DARLING INGREDIENTS INC (05574)

Date: 6/23/2022

New Jersey Department of Environmental Protection
Reason for Application

Permit Being Modified

Permit Class: PCP **Number:** 80001

Description of Modifications:

a) Remove the ABCO Boiler (PCP080001 - Equipment E2);
b) Replace ABCO Boiler with a Victory Boiler (E4) equipped with Selective Catalytic Reduction (CD3) air pollution control;
c) Limit fuel oil use to emergency use.

New Jersey Department of Environmental Protection
Facility Profile (General)

Facility Name (AIMS): DARLING INGREDIENTS INC **Facility ID (AIMS):** 05574

Street Address: 825 WILSON AVE
NEWARK, NJ 07105

Mailing Address: 825 WILSON AVE
NEWARK, NJ 07105

State Plane Coordinates:

X-Coordinate:	596,002
Y-Coordinate:	685,230
Units:	New Jersey State Plane (
Datum:	NAD83
Source Org.:	DEP-GIS
Source Type:	GPS

County: Essex

Location Description:

Industry:

Primary SIC:	
Secondary SIC:	
NAICS:	311613

New Jersey Department of Environmental Protection
Facility Profile (General)

Contact Type: Air Permit Information Contact

Organization: Darling Ingredients Inc
Org. Type: Corporation
Name: Jon Elrod
NJ EIN: 36249534600
Title: Director Environmental Affairs
Phone: (859) 344-2201 x
Fax: ( ) - x
Other: ( ) - x
Type:
Email: JELROD@DARLINGII.COM
Mailing Address: 4221 Alexandria Pike
Cold Spring, KY 41076

Contact Type: Fees/Billing Contact

Organization: Darling Ingredients Inc
Org. Type: Corporation
Name: Matthew Appleby
NJ EIN: 36249534600
Title: General Manager
Phone: (973) 465-1900 x
Fax: ( ) - x
Other: ( ) - x
Type:
Email: MAPPLEBY@DARLINGII.COM
Mailing Address: 825 Wilson Ave
Newark, NJ 07105

Contact Type: General Contact

Organization: Darling Ingredients Inc
Org. Type: Corporation
Name: Matthew Appleby
NJ EIN: 36249534600
Title: General Manager
Phone: (973) 465-1900 x
Fax: ( ) - x
Other: ( ) - x
Type:
Email: MAPPLEBY@DARLINGII.COM
Mailing Address: 825 Wilson Ave
Newark, NJ 07105

New Jersey Department of Environmental Protection
Facility Profile (General)

Contact Type: **Responsible Official**

Organization: Darling Ingredients Inc

Name: Jason Woosley

Title: Regional Vice President

Phone: (859) 740-1707 x

Fax: ( ) - x

Other: ( ) - x

Type:

Email: JWOOSLEY@DARLINGII.COM

Org. Type: Corporation

NJ EIN: 36249534600

Mailing Address: 4221 Alexandria Pike
Cold Spring, KY 41076

DARLING INGREDIENTS INC (05574) Date: 6/23/2022

New Jersey Department of Environmental Protection
Facility Profile (Permitting)

1. Is this facility classified as a small business by the USEPA?	No
2. Is this facility subject to N.J.A.C. 7:27-22?	No
3. Are you voluntarily subjecting this facility to the requirements of Subchapter 22?	No
4. Has a copy of this application been sent to the USEPA?	No
5. If not, has the EPA waived the requirement?	No
6. Are you claiming any portion of this application to be confidential?	No
7. Is the facility an existing major facility?	No
8. Have you submitted a netting analysis?	No
9. Are emissions of any pollutant above the SOTA threshold?	No
10. Have you submitted a SOTA analysis?	No
11. If you answered "Yes" to Question 9 and "No" to Question 10, explain why a SOTA analysis was not required	
12. Have you provided, or are you planning to provide air contaminant modeling?	No

DARLING INGREDIENTS INC (05574) Date: 6/23/2022

New Jersey Department of Environmental Protection
Equipment Inventory

Equip. NJID	Facility's Designation	Equipment Description	Equipment Type	Certificate Number	Install Date	Grand-Fathered	Last Mod. (Since 1968)	Equip. Set ID
E4	Victory	Victory Boiler	Boiler		5/15/2022	No		

DARLING INGREDIENTS INC (05574) Date: 6/23/2022

New Jersey Department of Environmental Protection
Control Device Inventory

CD NJID	Facility's Designation	Description	CD Type	Install Date	Grand-Fathered	Last Mod. (Since 1968)	CD Set ID
CD3	SCR Victory	SCR Victory	Selective Catalytic Reduction	5/15/2022	No		

DARLING INGREDIENTS INC (05574)

Date: 6/23/2022

New Jersey Department of Environmental Protection
Emission Points Inventory

PT NJID	Facility's Designation	Description	Config.	Equiv. Diam. (in.)	Height (ft.)	Dist. to Prop. Line (ft)	Exhaust Temp. (deg. F)			Exhaust Vol. (acfm)			Discharge Direction	PT Set ID
							Avg.	Min.	Max.	Avg.	Min.	Max.		
PT4	Victory	Victory Stack	Round	75	65	150	302.0	250.0	350.0	29,921.0	25,000.0	35,000.0	Up	

DARLING INGREDIENTS INC (05574)

Date: 6/23/2022

New Jersey Department of Environmental Protection
Emission Unit/Batch Process Inventory

U 2 Boilers Boilers

UOS NJID	Facility's Designation	UOS Description	Operation Type	Signif. Equip.	Control Device(s)	Emission Point(s)	SCC(s)	Annual Oper. Hours Min.	Annual Oper. Hours Max.	VOC Range	Flow (acfm) Min.	Flow (acfm) Max.	Temp. (deg F) Min.	Temp. (deg F) Max.
OS7	VIC Nat Gas	Victory Natural Gas	Normal - Steady State	E4	CD3 (P)	PT4	1-02-006-02	0.0	8,760.0		25,000.0	35,000.0	250.0	350.0
OS8	VIC #2 fuel	Victory #2 Fuel Oil	Normal - Steady State	E4		PT4	1-02-005-02	0.0	48.0		25,000.0	35,000.0	250.0	350.0

05574 DARLING INGREDIENTS INC Date: 6/23/2022

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **U2 Boilers**

Operating Scenario: **OS0 Summary**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Ammonia	0.00000000	0.00000000	1.14100000	1.14100000	tons/yr	No
Arsenic Emissions	0.00000000	0.00000850	0.00000850	0.00000850	tons/yr	No
Cadmium Emissions	0.00000000	0.00000626	0.00000626	0.00000626	tons/yr	No
Cobalt Emissions	0.00000000	0.00002100	0.00002100	0.00002100	tons/yr	No
CO	0.00000000	14.53200000	14.53200000	14.53200000	tons/yr	No
Dimethylbenz(a)anthracene (7,12-)	0.00000000	0.00000400	0.00000400	0.00000400	tons/yr	No
HAPs (Total)	0.00000000	0.00003970	0.00003970	0.00003970	tons/yr	No
NOx (Total)	0.00000000	29.41500000	6.46500000	6.46500000	tons/yr	No
Pb	0.00000000	D	D	D	tons/yr	No
PM-10 (Total)	0.00000000	2.95800000	2.95800000	2.95800000	tons/yr	No
PM-2.5 (Total)	0.00000000	1.91900000	1.91900000	1.91900000	tons/yr	No
SO2	0.00000000	0.68400000	0.68400000	0.68400000	tons/yr	No
TSP	0.00000000	2.95800000	2.95800000	2.95800000	tons/yr	No
VOC (Total)	0.00000000	2.03300000	2.03300000	2.03300000	tons/yr	No

Subject Item: **U2 Boilers**

Operating Scenario: **OS7**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Ammonia	0.00000000	0.00000000	0.40000000	0.40000000	lb/hr	No
Arsenic Emissions	0.00000000	0.00000006	0.00000006	0.00000006	lb/hr	No
Cadmium Emissions	0.00000000	D	D	D	lb/hr	No
Cobalt Emissions	0.00000000	0.00000736	0.00000736	0.00000736	lb/hr	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **U2 Boilers**

Operating Scenario: **OS7**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
CO	0.00000000	3.31000000	3.31000000	3.31000000	lb/hr	No
Dimethylbenz(a)anthracene (7,12-)	0.00000000	0.00000140	0.00000140	0.00000140	lb/hr	No
HAPs (Total)	0.00000000	0.00000879	0.00000879	0.00000879	lb/hr	No
NOx (Total)	0.00000000	8.94000000	0.89400000	0.89400000	lb/hr	No
Pb	0.00000000	D	D	D	lb/hr	No
PM-10 (Total)	0.00000000	0.67000000	0.67000000	0.67000000	lb/hr	No
PM-2.5 (Total)	0.00000000	0.67000000	0.67000000	0.67000000	lb/hr	No
SO2	0.00000000	0.05000000	0.05000000	0.05000000	lb/hr	No
TSP	0.00000000	0.67000000	0.67000000	0.67000000	lb/hr	No
VOC (Total)	0.00000000	0.45000000	0.45000000	0.45000000	lb/hr	No

Subject Item: **U2 Boilers**

Operating Scenario: **OS8**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Arsenic Emissions	0.00000000	0.00034700	0.00034700	0.00034700	lb/hr	No
Cadmium Emissions	0.00000000	0.00026000	0.00026000	0.00026000	lb/hr	No
CO	0.00000000	3.34000000	3.34000000	3.34000000	lb/hr	No
HAPs (Total)	0.00000000	0.00060800	0.00060800	0.00060800	lb/hr	No
NOx (Total)	0.00000000	2.63000000	2.63000000	2.63000000	lb/hr	No
Pb	0.00000000	D	D	D	lb/hr	No
PM-10 (Total)	0.00000000	1.22000000	1.22000000	1.22000000	lb/hr	No
PM-2.5 (Total)	0.00000000	0.79000000	0.79000000	0.79000000	lb/hr	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **U2 Boilers**

Operating Scenario: **OS8**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
SO2	0.00000000	0.13000000	0.13000000	0.13000000	lb/hr	No
TSP	0.00000000	1.22000000	1.22000000	1.22000000	lb/hr	No
VOC (Total)	0.00000000	0.76000000	0.76000000	0.76000000	lb/hr	No

000000 E4 (Boiler)
Print Date: 6/23/2022

Make:	Voyager
Manufacturer:	Victory
Model:	VSM-75-66SP
Maximum Rated Gross Heat Input (MMBtu/hr - HHV):	89.40
Boiler Type:	Water Tube
Utility Type:	Non-Utility
Output Type:	Steam Only
Steam Output (lb/hr):	75,000.00
Fuel Firing Method:	Other firing method
Description (if other):	Natural Gas fired with #2 FO during curtailment
Draft Type:	Forced
Heat Exchange Type:	Indirect

Is the boiler using? (check all that apply):

Low NOx Burner:	☑	Type:	Victory Energy Vision Burner System
Staged Air Combustion:	☐		
Flue Gas Recirculation (FGR):	☐	Amount (%):	

Have you attached a diagram showing the location and/or the configuration of this equipment?

No

Have you attached any manuf.'s data or specifications to aid the Dept. in its review of this application?

