s name, model number, rated capacity, and the types of waste material for which the unit is designed. [401 KAR 59:020 Section 5]

b. The permittee shall comply with the applicable recordkeeping requirements in 40 CFR 63.1211.

6. <u>Specific Reporting Requirements:</u>

a. The permittee shall comply with the applicable reporting requirements in 40 CFR 63.1211 and notification requirements of 40 CFR 63.1210.

b. See **Section F**.

7. <u>Specific Control Equipment Operating Conditions</u>:

See **1. Operating Limitations**, Condition a. above.

Permit Number:

SECTION C – INSIGNIFICANT ACTIVITIES

The following listed activities have been determined to be insignificant activities for this source pursuant to 401 KAR 52:020, Section 6. Although these activities are designated as insignificant the permittee must comply with the applicable regulation.

Utility Area

Equipment ID	Description	Capacity	Date Commenced	Generally Applicable Regulation
	Diesel Fire Water Pump	404 kW-h	2026	40 CFR 60, Subpart IIII
	Emergency Generator 1	1475 BHP	2026	40 CFR 60, Subpart JJJJ
	Emergency Generator 2	1475 BHP	2026	40 CFR 60, Subpart JJJJ
20-ZCT0001	Cooling Tower 1 Drift Emissions	3382 gpm	2026	None
21-ZCT0001	Cooling Tower 2 Drift Emissions	590 gpm	2026	None

Raw Material Handling Area

Equip ID	Description	Capacity	Date Commenced	Generally Applicable Regulation
02-T0001	Oleum Tank	58,677 gallons	2026	None
	Oleum Truck		2026	None
	Oleum Surge Blending Vessel		2026	None
02-T0010	97% Sulfuric Acid Tank	78,307 gallons	2026	None
02-T0030	98% Nitric Acid Tank	42,575 gallons	2026	None
02-T0042	Weak Nitric Acid Tank	8,338 gallons	2026	None
02-T0040	50% Nitric Acid Tank	8,616 gallons	2026	None
	Diesel Tank for fire water pump	550 gallons	2026	None

TNT Production Area

Equip ID	Description	Capacity	Date Commenced	Generally Applicable Regulation
	Washers 3-5	2459 lb/hr	2026	None
	Drying		2026	None
	Flaking		2026	None
	Packaging		2026	None
	Sodium Sulfite Bag Unloading	1000 kg bag/hr	2026	None
	Sodium Bisulfite Bag Unloading	100 kg bag/hr	2026	None

SECTION D – SOURCE EMISSION LIMITATIONS AND TESTING REQUIREMENTS

1. a. Total annual emissions from the emission points listed in Table 1 shall not exceed the emission rates listed in Table 2, based on a rolling 12-month total. [To preclude applicability of 401 KAR 51:017, Prevention of Significant Deterioration of Air Quality (PSD)]

Table 1
TNT Plant Construction Emission Points

Emission Point ID	Description
UTIL-1	Boiler
RMH-1A	Toluene Tank
RMH-1B	Toluene Equipment Fugitive Emissions
RMH-4C	Spent Acid Tank
TNT-1	Nitration + Washers 1&2
ARU-1	Acid Recovery Unit
ARU-2	Solvent Extraction Unit
TO-1	Thermal Oxidizer
TDU-1	Thermal Destruction Unit

Table 2
Dyno Nobel Emission Limits

Pollutant	Emission Limit (rolling 12-month total)
PM_{10}	90 tons
VOC	90 tons
CO	90 tons
NO_X	90 tons
SO_2	90 tons

SECTION E – SOURCE CONTROL EQUIPMENT REQUIREMENTS

1. Pursuant to 401 KAR 50:055, Section 2(5), 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. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Division which may include, but is not limited to, monitoring results, review of operating and maintenance procedures, and inspection of the source.

Freeman, Colby (EEC)

From: Bittner, Zachary P (EEC)
Sent: Wednesday, August 19, 2026 7:45 AM
To: Ross, Dakota D (EEC); Harley, Brian (EEC); Freeman, Colby (EEC); Luma, Johnson (EEC)
Subject: Fw: Draft Air Permit Language to KDEP
Attachments: N - Source Emissions RMH.xls; J - Volatile Liquid Storage RMH - revised 8-12.xls; 3 Sitewide Emission Summary - Rev1 08-14-2026.pdf; RESPONSE TO KDEP COMMENTS QUESTIONS - AUGUST 18TH 2026.pdf

****CAUTION** PDF attachments may contain links to malicious sites. Please contact the COT Service Desk ServiceCorrespondence@ky.gov for any assistance.**

See attached.

I communicated back that we would reach out with any additional questions and suggested dates should we need a meeting.

Thank you,
Zach

From: Pieter Haverkamp <Pieter.Haverkamp@dynonobel.com>
Sent: Tuesday, August 18, 2026 4:02 PM
To: Johnson, Kari (EEC) <Kari.Johnson@ky.gov>
Cc: Shewekah, Rick S (EEC) <Rick.Shewekah@ky.gov>; Wilhoite, Jessica L (EEC) <Jessica.Wilhoite@ky.gov>; Tina Maniatis <tina.maniatis@dynonobel.com>; Duncan Kimbro <dkimbro@franklinengineering.com>; Chloe Trinh <ctrinh@franklinengineering.com>; Bittner, Zachary P (EEC) <Zachary.Bittner@ky.gov>
Subject: Re: Draft Air Permit Language to KDEP

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Hi Kari, Rick, Jessica, Zach,

Further to this email, please find attached answers to questions from Johnson and Colby plus two additional points of confirmation from Duncan.

Could you please pass this onto the team and please let us know if you have further questions or feedback? Also could you please suggest dates and times that may work to discuss Table 2 of Subpart NNNa and any other questions / thoughts you may have on this or any other matters?

Thanks,

Pieter

From: Pieter Haverkamp <Pieter.Haverkamp@dynonobel.com>
Sent: Wednesday, August 12, 2026 9:41 PM
To: Johnson, Kari (EEC) <Kari.Johnson@ky.gov>
Cc: Shewekah, Rick S (EEC) <rick.shewekah@ky.gov>; Wilhoite, Jessica L (EEC) <Jessica.Wilhoite@ky.gov>; Tina Maniatis <tina.maniatis@dynonobel.com>; Duncan Kimbro <dkimbro@franklinengineering.com>; Chloe Trinh <ctrinh@franklinengineering.com>
Subject: FW: Draft Air Permit Language to KDEP

Hi Kari,

As discussed, please find attached some suggested content for draft air permit for TNT that Franklin Engineering has put together to review and use as you please.

Additionally, we expect to have answer back on questions from Johnson and Colby in the next few days. We would value a chance to talk the team though equipment design of the Acid Recovery Plant regarding DNT recovery and applicability of Table 2 of Subpart NNNa. Could you support a short meeting in the next week? We could also use this to cover any clarifications on suggested draft content or answers to other questions we will send shortly.

Thanks,

Pieter

From: Chloe Trinh <ctrinh@franklinengineering.com>
Date: Tuesday, 11 August 2026 at 3:20 pm
To: Pieter Haverkamp <Pieter.Haverkamp@dynonobel.com>; Tina Maniatis <tina.maniatis@dynonobel.com>
Cc: Duncan Kimbro <dkimbro@franklinengineering.com>
Subject: Draft Air Permit Language to KDEP

This Message Is From an External Sender
This message came from outside your organization.
If you do not know the sender or are not expecting this message please click on the Phish Alert button for IT to investigate.

Hi Pieter –

Please forward the draft air permit and the following message to KDEP along with any additional language you would like to add.

We have prepared proposed language for several sections of the draft air permit for the Dyno Nobel TNT Plant. The draft includes operating requirements, emission limitations, monitoring and recordkeeping requirements, and other permit conditions that we anticipate to be applicable based on our current understanding.

Thanks,

Chloe Trinh
Franklin Engineering Group, Inc.
381 Riverside Drive, Suite 200
Franklin, TN 37064
Cell Phone (336) 609-4955
Office Phone (615) 591-0058 ext. 271
Website: FranklinEngineering.com

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Division for Air Quality

300 Sower Boulevard
Frankfort, KY 40601
(502) 564-3999

DEP7007N

Source Emissions Profile

__ Section N.1: Emission Summary
__ Section N.2: Stack Information
__ Section N.3: Fugitive Information
__ Section N.4: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI

Source Name: Dyno Nobel Inc.
KY EIS (AFS) #: 21- 177-00067
Permit #: S-25-064
Agency Interest (AI) ID: 3241
Date: TBD

N.1: Emission Summary

Emission Unit #	Emission Unit Name	Process ID	Process Name	Control Device Name	Control Device ID	Stack ID	Maximum Design Capacity *(SCC Units/hour)*	Pollutant	Uncontrolled Emission Factor *(lb/SCC Units)*	Emission Factor Source (e.g. AP-42, Stack Test, Mass Balance)	Capture Efficiency *(%)*	Control Efficiency *(%)*	Hourly Emissions		Annual Emissions	
													Uncontrolled Potential *(lb/hr)*	Controlled Potential *(lb/hr)*	Uncontrolled Potential *(tons/yr)*	Controlled Potential *(tons/yr)*
RMH-1-A	01-T0001	RMH-1	Toluene Tank	-	-	RMH-1	139.2 gal/hr	Toluene	9.34E-05 lb/gal	AP-42 Section 7.1.7	-	-	0.013	0.013	0.058	0.058
RMH-1-B	Devices in Toluene Service	RMH-1	Equipment in Toluene Service	-	-	-	139.2 gal/hr	Toluene	9.84E-03 lb/gal	EPA 453/R-95-017, Table 2-1 SOCMI Emission Factors	-	-	1.37	1.37	6.0	6.0
RMH-2 RMH-3 RMH-4	02-T0001 Oleum Truck 02-V0009	RMH-2	20% Oleum Tank 67% Oleum Truck Oleum Blending Surge Vessel	Oleum Scrubber	02-Z0006	RMH-2	271.2 gal/hr TBD TBD	SO_3	TBD	Mass Balance/Vapor Liquid Equilibrium	100%	>99%	9.3	0.09	40.8	0.41
RMH-5	02-T0010	RMH-3	97% Sulfuric Acid Tank	-	-	RMH-3	369.6 gal/hr	H_2SO_4	1.71E-07 lb/gal	Mass Balance/Vapor Liquid Equilibrium	-	-	6.85E-05	6.85E-05	3.00E-04	3.00E-04
RMH-6 RMH-7 RMH-8	T404-1 02-T0030 02-T0042	RMH-4	Spent Acid Tank 98% Nitric Acid Tank 55% Nitric Acid Tank	Nitric Acid Scrubber	02-Z0060	RMH-4	641.7 gal/hr 274.2 gal/hr 146.4 gal/hr	H_2SO_4	2.09E-08 lb/gal	Mass Balance/Vapor Liquid Equilibrium	100%	>99%	2.22E-05	2.22E-07	9.72E-05	9.72E-07
RMH-6 RMH-7 RMH-8	T404-1 02-T0030 02-T0042	RMH-4	Spent Acid Tank 98% Nitric Acid Tank 55% Nitric Acid Tank	Nitric Acid Scrubber	02-Z0060	RMH-4	641.7 gal/hr 274.2 gal/hr 146.4 gal/hr	NO_2	2.42E-03 lb/gal	Mass Balance/Vapor Liquid Equilibrium	100%	-	2.6	2.6	11.2	11.2
RMH-9	02-T0040	RMH-5	Weak Nitric Acid Tank	NOx Absorber	NOx Absorber	ARU-1	92.4 gal/hr	NO_2	7.41E-04 lb/gal	Mass Balance/Vapor Liquid Equilibrium	100%	>99%	0.07	0.0007	0.30	0.003
RMH-10	TBD	RMH-6	Diesel Tank	-	-	RMH-5	6.85E-03 gal/hr	VOC	1.32E-03 lb/gal	U.S. EPA TANKS 5.2	-	-	9.06E-06	9.06E-06	3.97E-05	3.97E-05

Section N.2: Stack Information

UTM Zone:

Stack ID	Identify all Emission Units (with Process ID) and Control Devices that Feed to Stack	Stack Physical Data			Stack UTM Coordinates		Stack Gas Stream Data		
		Equivalent Diameter *(ft)*	Height *(ft)*	Base Elevation *(ft)*	Northing *(m)*	Easting *(m)*	Flowrate *(acfm)*	Temperature *(° F)*	Exit Velocity *(ft/sec)*
RMH-1	Toluene Tank	0.33	22.30				0.043	68	0.5
RMH-2	20% Oleum Tank 67% Oleum Truck Oleum Blending Surge Vessel Oleum Scrubber	0.13	33				53.88	113	50
RMH-3	97% Sulfuric Acid Tank	0.5	28.21				24.63	104	2.1
RMH-4	Spent Acid Tank 98% Nitric Acid Tank 55% Nitric Acid Tank Nitric Acid Scrubber	0.21	33				99.85	75	50
RMH-5	Diesel Tank	0.5	10				-	68	-

Section N.3: Fugitive Information

UTM Zone:

Emission Unit #	Emission Unit Name	Process ID	Area Physical Data		Area UTM Coordinates		Area Release Data	
			Length of the X Side *(ft)*	Length of the Y Side *(ft)*	Northing *(m)*	Easting *(m)*	Release Temperature *(°F)*	Release Height *(ft)*

Section N.4: Notes, Comments, and Explanations

1. The conservation vent for the Toluene tank is a horizontal discharge.

2. The vent for the Sulfuric Acid Tank is a vertical discharge.

3. RMH-1B is devices in toluene liquid or vapor service (valves, fitting, etc.) shown on form J.5

Division for Air Quality

300 Sower Boulevard

Frankfort, KY 40601

(502) 564-3999

DEP7007J

Volatile Liquid Storage

___ Section J.1: General Information

___ Section J.2: Tank Description

___ Section J.3: Gasoline Plants and Terminals

___ Section J.4: Loading Rack(s)

___ Section J.5: Equipment Leaks

___ Section J.6: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI, DEP7007N, DEP7007V, and DEP7007GG.

___ SDS attached

Source Name: **Dyno Nobel Inc.**

KY EIS (AFS) #: **21- 177-00067**

Permit #: **S-25-064**

Agency Interest (AI) ID: **3241**

Date: **TBD**

Section J.1: General Information

Emission Unit #	Emission Unit Name	Emission Unit Description	Proposed/Actual Date of Construction Commencement *(MM/YYYY)*	Date of modification/ reconstruction	Control Device ID	Stack ID
RMH-1-A	01-T0001	Toluene Tank	12/2026	N/A	-	RMH-1
RMH-2	02-T0001	20% Oleum Tank	12/2026	N/A	02-Z0006	RMH-2
RMH-2-B	02-V0009	Oleum Surge Blending Vessel	12/2026	N/A	02-Z0006	RMH-2
RMH-5	02-T0010	97% Sulfuric Acid Tank	12/2026	N/A	-	RMH-3
RMH-6	T404-1	Spent Acid Settling Tank	12/2026	N/A	02-Z0060	RMH-4
RMH-7	02-T0030	98% Nitric Acid Tank	12/2026	N/A	02-Z0060	RMH-4
RMH-8	02-T0042	55% Nitric Acid Tank	12/2026	N/A	02-Z0060	RMH-4
RMH-9	02-T0040	Weak Nitric Acid Tank (~50%)	12/2026	N/A	Absorber	ARU-1
RMH-10	TBD	Diesel Tank	12/2026	N/A	-	RMH-5

Section J.2: Tank Description

Emission Point #: RMH-1

Emission Point Name: Toluene Tank

Tank ID#: 01-T0001

Date Installed: TBD

List Applicable Regulations: 40 CFR 60 Subpart Kc

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
Toluene	1,219,392	7.250	92.14	100%	68	79.7	0.4243	0.5991

J.2B: Tank Data:

Tank Capacity: *(gallons)* 32400 **Shell Height/ Length:** *(ft)* 20.5 **Shell Diameter:** *(ft)* 18 **Tank Turnovers per Year:** 51.3

Tank Orientation: ☐ Horizontal ☑ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* 17.056 Average Liquid Height: *(ft)* 9.84

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☐ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** 10.7 ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☐ Good ☐ Poor **Vacuum Setting:** -0.6 psig

Is Tank Heated?: ☐ Yes ☑ No **Shell Condition:** ☐ Good ☐ Poor **Pressure Setting:** 1.0 psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
RMH-1	Toluene	Working	0.01595	Intermittent	U.S. EPA AP-42 Chapter 7.1.7
RMH-1	Toluene	Standing (Breathing)	0.0794	Intermittent	U.S. EPA AP-42 Chapter 7.1.7

Section J.2: Tank Description

Emission Point #: RMH-2

Emission Point Name: 20% Oleum Tank

Tank ID#: 02-T0001

Date Installed:

List Applicable Regulations:

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
20% Oleum	2,375,712	15.990	93.85	20% SO3 80% H2SO4	104	104	0.0696	0.0696

J.2B: Tank Data:

Tank Capacity: *(gallons)* 58677 **Shell Height/ Length:** *(ft)* 24.1 **Shell Diameter:** *(ft)* 22 **Tank Turnovers per Year:** **52**

Tank Orientation: ☐ Horizontal ☑ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* 20.664 Average Liquid Height: *(ft)* 11.644

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☐ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** 12.5 ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☐ Good ☐ Poor **Vacuum Setting:** -0.6 psig

Is Tank Heated?: ☑ Yes ☐ No **Shell Condition:** ☐ Good ☐ Poor **Pressure Setting:** 1.0 psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
RMH-2	Oleum	*See RMH Form N.1 for 20% Oleum Tank Emissions*	*See RMH Form N.1 for 20% Oleum Tank Emissions*	N.1 for 20% Oleum Tank Emissions	See RMH Form N.1 for 20% Oleum Tank Emissions

Section J.2: Tank Description

Emission Point #: RMH-2-B

Emission Point Name: Oleum Blending Surge Vessel

Tank ID#: 02-V0009

Date Installed:

List Applicable Regulations:

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
67% Oleum					104	104	0.0735	6.2845
Sulfuric Acid					104	104	0.0735	6.2845

J.2B: Tank Data:

Tank Capacity: *(gallons)* 951 **Shell Height/ Length:** *(ft)* 12.5 **Shell Diameter:** *(ft)* 3.6 **Tank Turnovers per Year:** _____

Tank Orientation: ☐ Horizontal ☑ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* _____ Average Liquid Height: *(ft)*

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☐ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** _____ ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☐ Good ☐ Poor **Vacuum Setting:** FV psig

Is Tank Heated?: ☑ Yes ☐ No **Shell Condition:** ☐ Good ☐ Poor **Pressure Setting:** >15 psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
RMH-2-B	Oleum Blending	*See RMH Form N.1 for Oleum Blending Surge Tank Emissions*	*See RMH Form N.1 for Oleum Surge Tank Emissions*	See RMH Form N.1 for Emissions	See RMH Form N.1 for Oleum Blending Surge Tank Emissions

Section J.2: Tank Description

Emission Point #: **RMH-5**

Emission Point Name: 97% Sulfuric Acid Tank

Tank ID#: 02-T0010

Date Installed:

List Applicable Regulations:

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
97% wt Sulfuric Acid	3,237,696	15.105	93.85	97% Sulfuric Acid	48	104	1.45E-07	6.18E-06

J.2B: Tank Data:

Tank Capacity: *(gallons)* 78307 **Shell Height/ Length:** *(ft)* 24.76 **Shell Diameter:** *(ft)* 25 **Tank Turnovers per Year:** 52.6

Tank Orientation: ☐ Horizontal ☑ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* 21.32 Average Liquid Height: *(ft)* 12.0

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☐ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** 12.8 ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☐ Good ☐ Poor **Vacuum Setting:** -0.6 psig

Is Tank Heated?: ☐ Yes ☐ No **Shell Condition:** ☐ Good ☐ Poor **Pressure Setting:** 1.0 psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
RMH-3	Sulfuric Acid	*See RMH Form N.1 for 97% Sulfuric Acid Tank Emissions*	See RMH Form N.1 for 97% Sulfuric Acid Tank Emissions	N.1 for 97% Sulfuric Acid Tank	See RMH Form N.1 for 97% Sulfuric Acid Tank Emissions

Section J.2: Tank Description

Emission Point #: RMH-6

Emission Point Name: Spent Acid Settling Tank

Tank ID#: T404-1

Date Installed:

List Applicable Regulations:

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
Spent Acid	2,264,327	13.186	46.8	Sulfuric Acid 66.3% Nitric Acid 5.3% Nitrous Acid 4.3% Water 23.9% Other Organics 0.2%	86	86	1.58	1.58

J.2B: Tank Data:

Tank Capacity: *(gallons)* 38772 **Shell Height/ Length:** *(ft)* 23.78 **Shell Diameter:** *(ft)* 18 **Tank Turnovers per Year:** 75.2

Tank Orientation: ☐ Horizontal ☑ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* 20.336 Average Liquid Height: *(ft)* 11.5

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☐ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** 12.3 ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☑ Good ☐ Poor **Vacuum Setting:** -0.6 psig

Is Tank Heated?: ☐ Yes ☑ No **Shell Condition:** ☑ Good ☐ Poor **Pressure Setting:** 1.0 psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
RMH-4	Spent Acid	*See RMH Form N.1 for Spent Acid Tank Emissions*	See RMH Form N.1 for Spent Acid Tank Emissions	N.1 for Spent Acid Tank Emissions	See RMH Form N.1 for Spent Acid Tank Emissions

Section J.2: Tank Description

Emission Point #: **RMH-7**

Emission Point Name: 98% Nitric Acid Tank

Tank ID#: 02-T0030

Date Installed:

List Applicable Regulations:

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
Nitric Acid	2,401,992	12.184	60.01	98% Nitric Acid	68	68	0.928	0.928

J.2B: Tank Data:

Tank Capacity: *(gallons)* 42575 **Shell Height/ Length:** *(ft)* 22.14 **Shell Diameter:** *(ft)* 19.68 **Tank Turnovers per Year:** 74.5

Tank Orientation: ☐ Horizontal ☑ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* 18.696 Average Liquid Height: *(ft)* 10.7

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☐ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** 11.5 ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☑ Good ☐ Poor **Vacuum Setting:** -0.6 psig

Is Tank Heated?: ☐ Yes ☑ No **Shell Condition:** ☑ Good ☐ Poor **Pressure Setting:** 1.0 psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
RMH-4	98% Nitric Acid	*See RMH Form N.1 for 98% Nitric Acid Tank Emissions*	See RMH Form N.1 for 98% Nitric Acid Tank Emissions	N.1 for 98% Nitric Acid Tank	See RMH Form N.1 for 98% Nitric Acid Tank Emissions

Section J.2: Tank Description

Emission Point #: **RMH-8**

Emission Point Name: 55% Nitric Acid Tank

Tank ID#: 02-T0042

Date Installed:

List Applicable Regulations:

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
Nitric Acid	1,282,464	10.490	29.67	55%	156	156	8.843	8.843

J.2B: Tank Data:

Tank Capacity: *(gallons)* 8338 **Shell Height/ Length:** *(ft)* 13.284 **Shell Diameter:** *(ft)* 12 **Tank Turnovers per Year:** 285.6

Tank Orientation: ☐ Horizontal ☑ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* 9.84 Average Liquid Height: *(ft)* 6.2

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☐ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** 7.1 ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☑ Good ☐ Poor **Vacuum Setting:** -0.6 psig

Is Tank Heated?: ☐ Yes ☑ No **Shell Condition:** ☑ Good ☐ Poor **Pressure Setting:** 1.0 psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
RMH-4	55% Nitric Acid	*See RMH Form N.1 for 55% Nitric Acid Tank Emissions*	See RMH Form N.1 for 55% Nitric Acid Tank Emissions	N.1 for 55% Nitric Acid Tank	See RMH Form N.1 for 55% Nitric Acid Tank Emissions

Section J.2: Tank Description

Emission Point #: **RMH-9**

Emission Point Name: Weak Nitric Acid Tank

Tank ID#: 02-T0040

Date Installed:

List Applicable Regulations:

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
Weak Nitric Acid (~50%)	809,424	10.816	28.02	~50%	48	86	0.487	1.58

J.2B: Tank Data:

Tank Capacity: *(gallons)* 8616 **Shell Height/ Length:** *(ft)* 13.612 **Shell Diameter:** *(ft)* 12 **Tank Turnovers per Year:** 170.2

Tank Orientation: ☐ Horizontal ☑ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* 10.168 Average Liquid Height: *(ft)* 6.4

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☐ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** 7.2 ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☑ Good ☐ Poor **Vacuum Setting:** -0.6 psig

Is Tank Heated?: ☐ Yes ☑ No **Shell Condition:** ☑ Good ☐ Poor **Pressure Setting:** 1.0 psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
ARU-1	Weak Nitric Acid	*See RMH Form N.1 for Weak Nitric Acid Tank Emissions*	See RMH Form N.1 for Weak Nitric Acid Tank Emissions	N.1 for Weak Nitric Acid Tank	See RMH Form N.1 for Weak Nitric Acid Tank Emissions

Section J.2: Tank Description

Emission Point #: **RMH-10**

Emission Point Name: Diesel Tank

Tank ID#: TBD

Date Installed:

List Applicable Regulations: TBD

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
Diesel	60	6.84-7.05		100%	0	125	0.042	0.042

J.2B: Tank Data:

Tank Capacity: *(gallons)* 550 **Shell Height/ Length:** *(ft)* 6.25 **Shell Diameter:** *(ft)* 4 **Tank Turnovers per Year:** 1

Tank Orientation: ☑ Horizontal ☐ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* _____ Average Liquid Height: *(ft)* 3.80

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☐ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** _____ ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☑ Good ☐ Poor **Vacuum Setting:** _____ psig

Is Tank Heated?: ☐ Yes ☑ No **Shell Condition:** ☑ Good ☐ Poor **Pressure Setting:** _____ psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
RMH-5	Diesel	Working	0.02	Firewater pump testing (non-emergency)	U.S. EPA TANKS 5.2
RMH-5	Diesel	Standing	1.3	Firewater pump testing (non-emergency)	U.S. EPA TANKS 5.2

Section J.5: Equipment Leaks

Emission Point #: RMH-1

Emission Point Name: Toluene Tank

This section is to be completed for all components of Volatile Liquid Storage Systems that may have leaks.

Equipment Type	Indicate the number of each type of equipment for this emission point		Emission Factor *(lb/SCC units)*		Source of Emission Factor	Total Emissions *(lb/yr)*
	Gasoline	Other (diesel, kerosene, etc.)	Gasoline	Other		
Valves	N/A	58	N/A	0.0089 lb/hr/source	EPA's Protocol for Equipment Leak Emission Estimates (EPA 453/R-95-017), Table 2-1 SOCMI Average Emission Factors	4514.9
Pumps	N/A	4	N/A	0.0439 lb/hr/source	EPA's Protocol for Equipment Leak Emission Estimates (EPA 453/R-95-017), Table 2-1 SOCMI Average Emission Factors	1537.5
Connectors	N/A	111	N/A	0.0040 lb/hr/source	EPA's Protocol for Equipment Leak Emission Estimates (EPA 453/R-95-017), Table 2-1 SOCMI Average Emission Factors	3923.6
Risers/Loading-Arm Valves	N/A	0	N/A	N/A	N/A	0
Open-ended Lines	N/A	2	N/A	0.0037 lb/hr/source	EPA's Protocol for Equipment Leak Emission Estimates (EPA 453/R-95-017), Table 2-1 SOCMI Average Emission Factors	65.7
Other	N/A	4 2	N/A	0.229 lb/hr/source 0.331 lb/hr/source	EPA's Protocol for Equipment Leak Emission Estimates (EPA 453/R-95-017), Table 2-1 SOCMI Average Emission Factors	1381.9 579.47

Section J.6: Notes, Comments, and Explanations

1. See Toluene Tank Emission Calculations.

2. Toluene Tank incorporates a vapor balancing system with the toluene tanker truck unloading system, so there are no working losses during filling with fresh toluene.

3. Preliminary determination is that 40 CFR 60 Subpart VVb for equipment leaks (LDAR) will apply to equipment in toluene service.

4. Equipment count on J.5 includes equipment from TNT Production, Raw Material Handling, and Solvent Extraction Unit.

5. The diesel tank feeds the emergency firewater pump. The maximum annual throughput is 60 gallons per year for non-emergency use (e.g. maintenance and testing of the firewater pump).

6. "Other" equipment in toluene service includes pressure relief valves (2) and sampling connection systems (4).

7. The Oleum Blending Surge Vessel is a small vessel used in a recirculation system, not a storage vessel.

Dyno Nobel TNT Plant

Emission Summary

	Uncontrolled Sitewide Emissions (TPY)			Controlled Sitewide Emissions (TPY)		
	Existing Dyno Nobel Site Emissions	New TNT Facility Emissions	**Total Uncontrolled**	Existing Dyno Nobel Site Emissions	New TNT Facility Emissions	**Total Controlled**
NO_X (as NO_2)*		1,443	**1443.00**		76	**76.33**
SO_X		215	**215.01**		18	**17.92**
CO		425	**424.88**		20.1	**20.06**
VOC / HC		49.7	**49.66**		2.36	**2.36**
Sulfuric Acid	10.07	3.97E-04	**10.07**	10.07	3.01E-04	**10.07**
Ammonia	0.03	1.19	**1.22**	0.03	1.19	**1.22**
DNT		3.3	**3.30**		0.0013	**0.0013**
PM	6.6	1,018	**1024.99**	0.12	10.6	**10.69**
PM10	6.6	1,018	**1024.99**	0.12	10.6	**10.69**
PM2.5	6.6	1,018	**1024.97**	0.11	10.6	**10.68**
Fugitive PM		< 40	**40.00**		< 40	**40**
Nitric Acid	452.17	n/a*	**452.17**	30.32	n/a*	**30.3**
Acetone	806.17		**806.17**	84.17		**84.2**
CO_2		27,906	**27,906**		27,906	**27,906**
N_2O		0.0388	**0.0388**		0.0388	**0.0388**
CH_4		0.386	**0.386**		0.386	**0.386**
Toluene		8.2	**8.2**		8.2	**8.2**
Benzene		3.00E-04	**3.00E-04**		3.00E-04	**3.00E-04**
Xylene		1.00E-04	**1.00E-04**		1.00E-04	**1.00E-04**
Formaldehyde		0.097	**0.097**		0.097	**0.097**
Dioxin/Furan		2.46E-09	**2.46E-09**		2.46E-09	**2.46E-09**
LVM, As+Be+Cr		0.082	**0.082**		5.20E-04	**5.20E-04**
SVM, Cd+Pb		0.017	**0.017**		2.25E-04	**2.25E-04**
Mercury		2.50E-04	**2.50E-04**		2.50E-04	**2.50E-04**
HCl/Cl2		7.10	**7.10**		0.71	**0.71**

* Emissions of nitric acid are not regulated for the New TNT Facility and are not included.