Yes

Comments:

000000 CD3 (Selective Catalytic Reduction)
Print Date: 6/23/2022

Make:	Direct reagent injection SCR
Manufacturer:	Peerless MFG
Model:	701894-1000
Minimum Temperature at Catalyst Bed (°F):	363.0
Maximum Temperature at Catalyst Bed (°F):	500.0
Minimum Temperature at Reagent Injection Point (°F):	363.0
Maximum Temperature at Reagent Injection Point (°F):	500.0
Type of Reagent:	Urea
Description:	
Chemical Formula of Reagent:	(NH2)2CO
Minimum Reagent Charge Rate (gpm):	0.1
Maximum Reagent Charge Rate (gpm):	0.1
Minimum Concentration of Reagent in Solution (% Volume):	32.50
Minimum NOx to Reagent Mole Ratio:	1.70
Maximum NOx to Reagent Mole Ratio:	1.90
Maximum Anticipated Ammonia Slip (ppm):	7.800
Type of Catalyst:	DNX-929
Volume of Catalyst (ft^3):	124.00
Form of Catalyst:	Honeycomb
Anticipated Life of Catalyst:	3.00
Units:	Years
Have you attached a catalyst replacement schedule?	○ Yes ● No
Method of Determining Breakthrough:	
Maximum Number of Sources Using this Apparatus as a Control Device (Include Permitted and Non-Permitted Sources):	1
Alternative Method to Demonstrate Control Apparatus is Operating Properly:	
Have you attached any manufacturer's data or specifications in support of the feasibility and/or effectiveness of this control apparatus?	○ Yes ● No
Have you attached a diagram showing the location and/or configuration of this control apparatus?	○ Yes ● No

000000 CD3 (Selective Catalytic Reduction)
Print Date: 6/23/2022

Comments:

05574 DARLING INGREDIENTS INC PCP000000 U2 OS7 (Primary Fuel)
Print Date: 6/23/2022

Is this fuel a blend?	No
Fuel Category:	Commercial
Fuel Type:	Natural gas
Description (if other):	Natural gas
Amount of Sulfur in Fuel (%):	
Amount of Ash in Fuel (%):	
Fuel Heating Value:	1,020.00
Units:	BTU/scf
Estimated Maximum Amount of Fuel Burned Annually:	500.00
Units:	MMft^3/yr
Estimated Actual Amount of Fuel Burned Annually:	
Units:	
Amount of Oxygen in Flue Gas (%):	
Amount of Moisture in Flue Gas (%):	
Comments:	

05574 DARLING INGREDIENTS INC PCP000000 U2 OS7 (Efficiency Table - CD3)
Print Date: 6/23/2022

Pollutant Category	Capture Efficiency (%)	Removal Efficiency (%)	Overall Efficiency (%)
CO			
HAP (Total)			
NOx	100.00	90.00	90.00
Other (Total)			
Pb			
PM-10			
PM-2.5			
SO2			
TSP			
VOC (Total)			

05574 DARLING INGREDIENTS INC PCP000000 U2 OS8 (Primary Fuel)
Print Date: 6/23/2022

Is this fuel a blend?	No
Fuel Category:	Commercial
Fuel Type:	#2 fuel oil
Description (if other):	#2 fuel oil
Amount of Sulfur in Fuel (%):	0.0015
Amount of Ash in Fuel (%):	
Fuel Heating Value:	140,000.00
Units:	BTU/gal
Estimated Maximum Amount of Fuel Burned Annually:	29,000.00
Units:	gal/yr
Estimated Actual Amount of Fuel Burned Annually:	
Units:	
Amount of Oxygen in Flue Gas (%):	
Amount of Moisture in Flue Gas (%):	
Comments:	

APPLICATION FOR AIR PERMIT MODIFICATION

REPLACEMENT OF ABCO BOILER WITH A VICTORY BOILER

Submitted to:

New Jersey Department of Environmental Protection

Bureau of Stationary Sources

401 East State Street

Trenton, NJ 08625-0420

Submitted by:

Darling Ingredients Inc.

825 Wilson Ave.

Newark, NJ

Prepared by:

APTIM Environmental & Infrastructure, LLC

17 Princess Road

Lawrenceville, NJ 08648

March 2022

Table of Contents

List of Appendices

1.0 INTRODUCTION

Darling Ingredients Inc. (Darling) operates a food processing byproduct conversion facility that produces natural animal and vegetable derived protein and fat ingredients, which are used in the production of food, feed, fuel, and organic fertilizer at its Newark, NJ facility ("the facility").

The facility receives "grease" (used cooking oil, or UCO) by truck from roughly 12,000 restaurants and food processors. The UCO is refined to remove impurities and stored in internal tanks or in the outdoor tank farm. The refined product is shipped to customers by tanker truck or by marine vessel, for primary use as an ingredient in the production of feed and renewable fuel.

The Facility also receives food processing byproducts (poultry, pork, beef, feathers, surplus meat, meat/fat/bone scraps, etc.) from roughly 1,200 slaughterhouses, butcher shops, meat markets and grocery stores. This material is processed (rendered) to separate it into two products: fats and proteins. Rendering involves a complex combination of thermal and mechanical separation steps with a primary focus on removing moisture. The fat is further refined to produce a marketable ingredient used primarily in the production of feed and renewable fuel. The protein is further refined to produce a marketable ingredient used primarily in the production of feed and organic fertilizer. Fats are shipped as a bulk liquid to customers by tanker truck or marine vessel. Protein is shipped to customers in bulk by truck/trailer.

The facility uses steam generated by two on-site boilers to process raw materials. The two boilers presently operating at the facility under air permit PCP080001 are as follows:

- ABCO Boiler;
- Nebraska Boiler.

This application is for an air permit modification to replace the existing ABCO Boiler. Darling proposes the following:

- Remove the existing ABCO Boiler;
- Install a Victory Boiler with Selective Catalytic Reduction air pollution control; and
- Limit fuel oil use FOR THE Nebraska boiler (E3) to emergency use

The ABCO boiler is permitted to combust various liquid fuels. The boiler has reached the end of its useful life. The proposed Victory boiler will combust natural gas, and clean No.2 fuel oil in accordance with NESHAP 40 CFR 63 Subpart JJJJJJ. Darling also proposes to operate the Nebraska boiler (E3) in a similar fashion. Clean No. 2 fuel oil would only be combusted during periods of gas curtailment, gas supply interruption, startups, or for periodic testing, maintenance, or operator training (periodic testing, maintenance, or operator training shall not exceed a combined total of 48 hours during any calendar year.

NOx emissions from the Victory boiler will be controlled by Selective Catalytic Reduction (SCR) air pollution control technology. This proposal will change emissions from the boilers, as follows:

Pollutant	**Presently Permitted Emissions (Two Boilers) Tons/Year**	**Proposed Emissions in This Application (Two Boilers) Tons/Year**	**Proposed Change in Emissions (Two Boilers) Tons/Year**
NOx	23.776	6.465	-17.311
CO	19.211	14.532	-4.679
SOx	22.72	0.684	-22.036
VOC	4.129	2.033	-2.096
Particulates	5.139	2.958	-2.181
Ammonia	0	1.141	1.141

2.0 PROJECT DESCRIPTION

This air permit application is for a modification to the air permit PCP080001 at the Darling facility located at 825 Wilson Avenue, Newark. The modification includes the implementation of boiler improvements at the facility to reduce emissions.

The following air permit modifications are being proposed:

- Remove the ABCO Boiler (PCP080001 – Equipment E2);
- Replace ABCO Boiler with a Victory boiler (E4) equipped with Selective Catalytic Reduction air pollution control (CD3); and
- Limit fuel oil use FOR THE Nebraska boiler (E3) to emergency use.

2.1 Remove ABCO Boiler and Replace with Victory Boiler With SCR

Darling will remove the existing ABCO boiler. This boiler is permitted to combust 5,250,000 gallons/year of various liquid fuels including No.2 fuel oil, tallow and yellow grease, in addition to 345,000,000 cubic feet/year of natural gas.

Darling with install a new Victory Voyager Series 'O'-style, Model VSM-75 package boiler designed to produce 75,000 pounds/hour of saturated steam. The Victory boiler will have a heat input rate of 89.4 MM BTU/hour (85.61 MM BTU/hour combusting No. 2 fuel oil during natural gas curtailment). This application proposes the following fuel usages for the Victory boiler:

- 500 MM cubic feet per year of natural gas; and
- No. 2 fuel oil only during natural gas curtailment.

The Victory boiler will be equipped with a Peerless Model 701894-1000 SCR system using direct injection of urea. The SCR will reduce NOx emissions to meet New Jersey's State of the Art requirements for boilers (See Section 4.2.1).

3.0 EMISSIONS

Emissions have been calculated based upon factors provided by the boiler manufacturer and USEPA AP-42 Air Pollutant Emissions Factors. Emissions calculations are presented in Appendix A.

This air permit application proposes the following emissions for the existing Nebraska and proposed Victory boilers combined:

- NOx 6.465 tons/year
- CO 14.532 tons/year
- VOC 2.033 tons/year
- SOx 0.684 tons/year
- TSP 2.958 tons/year
- PM_{10} 2.958 tons/year
- Ammonia 1.141 tons/year

3.1 Emissions Changes Resulting From This Proposed Modification

Emissions calculations have been prepared and are presented in Appendix A. Potential emissions, permitted emissions and the resulting emissions reductions are presented below:

	NOx PTE Tons/Year	**CO PTE Tons/Year**	**VOC PTE Tons/Year**	**TSP PTE Tons/Year**	**PM10 PTE Tons/Year**	**SOx PTE Tons/Year**	**Ammonia PTE Tons/Year**
Proposed PTE for this Modification	6.456	14.532	2.033	2.958	2.958	0.684	1.141
Presently Permitted PTE for PCP080001	23.776	19.211	4.129	5.139	5.139	22.720	0.000
Proposed Change in Emissions Resulting from This Modification	-17.311	-4.679	-2.096	-2.181	-2.181	-22.036	+1.141
Percent Reduction in Emissions Resulting from the Victory Boiler Installation	-72.8%	-24.4%	-50.8%	-42.4%	-42.4%	-97% Note 1	NA

Note 1: The reduction in SOx is due to a significant reduction in the potential use of liquid fuels (No.2 fuel oil, tallow and yellow grease).

The proposed Victory boiler equipped with SCR will result in significant emissions reductions from the two boilers combined, as noted above.

4.0 REGULATORY ASSESSMENT

4.1 NJAC 7:27-8 – Air Quality Impact Analysis (Risk Screening)

As required by NJAC 7:27-Subchapter 8 of New Jersey's air permitting regulations, the following assessment of the facility's proposed emissions was performed.

NJAC 7:27-8.5 Air quality impact analysis: An application shall include an air quality impact analysis if the Department determines that an air quality impact analysis is required for an accurate assessment of the environmental impact of the activities proposed.

The NJDEP's Risk Screening Worksheet was completed using the calculated HAPs emissions.

ASSESSMENT: Calculated risks associated with long- and short-term effects are "Negligible" as per the NJDEP's criteria.

4.2 NJAC 7:27-8 – State of the Art (SOTA)

As required by NJAC 7:27-Subchapter 8 of New Jersey's air permitting regulations, the following assessment of the facility's proposed emissions was performed.

NJAC 7:27-8.12: State of the Art (SOTA) - If an application proposes construction, installation, reconstruction, or modification of equipment and control apparatus that is a significant source meeting the following criteria, the applicant shall document state of the art (SOTA) for the source:

1. The equipment and control apparatus have a potential to emit any HAP at a rate equal to or greater than the SOTA Threshold at N.J.A.C. 7:27-17.9(b).
2. The equipment and control apparatus have a potential to emit any other air contaminant or category of air contaminant, except carbon dioxide (CO2), at a rate equal to or greater than the SOTA threshold in NJAC 7:27-8 Appendix 1, Table A.
3. The proposed equipment is subject to a NJDEP SOTA standard, as published in a NJDEP manual.

4.2.1 SOTA for Boilers

The NJDEP's State of the Art Manual for Boilers and Process Heaters indicates that the following SOTA emissions limitations must be met:

Natural Gas-Fired Boilers and Process Heaters

Criteria Pollutant	**Emission Level (LB/MMBTU)**
	≥ 75 MMBTU/hr
NO_x	0.010
CO	0.0390
VOC	0.00500

The boiler will be equipped with a Peerless Manufacturing, Direct Reagent Injection Selective Catalytic Reduction (SCR) unit. The SCR Model number is 701894-1000 and the unit uses urea as a reagent.

The boiler manufacturer guarantees that the Victory boiler equipped with the Peerless SCR will meet the emissions levels, as published in the SOTA manual.

- NOx: The boiler/SCR will meet the 0.01 pounds/MMBTU requirement;
- CO: The boiler/SCR will meet the 0.039 pounds/MMBTU requirement;
- VOC: The proposed PTE for VOC is less than 5 tons/year. The SOTA requirement, therefore, does not apply.

ASSESSMENT: The proposed Victory boiler will meet the SOTA requirements for Boilers and Process Heaters by implementing SCR technology.

4.2.2 SOTA for Criteria Pollutants

The SOTA applicability thresholds for criteria pollutants are listed at NJAC 7:27-8 – Appendix 1, Table A. The SOTA applicability threshold for each criteria pollutant is listed as 5 tons per year. The PTE for each criteria pollutant not listed in Section 4.2.1 (above) is as follows:

- TSP: 1.9 tons/Year
- PM10: 1.9 tons/Year
- SOx: 0.15 tons/Year

ASSESSMENT: The proposed Victory boiler will meet the SOTA requirements for criteria pollutants, as the potential emissions for each pollutant are less than the respective published SOTA threshold of 5 tons/year.

4.2.3 SOTA for Hazardous Air Pollutants

The PTE for the following hazardous air pollutants (HAPs)was calculated. The compounds were determined to be reportable under NJAC 7:27-8 and are therefore subject to the SOTA applicability assessment.

Chemical Name	Calculated Emissions Pounds/Year	Reporting threshold as per NJAC 7:27-Subch 8 (Pounds/Year)	Is it Reportable According to NJAC 7:27-Subch 8	SOTA threshold According to NJAC 7:27-Subch 17 (Pounds/Year)	Is SOTA Applicable?
Arsenic	0.0170	0.01	Reportable	10	No
Cadmium	0.0125	0.01	Reportable	20	No
Cobalt	0.0420	0.005	Reportable	200	No
7,12-Dimethylbenz(a) anthracene	0.0080	0.0007	Reportable	20	No

ASSESSMENT: The SOTA requirements for HAPs will not be applicable to the Victory boiler, as the potential emissions for each of the reportable HAPs are less than their respective published SOTA thresholds.

4.2.4 SOTA for Ammonia

Ammonia is not listed under the HAPs/TXSs regulations at NJAC 7:27-17.9. Therefore, the SOTA threshold for “other” pollutants at NJAC 7:27-8 – Appendix 1, Table A is used to evaluate SOTA applicability for ammonia. PTE for ammonia has been calculated to be 1.141 tons per year. The SOTA applicability threshold for “other” pollutants as per NJAC 7:27-8 – Appendix 1, Table A is 5 tons/year. The PTE for ammonia, therefore, is below the regulatory SOTA applicability threshold.

ASSESSMENT: The SOTA requirement for ammonia will not be applicable to the to the Victory boiler, as potential ammonia emissions are less than the SOTA threshold.

4.2.5 SOTA Documentation – LAER Non-Applicability

The SOTA assessment guidelines at NJAC 7:27-8.12(e) require that the Lowest Achievable Emissions Rate (LAER) be considered, if applicable. The LAER applicability threshold, as per NJAC 7:27-Subchapter 18 is as follows:

Air contaminant	Threshold level
CO	100 tons per year
PM10	100 tons per year
PM2.5	100 tons per year
TSP	100 tons per year
SO2	100 tons per year
NOx	25 tons per year
VOC	25 tons per year
Lead	10 tons per year;

As listed in Section 3, the potential to emit for criteria pollutants and HAPs will decrease significantly as a result of the action proposed in this application.

ASSESSMENT: The LAER requirement will not be applicable to the Victory boiler, as the potential emissions increase and the facility's overall potential to emit are less than the regulatory LAER threshold.

4.2.6 SOTA Documentation – BACT Non-Applicability

The SOTA assessment guidelines at NJAC 7:27-8.12(e) require that the Best Available Control Technology (BACT) be considered for New Source Review (NSR) pollutants, if applicable. The applicability thresholds at 40 CFR 52.21 apply to:

- New major sources or modifications with potential to emit of 250 tons per year or more of any regulated NSR pollutant.
- Fossil-fuel boilers (or combinations thereof) totaling more than 250 MM BTU/hour with potential to emit of 100 tons per year or more of any regulated NSR pollutant.

As listed in Section 3, the potential to emit for criteria/NSR pollutants will decrease significantly as a result of the action proposed in this application.

ASSESSMENT: The BACT requirements will not be applicable to the to the Victory boiler, as potential emissions, as listed above, are less than the thresholds at 40 CFR 52.21.

4.3 NJAC 7:27-8 and NJAC 7:27-16 VOC RACT

As required by NJAC 7:27-Subchapter 8 of New Jersey's air permitting regulations, the following assessment of the facility's proposed emissions was performed.

The regulatory requirements at NJAC 7:27-8.11(a)(1)(i): Standards for issuing a permit, require a Reasonably Available Control Technology (RACT) assessment as per the requirements under N.J.A.C. 7:27-16.8 for boilers. The RACT requirements for boilers are as follows:

The owner or operator of any industrial/commercial/institutional boiler with a maximum gross heat input rate of at least 50 million BTU per hour or greater shall:

1. Cause it to emit VOC in concentrations that do not exceed 50 ppm. This is equivalent to approximately 3.87 pounds/hour for the Victory boiler. The calculated VOC PTE for the Victory boiler combusting natural gas is 0.45 pounds/hour.
2. Cause it to emit CO in concentrations that do not exceed 100 ppm. This is equivalent to approximately 13.5 pounds/hour for the Victory boiler. The calculated CO PTE for the Victory boiler combusting natural gas is 3.31 pounds/hour.
3. Adjust its combustion process annually, during the same calendar quarter.

ASSESSMENT: The RACT requirements for CO and VOC will be met by the Victory boiler, as the calculated PTE is significantly lower than the RACT regulatory requirement. The facility will conduct annual combustion adjustments, as required by the regulation.

4.4 NJAC 7:27-8 and NJAC 7:27-19 NOx RACT

As required by NJAC 7:27-Subchapter 8 of New Jersey's air permitting regulations, the following assessment of the facility's proposed emissions was performed.

The regulatory requirements at NJAC 7:27-8.11(a)(1)(i): Standards for issuing a permit, require a Reasonably Available Control Technology (RACT) assessment as per the requirements under N.J.A.C. 7:27-19.7 – Table 9 for boilers. The RACT requirements for boilers are as follows:

The owner or operator of any industrial/commercial/institutional boiler with a maximum gross heat input rate of at least 25 million BTU per hour but less than 100 million BTU per hour or greater shall:

1. Cause it to emit NOx at a rate of <=0.05 pounds/MM BTU .
2. Adjust its combustion process annually, during the same calendar quarter.

The Victory boiler/SCR will meet the 0.01 pounds/MMBTU SOTA standard.

ASSESSMENT: The RACT requirements for NOx will be met by the Victory boiler, as the boiler actually meets the SOTA requirements (see Section 5.2.1, above). The facility will conduct annual combustion adjustments, as required by the regulation.

4.5 New Source Performance Standards 40CFR Part 60, Subpart Dc

As required by NJAC 7:27-Subchapter 8 of New Jersey's air permitting regulations, the following assessment of the facility's proposed emissions was performed. The regulatory requirements at NJAC 7:27-8.11(a)(1)(i): Standards for issuing a permit, require a regulatory assessment to include New Source Performance Standards (NSPS). The Victory boiler is subject to the sulfur in fuel standard, as well as recordkeeping and reporting standards of the regulation.

Sulfur Content in Fuel: 40CFR 60.42c (d) - no owner or operator of an affected facility that combusts oil shall cause to be discharged into the atmosphere from that affected facility any gases that contain SO2 in excess of 215 ng/J (0.50 lb/MMBtu) heat input; or, as an alternative, no owner or operator of an affected facility that combusts oil shall combust oil in the affected facility that contains greater than 0.5 weight percent sulfur. The percent reduction requirements are not applicable to affected facilities under this paragraph.

ASSESSMENT: The facility will comply with the fuel supplier certification standards by keeping records of certifications for each fuel oil delivery. No. 2 fuel oil in the state of New Jersey is limited to 0.0015% weight percent sulfur (15 ppm), therefore, the facility will easily comply with this standard.

Recordkeeping: 40CFR 60.48c (e) - The owner or operator of each affected facility subject to the fuel oil sulfur limits, shall keep records.

> 40CFR 60.48c (e) - The owner or operator of each affected facility subject to the fuel oil sulfur limits, shall keep records and submit reports as required.

ASSESSMENT: The facility will comply with the fuel supplier certification standards by keeping records of certifications for each fuel oil delivery. No. 2 fuel oil in the state of New Jersey is limited to 0.0015% weight percent sulfur (15 ppm).

40CFR 60.48c (e) (11) - If fuel supplier certification is used to demonstrate compliance, records of fuel supplier certification as described under paragraph (f)(1), (2), (3), or (4) of this section, as applicable. In addition to records of fuel supplier certifications, the report shall include a certified statement signed by the owner or operator of the affected facility that the records of fuel supplier certifications submitted represent all of the fuel combusted during the reporting period.

ASSESSMENT: The facility will comply with the fuel supplier certification standards by keeping records of certifications for each fuel oil delivery. No. 2 fuel oil in the state of New Jersey is limited to 0.0015% weight percent sulfur (15 ppm).

40CFR 60.48c (g)(1) The owner or operator of each affected facility shall record and maintain records of the amount of each fuel combusted during each operating day.

ASSESSMENT: See paragraph below.

40CFR 60.48c (g) (2) As an alternative to meeting the daily fuel recordkeeping requirements of paragraph (g)(1) the owner or operator of an affected facility that combusts only natural gas, fuels using fuel certification in 40CFR 60.48c (f) to demonstrate compliance with the SO2 standard, or a mixture of these fuels may elect to record and maintain records of the amount of each fuel combusted during each calendar month.

ASSESSMENT: The facility will keep records of fuels combusted on a monthly basis.

Reporting: 40CFR 60.48c(a) The owner or operator of each affected facility shall submit notification of the date of construction or reconstruction and actual startup, as provided by 40CFR 60.7. The requirements of 40CFR 60.7 are as follows: Any owner or operator subject to the provisions of this part shall furnish the Administrator written notification, as follows:

40CFR 60.7(a)(1) A notification of the date construction (or reconstruction as defined under §60.15) of an affected facility is commenced postmarked no later than 30 days after such date.

40CFR 60.7(a)(3) A notification of the actual date of initial startup of an affected facility postmarked within 15 days after such date.

40CFR 60.7(a)(4) A notification of any physical or operational change to an existing facility which may increase the emission rate of any air pollutant to which a standard applies. This notice shall be postmarked 60 days or as soon as practicable before the change is commenced and shall include information describing the precise nature of the change, present and proposed emission control systems, productive capacity of the facility before and after the change, and the expected completion date of the change.

ASSESSMENT: The facility will submit the appropriate reports.

40CFR 60.48c (d) The owner or operator of each affected facility subject to the fuel oil sulfur limits shall submit reports to the Administrator semi-annually.