Dyno Nobel TNT Plant
Emission Summary

		UNCONTROLLED (TPY)																							NOx UNCONTROLLED (TPY)				
ID NO.	EMISSION POINT	NO_x (as NO_2)*	SO_x	PM	PM10	PM2.5	Fugitive PM	CO	VOC / HC	Sulfuric Acid	Ammonia	DNT	CO_2	N_2O	CH_4	Toluene	Benzene	Xylene	Formalde hyde	Dioxin/ Furan	Low Volatile Metals (LVM, As+Be+Cr)	Semi Volatile Metals (SVM, Cd+Pb)	Mercury	HCl/Cl2	NO_x (emitted)	NO_2 (emitted)	NO (emitted)	NO_2 (as NO)	NO_x (as NO_2)*
	Toluene Tank Vent															0.058													
	Toluene Equipment Service Leaks															6.0													
	Oleum Scrubber Stack		40.8																										
	97% Sulfuric Acid Tank Vent									3.00E-04																			
	Nitric Acid Scubber Stack	11.3								9.72E-05																11.3			11.3
	Weak Nitric Acid Tank Vent	0.3																								0.3			0.3
	Diesel Tank								3.97E-05																				
	Boiler Stack	7.88	0.095	1.20	1.20	1.20		13.2	0.867				18602	3.50E-02	3.50E-01										7.88				7.88
	Diesel Fire Water Pump Stack	0.775	0.100	2.00E-02	0.02	2.00E-02		0.102	0.022				56.2	4.56E-04	2.28E-03	0.0001	0.0003	0.0001							0.78				0.78
	Emergency Generator 1 Stack	0.024	0.00140	0.0226	0.02	0.0226		0.520	0				278	5.24E-04	5.24E-03				0.049						0.02				0.02
	Emergency Generator 2 Stack	0.024	0.00140	0.0226	0.0226	0.0226		0.520	0				278	5.24E-04	5.24E-03				0.049						0.02				0.02
20-ZCT0001	Cooling Tower 1			0.095	0.095	0.095																							
21-ZCT0001	Cooling Tower 2			0.017	0.017	0.017																							
	Washers 3-5			< 5	< 5	< 5																							
	Dryer Scubber Stack			1.45	1.45	1.45																							
	Flaker Scubber Stack			1.45	1.45	1.45																							
	Packaging Scrubber Stack			1.45	1.45	1.45																							
	Sodium Sulfite HEPA Filter Vent			3.64	3.64	3.64																							
	Sodium Bisulfite HEPA Filter Vent			0.0018	0.0018	0.0018																							
	TNT Production Building Vents (4)						< 20***																						
	TNT Packaging Building Vents (2)						< 10***																						
	Sellite Preparation Building Vents (2)						< 10***																						
07-STA1000	ARU NOX Absorber/Thermal Oxidizer Stack	1309						406	48.3 **			3.3	435												454	21.9	544	834	1309
	ARU Thermal Oxidizer (from burner)	47.3	0.01	0.02	0.02	0.02		0.87	0.06				1231	2.32E-03	2.32E-02	3.50E-05						5.16E-06			1.03	46.3			47.3
	Solvent Extraction Vent Stack															2.12													
07-STA0003	TDU Stack	66.0	174	1004	1004	1004		3.99	0.41		1.19		7026							2.463E-09	0.082	0.017	2.50E-04	7.1	61.3				61.3
	Paved Haul Roads																												
	Total Uncontrolled	1,443	215	1,018	1,018	1,018	< 40	425	49.7	3.97E-04	1.2	3.3	27906	0.0388	0.386	8.18	3.00E-04	1.00E-04	0.097	2.463E-09	0.082	0.017	2.50E-04	7.1	525	79.8	544	834	1,438

Dyno Nobel TNT Plant
Emission Summary

		CONTROLLED (TPY)																						NOx CONTROLLED (TPY)				
ID NO.	EMISSION POINT	NO_x (as NO_2)*	SO_x	PM	PM10	PM2.5	Fugitive PM	CO	VOC / HC	Sulfuric Acid	Ammonia	DNT	CO_2	N_2O	CH_4	Toluene	Benzene	Xylene	Formalde hyde	Dioxin/ Furan	Low Volatile Metals (LVM, As+Be+Cr)	Semi Volatile Metals (SVM, Cd+Pb)	Mercury	HCl/Cl2	NO_x (emitted)	NO_2 (emitted)	NO (emitted)	NO (as NO_2)	NO_x (as NO_2)*
	Toluene Tank Vent															0.058													
	Toluene Equipment Service Leaks															6													
	Oleum Scrubber Stack		0.408																										
	97% Sulfuric Acid Tank Vent									3.00E-04																			
	Nitric Acid Scubber Stack	11.3								9.72E-07																11.3			11.3
	Weak Nitric Acid Tank Vent	0.003																											
	Diesel Tank								3.97E-05																				
	Boiler Stack	7.88	0.095	1.20	1.20	1.20		13.2	0.867				18602	3.50E-02	3.50E-01										7.88				7.88
	Diesel Fire Water Pump Stack	0.775	0.100	2.00E-02	2.00E-02	2.00E-02		0.102	0.022				56.2	4.56E-04	2.28E-03	0.0001	0.0003	0.0001							0.78				0.78
	Emergency Generator 1 Stack	2.40E-02	0.00140	0.0226	0.0226	0.0226		0.520	0				278	5.24E-04	5.24E-03				0.049						0.02				0.02
	Emergency Generator 2 Stack	2.40E-02	0.00140	0.0226	0.0226	0.0226		0.5203	0				278	5.24E-04	5.24E-03				0.049						0.02				0.02
20-ZCT0001	Cooling Tower 1			0.095	0.095	0.095																							
21-ZCT0001	Cooling Tower 2			0.017	0.017	0.017																							
	Washers 3-5			< 5	< 5	< 5																							
	Dryer Scubber Stack			0.145	0.145	0.145																							
	Flaker Scubber Stack			0.145	0.145	0.145																							
	Packaging Scrubber Stack			0.160	0.160	0.160																							
	Sodium Sulfite HEPA Filter Vent			3.64	3.64	3.64																							
	Sodium Bisulfite HEPA Filter Vent			0.0018	0.0018	0.0018																							
	TNT Production Building Vents (4)						< 20***																						
	TNT Packaging Building Vents (2)						< 10***																						
	Sellite Preparation Building Vents (2)						< 10***																						
07-STA1000	ARU NOX Absorber/Thermal Oxidizer Stack	2.43						0.811	1.0 **			0.00131	435												0.91	0.6	0.6	0.92	2.43
	ARU Thermal Oxidizer	47.3	0.01	0.02	0.02	0.02		0.87	0.06				1231	2.32E-03	2.32E-02	3.50E-05						5.16E-06			1.03	46.3			47.3
	Solvent Extraction Vent Stack															2.12													0
07-STA0003	TDU Stack	6.60	17.3	0.080	0.080	0.080		3.99	0.41		1.19		7026							2.463E-09	5.20E-04	2.20E-04	2.50E-04	0.71	6.1				6.1
	Paved Haul Roads																												
	Total Controlled	76	18	10.6	10.6	10.6	< 40	20.1	2.36	3.01E-04	1.2	0.00131	27906	0.0388	0.386	8.18	3.00E-04	1.00E-04	0.097	2.463E-09	5.20E-04	2.25E-04	2.50E-04	0.71	16.7	58.2	0.6	0.92	75.8

* NOx total was calculated by combining emitting NOx, NO_2, and NO (as NO_2).

** VOC shown for ARU NOx Absorber/Thermal Oxidizer Stack is trinitromethane (TNM) generated from nitration.

***Each building vent is < 5 TPY.

NO	30	lb/mol
NO2	46	lb/mol
NOx (as NO2)	1.533* NO	lb/hr

FROM DAKOTA ROSS, KDEP, JULY 24

In addition to the follow up questions sent by Colby on 7/15, below are several more areas where the Division needs additional information/ clarification in order to draft the Initial Title V permit:

1. Please explain how an emission rate of 0.7 tpy (1381.9 lb/yr) was calculated for PRVs in toluene service (pgs. 69/216 & 139/193). The Division finds the emission rate should be 4.01 tpy, pushing source-wide toluene emissions over 10 tpy, necessitating a source wide single HAP (toluene) limitation if the source wishes to maintain status as an area source.

RESPONSE: While the emission rate would be approximately 4 tpy if the vapor were 100% toluene, that will not be the case for the PRV on the toluene tank and the PRVs on the solvent recover system. For the toluene tank, the maximum true vapor pressure in the tank is estimated at 0.6 psia with a tank conservation vent setpoint of 15.7 psia. 0.6 psia is 4% of 15.7 psia. Thus for the toluene tank, the emission factor for toluene is multiplied by 4%. The solvent recovery system will operate at a nominal temperature of 140°F, which results in a maximum true vapor pressure of 3.4 psia. The pressure setpoints for the PRVs have not been established but are assumed to be 15.7 psia. 3.4 psia is 22% of 15.7 psia, so the emission factor for the 3 PRVs is multiplied by 22%. An example calculation is presented below:

*(1 tank PRV * 0.104 kg/hr/source * 2.205 lb/kg * 4%) + (3 solvent recovery PRVs * 0.104 kg/hr/source * 2.205 lb/kg * 22%) = 0.16 lb/hr*

*0.16 lb/hr ÷ 2000 lb/ton * 8760 hr/yr = 0.70 tpy*

2. For RMH-2 Oleum Operations:
    1. Please confirm that the Oleum Tanker Truck (RMH-2B) will operate with a vapor balancing system (pg. 7/216) and will not vent emission to the Oleum Scrubber (pgs. 12/216 & 141/193).

RESPONSE: During the blending operation, there is an open flow path for vapor balancing to the truck. The blending surge vessel is a small intermediate vessel for pump suction on blending loop. It will be connected to the scrubber header, which is open to the truck, 20%

Oleum tank, and scrubber during filling. When truck is not unloading, the surge vessel and 20% Oleum tank are connected to the scrubber header.

2. Please explain the discrepancy in emissions for the Oleum Scrubber. The DEP 7007N form (pg. 141/193) shows uncontrolled SO3 emissions of 256 tpy, while the emissions calculation attachment (pg. 51/216) shows 40.8 tpy from oleum blending and the oleum tank combined.

RESPONSE: The correct value is 40.8 tpy as shown in the submitted emission calculations. The 256 tpy value is incorrect and was transcribed from a preliminary, incorrect emission calculation. A corrected and revised sitewide summary is attached. A corrected and revised DEP 7007N form will be submitted under separate cover.

3. Please provide basic parameters for the Oleum Blending Surge Vessel (RMH-2C) to be listed in the permit description (capacity, max annual throughput, etc.).

RESPONSE: Basic parameters for the surge vessel are included in the attached revised J Form.

3. For the TDU:

1. Please provide additional information on startup and shutdown for the TDU, such as expected duration, frequency, and emissions.

RESPONSE: During startup, the TDU will be fired on natural gas until the target operating temperature is reached. During that time, only gases from natural gas combustion (primarily CO2, O2, N2 and water vapor) will be emitted. When the system reaches the target temperature, red water waste feed can be initiated at a controlled rate. When the system is initially fired up on natural gas and heated from ambient temperature the heat up period will last a number of hours (potentially up to 24 to 36 hours) to avoid thermal shock of the refractory lining. If the system has not fully cooled the heat up period will be shorter. The exhaust gases from the TDU will be routed through the air pollution control system (DSI, Baghouse, HEPA, SCR) at all times. Red Water waste feed will not be initiated until all of the operating parameter limits (OPLs) are within the required range for hazardous waste processing. Red Water waste will be introduced at a controlled rate until the target operating feed rate has been reached. Because the air pollution control system will be fully operational prior to introducing waste feed, the emissions will be lower than those during full operations under full waste feedrate.

During a planned shutdown, waste feed will be stopped and all emissions from the waste combustion will cease. Operation of the burner with natural gas only may continue, with emissions consisting of emissions of gases from natural gas combustion. During an unplanned shutdown or automatic waste feed cutoff (AWFCO), waste feed will cease via an automatic block valve and emissions from waste feed will stop. All emissions will still be routed through the air pollution control system. At most, a few seconds of emissions of products of incomplete combustion may occur due to an unplanned process upset, although because the system will still be at full combustion temperatures, this is unlikely.

The anticipated durations and frequencies of startups and shutdowns have not been determined, but emissions will be routed through the air pollution control equipment at all times, and no waste will be fed unless all operating parameters limits are within the permitted range.

2. The N form for the TDU lists annual uncontrolled PM emissions of 1004 tpy and controlled emissions of 0.08 tpy. These values are also listed in the source wide emission summaries for PM on pg. 19-20/216 and align with the vendor performance guarantee provided on pg. 59/216 of the narrative application. However, the source wide emission summary shows 630 tpy uncontrolled for PM10 and PM2.5 and 0.052 tpy controlled. Please provide additional information on the fractionation of PM to justify lower PM10/PM2.5 emission values.

RESPONSE: The PM emissions from the TDU are all expected to be less than 2.5 µm, as the air pollution control system includes a fabric filter (baghouse) and a HEPA filter. The source wide emission summary has been revised to show the same values for PM, PM10 and PM2.5 from the TDU (1004 tpy uncontrolled and 0.08 tpy controlled).

4. Please provide additional clarification on the toluene emission estimate for the Solvent Extraction Unit (ARU-2). Pg. 25/216 states "The average uncontrolled emissions of 0.48 lb/hr of toluene were provided by the equipment technology provider based on proprietary process modelling and *a schedule of operating scenarios under which emissions may occur*." The email response received 7/9/2026 appeared to indicate the emission estimate was in fact based on "release rates typical of stated events" and 8,760 hours per annum. These appear to be conflicting statements.

RESPONSE: The hourly release was estimated based on the equipment provider's process modeling. These are expected to be very infrequent and short duration events. The

annualized estimate was based on 8760 hours/year to provide an extremely conservative estimate.

5. Please provide additional information on the 550 gallon gasoline storage tank currently permitted as EP IA6. Is or should this unit be subject to 40 CFR 63 subpart CCCCCC?

RESPONSE: Yes, the existing gasoline tank is subject to 40 CFR 63 Subpart CCCCCC and the facility meets the requirements of 40 CFR 63.11116, Requirements for facilities with monthly throughput of less than 10,000 gallons of gasoline.

FROM COLBY FREEMAN, KDEP, JULY 15

Thank you for providing the updated V form. In our review of Subpart NNNa as it relates to the ARU, the Division identified that the NOx absorber appears to meet the definition of a recovery device, as it is "capable of and used for the purpose of recovering chemicals" (DNT) for reuse. Absorbers used as a recovery device must monitor exit temperature of the absorbing liquid and exit specific gravity (see Table 2 of Subpart NNNa). Testing establishes a maximum limit for exit temperature and a range of 0.1 specific gravity units from the average of the performance test (see 40 CFR 60.665a(c)(1)). We intend to include these requirements in the permit, so I wanted to bring your attention to this as it was not included in the updated V form.

RESPONSE: The DNT is removed from the acid in the MNT/DNT stripper, which is subject to Subpart NNNa. The NOx Absorber is a standalone scrubber that may remove some incidental organics, but its purpose is to scrub NOx from the exhaust gases/vent streams from the TNT and ARU processes, and convert that NOx to nitric acid that can be reused. The presence of any organics (including DNT) in the NOx absorber inlet and subsequent removal is incidental. As such, we do not believe that the NOx Absorber should be classified as a recovery device under Subpart NNNa. Dyno Nobel would like to schedule a call at KDEP's convenience to explain the process details to confirm that the agency concurs with Dyno Nobe's opinion.

Separately, the Division is concerned that 40 CFR 64, Compliance Assurance Monitoring (CAM), may be applicable to the TDU (for SO_2) and the ARU (for NOx and for CO from the TNT area). My understanding is that the NOx absorber would meet the definition of a control device for NOx under 40 CFR 64 regardless of its status as

a recovery device under 40 CFR 60, Subparts NNNa and RRRa, as it is evaluated for the pollutant-specific emission unit. Please provide an applicability analysis for CAM for these units and propose monitoring to ensure compliance prior to the CAM plan submittal date.

Although CAM is likely not applicable for NOx from the TDU, we will also need to determine appropriate monitoring of the SCR for demonstrating sufficient control for the source wide limits.

RESPONSE: 40 CFR 64.2 applies to emissions units at major sources that are required to obtain a Title V permit, provided that the unit satisfies the criteria listed in this section. Major source is defined as any stationary source that has the potential to emit pollutants above any of the listed thresholds (see 40 CFR 64.1). 40 CFR 70.2 defines potential to emit as follows, "...the maximum capacity of a stationary source to emit any air pollutant under its physical and operational design. ***Any physical or operational limitation on the capacity of a source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation is enforceable by the Administrator***. This term does not alter or affect the use of this term for any other purposes under the Act, or the term "capacity factor" as used in title IV of the Act or the regulations promulgated thereunder." Given that Dyno Nobel will have enforceable emissions limitations that are below the applicable threshold, the site will not be considered a major source under the regulations. It is our understanding that there is no analogous state requirement, so we believe CAM requirements do not apply to the site.