ASSESSMENT: The facility will submit annual NSPS reports prior to January 31 and July 31 of each year.

ASSESSMENT: The NSPS standards for fuel sulfur content, recordkeeping and reporting will be applicable to the proposed Victory boiler. The facility will comply with the NSPS standards as noted under each paragraph above.

4.6 National Emissions Standards for Hazardous Air Pollutants 40 CFR PART 63, Subpart JJJJJJ

As required by NJAC 7:27-Subchapter 8 of New Jersey's air permitting regulations, the following assessment of the facility's proposed emissions was performed.

The regulatory requirements at NJAC 7:27-8.11(a)(1)(i): Standards for issuing a permit, require a regulatory assessment to include National Emissions Standards for Hazardous Air Pollutants (NESHAPs). The NESHAPs requirements for boilers at 40 CFR Part 63, Subpart JJJJJJ were reviewed. These requirements apply to boilers at "area sources", also referred to as minor sources. The Darling Newark facility is an area source, as its potential to emit is below major source (Title V) permitting thresholds. The proposed Victory boiler meets the definition of a "gas-fired boiler" as per 40CFR 63.11237. Subpart JJJJJJ does not apply to gas-fired boilers.

ASSESSMENT: Subpart JJJJJJ does not apply to the proposed Victory boiler, as it meets the definition of a "gas-fired boiler".

APPENDIX A

AIR EMISSIONS CALCULATIONS and RISK SCREENING

DARLING INGREDIENTS INC.
Newark, NJ

AIR PERMIT APPLICATION FOR BOILERS

PCP080001 - BOILERS

EMISSION UNIT: U2 - BOILERS

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EMISSION UNIT: U2 - BOILERS

1.0 EMISSION SUMMARY

1.1 VICTORY BOILER EMISSIONS SUMMARY

Operating Scenario	Fuel Type	Proposed Fuel amount	Units	Proposed Run hours	Units	NOx		CO		VOC		TSP		PM10		SOx		NH3	
						lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
OS7	Natural Gas	500.00	MM FT^3/yr	5,705	Hours/yr	0.89	2.55	3.31	9.44	0.45	1.28	0.67	1.90	0.67	1.90	0.05	0.15	0.40	1.14
OS8	No. 2 Fuel Oil	29.355	1000's gal/yr	48	Hours/yr	2.63	0.06	3.34	0.08	0.76	0.02	1.22	0.03	1.22	0.03	0.13	0.00	------	------
			TOTAL		TOTAL		2.613		9.515		1.293		1.929		1.929		0.153		1.141

1.2 NEBRASKA BOILER EMISSIONS SUMMARY (EXISTING PERMIT- NO EMISSIONS INCREASES)

Operating Scenario	Fuel Type	Proposed Fuel amount	Units	Proposed Run hours	Units	NOx		CO		VOC		TSP		PM10		SOx	
							tons/yr		tons/yr		tons/yr		tons/yr		tons/yr		tons/yr
OS5	No. 2 Fuel Oil	31.500	1000's gal/yr	48	Hours/yr	8.23	0.21	3.56	0.09	0.46	0.01	0.92	0.02	0.92	0.02	18.38	0.45
			TOTAL				3.852		5.017		0.740		1.029		1.029		0.531

1.3 POTENTIAL TO EMIT REVISION SUMMARY

	NOx	CO	VOC	TSP	PM10	SOx
NEW PTE FOR TWO (2) BOILER COMBINED (tons/yr)=	6.465	14.532	2.033	2.958	2.958	0.684

	NOx	CO	VOC	TSP	PM10	SOx
PERMITTED FOR TWO (2) BOILER COMBINED (tons/yr)=	23.776	19.211	4.129	5.139	5.139	22.720

	NOx	CO	VOC	TSP	PM10	SOx
TOTAL PROPOSED CHANGE (tons/yr) =	-17.311	-4.679	-2.096	-2.181	-2.181	-22.036

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2.0 VICTORY BOILER EMISSIONS (E4)

2.1 EMISSION FACTORS

2.1.1 Natural Gas Emission Factors

NOx	0.89	lbs/hr (Based on Manufacturer data)	=	10.20	lbs/MM FT^3	1.00E-02	lb/MM BTU (Manufacturer)
CO	3.31	lbs/hr (Based on Manufacturer data)	=	37.74	lbs/MM FT^3	3.70E-02	lb/MM BTU (Manufacturer)
VOC	0.45	lbs/hr (Based on Manufacturer data)	=	5.10	lbs/MM FT^3	5.00E-03	lb/MM BTU (Manufacturer)
TSP	0.67	lbs/hr (Based on (AP-42 Filter+Cond)	=	7.60	lbs/MM FT^3 (AP-42 Filter+Cond)	7.45E-03	lb/MM BTU
PM10	0.67	lbs/hr (Based on (AP-42 Filter+Cond)	=	7.60	lbs/MM FT^3 (AP-42 Filter+Cond)	7.45E-03	lb/MM BTU
PM2.5	0.67	lbs/hr (Based on (AP-42 Filter+Cond)	=	7.60	lbs/MM FT^3 (AP-42 Filter+Cond)	7.45E-03	lb/MM BTU
SOx	0.05	lbs/hr (AP-42)	=	0.60	lbs/MM FT^3 (AP-42)	5.88E-04	lb/MM BTU
NH3	0.40	lbs/hr (Based on Manufacturer data)	=	4.56	lbs/MM FT^3	4.47E-03	lb/MM BTU

NOx BEFORE Control (SCR) Emission Factor from Manufacturer is = 0.1 lbs/ MM BTU and AFTER Control (SCR) is = 0.01 lbs/ MM BTU

Conversion Factor Natural Gas= 1020 BTU/FT^3

2.1.2 No 2 Fuel Oil Emission Factors

NOx	2.63	lbs/hr (Based on Manufacturer data)	=	4.30	lbs/1,000s gallons	0.031	lb/MM BTU (Manufacturer)
CO	3.34	lbs/hr (Based on Manufacturer data)	=	5.46	lbs/1,000s gallons	0.039	lb/MM BTU (Manufacturer)
VOC	0.76	lbs/hr (Based on AP 42)	=	1.25	lbs/1,000s gallons	0.009	lb/MM BTU (Manufacturer)
TSP	1.22	lbs/hr (Based on AP 42)	=	2.00	lbs/1,000s gallons (AP-42 - Filterable)	1.43E-02	lb/MM BTU
PM10	1.22	lbs/hr (Based on AP 42)	=	2.00	lbs/1,000s gallons (AP-42 - Filterable)	1.43E-02	lb/MM BTU
PM2.5	0.79	lbs/hr (Based on AP 42)	=	1.30	lbs/1,000s gallons (AP-42 - Condensible)	9.29E-03	lb/MM BTU
SOx	0.13	lbs/hr (Based on AP-42 Air Emission factor, USEPA 2010, 142S lb Sulfur/1,000 gal, where S = 0.0015. Sulfur allowed in NJ is 15 ppm)		0.213	lbs/1,000s gallons (AP-42)	1.52E-03	lb/MM BTU
NH3	0.40	lbs/hr (Based on Manufacturer data)		0.65	lbs/1,000s gallons	4.67E-03	lb/MM BTU

Conversion factor Fuel #2 Oil = 140000 BTU/ gallons

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2.2 FUEL USAGE & HEAT INPUT RATE

2.2.1 Annual usage

OS-7 Natural Gas:	500.0	MM FT^3/YEAR = (hr/year) x (MMbtu/Hr) x (1,000,000 btu/MMbtu) x (1/1,020 BTU/ft3) x (MM ft3/1,000,000 ft3)
OS-8 No 2 Fuel Oil:	29	1,000s GALLONS/YEAR = (hr/year) x (MMbtu/Hr) x (1,000,000 btu/MMbtu) x (1/BTU/ft3) x (MM ft3/1,000,000 ft3)

2.2.2 Heat Input rate

Nat Gas:	89.40	MMBTU/hr
No 2 Fuel Oil:	85.61	MMBTU/hr

2.3 EMISSIONS CALCULATION

2.3.1 Emission calculation Natural Gas (OS7)

NOx lbs/yr =	10.200	lbs/MM FT^3 x	500	MM FT^3/yr	
NOx lbs/yr =	5100.00	lbs/yr /	2000	lbs/tons	
NOx =	2.55	tons / yr			
CO lbs/yr =	37.740	lbs/MM FT^3 x	500	MM FT^3/yr	
CO lbs/yr =	18870.00	lbs/yr /	2000	lbs/tons	
CO =	9.44	tons / yr			
VOC lbs/yr =	5.100	lbs/MM FT^3 x	500	MM FT^3/yr	
VOC lbs/yr =	2550.00	lbs/yr /	2000	lbs/tons	
VOC =	1.28	tons / yr			
TSP lbs/yr =	7.600	lbs/MM FT^3 x	500	MM FT^3/yr	
TSP lbs/yr =	3800.00	lbs/yr /	2000	lbs/tons	
TSP =	1.90	tons / yr			
PM10 lbs/yr =	7.600	lbs/MM FT^3 x	500	MM FT^3/yr	
PM10 lbs/yr =	3800.00	lbs/yr /	2000	lbs/tons	
PM10 =	1.90	tons / yr			
PM2.5 lbs/yr =	7.600	lbs/MM FT^3 x	500	MM FT^3/yr	
PM2.5 lbs/yr =	3800.00	lbs/yr /	2000	lbs/tons	
PM2.5 =	1.90	tons / yr			
SOx lbs/yr =	0.60	lbs/MM FT^3 x	500	MM FT^3/yr	
SOx lbs/yr =	300.00	lbs/yr /	2000	lbs/tons	
SOx =	0.15	tons / yr			
NH3 lbs/yr =	4.56	lbs/MM FT^3 x	500	MM FT^3/yr	
NH3 lbs/yr =	2281.88	lbs/yr /	2000	lbs/tons	
NH3 =	1.14	tons / yr			

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2.3.2 Emission calculation No 2 Fuel Oil (OS8)

NOx lbs/yr =	4.30	lbs/1,000s gallons x	29	1000s gallons/yr
NOx lbs/yr =	126.17	lbs/yr /	2000	lbs/tons
NOx =	0.06	tons / yr		
CO lbs/yr =	5.46	lbs/1,000s gallons x	29	1000s gallons/yr
CO lbs/yr =	160.28	lbs/yr /	2000	lbs/tons
CO =	0.08	tons / yr		
VOC lbs/yr =	1.25	lbs/1,000s gallons x	29	1000s gallons/yr
VOC lbs/yr =	36.58	lbs/yr /	2000	lbs/tons
VOC =	0.02	tons / yr		
TSP lbs/yr =	2.00	lbs/1,000s gallons x	29	1000s gallons/yr
TSP lbs/yr =	58.71	lbs/yr /	2000	lbs/tons
TSP =	0.03	tons / yr		
PM10 lbs/yr =	2.00	lbs/1,000s gallons x	29	1000s gallons/yr
PM10 lbs/yr =	58.71	lbs/yr /	2000	lbs/tons
PM10 =	0.03	tons / yr		
PM2.5 lbs/yr =	1.30	lbs/1,000s gallons x	29	1000s gallons/yr
PM2.5 lbs/yr =	38.16	lbs/yr /	2000	lbs/tons
PM2.5 =	0.02	tons / yr		
SOx lbs/yr =	0.21	lbs/1,000s gallons x	29	1000s gallons/yr
SOx lbs/yr =	6.25	lbs/yr /	2000	lbs/tons
SOx =	0.00	tons / yr		
NH3 lbs/yr =	0.65	lbs/1,000s gallons x	29	1000s gallons/yr
NH3 lbs/yr =	19.20	lbs/yr /	2000	lbs/tons
NH3 =	0.01	tons / yr		

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2.3.3 Emission calculation HAPs (OS7 and OS8 Combined)

HAPs emission reporting thresholds are based on 7:27-17 Table 2.

Boiler Natural Gas HAPs emission factors are based on AP-42 Table 1.4-3 & Table 1.4-4, unless noted otherwise

Boiler Fuel Oil HAPs emission factors are based on AP-42 Table 1.3-9 & Table 1.3-10. "NA" means Not Available, unless noted otherwise

CAS	Chemical Name	EPA AP-42 Unless noted lbs/ MMft3 of NAT GAS	EPA AP-42 Unless noted lbs/1,000 gal of FUEL OIL	Reporting threshold as per NJAC 7:27-Subch 8 lb/Yr	Emissions OS-7 NAT GAS lb/Hr	Emissions OS-8 FUEL OIL lb/Hr	Emissions lbs/Yr	Emissions Tons/Yr	Is it Reportable According to NJAC 7:27-Subch 8
71-43-2	Benzene	2.10E-03	2.14E-04	6	1.84E-04	1.31E-04	1.0563	5.28E-04	Diminimis
50-00-0	Formaldehyde Note 4	1.50E-05	3.30E-02	3.5	1.31E-06	2.02E-02	0.9762	4.88E-04	Diminimis
110-54-3	Hexane	1.80E+00	NA	2000	1.58E-01	NA	900.0000	4.50E-01	Diminimis
91-20-3	Naphthalene	6.10E-04	1.13E-03	1.4	5.35E-05	6.91E-04	0.3382	1.69E-04	Diminimis
108-88-3	Toluene	3.40E-03	6.20E-03	2000	2.98E-04	3.79E-03	1.8820	9.41E-04	Diminimis
25321-22-6	Dichlorobenzene	1.20E-03	NA	4	1.05E-04	NA	0.6000	3.00E-04	Diminimis
7440-38-2	Arsenic Note 5	6.58E-07	5.68E-04	0.01	5.77E-08	3.47E-04	0.0170	8.50E-06	Reportable
7440-41-7	Beryllium Note 1	1.20E-05	4.26E-04	0.02	1.05E-06	2.60E-04	0.0185	9.25E-06	Diminimis
7440-43-9	Cadmium Note 5	1.25E-08	4.26E-04	0.01	1.09E-09	2.60E-04	0.0125	6.26E-06	Reportable
7440-47-3	Chromium Note 1	1.40E-03	4.26E-04	1000	1.23E-04	2.60E-04	0.7125	3.56E-04	Diminimis
7440-48-4	Cobalt	8.40E-05	NA	0.005	7.36E-06	NA	0.0420	2.10E-05	Reportable
7439-96-5	Manganese Note 1	3.80E-04	8.52E-04	0.6	3.33E-05	5.21E-04	0.2150	1.08E-04	Diminimis
7439-97-6	Mercury Note 1	2.60E-04	4.26E-04	2	2.28E-05	2.60E-04	0.1425	7.13E-05	Diminimis
7440-02-0	Nickel Note 5	6.20E-07	4.26E-04	0.6	5.44E-08	2.60E-04	0.0128	6.41E-06	Diminimis
7782-49-2	Selenium Note 1	2.40E-05	2.13E-03	925	2.10E-06	1.30E-03	0.0745	3.73E-05	Diminimis
7440-62-2	Vanadium	2.30E-03	3.18E-02	NA	2.02E-04	1.94E-02	2.0835	1.04E-03	Diminimis
7440-66-6	Zinc Note 1	2.90E-02	5.68E-04	NA	2.54E-03	3.47E-04	14.5167	7.26E-03	Diminimis
7440-39-3	Barium	4.40E-03	2.57E-03	NA	3.86E-04	1.57E-03	2.2754	1.14E-03	Diminimis
7440-50-8	Copper Note 1	8.50E-04	8.52E-04	NA	7.45E-05	5.21E-04	0.4500	2.25E-04	Diminimis
7439-92-1	Lead Note 1	5.00E-04	1.28E-03	2	4.38E-05	7.81E-04	0.2875	1.44E-04	Diminimis
56-55-3	Benz(a)anthracene	1.80E-06	4.01E-06	0.4	1.58E-07	2.45E-06	0.0010	5.09E-07	Diminimis
50-32-8	Benzo(a)pyrene	1.20E-06	NA	0.04	1.05E-07	NA	0.0006	3.00E-07	Diminimis
205-99-2	Benzo(b)fluoranthene	1.80E-06	1.48E-06	0.4	1.58E-07	9.05E-07	0.0009	4.72E-07	Diminimis
218-01-9	Chrysene	1.80E-06	2.38E-06	2	1.58E-07	1.46E-06	0.0010	4.85E-07	Diminimis
53-70-3	Dibenzo(a,h)anthracene	1.20E-06	1.67E-06	0.04	1.05E-07	1.02E-06	0.0006	3.25E-07	Diminimis
57-97-6	7,12- Dimethylbenz(a)anthracene Note 3	1.60E-05	NA	0.0007	1.40E-06	NA	0.0080	4.00E-06	Reportable
193-39-5	Indeno(1,2,3-cd)pyrene	1.80E-06	2.14E-06	0.4	1.58E-07	1.31E-06	0.0010	4.81E-07	Diminimis
NA	Polycyclic Organic Matter (POM) is a HAP Note 2	4.10E-05	3.30E-03	2	3.59E-06	2.02E-03	0.1174	5.87E-05	Diminimis
					8.82E-06	6.08E-04		3.98E-05	

Note 1: AP 42 - Table 1.3-10 Emission Factor - converted from $lb/10^{12}$ BTU to lb/MM ft3

Note 2: See Attachment 1 for Polycyclic Organic Matter (POM)

Note 3: 7,12- Dimethylbenz(a)anthracene is a Polycyclic Organic Matter (POM). Per NJAC 7:27-17.9 (b) Table 2, it has a lower Reporting threshold than the POM group.

Note 4: Formaldehyde Natural Gas Emission factor based on the "Mean value" from "Hazardous air pollutant emissions from gas-fired combustion sources: emissions and the effects of design and fuel type" Table 3; Chemosphere Vol 42 (2001); Authors: Glenn C England et al.

Note 5: Per Energy Fuels 2018, 32, 6397−6400, "Characterization and Comparison of Trace Metal Compositions in Natural Gas, Biogas, and Biomethane"; by M. Cachia et al. (See Attachment 2)

DARLING INGREDIENTS INC.
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3.0 NEBRASKA EMISSIONS (E3)

3.1 EMISSION FACTORS

3.1.1 Natural Gas Emission Factors

NOx	2.27	lbs/hr (Per Air Permit PCP080001)	=	27.47	lbs/MM FT^3
CO	3.53	lbs/hr (Per Air Permit PCP080001)	=	37.22	lbs/MM FT^3
VOC	0.52	lbs/hr (Per Air Permit PCP080001)	=	5.50	lbs/MM FT^3
TSP	0.72	lbs/hr (Per Air Permit PCP080001)	=	7.60	lbs/MM FT^3
PM10	0.72	lbs/hr (Per Air Permit PCP080001)	=	7.60	lbs/MM FT^3
SOx	0.06	lbs/hr (Per Air Permit PCP080001)	=	0.63	lbs/MM FT^3

Conversion Factor = lb/MM BTU x 1020 BTU/FT^3

3.1.2 No 2 Fuel Oil Emission Factors

NOx	8.23	lbs/hr (Per Air Permit PCP080001)	=	13.48	lbs/1,000s gallons
CO	3.56	lbs/hr (Per Air Permit PCP080001)	=	5.42	lbs/1,000s gallons
VOC	0.46	lbs/hr (Per Air Permit PCP080001)	=	0.70	lbs/1,000s gallons
TSP	0.92	lbs/hr (Per Air Permit PCP080001)	=	1.40	lbs/1,000s gallons
PM10	0.92	lbs/hr (Per Air Permit PCP080001)	=	1.40	lbs/1,000s gallons
SOx	18.38	lbs/hr (Per Air Permit PCP080001)	=	28.400	lbs/1,000s gallons (Based on AP-42 1998 with 0.142 MMBTU/gal and **0.2 % of Sulfur**)

Conversion factor = 140 MMBTU/ 1000s gallons

NOTES: 1. Emission factor reference: NJDEP-required stack tests conducted on the two boilers on May 9, 2006 (Nebraska Boiler combustiong Natural gas) and January 23 and 24, 2007 (Abco Boiler combusting Natural Gas, No. 2 Fuel Oil, Tallow and Yellow Grease, as well as Nebraska Boiler combusting No. 2 Fuel Oil). These stack tests were pre-approved and witnessed by the NJDEP.

2. The emission factors used are the worst case for the three runs conducted under each condition and are NOT averages. This was done to lend as much conservatism to the factors and emissions as possible.

3.2 FUEL USAGE & HEAT INPUT RATE

3.2.1 Annual usage

OS-1 Natural Gas: 265.0 MM FT^3/YEAR

OS-2 No 2 Fuel Oil: 31.500 1,000s GALLONS/YEAR

3.2.2 Heat Input rate

Nat Gas:	96.75	MMBTU/hr
No 2 Fuel Oil:	91.88	MMBTU/hr

DARLING INGREDIENTS INC.
Newark, NJ

AIR PERMIT APPLICATION FOR BOILERS

3.3 EMISSIONS CALCULATION

3.3.1 Emission calculation Natural Gas (OS6)

NOx lbs/yr =	27.47	lbs/MM FT^3 x	265	MM FT^3/yr
NOx lbs/yr =	7279.55	lbs/yr /	2000	lbs/tons
NOx =	3.64	tons / yr		
CO lbs/yr =	37.22	lbs/MM FT^3 x	265	MM FT^3/yr
CO lbs/yr =	9863.30	lbs/yr /	2000	lbs/tons
CO =	4.93	tons / yr		
VOC lbs/yr =	5.50	lbs/MM FT^3 x	265	MM FT^3/yr
VOC lbs/yr =	1457.50	lbs/yr /	2000	lbs/tons
VOC =	0.73	tons / yr		
TSP lbs/yr =	7.60	lbs/MM FT^3 x	265	MM FT^3/yr
TSP lbs/yr =	2014.00	lbs/yr /	2000	lbs/tons
TSP =	1.01	tons / yr		
PM10 lbs/yr =	7.60	lbs/MM FT^3 x	265	MM FT^3/yr
PM10 lbs/yr =	2014.00	lbs/yr /	2000	lbs/tons
PM10 =	1.01	tons / yr		
SOx lbs/yr =	0.63	lbs/MM FT^3 x	265	MM FT^3/yr
SOx lbs/yr =	166.95	lbs/yr /	2000	lbs/tons
SOx =	0.08	tons / yr		

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Newark, NJ

AIR PERMIT APPLICATION FOR BOILERS

3.3.2 Emission calculation No 2 Fuel Oil (OS5)

NOx lbs/yr =	13.48	lbs/1,000s gallons x		32	1000s gallons/yr
NOx lbs/yr =	424.62	lbs/yr /		2000	lbs/tons
NOx =	0.21	tons / yr			
CO lbs/yr =	5.42	lbs/1,000s gallons x		32	1000s gallons/yr
CO lbs/yr =	170.73	lbs/yr /		2000	lbs/tons
CO =	0.09	tons / yr			
VOC lbs/yr =	0.70	lbs/1,000s gallons x		32	1000s gallons/yr
VOC lbs/yr =	22.05	lbs/yr /		2000	lbs/tons
VOC =	0.01	tons / yr			
TSP lbs/yr =	1.40	lbs/1,000s gallons x		32	1000s gallons/yr
TSP lbs/yr =	44.10	lbs/yr /		2000	lbs/tons
TSP =	0.02	tons / yr			
PM10 lbs/yr =	1.40	lbs/1,000s gallons x		32	1000s gallons/yr
PM10 lbs/yr =	44.10	lbs/yr /		2000	lbs/tons
PM10 =	0.02	tons / yr			
SOx lbs/yr =	28.40	lbs/1,000s gallons x		32	1000s gallons/yr
SOx lbs/yr =	894.60	lbs/yr /		2000	lbs/tons
SOx =	0.45	tons / yr			

ATTACHMENT 1

Polycyclic Organic Matter (POM) Emission Factors

Polycyclic Organic Matter (POM) is a HAP as defined by Section 112(b) of the Clean Air Act.