Additionally, EPA's response to comments document from the CAM rulemaking states the following:

> 'The CAM rule applies to pollutant-specific emissions units at major sources that are required to obtain title V permits. ***To the extent that synthetic minor sources are exempt from title V permitting requirements or are not a major source, units at such sources are not subject to part 64 requirements.*** In addition, part 64 will not apply to synthetic minor sources that do not meet the definition of a "major source" in part 70 but may be subject to part 70 because of NSPS or NESHAP units. Certain sources may be classified as synthetic minor sources for title 1, part C, New Source Review permit purposes (i.e., they are below the generally applicable 250 tons per year threshold for PSD permitting) but still be classified as a "major source" for part 70 purposes. Pollutant-specific emissions units at those sources which meet all of the part 64 applicability criteria will be subject to part 64. The criteria for triggering part 64 requirements are discussed above. Whether minor NSR programs

are applicable requirements under part 70 is not an issue relative to part 64. No additional response is necessary.'"

Emphasis was added in bold, italic font. Based on the above, it is our understanding that the site will not need to comply with the CAM rule, however, we welcome discussion and KDEP's thoughts on this point.

QUESTION FROM DUNCAN KIMBRO, FEG

40 CFR 63.1210(b)

We understand that prior to submitting the notification of intent to comply under 40 CFR 63.1210(b), Dyno Nobel must schedule and hold a public meeting pursuant to 40 CFR 63.1210(c). Given the uncertainty around whether a public meeting will be required for the air permit, Dyno Nobel intends to hold two separate public meetings. We would appreciate KDEP's confirmation that holding two separate public meetings is acceptable. Can KDEP advise on appropriate timing for the NIC public meeting?

Testing Activities during Equipment Commissioning

As part of the startup and commissioning of the TDU, Dyno Nobel intends to conduct engineering testing of the TDU to verify that the equipment meets the equipment vendor's performance guarantee, as well as operational readiness to perform the Comprehensive Performance Test ("CPT"). This engineering testing would include emissions measurements. The engineering testing would be performed prior to pretesting for the CPT, and all testing prior to the CPT would fall within the 720 hour limit permitted by 40 CFR 63.1207(h)(2). While we do not anticipate any issues that would result in the equipment not functioning as designed, in an abundance of caution, we would like to request that the construction permit specifically exclude exceedances that occur during engineering testing during commissioning from enforcement. Can KDEP advise whether it is able to accommodate this request?

Process Description

Graham Kentucky TNT Facility

Status: *Approved*

Version and Date: *0.1 (29 May 2026)*

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1 INTRODUCTION

The Graham Kentucky Trinitrotoluene (TNT) Manufacturing Facility is a joint venture between Dyno Nobel and Paligen Technologies. The facility will be constructed at the existing Dyno Nobel site in Graham, Kentucky. This project is intended to provide a reliable U.S. based source of TNT for defense and industrial use. The new facility will include raw material handling and storage areas, TNT production area, acid recovery, a hazardous waste incinerator (Thermal Destruction Unit) and supporting utilities.

The facility processes are interlocked with control devices such that if the control device is shut down, operation of the emission source will be stopped. See the sitewide emission summary document for the overall emission estimates from the proposed TNT facility. The control devices will be integral and interlocked to the process such that it will be a Synthetic Minor Source. The site is required to apply for a Title V Air Permit, as required for facilities with a hazardous waste incinerator per 40 CFR §63.1200(a)(2).

This document is provided to present a high-level overview of the proposed operations for the new TNT manufacturing facility and is submitted in conjunction with the Kentucky Department for Environmental Protection Division for Air Quality permit application forms. This document also includes the following appendices to support the Title V air permit application:

Appendix 1 – Site map showing the location of the site and the boundaries of the new TNT manufacturing operations on the site

Appendix 2 – Block Flow Diagrams (BFDs) for the processes described in this document:

1. Sitewide air emission sources and control devices
2. TNT Production Area
3. Acid Recovery Unit (ARU)
4. Thermal Destruction Unit (TDU)
5. Raw Material Handling (RMH)
6. Utilities

Appendix 3 – A sitewide pollutant emissions summary for all new and existing sources

Appendix 4 – Documentation of the approach for estimating emissions of regulated air pollutants

Appendix 5 – Information and specifications from equipment vendors for specific equipment (emission sources and/or pollution control devices)

Appendix 6 – An evaluation of applicability of select U.S. EPA New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP).

The remaining sections of this document describe the processes and operations for the new TNT Manufacturing Facility.

2 TNT PRODUCTION UNIT

The nitration of toluene (or alternatively ortho-nitrotoluene - ONT) to trinitrotoluene (TNT) is carried out continuously in a series of nitration reactors where the nitrating acid and toluene / mononitrotoluene (MNT) / dinitrotoluene (DNT) flow counter-current to each other. Toluene reacts with nitric acid in the presence of sulfuric acid (in oleum). The nitric acid supplies the nitro group, and the sulfuric acid absorbs the water formed during the reaction.

2.1 TNT Nitration

Toluene, weak nitric acid (WNA) and oleum are fed to the Extractor and nitration reactors (nitrators). Toluene is fed to the Extractor and Nitrator #1 and oleum is fed to the final nitrator. WNA is fed to the Nitrator #1 and concentrated nitric acid (CNA) is fed to subsequent nitrators.

To form TNT, three nitro groups must be added to the toluene molecule. The introduction of the first nitro group to form MNT is carried out at low temperatures with weak nitric acid. Increasingly higher temperatures and stronger acids are then required for the stepwise conversion of MNT to DNT then DNT to TNT through subsequent nitrators.

The nitrators are cylindrical vessels each provided with an agitator, cooling coil and a liquid-to-liquid dynamic separator. Crude TNT and spent acid leave the system in a constant flow.

Steam, nitrogen, nitrogen oxide (NOX), carbon monoxide (CO), carbon dioxide (CO2), and other organics are vented from the nitrators to the NOX Absorber and the Thermal Oxidizer in the Acid Recovery Unit (ARU) area.

2.2 TNT Washing

The purification of crude TNT involves the removal of mineral acids, oxidation products and unsymmetrical TNT. Each Washer is a cylindrical vessel provided with agitator, heating jacket (circulating hot water) and a liquid-to-liquid Dynamic Separator.

The removal of mineral acids and some of the oxidation products is accomplished by washing the molten TNT with hot water in Washers #1&2, washing solution (sellite) in Washers #3&4 and further hot washing in Washer #5. Wash water from Washer #3, 4, and 5 flows to the Red Water Balance Tank and is pumped to the Red Water Feed Tank then to the Thermal Destruction Unit (TDU). Wash water from Washers #1&2 is recycled to Nitration.

Washers #1 & 2 are also vented to the NOX Absorber and Thermal Oxidizer in the ARU area. Washers #3-5 are vented to atmosphere, as there are no pollutant emissions from these washers.

2.3 TNT Finishing

TNT from Washer #5 flows to the Dryer. Purified TNT contains a small amount of water which must be removed before flaking.

At the outlet of the Static Separator, the TNT passes by gravity to the Dryer. Hot air is supplied to the Dryer. The TNT leaving the Dryer enters the pan in the Flaker. The molten TNT is picked up on a water-cooled rotating drum, solidified and scraped off with a knife which shatters it into small irregular pieces.

Exhaust containing TNT particles from the Dryer and Flaker is scrubbed in the Dryer Scrubber/Filter and Flaker Scrubber/Filter, respectively, each of which consists of a scrubber, and filters.

The flakes drop into a hopper, in the Packaging building, and are packed in boxes before being transported to the intermediate storage area at the site.

Exhaust containing TNT particles from the Packaging operations is collected and sent to the Packaging Scrubber/Filter, which consists of a scrubber, and filter in series.

2.4 TNT Emergency Vents

Other than the exhaust from the Washers #3-5 (which contains no pollutants) and cleaned exhaust from the Dryer and Flaker Scrubbers/Filters and Packaging Scrubber/Filter, there are

no emissions to atmosphere during normal operation. There are additional pressure relief devices (particularly from the Nitrators and Washers #1&2) that will relieve only in the event of an emergency.

3 ACID RECOVERY UNIT (ARU)

The purpose of the Acid Recovery Unit (ARU) is to remove contaminants from spent acids and recover useful materials that can be recycled back to the production process. The ARU area receives spent acid containing nitric acid, sulfuric acid, water, MNT and DNT from Nitration. The ARU area includes the NOX Absorber which is a scrubber for NOX from nitration operations and the other ARU process units. The ARU also includes an Extraction system that extracts organics from wastewater. Process steps in the ARU include:

- Denitration Unit (DENI)
- Organic Stripper
- Sulfuric Acid Concentrators
- Nitric Acid Concentrator (NAC)
- NOX Absorber
- Extraction Unit

3.1 Denitration Unit (DENI)

In the first step, spent acid from the spent acid tank is fed to the DENI unit where nitric acid and nitrous compounds are stripped from spent acid before being condensed and recycled to back to TNT Nitration as weak nitric acid (WNA). The spent acid (now mostly sulfuric acid) is sent to the MNT/DNT Stripping Unit to remove MNT and DNT from the stream.

Some non-condensable exhaust from this process step is sent to the NOx Absorber.

3.2 MNT/DNT Stripping Unit

In the second step, MNT and DNT stripped from the spent acid using steam. MNT and DNT are separated from this stream once condensed then sent to TNT Nitration. The remaining condensate containing organics (MNT/DNT) and is sent to the Extraction unit.

Some non-condensable exhaust from this unit is fed to NOX Absorber unit.

3.3 Sulfuric Acid Concentrators (SAC Unit)

After removing organics, sulfuric acid is concentrated up to 97% by weight (SA97). This takes place in successive concentration stages. The SAC Unit generates additional wastewater (acidic water) which is recycled back to the TDU as conditioning water.

3.4 Nitric Acid Concentrator (NAC Unit)

The Nitric Acid Concentrator (NAC) unit concentrates 50% nitric acid (NA50) from the NOX Absorber into Concentrated Nitric Acid (CNA) and recycled to TNT Nitration.

Exhaust from the NAC is mainly non-condensable exhaust. Nitrous compounds produced by the NAC unit are returned to the NOX Absorber unit.

3.5 Solvent Extraction Unit

The Extraction Unit uses fresh toluene to strip organics in the organic contaminated condensate from the ARU Organic Stripper and then this is sent to TNT Nitration. The clean condensate stream is also recycled. Some exhaust is vented to **atmosphere.**

3.6 NOX Absorber Unit (NOX ABS)

The NOX Absorber unit removes NOX from the various exhaust streams which are collected from upstream processes, including the ARU unit operations (DENI, MNT/DNT Stripper and NAC) as well as exhaust from TNT Nitration and the Weak Nitric Acid Storage Tank. The NOX Absorber uses water to remove NOX from the exhaust. NO is oxidized to NO2 using air. NO2 is absorbed in water to form nitric acid. The NA50 produced in the NOX Absorber column is concentrated to CNA in the ARU NAC and reused in TNT Nitration.

The exhaust from the NOX Absorber is vented to the Thermal Oxidizer. NA50 is sent to the NAC unit and the DENI unit.

3.7 Thermal Oxidizer

The exhaust from the NOX Absorber is routed to a thermal oxidizer (TO) for destruction of CO and TNM generated in the nitration process. The TO is a vertical direct-fired thermal oxidizer. Natural gas is used as a supplemental fuel. Exhaust from the NOX Absorber and supplemental combustion air are mixed in the burner with natural gas. The combustion gases exit through an exhaust stack.

3.8 Emergency Vents

Other than the cleaned exhaust from the NOX Absorber/TO there are no emissions to atmosphere during normal operation. There are additional pressure relief devices (particularly from DENI and SAC units) that will relieve, only in the event of an emergency. During these emergency events, emissions may include steam, NOX, organics, CO, and other inert gases (N2, O2, CO2).

4 THERMAL DESTRUCTION UNIT (TDU)

The Thermal Destruction Unit (TDU) system is a technology designed to destroy the Red Water hazardous waste stream that contains a variety of sulfur and nitrogen bound salts formed in the production of TNT. The system is subject to the National Emission Standards for Hazardous Air Pollutants (NESHAP) from Hazardous Waste Combustors (HWC), which requires the use of Maximum Achievable Control Technology (MACT) and is commonly call the HWC MACT regulation. The waste stream is injected into the Thermal Destruction Unit (TDU) after the flame. The Red Water waste stream is injected via air atomized nozzles. The hot flue gas generated in the Thermal Destruction Unit (TDU) section contains sulfur dioxide (SO2) and sulfur trioxide (SO3) and is treated. In this section, all the sulfur atoms will be converted to SOX (SO2/ SO3) and the nitrogen atoms will be converted to N2 and NOX (NO/ NO2). Any hydrocarbons present will be converted to CO2 and H2O. The burner and combustion chamber are designed to the regulatory requirement of 99.99% Destruction & Removal Efficiency (DRE) of Principal Organic Hazardous Constituents as well as sulfur and nitrogen bound constituents.

After the combustion chamber exhaust gas is passed to a DSI (dry sorbent injection) system. Sulfur dioxide (SO2) and sulfur trioxide (SO3) in the flue gas will be treated by injecting sodium bicarbonate. The SOX scrubbed flue gas from DSI injection passed through a baghouse/HEPA filter for removal of the resulting solids. NOX is then removed from the flue gas by a Selective Catalytic Reduction unit (SCR) via injecting ammonia to convert the NOX to N2 and H2O. After the SCR, the flue gases are emitted to the atmosphere via a stack, in compliance with the gaseous emission limits and performance guarantee provided by technology supplier.

Emissions of semi-volatile metals (SVM) and low volatile metals (LVM) constituents are removed to below HWC MACT emission limits. Any mercury present will be emitted to the atmosphere under the HWC MACT limits via the stack. Halogens are not expected as such, the formation of dioxins and furans is not expected. Any trace HCl/Cl2 will be removed in the DSI system.

5 RAW MATERIAL HANDLING

5.1 Toluene Tank

The toluene tank is located near the TNT Production area and has a capacity of ~~32,400~~31,304 gallons. The tank is top-filled by the delivery truck, which includes a vapor balancing recovery system to capture the vapors inside the tank during filling. This eliminates working losses from the toluene tank during filling from delivery trucks. Due to the vapor recovery system, the recycled toluene from the extraction system is the only source of toluene filling where working losses are present. The toluene tank is equipped with a conservation vent with a horizontal discharge.

5.2 Oleum Tank

The Oleum tank is in the Acid Tank Farm and has a capacity of ~~58,677~~45,358 gallons. During filling, vapors are captured via a vapor balancing recovery system back to the delivery truck.

The oleum vapor space is connected to the Oleum Scrubber for emission control. The tank is equipped with a conservation vent for inbreathing and emergency venting. Normal outbreathing is sent to the Oleum Scrubber, which scrubs SO3 and sulfuric acid vapors. 97% sulfuric acid from the storage tank is used as the scrubbing liquid in the Oleum Scrubber and is recycled back to the 97% sulfuric acid storage tank.

5.3 97% Sulfuric Acid Tank

97% Sulfuric acid is produced by a Sulfuric Acid Concentrator system in the Acid Recovery Unit (ARU) and is stored in the Acid Tank Farm. The 97% Sulfuric Acid Tank has a capacity of ~~78,307~~76,663 gallons and has a vent, which discharges vertically. The 97% sulfuric acid is used to produce oleum for use in TNT production, and as scrubbing liquid for the Oleum Scrubber.

5.4 Concentrated Nitric Acid Tank

Concentrated nitric acid is fed to the tank via delivery truck and recycled from the Nitric Acid Concentrator (NAC Unit) in the ARU. The tank has a capacity of ~~42,575~~36,826 gallons. Concentrated nitric acid is used during the Nitration process of TNT production. The vent from the concentrated nitric acid tank discharges to the Nitric Acid Scrubber. Demineralized water is used as the scrubbing liquid. Weak nitric acid removed in the scrubber is sent to the weak nitric acid tank.

5.5 Weak Nitric Acid Tank

Weak nitric acid is generated in the ARU DENI and is fed to a weak nitric acid tank before being used in TNT Nitration. It is in the Acid Tank Farm and has a capacity of ~~8,338~~12,363 gallons. This tank is vented to the Nitric Acid Scrubber for emission control.

5.6 Spent Acid Tank

The spent acid tank collects spent acid from TTN Nitration process during TNT production. This spent acid is then processed in the ARU to recover nitric acid and sulfuric acid. The capacity of the tank is ~~38,772~~56,559 gallons. The spent acid tank vents to the Nitric Acid Scrubber for air emission control.

5.7 NA50 Tank

The weak nitric acid from the Nitric Acid Scrubber and NOX Absorption Unit (ARU) are stored in the NA50 Tank before being processed to CNA in the ARU NAC. The tank has a capacity of ~~8,616~~8,955 gallons. Vapors from the NA50 are sent to the NOX Absorber in the ARU.

5.8 Sellite Washing Solution Preparation and Storage

The raw material bag unloading station is used to prepare the washing solution mixture that is used in the TNT washing process. ~~Two~~ One unloading station~~s~~ is~~are~~ used to unload raw material~~, one for each raw material~~. One bag of each raw material is unloaded per day (~~2,420~~4,630 lbs). ~~Each~~ The unloading station is equipped with a hopper and a screw conveyor to feed into the mixing vessel. There are no emissions anticipated from the washing solution mixing tank to the washing solution storage tank.

5.9 Diesel Storage Tank

Diesel for the fire water pump is stored in a 550-gallon tank. Minimal emissions of VOC are expected from the Diesel Storage Tank.

6 UTILITIES

The utility equipment includes a package boiler, two natural gas fired emergency generators, a diesel fire water pump, and two packaged cooling tower units. The boiler is natural gas fired and has a rated heat input capacity of 36.3 MMBTU/hr. The fire water pump is fuelled by diesel and has a brake horsepower of 542. Both emergency generators are natural gas fired and have a brake horsepower of 1475. Particulate emissions from the two cooling towers are anticipated to result from drift.

Appendix 1

Site Map

Appendix 2

Block Flow Diagrams (BFDs)

Appendix 3

Sitewide Pollutant Emissions Summary

Appendix 4

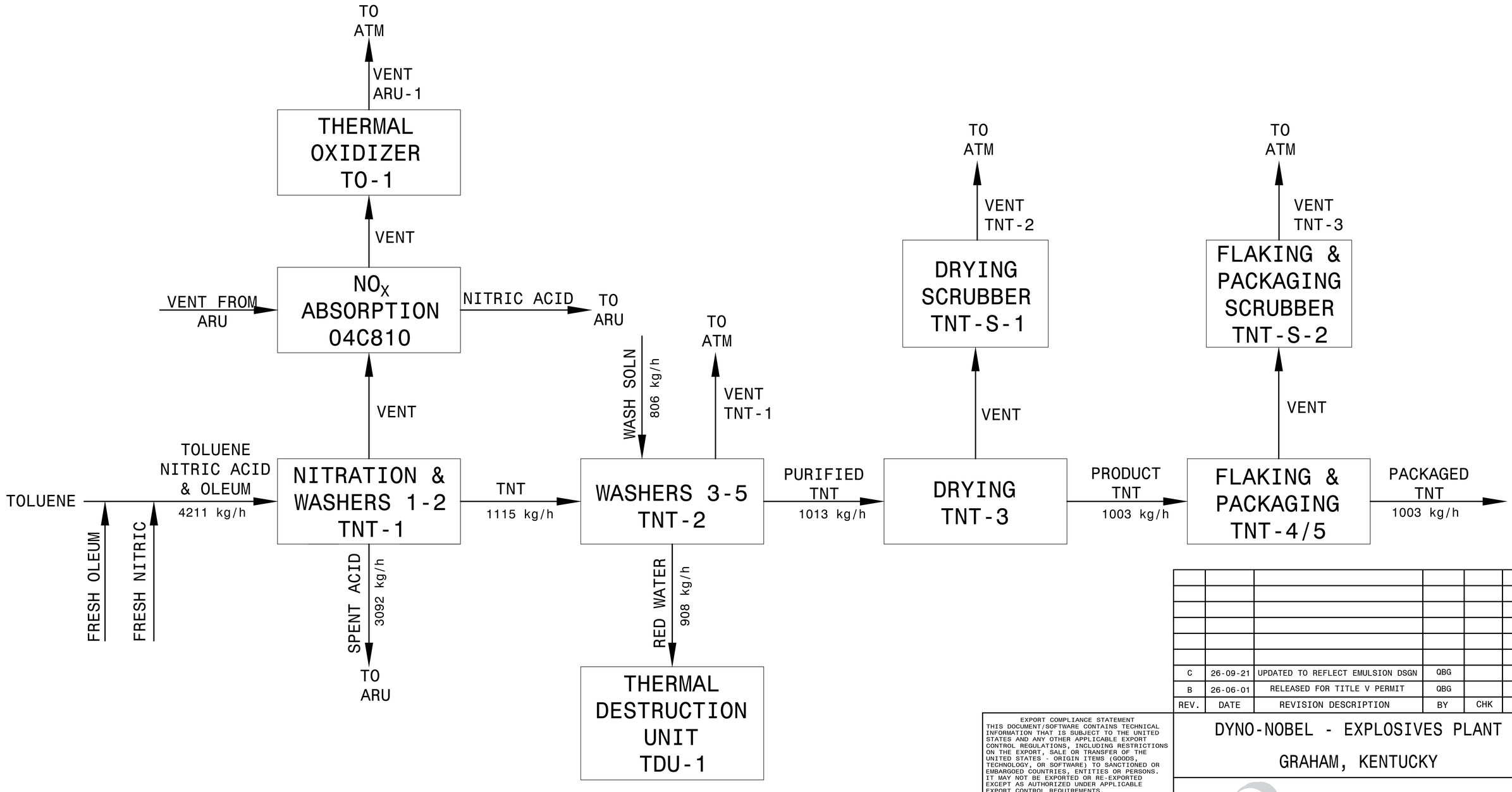
Emission Estimates

Appendix 5

Equipment Information and Specifications

Appendix 6

Applicability Evaluation for U.S. EPA NSPS and NESHAP Regulations



REV.	DATE	REVISION DESCRIPTION	BY	CHK	APP
C	26-09-21	UPDATED TO REFLECT EMULSION DSGN	QBG		
B	26-06-01	RELEASED FOR TITLE V PERMIT	QBG		

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2026-05-07

DRAWN BY	QBG	2026-09-21
CHECKED BY	-	YYYY-MM-DD
APPROVED BY	-	YYYY-MM-DD

DYNO-NOBEL - EXPLOSIVES PLANT
GRAHAM, KENTUCKY

PALIGEN™ TECHNOLOGIES
4301 West Boy Scout Boulevard Suite 400 Tampa, FL 33607

TITLE
TNT PRODUCTION
AIR PERMIT
BLOCK FLOW DIAGRAM

SIZE	CAGE CODE	DRAWING NUMBER	REV
B	9YPU0	-	C

SCALE	WEIGHT	SHEET
-	-	1/2

UNCONTROLLED: FOR PERMITTING PURPOSES ONLY

	98% Nitric Acid Tank 02-T0030	Weak Nitric Acid Tank 02-T0042	Spent Acid Tank 02-T0020	NA50 Tank 02-T0040	97% SA Tank 02-T0010	Oleum Blending	20% Oleum Tank 02-T0001
Composition, kg							
HNO3	19,915	719	1,867	3,541	226	0	0
H2SO4	0	0	0.07	0	0.2	0	0
SO3	0	0	0	0	0	8,094	25,009
NO2	3,002	67	5,062	331	0	0	0
H2O	600	622	2,034	1,620	240	0	0
Other organics	0	0	0	0	0	0	0
N2	63,939	25,023	100,741	54,529	131,658	0	76,577
O2	19,936	7,610	28,279	16,615	39,977	0	22,791
NO	0.003	0	0.3	0	0	0	0
Annual Mass, kg	107,392	34,041	137,984	76,636	172,101	8,094	124,376
Annual volume, m3	80,748	29,063	118,886	64,519	153,306	2,649	98,244
Avg Density, kg/m3	1.330	1.171	1.161	1.188	1.123	3.055	1.266
Uncontrolled Emissions, Ton/year							
HNO3	22	0.8	2.1	3.9	0.2	0	0
H2SO4	0	0	8E-05	0	3E-04	0	0
SO3	0	0	0	0	0	8.9	28
NO2	3.3	0.1	5.6	0.4	0	0	0
NO	4E-06	0	4E-04	0	0	0	0

Dyno Nobel TNT Plant
Emission Summary

	Uncontrolled Sitewide Emissions (TPY)			Controlled Sitewide Emissions (TPY)		
	Existing Dyno Nobel Site Emissions	New TNT Facility Emissions	**Total Uncontrolled**	Existing Dyno Nobel Site Emissions	New TNT Facility Emissions	**Total Controlled**
NO_X (as NO_2)*		1,444	**1444.13**		74	**73.90**
SO_X		211	**211.10**		18	**17.87**
CO		425	**424.51**		19.7	**19.71**
VOC / HC		49.6	**49.62**		2.32	**2.32**
Sulfuric Acid	10.07	3.97E-04	**10.07**	10.07	3.01E-04	**10.07**
Ammonia	0.03	1.19	**1.22**	0.03	1.19	**1.22**
DNT		3.3	**3.30**		0.0013	**0.0013**
PM	6.6	1,019	**1025.58**	0.12	13.8	**13.87**
PM10	6.6	1,019	**1025.58**	0.12	13.8	**13.87**
PM2.5	6.6	1,019	**1025.56**	0.11	13.8	**13.86**
Fugitive PM		< 40	**40.00**		< 40	**40**
Nitric Acid	452.17	n/a*	**452.17**	30.32	n/a*	**30.3**
Acetone	806.17		**806.17**	84.17		**84.2**
CO_2		27,086	**27,086**		27,086	**27,086**
N_2O		0.0368	**0.0368**		0.0368	**0.0368**
CH_4		0.366	**0.366**		0.366	**0.366**
Toluene		8.2	**8.2**		8.2	**8.2**
Benzene		3.00E-04	**3.00E-04**		3.00E-04	**3.00E-04**
Xylene		1.00E-04	**1.00E-04**		1.00E-04	**1.00E-04**
Formaldehyde		0.097	**0.097**		0.097	**0.097**
Dioxin/Furan		2.46E-09	**2.46E-09**		2.46E-09	**2.46E-09**
LVM, As+Be+Cr		0.082	**0.082**		5.20E-04	**5.20E-04**
SVM, Cd+Pb		0.017	**0.017**		2.25E-04	**2.25E-04**
Mercury		2.50E-04	**2.50E-04**		2.50E-04	**2.50E-04**
HCl/Cl2		7.10	**7.10**		0.71	**0.71**

* Emissions of nitric acid are not regulated for the New TNT Facility and are not included.

Dyno Nobel TNT Plant
Emission Summary

		UNCONTROLLED (TPY)																						NOx UNCONTROLLED (TPY)				
ID NO.	EMISSION POINT	NO_x (as NO_2)*	SO_x	PM	PM10	PM2.5	Fugitive PM	CO	VOC / HC	Sulfuric Acid	Ammonia	DNT	CO_2	N_2O	CH_4	Toluene	Benzene	Xylene	Formaldehyde	Dioxin/ Furan	Low Volatile Metals (LVM, As+Be+Cr)	Semi Volatile Metals (SVM, Cd+Pb)	Mercury	HCl/Cl2	NO_x (emitted)	NO_2 (emitted)	NO (emitted)	NO_2 (as NO)	NO_x (as NO_2)*
01-PVRV02091	Toluene Tank Vent															0.058													
	Toluene Equipment Service Leaks															6.0													
02-STA0062	Oleum Scrubber Stack		36.9																										
02-PVRV03491	97% Sulfuric Acid Tank Vent									3.00E-04																			
02-STA0061	Nitric Acid Scubber Stack	9.0								9.72E-05																9.0			9.0
	50% Nitric Acid Tank Vent	3.9																								3.9			3.9
	Diesel Tank								3.97E-05																				
20-B0030	Boiler Stack	7.67	0.092	1.20	1.20	1.20		12.9	0.832				17782	3.30E-02	3.30E-01										7.67				7.67
31-STA0024	Diesel Fire Water Pump Stack	0.775	0.100	2.00E-02	0.02	2.00E-02		0.102	0.022				56.2	4.56E-04	2.28E-03	0.0001	0.0003	0.0001							0.78				0.78
23-GEN1000	Emergency Generator 1 Stack	0.024	0.00140	0.0226	0.02	0.0226		0.520	0				278	5.24E-04	5.24E-03				0.049						0.02				0.02
23-GEN1001	Emergency Generator 2 Stack	0.024	0.00140	0.0226	0.0226	0.0226		0.520	0				278	5.24E-04	5.24E-03				0.049						0.02				0.02
20-ZCT0001	Cooling Tower 1			0.095	0.095	0.095																							
21-ZCT0001	Cooling Tower 2			0.017	0.017	0.017																							
	Washers 3-5			< 5	< 5	< 5																							
08-STA0307	Dryer Scubber Stack			1.45	1.45	1.45																							
08-STA0314	Flaker + Packaging Scubber Stack			2.9	2.9	2.9																							
	Sodium Sulfite Unloading Station			4.23	4.23	4.23																							
	Sodium Bisulfite Unloading Station			0.0018	0.0018	0.0018																							
	TNT Production Building Vents (4)						< 20***																						
	TNT Packaging Building Vents (2)						< 10***																						
	Sellite Preparation Building Vents (2)						< 10***																						
07-STA1000	ARU NOX Absorber/Thermal Oxidizer Stack	1309						406	48.3 **			3.3	435												454	21.9	544	834	1309
	ARU Thermal Oxidizer (from burner)	47.3	0.01	0.02	0.02	0.02		0.87	0.06				1231	2.32E-03	2.32E-02	3.50E-05						5.16E-06			1.03	46.3			47.3
	Solvent Extraction Vent Stack															2.12													
07-STA0003	TDU Stack	66.0	174	1004	1004	1004		3.99	0.41		1.19		7026							2.463E-09	0.082	0.017	2.50E-04	7.1	61.3				61.3
	Paved Haul Roads																												
	Total Uncontrolled	1,444	211	1,019	1,019	1,019	< 40	425	49.6	3.97E-04	1.2	3.3	27086	0.0368	0.366	8.18	3.00E-04	1.00E-04	0.097	2.463E-09	0.082	0.017	2.50E-04	7.1	525	81.1	544	834	1,439

Dyno Nobel TNT Plant
Emission Summary

		CONTROLLED (TPY)																						NOx CONTROLLED (TPY)				
ID NO.	EMISSION POINT	NO_x (as NO_2)*	SO_x	PM	PM10	PM2.5	Fugitive PM	CO	VOC / HC	Sulfuric Acid	Ammonia	DNT	CO_2	N_2O	CH_4	Toluene	Benzene	Xylene	Formaldehyde	Dioxin/ Furan	Low Volatile Metals (LVM, As+Be+Cr)	Semi Volatile Metals (SVM, Cd+Pb)	Mercury	HCl/Cl2	NO_x (emitted)	NO_2 (emitted)	NO (emitted)	NO (as NO_2)	NO_x (as NO_2)*
01-PVRV02091	Toluene Tank Vent															0.058													
	Toluene Equipment Service Leaks															6													
02-STA0062	Oleum Scrubber Stack		0.369																										
02-PVRV03491	97% Sulfuric Acid Tank Vent									3.00E-04																			
02-STA0061	Nitric Acid Scubber Stack	9.0								9.72E-07																9.0			9.0
	50% Nitric Acid Tank Vent	0.039																								0.39			0.39
	Diesel Tank								3.97E-05																				
20-B0030	Boiler Stack	7.67	0.092	1.20	1.20	1.20		12.9	0.832				17782	3.30E-02	3.30E-01										7.67				7.67
31-STA0024	Diesel Fire Water Pump Stack	0.775	0.100	2.00E-02	2.00E-02	2.00E-02		0.102	0.022				56.2	4.56E-04	2.28E-03	0.0001	0.0003	0.0001							0.78				0.78
23-GEN1000	Emergency Generator 1 Stack	2.40E-02	0.00140	0.0226	0.0226	0.0226		0.520	0				278	5.24E-04	5.24E-03				0.049						0.02				0.02
23-GEN1001	Emergency Generator 2 Stack	2.40E-02	0.00140	0.0226	0.0226	0.0226		0.5203	0				278	5.24E-04	5.24E-03				0.049						0.02				0.02
20-ZCT0001	Cooling Tower 1			0.095	0.095	0.095																							
21-ZCT0001	Cooling Tower 2			0.017	0.017	0.017																							
	Washers 3-5			< 5	< 5	< 5																							
08-STA0307	Dryer Scubber Stack			0.145	0.145	0.145																							
08-STA0314	Flaker + Packaging Scubber Stack			2.9	2.9	2.9																							
	Sodium Sulfite Unloading Station			4.23	4.23	4.23																							
	Sodium Bisulfite Unloading Station			0.0018	0.0018	0.0018																							
	TNT Production Building Vents (4)						< 20***																						
	TNT Packaging Building Vents (2)						< 10***																						
	Sellite Preparation Building Vents (2)						< 10***																						
07-STA1000	ARU NOX Absorber/Thermal Oxidizer Stack	2.43						0.811	1.0 **			0.00131	435												0.91	0.6	0.6	0.92	2.43
	ARU Thermal Oxidizer	47.3	0.01	0.02	0.02	0.02		0.87	0.06				1231	2.32E-03	2.32E-02	3.50E-05						5.16E-06			1.03	46.3			47.3
	Solvent Extraction Vent Stack															2.12													0
07-STA0003	TDU Stack	6.60	17.3	0.080	0.080	0.080		3.99	0.41		1.19		7026							2.463E-09	5.20E-04	2.20E-04	2.50E-04	0.71	6.1				6.1
	Paved Haul Roads																												
	Total Controlled	74	18	13.8	13.8	13.8	< 40	19.7	2.32	3.01E-04	1.2	0.00131	27086	0.0368	0.366	8.18	3.00E-04	1.00E-04	0.097	2.463E-09	5.20E-04	2.25E-04	2.50E-04	0.71	16.5	56.3	0.6	0.92	73.8

* NOx total was calculated by combining emitting NOx, NO_2, and NO (as NO_2).