Natural Gas - Polycyclic Organic Matter (POM)

The emission factor listed below has been compile based on AP-42 Table 1.4-3

POM	91-57-6	2-Methylnaphthalene	2.40E-06	lbs/ MMft3
POM	56-49-5	3-Methylcholanthrene	1.80E-06	lbs/ MMft3
POM	83-32-9	Acenaphthene	1.80E-06	lbs/ MMft3
POM	203-96-8	Acenaphthylene	1.80E-06	lbs/ MMft3
POM	120-12-7	Anthracene	2.40E-06	lbs/ MMft3
POM	191-24-2	Benzo(g,h,i)perylene	1.20E-06	lbs/ MMft3
POM	207-08-9	Benzo(k)fluoranthene	1.80E-06	lbs/ MMft3
POM	206-44-0	Fluoranthene	3.00E-06	lbs/ MMft3
POM	86-73-7	Fluorene	2.80E-06	lbs/ MMft3
POM	85-01-8	Phenanathrene	1.70E-05	lbs/ MMft3
POM	129-00-0	Pyrene	5.00E-06	lbs/ MMft3

Distillate Oil - Polycyclic Organic Matter (POM)

The POM emission factor is based on AP-42 Table 1.3-8

POM = 0.0033 lbs / 1000 gal

ATTACHMENT 2

Trace Metals (Arsenic, Cadmium and Nickel) in Natural Gas

Per Energy Fuels 2018, 32, 6397−6400, "Characterization and Comparison of Trace Metal Compositions in Natural Gas, Biogas, and Biomethane"; by M. Cachia et al.

Arsenic	6.33	ng / N m3	of Natural Gas
Cadmium	0.12	ng / N m3	of Natural Gas
Nickel	5.97	ng / N m3	of Natural Gas

Conversions

Convert N m3 to Actual m3 at plant conditions

1 N m3 = 0.601 m3 @ 12 PSI and 25 degrees C using V2 = V1 x (P1/P2) x (T2/T1)

Where:	V2=	0.601	Actual m3 @ actual plant conditions (pressure & Temp)	
	V1 =	1	N m3	
	P1=	1	atmosphere N	
	P2 =	1.817	atmosphere Actual at	26.7 PSI (12 PSI gauge + 14.7 PSI)
	T1 =	273.15	degrees K Normal at	0 degrees C
	T2 =	298.15	degrees K Normal at	25 degrees C

Convert ng/ N m3 to ng/m3

Arsenic	6.33	ng / N m3 x	(1 Nm3/	0.601	m3 =	10.536	ng/m3
Cadmium	0.12	ng / N m3 x	(1 Nm3/	0.601	m3 =	0.200	ng/m3
Nickel	5.97	ng / N m3 x	(1 Nm3/	0.601	m3 =	9.937	ng/m3

Convert ng/m3 to lb/MM ft3

Arsenic	10.536	ng/m3 x	2.20E-12	lb/ng) /	35.31	ft3/m3 x	1.00E+06	ft3/MM ft3 =	6.58E-07	lb/MMft3
Cadmium	0.200	ng/m3 x	2.20E-12	lb/ng) /	35.31	ft3/m3 x	1.00E+06	ft3/MM ft3 =	1.25E-08	lb/MMft3
Nickel	9.937	ng/m3 x	2.20E-12	lb/ng) /	35.31	ft3/m3 x	1.00E+06	ft3/MM ft3 =	6.20E-07	lb/MMft3

NJDEP DIVISION OF AIR QUALITY RISK SCREENING WORKSHEET
For Long-Term Carcinogenic and Noncarcinogenic Effects and Short-Term Effects

June 2020

Read the Instructions tab carefully before completing this spreadsheet.

Date	4/16/2022
Facility ID No.	05574
Activity ID No.	PCP080001
Facility name	Darling Ingredient Inc
Facility location	Newark, NJ
File name (.xls)	

Emission Unit/Batch Process ID No.	2	Stack height[1]	65.0 ft
Emission Point ID No.	4	Distance to property line	150 ft
Equipment ID No(s).	4	**Annual air impact value, C'**	5.290616 **(ug/m³)/(ton/yr)**
Operating Scenario(s)	OS7, OS8	**1-hour air impact value, C'st**	429.9932 **(ug/m³)/(lb/hr)**

KEY:

Long-Term Effects

- **Q =** Annual emission rate (in tons per year) contributed from the source
- **C =** C' x Q = Annual average ambient air concentration
- **URF =** Unit risk factor (for carcinogenic risk)
- **IR =** C x URF = Incremental risk (for carcinogen)
- **RfC =** Reference concentration (for noncarcinogenic effects)
- **HQ =** C/RfC = Hazard quotient (for noncarcinogenic risk)
- **RsIt =** The result of comparing the IR or HQ to the negligible threshold (FER if > threshold, Negl. if <= threshold)
- **FER =** Further Evaluation Required (See Notes for thresholds)
- **Negl. =** Negligible (See Notes for thresholds)

Short-Term Effects

- **Q_h =** Hourly emission rate (in pounds per hour)
- **C_{st} =** C'_{st} x Q_h = Short-term average ambient air concentration
- **RfC_{st} =** Short-term reference concentration (for noncarcinogenic effects)
- **HQ_{st} =** C_{st}/RfC_{st} = Hazard quotient for short-term noncarcinogenic effects
- **RsIt =** The result of comparing the HQ_{st} to the negligible threshold (FER if > threshold, Negl. if <= threshold)
- **FER =** Further Evaluation Required (See Notes for thresholds)
- **Negl. =** Negligible (See Notes for thresholds)

[1] When evaluating risk for diesel engines, use the equivalent stack height consistent with the memo dated June 10, 2009.
Click here to view the "Stack Height Equivalents for Use in First Level Screening Analyses for Diesel Engines" memo.

				LONG-TERM EFFECTS								SHORT-TERM EFFECTS				
	HAP	CAS No.	Air Toxic	Q (ton/yr)	C (ug/m³)	URF [(ug/m³)⁻¹]	IR	RsIt	RfC (ug/m³)	HQ	RsIt	Q_h (lb/hr)	C_{st} (ug/m³)	RfC_{st} (ug/m³)	HQ_{st}	RsIt
1	*	75070	Acetaldehyde			2.2E-06			9					470		
2	*	60355	Acetamide			2.0E-05										
3		67641	Acetone						31000					62000		
4		75865	Acetone cyanohydrin						2							
5	*	75058	Acetonitrile						60							
6	*	98862	Acetophenone						0.02							
7	*	53963	Acetylaminofluorene (2-)			1.3E-03										
8	*	107028	Acrolein						0.02					2.5		
9	*	79061	Acrylamide			1.0E-04			6							
10	*	79107	Acrylic acid						1					6000		
11	*	107131	Acrylonitrile			6.8E-05			2							
12		309002	Aldrin			4.9E-03										
13	*	107051	Allyl chloride			6.0E-06			1							
14		117793	Aminoanthraquinone (2-)			9.4E-06										
15	*	92671	Aminobiphenyl (4-)			6.0E-03										
16		7664417	Ammonia	1.1E+00	6.0E+00				100	**6.0E-02**	**Negl.**	4.0E-01	171.9973	3200	**5.4E-02**	**Negl.**
17	*	62533	Aniline			1.6E-06			1					3000		
18	*	90040	Anisidine (o-)			4.0E-05										
19	**	1309644	Antimony trioxide						0.2							
20		140578	Aramite			7.1E-06										
21	*		Arsenic (inorganic)	8.5E-06	4.5E-05	4.3E-03	**1.9E-07**	**Negl.**	0.015	**3.0E-03**	**Negl.**	5.8E-08	2.48E-05	0.2	**1.2E-04**	**Negl.**
22	**	7784421	Arsine						0.05							
23	*	1332214	Asbestos			7.7E-03										
24		103333	Azobenzene			3.1E-05										
25			Barium	Diminimis	#VALUE!		**#VALUE!**	**####**		**#VALUE!**	**####**	Diminimis	#VALUE!	0.5	**#VALUE!**	**#VALUE!**
26	*	71432	Benzene	Diminimis	#VALUE!	7.8E-06	**#VALUE!**	**####**	3	**#VALUE!**	**####**	Diminimis	#VALUE!	27	**#VALUE!**	**#VALUE!**
27	*	92875	Benzidine			6.7E-02										
28	**	50328	Benzo(a)pyrene	Diminimis	#VALUE!	6.0E-04	**#VALUE!**	**####**	0.002	**#VALUE!**	**####**	Diminimis	#VALUE!		**#VALUE!**	**#VALUE!**
29	*	98077	Benzotrichloride			3.7E-03										
30	*	100447	Benzyl chloride			4.9E-05								240		
31	*		Beryllium	Diminimis	#VALUE!	2.4E-03	**#VALUE!**	**####**	0.02	**#VALUE!**	**####**	Diminimis	#VALUE!		**#VALUE!**	**#VALUE!**
32	*	92524	Biphenyl (1,1-)						0.4							
33		108601	Bis(2-chloroisopropyl)ether			1.0E-05										
34	*	117817	Bis(2-ethylhexyl)phthalate			2.4E-06										
35	*	542881	Bis(chloromethyl)ether			6.2E-02										
36		7440428	Boron (elemental)						20							
37		7637072	Boron trifluoride						0.7							
38		74975	Bromochloromethane						40							
39		75274	Bromodichloromethane			3.7E-05										
40	*	75252	Bromoform			1.1E-06										
41		106945	Bromopropane (1-)						101					5030		
42	*	106990	Butadiene (1,3-)			3.0E-05			2					660		
43	*		Cadmium	6.3E-06	3.3E-05	4.2E-03	**1.4E-07**	**Negl.**	0.02	**1.7E-03**	**Negl.**	1.1E-09	4.7E-07			
44		105602	Caprolactam						2.2					50		
45	*	133062	Captan			6.6E-07										
46	*	75150	Carbon disulfide						700					6200		
47	*	56235	Carbon tetrachloride			6.0E-06			40					1900		
48	*	463581	Carbonyl sulfide						10					660		
49	*	57749	Chlordane			1.0E-04			0.02							
50		108171262	Chlorinated paraffins			2.0E-05										
51	*	7782505	Chlorine						0.2					210		
52		10049044	Chlorine dioxide						0.2					28		
53		75683	Chloro-1,1-difluoroethane (1-) *(HCFC-142b)*						50000							
54	*	532274	Chloroacetophenone (2-)						0.03							
55	*	108907	Chlorobenzene						1000							
56	*	510156	Chlorobenzilate			3.1E-05										
57		75456	Chlorodifluoromethane *(HCFC-22)*						50000							
58	*	67663	Chloroform			2.3E-05			300					150		
59	*	107302	Chloromethyl methyl ether			6.9E-04										
60		95830	Chloro-o-phenylenediamine (4-)			4.6E-06										
61		95692	Chloro-o-toluidine (p-)			7.7E-05										
62		76062	Chloropicrin						0.4					29		
63	*	126998	Chloroprene			5.0E-04			20							
64		75296	Chloropropane (2-)						100							
65	**		Chromic acid mists (Cr VI)						0.008							
66	**	18540299	Chromium VI (total)			1.2E-02										
67	**		Chromium VI dissolved aerosols						0.008							
68	**		Chromium VI particulates						0.1							
69	*		Cobalt	2.1E-05	1.1E-04	9.0E-03	**1.0E-06**	**Negl.**	0.006	**1.9E-02**	**Negl.**					
70	*	8007452	Coke oven emissions			6.2E-04										
71			Copper	Diminimis	#VALUE!		**#VALUE!**	**####**		**#VALUE!**	**####**			100		
72		120718	Cresidine (p-)			4.3E-05										
73	*		Cresol mixtures						600							
74		98828	Cumene						400							
75		135206	Cupferron			6.3E-05										