** VOC shown for ARU NOx Absorber/Thermal Oxidizer Stack is trinitromethane (TNM) generated from nitration.

***Each building vent is < 5 TPY.

NO	30	lb/mol
NO2	46	lb/mol
NOx (as NO2)	1.533* NO	lb/hr

Division for Air Quality

300 Sower Boulevard

Frankfort, KY 40601

(502) 564-3999

DEP7007J

Volatile Liquid Storage

___ Section J.1: General Information

___ Section J.2: Tank Description

___ Section J.3: Gasoline Plants and Terminals

___ Section J.4: Loading Rack(s)

___ Section J.5: Equipment Leaks

___ Section J.6: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI, DEP7007N, DEP7007V, and DEP7007GG.

___ SDS attached

Source Name: **Dyno Nobel Inc.**

KY EIS (AFS) #: **21- 177-00067**

Permit #: **S-25-064**

Agency Interest (AI) ID: **3241**

Date: **6/1/2026**

Section J.1: General Information

Emission Unit #	Emission Unit Name	Emission Unit Description	Proposed/Actual Date of Construction Commencement *(MM/YYYY)*	Date of modification/ reconstruction	Control Device ID	Stack ID
RMH-1	01-T0001	Toluene Tank	12/2026	N/A	-	RMH-1
RMH-2A	02-T0001	Oleum Tank	12/2026	N/A	02-Z0006	RMH-2
RMH-3	02-T0010	97% Sulfuric Acid Tank	12/2026	N/A	-	RMH-3
RMH-4C	T404-1	Spent Acid Tank	12/2026	N/A	02-Z0060	RMH-4
RMH-4A	02-T0030	98% Nitric Acid Tank	12/2026	N/A	02-Z0060	RMH-4
RMH-4B	02-T0042	Weak Nitric Acid Tank	12/2026	N/A	02-Z0060	RMH-4
RMH-5	02-T0040	NA50 Acid Tank	12/2026	N/A	NOx Absorber	ARU-1
RMH-10	TBD	Diesel Tank	12/2026	N/A	-	RMH-5

Emission Unit #	Emission Unit Name	Emission Unit Description	Proposed/Actual Date of Construction Commencement *(MM/YYYY)*	Date of modification/ reconstruction	Control Device ID	Stack ID

Section J.2: Tank Description

Emission Point #: RMH-1

Emission Point Name: Toluene Tank

Tank ID#: 01-T0001

Date Installed: Dec-26

List Applicable Regulations: 40 CFR 60 Subpart Kc

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
Toluene	1,219,392	7.250	92.14	100%	68	79.7	0.4243	0.5991

J.2B: Tank Data:

Tank Capacity: *(gallons)* 31304 **Shell Height/ Length:** *(ft)* 16.5 **Shell Diameter:** *(ft)* 16 **Tank Turnovers per Year:** 51.3

Tank Orientation: ☐ Horizontal ☑ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* 17.056 Average Liquid Height: *(ft)* 9.84

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☐ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** 10.7 ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☐ Good ☐ Poor **Vacuum Setting:** -0.6 psig

Is Tank Heated?: ☐ Yes ☑ No **Shell Condition:** ☐ Good ☐ Poor **Pressure Setting:** 1.0 psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
RMH-1	Toluene	Working	0.01595	Intermittent	U.S. EPA AP-42 Chapter 7.1.7
RMH-1	Toluene	Standing (Breathing)	0.0794	Intermittent	U.S. EPA AP-42 Chapter 7.1.7

Section J.2: Tank Description

Emission Point #: **RMH-2A**

Emission Point Name: Oleum Tank

Tank ID#: 02-T0001

Date Installed: **26-Dec**

List Applicable Regulations:

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
Oleum	2,423,016	15.990	93.85	SO3 dissolved in H2SO4	104	104	0.0696	0.0696

J.2B: Tank Data:

Tank Capacity: *(gallons)* 45358 **Shell Height/ Length:** *(ft)* 19.23 **Shell Diameter:** *(ft)* 20 **Tank Turnovers per Year:** 52

Tank Orientation: ☐ Horizontal ☑ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* 18.78 Average Liquid Height: *(ft)* 11.644

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☐ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** 12.5 ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☐ Good ☐ Poor **Vacuum Setting:** -0.6 psig

Is Tank Heated?: ☑ Yes ☐ No **Shell Condition:** ☐ Good ☐ Poor **Pressure Setting:** 1.0 psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
RMH-2A	Oleum	*See RMH Form N.1 for Oleum Tank Emissions*	*See RMH Form N.1 for Oleum Tank Emissions*	N.1 for Oleum Tank Emissions	See RMH Form N.1 for Oleum Tank Emissions

Section J.2: Tank Description

Emission Point #: **RMH-3**

Emission Point Name: 97% Sulfuric Acid Tank

Tank ID#: 02-T0010

Date Installed: **26-Dec**

List Applicable Regulations:

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
97% wt Sulfuric Acid	3,400,632	15.105	93.85	97% Sulfuric Acid	48	104	1.45E-07	6.18E-06

J.2B: Tank Data:

Tank Capacity: *(gallons)* 76663 **Shell Height/ Length:** *(ft)* 21.57 **Shell Diameter:** *(ft)* 25 **Tank Turnovers per Year:** 52.6

Tank Orientation: ☐ Horizontal ☑ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* 20.88 Average Liquid Height: *(ft)* 12.0

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☐ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** 12.8 ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☐ Good ☐ Poor **Vacuum Setting:** -0.6 psig

Is Tank Heated?: ☐ Yes ☐ No **Shell Condition:** ☐ Good ☐ Poor **Pressure Setting:** 1.0 psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
RMH-3	Sulfuric Acid	*See RMH Form N.1 for 97% Sulfuric Acid Tank Emissions*	See RMH Form N.1 for 97% Sulfuric Acid Tank Emissions	See RMH Form N.1 for 97% Sulfuric Acid Tank Emissions	See RMH Form N.1 for 97% Sulfuric Acid Tank Emissions

Section J.2: Tank Description

Emission Point #: **RMH-4C**

Emission Point Name: Spent Acid Tank

Tank ID#: T404-1

Date Installed: **26-Dec**

List Applicable Regulations:

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
Spent Acid	5,493,804	13.186	46.8	Sulfuric Acid / Nitric Acid / Nitrous Acid / Water Trace Organics	86	86	1.58	1.58

J.2B: Tank Data:

Tank Capacity: *(gallons)* 56559 **Shell Height/ Length:** *(ft)* 19.93 **Shell Diameter:** *(ft)* 22 **Tank Turnovers per Year:** 121.6

Tank Orientation: ☐ Horizontal ☑ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* 19.23 Average Liquid Height: *(ft)* 11.5

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☐ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** 12.3 ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☑ Good ☐ Poor **Vacuum Setting:** -0.6 psig

Is Tank Heated?: ☐ Yes ☑ No **Shell Condition:** ☑ Good ☐ Poor **Pressure Setting:** 1.0 psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
RMH-4C	Spent Acid	*See RMH Form N.1 for Spent Acid Tank Emissions*	See RMH Form N.1 for Spent Acid Tank Emissions	See RMH Form N.1 for Spent Acid Tank Emissions	See RMH Form N.1 for Spent Acid Tank Emissions

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*

Section J.2: Tank Description

Emission Point #: **RMH-4A**

Emission Point Name: 98% Nitric Acid Tank

Tank ID#: 02-T0030

Date Installed: **12/236**

List Applicable Regulations:

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
Nitric Acid	2,401,992	12.184	60.01	98% Nitric Acid	68	113	0.928	0.928

J.2B: Tank Data:

Tank Capacity: *(gallons)* 36826 **Shell Height/ Length:** *(ft)* 19.4 **Shell Diameter:** *(ft)* 18 **Tank Turnovers per Year:** 74.5

Tank Orientation: ☐ Horizontal ☑ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* 18.61 Average Liquid Height: *(ft)* 10.7

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☐ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** 11.5 ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☑ Good ☐ Poor **Vacuum Setting:** -0.6 psig

Is Tank Heated?: ☐ Yes ☑ No **Shell Condition:** ☑ Good ☐ Poor **Pressure Setting:** 1.0 psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
RMH-4A	98% Nitric Acid	*See RMH Form N.1 for 98% Nitric Acid Tank Emissions*	See RMH Form N.1 for 98% Nitric Acid Tank Emissions	See RMH Form N.1 for 98% Nitric Acid Tank Emissions	See RMH Form N.1 for 98% Nitric Acid Tank Emissions

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*

Section J.2: Tank Description

Emission Point #: RMH-4B

Emission Point Name: 55% Nitric Acid Tank

Tank ID#: 02-T0042

Date Installed: 26-Dec

List Applicable Regulations:

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
55% Nitric Acid	1,009,152	10.490	29.67	Diluted Nitric Acid	156	156	8.843	8.843

J.2B: Tank Data:

Tank Capacity: *(gallons)* 12363 **Shell Height/ Length:** *(ft)* 10.77 **Shell Diameter:** *(ft)* 14 **Tank Turnovers per Year:** 285.6

Tank Orientation: ☐ Horizontal ☑ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* 10.08 Average Liquid Height: *(ft)* 6.2

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☐ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** 7.1 ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☑ Good ☐ Poor **Vacuum Setting:** -0.6 psig

Is Tank Heated?: ☐ Yes ☑ No **Shell Condition:** ☑ Good ☐ Poor **Pressure Setting:** 1.0 psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
RMH-4B	55% Nitric Acid	*See RMH Form N.1 for Weak Nitric Acid Tank Emissions*	See RMH Form N.1 for Weak Nitric Acid Tank Emissions	See RMH Form N.1 for Weak Nitric Acid Tank Emissions	See RMH Form N.1 for Weak Nitric Acid Tank Emissions

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*

Section J.2: Tank Description

Emission Point #: **RMH-5**

Emission Point Name: NA50 Tank

Tank ID#: 02-T0040

Date Installed: **26-Dec**

List Applicable Regulations:

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
Nitric Acid (~50%)	1,965,744	10.816	28.02	~50% Nitric Acid	48	86	0.487	1.58

J.2B: Tank Data:

Tank Capacity: *(gallons)* 8955 **Shell Height/ Length:** *(ft)* 15.75 **Shell Diameter:** *(ft)* 18 **Tank Turnovers per Year:** 85

Tank Orientation: ☐ Horizontal ☑ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* 9.87 Average Liquid Height: *(ft)* 6.4

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☐ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** 7.2 ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☑ Good ☐ Poor **Vacuum Setting:** -0.6 psig

Is Tank Heated?: ☐ Yes ☑ No **Shell Condition:** ☑ Good ☐ Poor **Pressure Setting:** 1.0 psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
RMH-5	Nitric Acid (50%)	*See RMH Form N.1 for NA50 Tank Emissions*	See RMH Form N.1 for NA50 Tank Emissions	See RMH Form N.1 for NA50 Tank Emissions	See RMH Form N.1 for NA50 Tank Emissions

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*

Section J.2: Tank Description

Emission Point #: **RMH-10**

Emission Point Name: Diesel Tank

Tank ID#: TBD

Date Installed: **26-Dec**

List Applicable Regulations:

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
Diesel fuel	60	6.84-7.05		100%	0	125	0.042	0.042

J.2B: Tank Data:

Tank Capacity: *(gallons)* 550 **Shell Height/ Length:** *(ft)* 6.25 **Shell Diameter:** *(ft)* 4 **Tank Turnovers per Year:** 1

Tank Orientation: ☑ Horizontal ☐ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* _____ Average Liquid Height: *(ft)* 3.80

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☐ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** _____ ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☑ Good ☐ Poor **Vacuum Setting:** _____ psig

Is Tank Heated?: ☐ Yes ☑ No **Shell Condition:** ☑ Good ☐ Poor **Pressure Setting:** _____ psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
RMH-10	Diesel	Working	0.02	Firewater pump testing (non-emergency)	U.S. EPA TANKS 5.2
RMH-10	Diesel	Standing	1.3	Firewater pump testing (non-emergency)	U.S. EPA TANKS 5.2

Section J.5: Equipment Leaks

Emission Point #: RMH-1

Emission Point Name: Equipment associated with Toluene Tank

This section is to be completed for all components of Volatile Liquid Storage Systems that may have leaks.

Equipment Type	Indicate the number of each type of equipment for this emission point		Emission Factor *(lb/SCC units)*		Source of Emission Factor	Total Emissions *(lb/yr)*
	Gasoline	Other (diesel, kerosene, etc.)	Gasoline	Other		
Valves	N/A	58	N/A	0.0089 lb/hr/source	EPA's Protocol for Equipment Leak Emission Estimates (EPA 453/R-95-017), Table 2-1 SOCMI Average Emission Factors	4514.9
Pumps	N/A	4	N/A	0.0439 lb/hr/source	EPA's Protocol for Equipment Leak Emission Estimates (EPA 453/R-95-017), Table 2-1 SOCMI Average Emission Factors	1537.5
Connectors	N/A	111	N/A	0.0040 lb/hr/source	EPA's Protocol for Equipment Leak Emission Estimates (EPA 453/R-95-017), Table 2-1 SOCMI Average Emission Factors	3923.6
Risers/Loading-Arm Valves	N/A	0	N/A	N/A	N/A	0
Open-ended Lines	N/A	2	N/A	0.0037 lb/hr/source	EPA's Protocol for Equipment Leak Emission Estimates (EPA 453/R-95-017), Table 2-1 SOCMI Average Emission Factors	65.7
Other	N/A	4 2	N/A	0.229 lb/hr/source 0.331 lb/hr/source	EPA's Protocol for Equipment Leak Emission Estimates (EPA 453/R-95-017), Table 2-1 SOCMI Average Emission Factors	1381.9 579.47

Section J.6: Notes, Comments, and Explanations

1. See Toluene Tank Emission Calculations.

2. Toluene Tank incorporates a vapor balancing system with the toluene tanker truck unloading system, so there are no working losses during filling with fresh toluene.

3. Preliminary determination is that 40 CFR 60 Subpart VVb for equipment leaks (LDAR) will apply to equipment in toluene service.

4. Equipment count on J.5 includes equipment from TNT Production, Raw Material Handling, and Solvent Extraction Unit.

5. The diesel tank feeds the emergency firewater pump. The maximum annual throughput is 60 gallons per year for non-emergency use (e.g. maintenance and testing of the firewater pump).

6. "Other" equipment in toluene service includes pressure relief valves (2) and sampling connection systems (4).

Division for Air Quality

300 Sower Boulevard
Frankfort, KY 40601
(502) 564-3999

DEP7007N

Source Emissions Profile

__ Section N.1: Emission Summary
__ Section N.2: Stack Information
__ Section N.3: Fugitive Information
__ Section N.4: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI

Source Name: Dyno Nobel, Inc.

KY EIS (AFS) #: 21- 177-00067

Permit #: S-25-064

Agency Interest (AI) ID: 3241

Date: 6/1/2026

N.1: Emission Summary

Emission Unit #	Emission Unit Name	Process ID	Process Name	Control Device Name	Control Device ID	Stack ID	Maximum Design Capacity *(SCC Units/hour)*	Pollutant	Uncontrolled Emission Factor *(lb/SCC Units)*	Emission Factor Source (e.g. AP-42, Stack Test, Mass Balance)	Capture Efficiency *(%)*	Control Efficiency *(%)*	Hourly Emissions		Annual Emissions	
													Uncontrolled Potential *(lb/hr)*	Controlled Potential *(lb/hr)*	Uncontrolled Potential *(tons/yr)*	Controlled Potential *(tons/yr)*
RMH-1A	01-T0001	RMH-1	Toluene Tank	-	-	RMH-1	139.2 gal/hr	Toluene	9.34E-05 lb/gal	AP-42 Section 7.1.7	-	-	0.013	0.013	0.058	0.058
RMH-1B	Devices in Toluene Service	RMH-1	Equipment in Toluene Service	-	-	-	139.2 gal/hr	Toluene	9.84E-03 lb/gal	EPA 453/R-95-017, Table 2-1 SOCMI Emission Factors	-	-	1.37	1.37	6.0	6.0
RMH-2A RMH-2B RMH-2C	02-T0001 Oleum Truck 02-V0009	RMH-2A RMH-2B RMH-2	Oleum Tank Oleum Truck Oleum Blending Surge Vessel	Oleum Scrubber	02-Z0006	RMH-2	304.3 gal/hr (Oleum Tank)	SO_3	2.10E-02 lb/gal (Oleum Tank)	Mass Balance/Vapor Liquid Equilibrium	100%	>99%	6.4 N/A 2.03	0.064 N/A 0.02	28 N/A 8.9	0.28 N/A 0.089
RMH-3	02-T0010	RMH-3	97% Sulfuric Acid Tank	-	-	RMH-3	444 gal/hr	H_2SO_4	1.54E-07 lb/gal	Mass Balance/Vapor Liquid Equilibrium	-	-	6.85E-05	6.85E-05	3.00E-04	3.00E-04
RMH-4A RMH-4B RMH-4C	02-T0030 02-T0042 T404-1	RMH-4A RMH-4B RMH-4C	98% Nitric Acid Tank Weak Nitric Acid Tank Spent Acid Tank	Nitric Acid Scrubber	02-Z0060	RMH-4	296.9 gal/hr 126.7 gal/hr 655.2 gal/hr	H_2SO_4	0.00 lb/gal 0.00 lb/gal 2.75E-08 lb/gal	Mass Balance/Vapor Liquid Equilibrium	100%	>99%	0.00 0.00 1.83E-05	0.00 0.00 1.83E-07	0.00 0.00 8E-05	0.00 0.00 8E-07
RMH-4A RMH-4B RMH-4C	02-T0030 02-T0042 T404-1	RMH-4A RMH-4B RMH-4C	98% Nitric Acid Tank Weak Nitric Acid Tank Spent Acid Tank	Nitric Acid Scrubber	02-Z0060	RMH-4	296.9 gal/hr 126.7 gal/hr 655.2 gal/hr	NO_2	2.54E-03 lb/gal 1.82E-04 lb/gal 1.95E-03 lb/gal	Mass Balance/Vapor Liquid Equilibrium	100%	-	0.753 0.023 1.28	0.753 0.023 1.28	3.3 0.1 5.6	3.3 0.1 5.6
RMH-5	02-T0040	RMH-5	NA50 Tank	NO_X Absorber	NO_X Absorber	ARU-1	247.1 gal/hr	NO_2	3.60E-03 lb/gal	Mass Balance/Vapor Liquid Equilibrium	100%	>99%	0.89	0.0089	3.9	0.039
RMH-10	TBD	RMH-10	Diesel Tank	-	-	RMH-10	6.85E-03 gal/hr	VOC	1.32E-03 lb/gal	U.S. EPA TANKS 5.2	-	-	9.06E-06	9.06E-06	3.97E-05	3.97E-05

Section N.2: Stack Information

UTM Zone:

Stack ID	Identify all Emission Units (with Process ID) and Control Devices that Feed to Stack	Stack Physical Data			Stack UTM Coordinates		Stack Gas Stream Data		
		Equivalent Diameter *(ft)*	Height *(ft)*	Base Elevation *(ft)*	Northing *(m)*	Easting *(m)*	Flowrate *(acfm)*	Temperature *(° F)*	Exit Velocity *(ft/sec)*
RMH-1	Toluene Tank	0.33	22.3				0.043	68	0.5
RMH-2	Oleum Tank Oleum Truck Oleum Blending Surge Vessel Oleum Scrubber	0.13	33				53.88	113	50
RMH-3	97% Sulfuric Acid Tank	0.5	28.21				24.63	104	2.1
RMH-4	98% Nitric Acid Tank Weak Nitric Acid Tank Spent Acid Tank Nitric Acid Scrubber	0.21	33				99.85	75	50
RMH-10	Diesel Tank	0.5	10				-	68	-

Section N.3: Fugitive Information

UTM Zone:

Emission Unit #	Emission Unit Name	Process ID	Area Physical Data		Area UTM Coordinates		Area Release Data	
			Length of the X Side *(ft)*	Length of the Y Side *(ft)*	Northing *(m)*	Easting *(m)*	Release Temperature *(°F)*	Release Height *(ft)*

Section N.4: Notes, Comments, and Explanations
1. The conservation vent for the Toluene tank is a horizontal discharge.
2. The vent for the Sulfuric Acid Tank is a vertical discharge.
3. RMH-1B is devices in toluene liquid or vapor service (valves, fitting, etc.) shown on form J.5.

Division for Air Quality

300 Sower Boulevard
Frankfort, KY 40601
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DEP7007N

Source Emissions Profile

__ Section N.1: Emission Summary
__ Section N.2: Stack Information
__ Section N.3: Fugitive Informatic
__ Section N.4: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI

Source Name: Dyno Nobel Inc.

KY EIS (AFS) #: 21- 177-00067

Permit #: S-25-064

Agency Interest (AI) ID: 3241

Date:

N.1: Emission Summary

Emission Unit #	Emission Unit Name	Process ID	Process Name	Control Device Name	Control Device ID	Stack ID	Maximum Design Capacity *(SCC Units/hour)*	Pollutant	Uncontrolled Emission Factor *(lb/SCC Units)*	Emission Factor Source (e.g. AP-42, Stack Test, Mass Balance)	Capture Efficiency *(%)*	Control Efficiency *(%)*	Hourly Emissions		Annual Emissions	
													Uncontrolled Potential *(lb/hr)*	Controlled Potential *(lb/hr)*	Uncontrolled Potential *(tons/yr)*	Controlled Potential *(tons/yr)*
TNT-1	Nitration + Washers 1 & 2	TNT	TNT Manufacturing	NOx Absorber & Thermal Oxidizer	TBD	ARU-1	8139 lb/hr	CO	0.01138	Technology Provider Process Model	100.00%	99.8%	92.61	0.185	405.63	0.811
TNT-1	Nitration + Washers 1 & 2	TNT	TNT Manufacturing	NOx Absorber & Thermal Oxidizer	04C8010	ARU-1	8139 lb/hr	NOx	0.01273	Technology Provider Process Model	100.00%	99.8%	103.64	0.207	453.94	0.908
TNT-1	Nitration + Washers 1 & 2	TNT	TNT Manufacturing	NOx Absorber & Thermal Oxidizer	04C8010	ARU-1	2205 lb/hr	VOC (TNM)*	0.5 lb/100 lb TNT produced	Literature Data	100.00%	98.0%	11.0	0.22	48.3	1.0
TNT-1	Nitration + Washers 1 & 2	TNT	TNT Manufacturing	-	-	-	8139 lb/hr	CO_2	0.01219	Technology Provider Process Model	-	-	99.2	99.23	434.6	434.6
TNT-2	Washers 3-5	TNT	TNT Manufacturing	-	-	TNT-1	2459 lb/hr	PM	0.00046	Technology Provider Process Model	-	-	<1.14	<1.14	<5	<5
TNT-3	Drying	TNT	TNT Manufacturing	Dryer Scrubber/HEPA	TNT-S-1	TNT-2	2234 lb/hr	PM	0.00015	Technology Provider Process Model	100%	>90%	0.33	0.033	1.45	0.145

Emission Unit #	Emission Unit Name	Process ID	Process Name	Control Device Name	Control Device ID	Stack ID	Maximum Design Capacity *(SCC Units/hour)*	Pollutant	Uncontrolled Emission Factor *(lb/SCC Units)*	Emission Factor Source (e.g. AP-42, Stack Test, Mass Balance)	Capture Efficiency *(%)*	Control Efficiency *(%)*	Hourly Emissions		Annual Emissions	
													Uncontrolled Potential *(lb/hr)*	Controlled Potential *(lb/hr)*	Uncontrolled Potential *(tons/yr)*	Controlled Potential *(tons/yr)*
TNT-4	Flaking	TNT	TNT Manufacturing	Flaker + Packaging Scrubber/HEPA	TNT-S-2	TNT-3	2234 lb/hr	PM	0.00015	Technology Provider Process Model	100%	>90%	0.33	0.033	1.45	0.145
TNT-5	Packaging	TNT	TNT Manufacturing	Flaker + Packaging Scrubber/HEPA	TNT-S-2	TNT-3	2212 lb/hr	PM	0.00015	Technology Provider Process Model	100%	89%	0.33	0.036	1.45	0.160
TNT-6	Sodium Sulfite Loading	TNT	TNT Manufacturing	-	-	TNT-4	2100 kg bag /hr	PM	23.15 lb/ 2100 kg bag	Vendor estimate	-	-	23.15	23.15	4.23	4.23
TNT-7	Sodium Bisulfite Loading	TNT	TNT Manufacturing	-	-	TNT-4	100 kg bag /hr	PM	0.011 lb/ 100 kg bag	Vendor estimate	-	-	0.011	0.011	0.0018	0.0018
U5-EF-1	TNT Production Building Vent	TNT	TNT Manufacturing	-	-	U5-EF-1	TBD	Fugitive PM	TBD	Fugitive Dust Estimate	-	-	< 0.11	< 0.11	<5	<5
U5-EF-2	TNT Production Building Vent	TNT	TNT Manufacturing	-	-	U5-EF-2	TBD	Fugitive PM	TBD	Fugitive Dust Estimate	-	-	< 0.11	< 0.11	<5	<5
U5-EF-3	TNT Production Building Vent	TNT	TNT Manufacturing	-	-	U5-EF-3	TBD	Fugitive PM	TBD	Fugitive Dust Estimate	-	-	< 0.11	< 0.11	<5	<5
U5-EF-4	TNT Production Building Vent	TNT	TNT Manufacturing	-	-	U5-EF-4	TBD	Fugitive PM	TBD	Fugitive Dust Estimate	-	-	< 0.11	< 0.11	<5	<5
U8-EF-1	TNT Packaging Building Vent	TNT	TNT Manufacturing	-	-	U8-EF-1	TBD	Fugitive PM	TBD	Fugitive Dust Estimate	-	-	< 0.11	< 0.11	<5	<5
U8-EF-2	TNT Packaging Building Vent	TNT	TNT Manufacturing	-	-	U8-EF-2	TBD	Fugitive PM	TBD	Fugitive Dust Estimate	-	-	< 0.11	< 0.11	<5	<5
U6-EF-1	Sellite Preperation Building Vent	TNT	TNT Manufacturing	-	-	U6-EF-1	TBD	Fugitive PM	TBD	Fugitive Dust Estimate	-	-	< 0.11	< 0.11	<5	<5

Section N.2: Stack Information

UTM Zone:

Stack ID	Identify all Emission Units (with Process ID) and Control Devices that Feed to Stack	Stack Physical Data			Stack UTM Coordinates		Stack Gas Stream Data		
		Equivalent Diameter *(ft)*	Height *(ft)*	Base Elevation *(ft)*	Northing *(m)*	Easting *(m)*	Flowrate *(acfm)*	Temperature *(° F)*	Exit Velocity *(ft/sec)*
TNT-1	Washers 3-5 vent	N/A	N/A				N/A	N/A	N/A
TNT-2	Drying, Dryer Scrubber	1.67	50				2782	93	21
TNT-3	Flaking, Packaging, Flaker & Packaging Scrubber	1.67	50				4708	49	36
TNT-4	Sodium Sulfite Loading	0.25	38				147	68	50
	Sodium Bisulfite Loading	0.17	38				65	68	50

Stack ID	Identify all Emission Units (with Process ID) and Control Devices that Feed to Stack	Stack Physical Data			Stack UTM Coordinates		Stack Gas Stream Data		
		Equivalent Diameter *(ft)*	Height *(ft)*	Base Elevation *(ft)*	Northing *(m)*	Easting *(m)*	Flowrate *(acfm)*	Temperature *(° F)*	Exit Velocity *(ft/sec)*

Section N.3: Fugitive Information

UTM Zone:

Emission Unit #	Emission Unit Name	Process ID	Area Physical Data		Area UTM Coordinates		Area Release Data	
			Length of the X Side *(ft)*	Length of the Y Side *(ft)*	Northing *(m)*	Easting *(m)*	Release Temperature *(°F)*	Release Height *(ft)*
U5-EF-1	TNT Production Building Vent	TNT	TBD	TBD			80	23
U5-EF-2	TNT Production Building Vent	TNT	TBD	TBD			80	23
U5-EF-3	TNT Production Building Vent	TNT	TBD	TBD			80	23
U5-EF-4	TNT Production Building Vent	TNT	TBD	TBD			80	23
U8-EF-1	TNT Packaging Building Vent	TNT	TBD	TBD			75	24
U8-EF-2	TNT Packaging Building Vent	TNT	TBD	TBD			75	24
U6-EF-1	Sellite Preperation Building Vent	TNT	TBD	TBD			75	30

Section N.4: Notes, Comments, and Explanations

1. Nitrogen oxide (NOX) and carbon monoxide (CO) Fumes from TNT nitration are controlled by the NOx Absorber & Thermal Oxidizer in the Acid Recovery Unit area.

2. The Nitrators and Washers 1 & 2 are vented to the NOx Absorber & Thermal Oxidizer in the Acid Recovery Unit area.

3. Stated removal efficiencies are based on emission rates estimated by the TNT Production Unit process technology provider, based on a proprietary design simulation model.