76		110827	Cyclohexane											6000		
77	*	72559	DDE			9.7E-05										
78		50293	DDT			9.7E-05										
79		615054	Diaminoanisole (2,4-)			6.6E-06										
80		124481	Dibromochloromethane			2.7E-05										
81	*	96128	Dibromo-3-chloropropane (1,2-)			2.0E-03			0.2							
82		764410	Dichloro-2-butene (1,4-)			4.2E-03										
83		95501	Dichlorobenzene (1,2-)						200							
84	*	106467	Dichlorobenzene (1,4-)			1.1E-05			800							
85	*	91941	Dichlorobenzidine (3,3'-)			3.4E-04										
86		75718	Dichlorodifluoromethane						100							
87	*	111444	Dichloroethyl ether			3.3E-04										
88	*	542756	Dichloropropene (1,3-)			4.0E-06			20							
89	*	62737	Dichlorvos			8.3E-05			0.5							
90		77736	Dicyclopentadiene						0.3							
91		60571	Dieldrin			4.6E-03										
92			Diesel particulate matter			3.0E-04			5							
93	*	111422	Diethanolamine						3							
94		112345	Diethylene glycol monobutyl ether						0.1							
95		75376	Difluoroethane (1,1-)						40000							
96	*	77781	Dimethyl sulfate			4.0E-03										
97	*	60117	Dimethylaminoazobenzene (4-)			1.3E-03										
98	*	79447	Dimethylcarbamyl chloride			3.7E-03										
99	*	68122	Dimethylformamide (N,N-)						30							
100	*	57147	Dimethylhydrazine (1,1-)						0.002							
101		540738	Dimethylhydrazine (1,2-)			1.6E-01										
102	*	121142	Dinitrotoluene (2,4-)			8.9E-05										
103	*	123911	Dioxane (1,4-)			5.0E-06			30					3000		
104	*		Dioxin						See footnote "a"							
105	*	122667	Diphenylhydrazine (1,2-)			2.2E-04										
106	*	106898	Epichlorohydrin			1.2E-06			1					1300		
107	*	106887	Epoxybutane (1,2-)						20							
108	*	140885	Ethyl acrylate						8							
109	*	100414	Ethylbenzene			2.5E-06								1000		
110	*	51796	Ethyl carbamate			2.9E-04										
111	*	75003	Ethyl chloride											10000		
112	*	106934	Ethylene dibromide			6.0E-04			0.8							
113	*	107062	Ethylene dichloride			2.6E-05			400							
114	*	107211	Ethylene glycol						400							
115		111762	Ethylene glycol monobutyl ether						82					4700		
116	**	110805	Ethylene glycol monoethyl ether						200					370		
117	**	111159	Ethylene glycol monoethyl ether acetate						300					140		
118	**	109864	Ethylene glycol monomethyl ether						20					93		
119	**	110496	Ethylene glycol monomethyl ether acetate						90							
120	*	75218	Ethylene oxide			5.0E-03			30					42		
121	*	96457	Ethylene thiourea			1.3E-05										
122	*	151564	Ethyleneimine			1.9E-02										
123	*	75343	Ethylidene dichloride			1.6E-06			500							
124		16984488	Fluoride						13							
125	*	50000	Formaldehyde	Diminimis	#VALUE!	1.3E-05	**#VALUE!**	**####**	9	**#VALUE!**	**####**	Diminimis	#VALUE!	55	**#VALUE!**	**#VALUE!**
126		98011	Furfural						50							
127			Gasoline vapors			1.0E-06			15							
128		111308	Glutaraldehyde						0.08					4.1		
129		765344	Glycidaldehyde						1							
130	*	76448	Heptachlor			1.3E-03										
131		1024573	Heptachlor epoxide			2.6E-03										
132	*	118741	Hexachlorobenzene			4.6E-04										
133	*	87683	Hexachlorobutadiene			2.2E-05										
134	**	319846	Hexachlorocyclohexane (alpha-)			1.8E-03										
135	**	319857	Hexachlorocyclohexane (beta-)			5.3E-04										
136	*	58899	Hexachlorocyclohexane (gamma-)			3.1E-04										
137	**	608731	Hexachlorocyclohexane (technical grade)			5.1E-04										
138	*	77474	Hexachlorocyclopentadiene						0.2							
139		19408743	Hexachlorodibenzo-p-dioxin, mixture			1.3E+00										
140	*	67721	Hexachloroethane			1.1E-05			30							
141	*	822060	Hexamethylene diisocyanate						0.01							
142	*	110543	Hexane (N-)	Diminimis	#VALUE!		**#VALUE!**	**####**	700	**#VALUE!**	**####**					
143	*	302012	Hydrazine			4.9E-03			0.2					10		
144		10034932	Hydrazine sulfate			4.9E-03										
145	*	7647010	Hydrogen chloride						20					2100		
146	**	74908	Hydrogen cyanide						0.8					340		
147	*	7664393	Hydrogen fluoride						14					240		
148	**	7783075	Hydrogen selenide											5		
149		7783064	Hydrogen sulfide						2					98		
150	*	78591	Isophorone						2000							
151		67630	Isopropanol											3200		
152	*		Lead	Diminimis	#VALUE!	1.2E-05	**#VALUE!**	**####**		**#VALUE!**	**####**	Diminimis	#VALUE!	0.1	**#VALUE!**	**#VALUE!**
153	*	108316	Maleic anhydride						0.7							
154	*		Manganese	Diminimis	#VALUE!		**#VALUE!**	**####**	0.05	**#VALUE!**	**####**	Diminimis	#VALUE!	0.17	**#VALUE!**	**#VALUE!**
155	*		Mercury (elemental)						0.3							
156	*	7439976	Mercury (inorganic)	Diminimis	#VALUE!		**#VALUE!**	**####**	0.03	**#VALUE!**	**####**	Diminimis	#VALUE!	0.6	**#VALUE!**	**#VALUE!**
157		126987	Methacrylonitrile						0.7							
158	*	67561	Methanol						4000					28000		
159	*	74839	Methyl bromide						5					3900		
160	*	74873	Methyl chloride			1.8E-06			90							
161	*	71556	Methyl chloroform						1000					9000		
162		78933	Methyl ethyl ketone						5000					13000		
163	*	108101	Methyl isobutyl ketone											3000		
164	*	624839	Methyl isocyanate						1							
165	*	80626	Methyl methacrylate						700							
166		25013154	Methyl styrene (mixed isomers)						40							
167	*	1634044	Methyl tert butyl ether			2.6E-07			3000							
168		108872	Methylcyclohexane						3000							
169	*	101144	Methylene bis(2-chloroaniline) (4,4'-)			4.3E-04										
170	*	75092	Methylene chloride			1.3E-08			600					14000		
171	*	101779	Methylenedianiline (4,4-)			4.6E-04			20							
172	*	101688	Methylenediphenyl diisocyanate (4,4'-)						0.08					12		
173	*	60344	Methylhydrazine			1.0E-03			0.02							
174		90948	Michler's ketone			2.5E-04										
175	*		Mineral fibers (<1% free silica)						24							
176	*	91203	Naphthalene	Diminimis	#VALUE!	3.4E-05	**#VALUE!**	**####**	3	**#VALUE!**	**####**					
177	*		Nickel and compounds	Diminimis	#VALUE!	4.8E-04	**#VALUE!**	**####**	0.014	**#VALUE!**	**####**	Diminimis	#VALUE!	0.2	**#VALUE!**	**#VALUE!**
178	**	1313991	Nickel oxide						0.02							
179	**		Nickel refinery dust			2.4E-04										
180	**		Nickel, soluble salts						0.2							
181	**	12035722	Nickel subsulfide			4.8E-04										
182		7697372	Nitric acid											86		
183		88744	Nitroaniline (o-)						0.05							
184	*	98953	Nitrobenzene			4.0E-05			9							

185	*	79469	Nitropropane (2-)			2.7E-03			20								
186		55185	Nitrosodiethylamine (N-)			4.3E-02											
187	*	62759	Nitrosodimethylamine (N-)			1.4E-02											
188		924163	Nitrosodi-n-butylamine (N-)			1.6E-03											
189		621647	Nitrosodi-n-propylamine (N-)			2.0E-03											
190		86306	Nitrosodiphenylamine (N-)			2.6E-06											
191		156105	Nitrosodiphenylamine (p-)			6.3E-06											
192		10595956	Nitrosomethylethylamine (N-)			6.3E-03											
193	*	59892	Nitrosomorpholine (N-)			1.9E-03											
194		759739	Nitroso-n-ethylurea (N-)			7.7E-03											
195	*	684935	Nitroso-n-methylurea (N-)			3.4E-02											
196		100754	Nitrosopiperidine (N-)			2.7E-03											
197		930552	Nitrosopyrrolidine (N-)			6.1E-04											
198	*	87865	Pentachlorophenol			5.1E-06											
199	*	108952	Phenol						200					5800			
200	*	75445	Phosgene						0.3					4			
201	*	7803512	Phosphine						0.3					70			
202	*	7664382	Phosphoric acid						10								
203	*		Phosphorus (white)						0.07								
204	*	85449	Phthalic anhydride						20								
205	*	1336363	Polychlorinated biphenyls (PCBs)			1.0E-04											
206	*		Polycylic aromatic hydrocarbons (PAHs)	See footnote "b"													
207	*		Polycylic organic matter (POM)														
208		7758012	Potassium bromate			1.4E-04											
209	*	1120714	Propane sultone (1,3-)			6.9E-04											
210	*	57578	Propiolactone (beta-)			4.0E-03											
211	*	123386	Propionaldehyde						8								
212		115071	Propylene						3000								
213	*	78875	Propylene dichloride			1.0E-05			4								
214		107982	Propylene glycol monomethyl ether						2000								
215	*	75569	Propylene oxide			3.7E-06			30					3100			
216	**		Selenium and compounds	Diminimis	#VALUE!		**#VALUE!**	**####**	20	**#VALUE!**	**####**						
217		7631869	Silica (crystalline, respirable)						3								
218		1310732	Sodium hydroxide											8			
219	*	100425	Styrene			5.7E-07			1000					21000			
220	*	96093	Styrene oxide			4.6E-05											
221			Sulfates											120			
222		7664939	Sulfuric acid						1					120			
223	*	1746016	Tetrachlorodibenzo(p)dioxin (2,3,7,8-)			3.8E+01			0.00004								
224		630206	Tetrachloroethane (1,1,1,2-)			7.4E-06											
225	*	79345	Tetrachloroethane (1,1,2,2-)			5.8E-05											
226	*	127184	Tetrachloroethylene			6.1E-06			40					20000			
227		811972	Tetrafluoroethane (1,1,1,2-)						80000								
228		109999	Tetrahydrofuran						2000								
229		62555	Thioacetamide			1.7E-03											
230	*	7550450	Titanium tetrachloride						0.1								
231	*	108883	Toluene	Diminimis	#VALUE!		**#VALUE!**	**####**	3760	**#VALUE!**	**####**	Diminimis	#VALUE!	7520	**#VALUE!**	**#VALUE!**	
232	*	584849	Toluene diisocyanate (2,4-)			1.1E-05			0.008					2			
233	*	26471625	Toluene diisocyanate (2,4-/2,6-)			1.1E-05			0.008					2			
234	*	91087	Toluene diisocyanate (2,6-)			1.1E-05			0.008					2			
235	*	95807	Toluene-2,4-diamine			1.1E-03											
236	*	95534	Toluidine (o-)			5.1E-05											
237	*	8001352	Toxaphene			3.2E-04											
238		76131	Trichloro-1,2,2-trifluoroethane (1,1,2-)						30000								
239	*	120821	Trichlorobenzene (1,2,4-)						2								
240	*	79005	Trichloroethane (1,1,2-)			1.6E-05											
241	*	79016	Trichloroethylene			4.8E-06			2					2			
242		75694	Trichlorofluoromethane						700								
243	*	88062	Trichlorophenol (2,4,6-)			3.1E-06											
244	*	121448	Triethylamine						7					2800			
245	*	1582098	Trifluralin			2.2E-06											
246		526738	Trimethylbenzene (1,2,3-)						60								
247		95636	Trimethylbenzene (1,2,4-)						60								
248		108678	Trimethylbenzene (1,3,5-)						60								
249		25551137	Trimethylbenzene (1,2,3-/1,2,4-/1,3,5-)						60								
250		7440622	Vanadium	Diminimis	#VALUE!		**#VALUE!**	**####**	0.1	**#VALUE!**	**####**	Diminimis	#VALUE!	0.8	**#VALUE!**	**#VALUE!**	
251		1314621	Vanadium pentoxide											30			
252	*	108054	Vinyl acetate						200								
253	*	593602	Vinyl bromide			3.2E-05			3								
254	*	75014	Vinyl chloride			8.8E-06			100					180000			
255	*	75354	Vinylidene chloride						200								
256	*		Xylene (m-,o-,p-, or mixed isomers)						100					22000			