4. TNM is trinitromethane generated from nitration. TNM is a VOC.

5. No emissions are expected from Washers 3-5.

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DEP7007N

Source Emissions Profile

__ Section N.1: Emission Summary
__ Section N.2: Stack Information
__ Section N.3: Fugitive Information
__ Section N.4: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI

Source Name: Dyno Nobel Inc.
KY EIS (AFS) #: 21- 177-00067
Permit #: S-25-064
Agency Interest (AI) ID: 3241
Date: 6/1/2026

N.1: Emission Summary

Emission Unit #	Emission Unit Name	Process ID	Process Name	Control Device Name	Control Device ID	Stack ID	Maximum Design Capacity *(SCC Units/hour)*	Pollutant	Uncontrolled Emission Factor *(lb/SCC Units)*	Emission Factor Source (e.g. AP-42, Stack Test, Mass Balance)	Capture Efficiency *(%)*	Control Efficiency *(%)*	Hourly Emissions		Annual Emissions	
													Uncontrolled Potential *(lb/hr)*	Controlled Potential *(lb/hr)*	Uncontrolled Potential *(tons/yr)*	Controlled Potential *(tons/yr)*
UTIL-1	Boiler Package	20-B0030	Boiler	-	-	UTIL-1	0.035 MMscf/hr (~34.7 MMBtu/hr)	NO_x	50 lb/MMscf	AP-42	-	-	1.75	1.75	7.665	7.665
UTIL-1	Boiler Package	20-B0030	Boiler	-	-	UTIL-1	0.035 MMscf/hr	SO_x	0.6 lb/MMscf	AP-42	-	-	0.021	0.021	0.092	0.092
UTIL-1	Boiler Package	20-B0030	Boiler	-	-	UTIL-1	0.035 MMscf/hr	CO	84 lb/MMscf	AP-42	-	-	2.94	2.94	12.877	12.877
UTIL-1	Boiler Package	20-B0030	Boiler	-	-	UTIL-1	0.035 MMscf/hr	VOC	5.5 lb/MMscf	AP-42	-	-	0.19	0.19	0.832	0.832
UTIL-1	Boiler Package	20-B0030	Boiler	-	-	UTIL-1	0.035 MMscf/hr	PM 2.5	7.6 lb/MMscf	AP-42	-	-	0.27	0.27	1.198	1.198
UTIL-1	Boiler Package	20-B0030	Boiler	-	-	UTIL-1	34.7 MMBtu/hr	CO_2	117 lb/MMbtu	CFR 98 Table C-1	-	-	4059.90	4059.90	17782.362	17782.362
UTIL-1	Boiler Package	20-B0030	Boiler	-	-	UTIL-1	34.7 MMBtu/hr	N_2O	0.00022 lb/MMBtu	CFR 98 Table C-2	-	-	7.60E-03	7.60E-03	3.33E-02	3.33E-02

Emission Unit #	Emission Unit Name	Process ID	Process Name	Control Device Name	Control Device ID	Stack ID	Maximum Design Capacity *(SCC Units/hour)*	Pollutant	Uncontrolled Emission Factor *(lb/SCC Units)*	Emission Factor Source (e.g. AP-42, Stack Test, Mass Balance)	Capture Efficiency *(%)*	Control Efficiency *(%)*	Hourly Emissions		Annual Emissions	
													Uncontrolled Potential *(lb/hr)*	Controlled Potential *(lb/hr)*	Uncontrolled Potential *(tons/yr)*	Controlled Potential *(tons/yr)*
UTIL-1	Boiler Package	20-B0030	Boiler	-	-	UTIL-1	34.7 MMBtu/hr	CH_4	0.0022 lb/MMBtu	CFR 98 Table C-2	-	-	7.60E-02	7.60E-02	3.33E-01	3.33E-01
UTIL-2	Diesel Fire Water Pump	31-P0022	Diesel Fire Water Pump	-	-	UTIL-2	404 kW-h	NOx	3.48 g/ kW-hr	Vendor data for similar unit	-	-	3.1	3.1	0.775	0.775
UTIL-2	Diesel Fire Water Pump	31-P0022	Diesel Fire Water Pump	-	-	UTIL-2	404 kW-h	HC	0.1 g/kW-hr	Vendor data for similar unit	-	-	0.089	0.089	0.022	0.022
UTIL-2	Diesel Fire Water Pump	31-P0022	Diesel Fire Water Pump	-	-	UTIL-2	404 kW-h	PM / PM10 / PM 2.5	0.09 g/kW-hr	Vendor data for similar unit	-	-	0.080	0.080	0.020	0.020
UTIL-2	Diesel Fire Water Pump	31-P0022	Diesel Fire Water Pump	-	-	UTIL-2	404 kW-h	CO	0.46 g/kW-hr	Vendor data for similar unit	-	-	0.41	0.41	0.102	0.102
UTIL-2	Diesel Fire Water Pump	31-P0022	Diesel Fire Water Pump	-	-	UTIL-2	10.1 gal/hr	SO2	39.7 lb/1000 gal used	AP-42	-	-	0.40	0.40	0.100	0.100
UTIL-2	Diesel Fire Water Pump	31-P0022	Diesel Fire Water Pump	-	-	UTIL-2	10.1 gal/hr	CO2	163.0818 lb/MMBtu	CFR 98 Table C-1	-	-	225	225	56.22	56.22
UTIL-2	Diesel Fire Water Pump	31-P0022	Diesel Fire Water Pump	-	-	UTIL-2	10.1 gal/hr	N_2O	0.001323 lb/MMBtu	CFR 98 Table C-2	-	-	1.82E-03	1.82E-03	4.56E-04	4.56E-04
UTIL-2	Diesel Fire Water Pump	31-P0022	Diesel Fire Water Pump	-	-	UTIL-2	10.1 gal/hr	CH_4	0.006615 lb/MMBtu	CFR 98 Table C-2	-	-	9.12E-03	9.12E-03	2.28E-03	2.28E-03
UTIL-2	Diesel Fire Water Pump	31-P0022	Diesel Fire Water Pump	-	-	UTIL-2	1.38 MMBtu/hr	benzene	0.000933 lb/MMBtu	AP-42	-	-	0.0013	0.0013	0.0003	0.0003
UTIL-2	Diesel Fire Water Pump	31-P0022	Diesel Fire Water Pump	-	-	UTIL-2	1.38 MMBtu/hr	toluene	0.000409 lb/MMBtu	AP-42	-	-	0.00056	0.00056	0.0001	0.0001
UTIL-2	Diesel Fire Water Pump	31-P0022	Diesel Fire Water Pump	-	-	UTIL-2	1.38 MMBtu/hr	xylene	0.000285 lb/MMBtu	AP-42	-	-	0.00039	0.00039	0.0001	0.0001
UTIL-3	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-3	1475 BHP	NO_x	0.03 g/BHP-hr	Vendor data for similar unit	-	-	0.0976	0.0976	0.024	0.024
UTIL-3	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-3	9.5 MMBtu/hr	SO_x	0.000588 lb/MMBtu	AP-42	-	-	0.0056	0.0056	0.0014	0.0014
UTIL-3	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-3	1475 BHP	CO	0.64 g/BHP-hr	Vendor data for similar unit	-	-	2.0812	2.0812	0.5203	0.5203
UTIL-3	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-3	1475 BHP	VOC	0 g/BHP-hr	Vendor data for similar unit	-	-	0	0	0	0
UTIL-3	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-3	9.5 MMBtu/hr	PM / PM10 / PM 2.5	0.0095 lb/MMBtu	AP-42	-	-	0.090	0.090	0.0226	0.0226
UTIL-3	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-3	9.5 MMBtu/hr	Formaldehyde	0.0205 lb/MMBtu	AP-42	-	-	0.19	0.19	0.0482	0.0482
UTIL-3	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-3	9.5 MMBtu/hr	CO_2	117 lb/MMBtu	CFR 98 Table C-1	-	-	1112.62	1112.62	278	278
UTIL-3	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-3	9.5 MMBtu/hr	N_2O	0.00022 lb/MMBtu	CFR 98 Table C-2			2.10E-03	2.10E-03	5.24E-04	5.24E-04

Emission Unit #	Emission Unit Name	Process ID	Process Name	Control Device Name	Control Device ID	Stack ID	Maximum Design Capacity *(SCC Units/hour)*	Pollutant	Uncontrolled Emission Factor *(lb/SCC Units)*	Emission Factor Source (e.g. AP-42, Stack Test, Mass Balance)	Capture Efficiency *(%)*	Control Efficiency *(%)*	Hourly Emissions		Annual Emissions	
													Uncontrolled Potential *(lb/hr)*	Controlled Potential *(lb/hr)*	Uncontrolled Potential *(tons/yr)*	Controlled Potential *(tons/yr)*
UTIL-3	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-3	9.5 MMBtu/hr	CH_4	0.0022 lb/MMBtu	CFR 98 Table C-2			2.10E-02	2.10E-02	5.24E-03	5.24E-03
UTIL-4	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-4	1475 BHP	NO_x	0.03 g/BHP-hr	Vendor data for similar unit	-	-	0.0976	0.0976	0.0244	0.0244
UTIL-4	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-4	9.5 MMBtu/hr	SO_x	0.000588 lb/MMBtu	AP-42	-	-	0.0056	0.0056	0.0014	0.0014
UTIL-4	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-4	1475 BHP	CO	0.64 g/BHP-hr	Vendor data for similar unit	-	-	2.0812	2.0812	0.5203	0.5203
UTIL-4	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-4	1475 BHP	VOC	0 g/BHP-hr	Vendor data for similar unit	-	-	0	0	0	0
UTIL-4	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-4	9.5 MMBtu/hr	PM / PM10 / PM 2.5	0.0095 lb/MMBtu	AP-42	-	-	0.090	0.090	0.0226	0.0226
UTIL-4	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-4	9.5 MMBtu/hr	Formaldehyde	0.0205 lb/MMBtu	AP-42			0.19	0.19	0.0487	0.0487
UTIL-4	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-4	9.5 MMBtu/hr	CO_2	117 lb/MMBtu	AP-42	-	-	1112.62	1112.62	278	278
UTIL-4	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-4	9.5 MMBtu/hr	N_2O	0.00022 lb/MMBtu	CFR 98 Table C-2			2.10E-03	2.10E-03	5.24E-04	5.24E-04
UTIL-4	Emergency Generator	TBD	Emergency Generator	-	-	UTIL-4	9.5 MMBtu/hr	CH_4	0.0022 lb/MMBtu	CFR 98 Table C-2			2.10E-02	2.10E-02	5.24E-03	5.24E-03
UTIL-5	Cooling Tower 1	20-ZCT0001	Cooling Tower 1	-	-	UTIL-5	3382 gpm recirc rate	PM / PM10 / PM 2.5	255.4 mg/L	0.005% Maximum drift based on vendor data, TDS of 255.4 in makeup water	-	-	0.022	0.022	0.095	0.095
UTIL-6	Cooling Tower 2	21-ZCT0001	Cooling Tower 2	-	-	UTIL-6	590 gpm recirc rate	PM / PM10 / PM 2.5	255.4 mg/L	0.005% Maximum drift based on vendor data, TDS of 255.4 in makeup water	-	-	0.0038	0.0038	0.017	0.017

Section N.2: Stack Information

UTM Zone:

Stack ID	Identify all Emission Units (with Process ID) and Control Devices that Feed to Stack	Stack Physical Data			Stack UTM Coordinates		Stack Gas Stream Data		
		Equivalent Diameter *(ft)*	Height *(ft)*	Base Elevation *(ft)*	Northing *(m)*	Easting *(m)*	Flowrate *(acfm)*	Temperature *(° F)*	Exit Velocity *(ft/sec)*
UTIL-1	Boiler (20-B0030)	2.1667	52.5				10560	310	48
UTIL-2	Diesel Fire Water Pump (31-P0022)	0.67	13.2				3350	924	151.67
UTIL-3	Emergency Generator	0.83	11.06				8500	1458	250
UTIL-4	Emergency Generator	0.83	11.06				8500	1458	250
UTIL-5	Cooling Tower 1 (20-ZCT0001)	16.7	26.6				180000	81	13.68
UTIL-6	Cooling Tower 2 (21-ZCT0001)	12	21.8				102000	81	15

Section N.3: Fugitive Information

UTM Zone:

Emission Unit #	Emission Unit Name	Process ID	Area Physical Data		Area UTM Coordinates		Area Release Data	
			Length of the X Side *(ft)*	Length of the Y Side *(ft)*	Northing *(m)*	Easting *(m)*	Release Temperature *(°F)*	Release Height *(ft)*

Section N.4: Notes, Comments, and Explanations
1. Low NOX burner information is located on page 9 of the Industrial Boiler & Mechanical Company, Inc. vendor sheet.

Division for Air Quality

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DEP7007Y

Good Engineering Practice and Stack Height Determination

___ Section Y.1: Building Dimension Information
___ Section Y.2: Exhaust Point Information
___ Section Y.3: Notes, Comments, and Explanations

Additional Documentation

___ Attach Flow Diagram for Exhaust Points

___ Complete DEP7007AI

Source Name: **Dyno Nobel, Inc.**
KY EIS (AFS) #: **21- 177-00067**
Permit #: **S-25-064**
Agency Interest (AI) ID: **3241**
Date: **6/1/2026**

Section Y.1: Building Dimension Information

Exhaust Point #	Exhaust Point Name	Description of Exhaust Point *(stack, vent, roof monitor, indoors, etc.)*		List all processes and control devices serviced by the exhaust point:		Building dimensions where exhaust point is located:			Distance to nearest building *(ft)*	Dimensions of this nearest building:		
				Name	Flow Diagram Designation	Length *(ft)*	Width *(ft)*	Height *(ft)*		Length *(ft)*	Width *(ft)*	Height *(ft)*
UTIL-1	Boiler	Stack		Boiler	Boiler	78	70	20	7.2	Cylindrical Tank	13.9	13
UTIL-2	Diesel Fire Water Pump	Stack		Diesel Fire Water Pump	Diesel Fire Water Pump	37	16	12	19	60	25	20
UTIL-3	Emergency Generator	Stack		Emergency Generator	Emergency Generator	N/A	N/A	N/A	5	60	25	20
UTIL-4	Emergency Generator	Stack		Emergency Generator	Emergency Generator	N/A	N/A	N/A	5	60	25	20
UTIL-5	Cooling Tower 1	Drift		Cooling Tower 1	Cooling Tower 1	N/A	N/A	N/A	9.9	Cylindrical Tank	12	15
UTIL-6	Cooling Tower 2	Drift		Cooling Tower 2	Cooling Tower 2	N/A	N/A	N/A	27.6	80	55	25

Section Y.2: Exhaust Point Information

Exhaust Point	Distance to nearest plant boundary from exhaust point discharge *(ft)*	Good engineering practice (GEP) height, if known *(ft)*	Diameter of exhaust point *(ft)*	Direction of Exhaust	Geographical Coordinates *(in decimal degrees)*		UTM Coordinates		Exit Gas Flow Rate *(acfm)*		Exit Gas Temperature *(°F)*	
					Latitude	Longitude	Northing	Easting	Minimum	Maximum	At Minimum Flow Rate	At Maximum Flow Rate
UTIL-1	1110		2.1667	Vertical					10560	10560	310	310
UTIL-2	1180		0.67	Vertical					3350	3350	924	924
UTIL-3	1260		0.83	Vertical					8500	8500	1458	1458
UTIL-4	1260		0.83	Vertical					8500	8500	1458	1458
UTIL-5	1130		16.7	Vertical					180000	180000	81	81
UTIL-6	700		12	Vertical					102000	102000	81	81

Section Y.3: Notes, Comments, and Explanations
1. UTIL-3 and UTIL-4 Emergency generator stacks are located outdoors.
2. UTIL-5 and UTIL-6 Cooling towers are located outdoors.
3. UTIL-1 Boiler stack is located outdoors.

Division for Air Quality

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DEP7007Y

Good Engineering Practice and Stack Height Determination

___ Section Y.1: Building Dimension Information
___ Section Y.2: Exhaust Point Information
___ Section Y.3: Notes, Comments, and Explanations

Additional Documentation

___ Attach Flow Diagram for Exhaust Points

___ Complete DEP7007AI

Source Name: Dyno Nobel, Inc.
KY EIS (AFS) #: 21- 177-00067
Permit #: S-25-064
Agency Interest (AI) ID: 3241
Date: 6/1/2026

Section Y.1: Building Dimension Information

Exhaust Point #	Exhaust Point Name	Description of Exhaust Point *(stack, vent, roof monitor, indoors, etc.)*		List all processes and control devices serviced by the exhaust point:		Building dimensions where exhaust point is located:			Distance to nearest building *(ft)*	Dimensions of this nearest building:		
				Name	Flow Diagram Designation	Length *(ft)*	Width *(ft)*	Height *(ft)*		Length *(ft)*	Width *(ft)*	Height *(ft)*
TNT-2	Dryer Scrubber	stack		Drying	Drying	142	62	23	236.9	55	35	16
TNT-3	Flaking & Packaging Scrubber	stack		Flaking Packaging	Flaking Packaging	142	62	23	236.9	55	35	16

Section Y.2: Exhaust Point Information

Exhaust Point	Distance to nearest plant boundary from exhaust point discharge *(ft)*	Good engineering practice (GEP) height, if known *(ft)*	Diameter of exhaust point *(ft)*	Direction of Exhaust	Geographical Coordinates *(in decimal degrees)*		UTM Coordinates		Exit Gas Flow Rate *(acfm)*		Exit Gas Temperature *(°F)*	
					Latitude	Longitude	Northing	Easting	Minimum	Maximum	At Minimum Flow Rate	At Maximum Flow Rate
TNT-2	577		1.67	Vertical					2782	4708	93	93
TNT-3	577		1.67	Vertical					4708	4708	49	49

Section Y.3: Notes, Comments, and Explanations
1. Sodium sulfite and bisulfite unloading process no longer has stacks.