If any calculated long-term or short-term effects for an air toxic result in "Further Evaluation Required" (FER) on this Risk Screening Worksheet, a Refined Risk Assessment is required for that air toxic.

NOTE:

* **Clean Air Act hazardous air pollutant**

** **Clean Air Act hazardous air pollutant, but not listed individually (part of a group)**

a Dioxins may be considered to be all 2,3,7,8-tetrachlorodibenzo(p)dioxin), or separated into congeners (contact AQEv)

b PAH or POM may be considered to be all benzo(a)pyrene, or separated into individual PAHs (contact AQEv)

The results are determined by comparing the long-term and short-term effects to the single-source thresholds, listed below
The threshold value of negligible risk for incremental risk (IR) is 1 in a million (1.0E-06). An IR value less than or equal to 1 in million is considered negligible
The threshold value of negligible risk for long-term hazard quotient (HQ) for non-carcinogenic risk is 1.0. An HQ less than or equal to 1.0 is considered negligible
The threshold value of negligible risk for short-term hazard quotient (HQ_{st}) for non-carcinogenic risk is 1.0. An HQ_{st} less than or equal to 1.0 is considered negligible.

APPENDIX B

MANUFACTURER SPECIFICATIONS - BOILER

VICTORY ENERGY®

victoryenergy.com/watertube-boilers/o-type/

O-TYPE BOILER

VOYAGER® series

FOLLOW A LEADER

Victory Energy manufactures a full line of industrial watertube boilers. Suited for all industrial and institutional applications. We have hundreds of watertube boilers in operation worldwide.

VOYAGER Series O-type watertube boilers provide a rapid ramp rate. They're easy to ship, install, operate and maintain. Engineered and manufactured to be versatile and reliable.

Victory Energy Operations, LLC
10701 E. 126th St. N.
Collinsville, OK 74021

Call: 918.274.0023
Fax: 918.274.0059
Web: victoryenergy.com

VICTORY ENERGY®

victoryenergy.com/watertube-boilers/o-type/

O-TYPE BOILER

VOYAGER® series

FOLLOW A LEADER

EXCELLENCE IN THE MAKING

From the beginning, the goals of Victory Energy have been to be a single-source solutions provider backed by world-class service. Today, we are a leading boiler supplier offering proven energy solutions through advanced technologies and state-of-the-art manufacturing.

No application is too small or too large. We thrive in an atmosphere of innovative thinking and breakthrough methodology. We carry this attitude forward from "Concept to Completion®" as we work closely with our customers, in-house engineering teams, in-house project management teams, fabrication personnel, manufacturing crews, logistics department and field technicians.

In addition to providing rock-solid solutions that are reliable and compliant with the most stringent technical requirements, we are constantly looking for ways to maximize the efficiencies and value of total integration for our customers and end users.

Quality materials and superior construction are essential to producing industrial-duty boiler systems that are, by design, engineered to be the most reliable boilers in the world. Our approach to modularization is designed to maximize shop assembly while minimizing costly field labor and delivery time.

State-of-the-art manufacturing facilities are located just North of Tulsa, Okla.

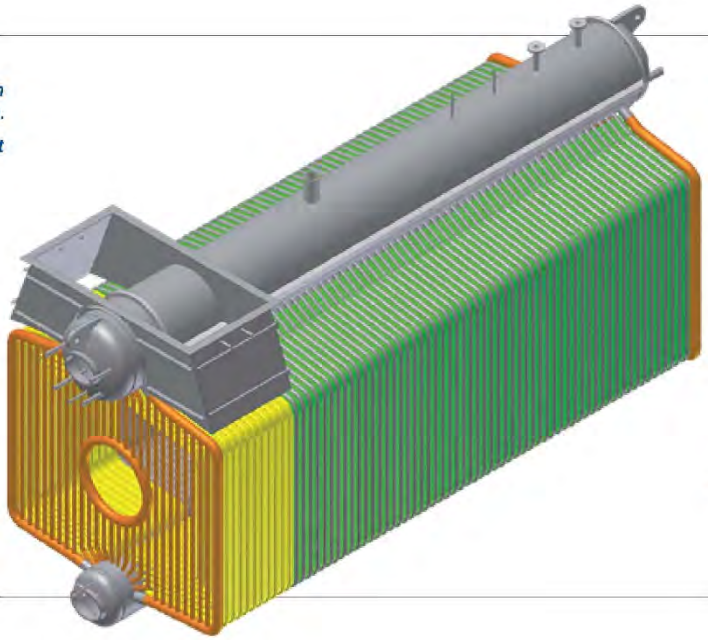
From permanent full-scale installations to temporary mobile systems, Victory Energy offers custom-engineered solutions for all types of applications in all kinds of industries including, Petroleum, Utility/Power, Textiles/Pulp & Paper, Chemical Processing, Process Waste Heat, Institutional, District Heating, Ethanol, Oil Sands/Enhanced Oil Recovery and Thermal Solar projects.

Large drums with proprietary internals and moisture separation provide the highest quality steam.

Total integration ensures efficient interaction of all components.

Easy access is provided through manways at both ends of the drums.

Large, welded water-cooled, gas-tight furnace areas are designed to yield optimum emissions performance, boiler reliability, and longevity with reduced maintenance costs.



Each boiler is custom engineered and modeled with a complete circulation analysis.

High service factors for extreme-duty applications.

Fully welded gas seals are used throughout, eliminating concerns of hot spots.

Fully membrane boiler reduces CO emissions due to bypassing.

Boilers are 100% water cooled and refractory free front and rear walls.

Conservatively designed tube layouts, coupled with large drums, provide flexibility for all operational conditions.

VICTORY ENERGY®

victoryenergy.com/watertube-boilers/o-type/

O-TYPE BOILER

VOYAGER® series

FOLLOW A LEADER

O-TYPE WATERTUBE BOILER

The Victory Energy VOYAGER® O-style Boiler is designed to provide a rapid ramp rate and is easy to ship, install, operate and maintain. These versatile robust boilers have become very popular for applications that are extremely demanding in harsh environments. It's symmetrical configuration is ideally suited for restrictive floor plans, while the gas outlet allows the addition of an enhanced heat recovery system in a vertical configuration to ensure a slim footprint.

Each VOYAGER O-style Boiler is custom engineered with constructability in mind. Steam capacities range from 10,000 PPH up to 500,000 PPH, design pressures from 250 PSIG to 2,000 PSIG with saturated and superheat temperatures up to 1,050 degrees F.

MODEL	MAX CAP	HEIGHT	WIDTH	LENGTH
VS-1	25,000 PPH	13'-7"	8'-9"	14'-0"
VS-2	37,000 PPH	13'7"	9'-8 3/4"	16'-6"
VS-3	55,000 PPH	13'-11 3/4"	10'-5 3/4"	19'-6"
VSM-75	75,000 PPH	14'-0 7/8"	11'-9 3/4"	22'-7"
VS-4	85,000 PPH	14'-7 3/4"	11'-9 1/2"	25'-10"
VS-5	127,000 PPH	15'-1 3/4"	12'-6 1/2"	32'-2"
VS-6	165,000 PPH	16'-1 7/8"	12'-10 1/2"	35'-2"
VS-7	250,000 PPH	17'-4"	12'-11"	42'-6"
VS-8	300,000 PPH	Varies with operational requirements		

Larger sizes are available with barge shipments.
FUELS: NATURAL GAS, BIO GAS, OFF-GASSES OR #2 - #6 OIL

All fired boilers come with low NO_X burners that are state-of-the-art and fuel-efficient.

Gas outlets are insulated with 8-lb. high density wool for improved efficiencies and safety.

Drum heads are assembled with ceramic insulation covered with carbon steel.

VICTORY ENERGY®

victoryenergy.com/watertube-boilers/o-type/

O-TYPE BOILER

VOYAGER® series

ABMA American Boiler Manufacturers Association

Custom-engineered VOYAGER® A-type boiler.

On-site Railway capabilities for over-sized projects.

Superheaters are available with a variety of configuration.

Fully customized control systems, utilizing the latest PLC technology.

Fully integrated TITAN® water level equipment.

VOYAGER® O-type boiler with EXPLORER® economizer installed.

VICTORY ENERGY®

victoryenergy.com/watertube-boilers/o-type/

O-TYPE BOILER

VOYAGER® series

FOLLOW A LEADER

ANCILLARY EQUIPMENT

Victory Energy can provide a complete suite of ancillary equipment to maximize the value of our products.

- ***Duct-work***
- ***Transitions including D-type transitions***
- ***Support steel to elevate units off-grade***
- ***Stack***
- ***Controls***
- ***Dampers***
- ***Expansion joints***

Heat Recovery Products are a vital part of our sustainability initiative and a part of the many ways in which we provide innovative solutions to maximize waste heat recovery.

THE POWER OF ONE EXTRA DEGREE!

Our commitment to the 212 Principle continues to drive our dedication to customer satisfacion.

The 212 Principle

At 211 degrees, water is hot.
At 212 degrees, it boils.
And with boiling water, comes steam.
And with steam, we power the progress of change.

1-877-783-2665

VICTORY ENERGY OPERATIONS, LLC | 10701 E. 126TH ST. N., COLLINSVILLE, OK 74021 | TEL: 918.274.0023 FAX: 918.382.4896

APPENDIX C

MANUFACTURER EMISSIONS FACTORS

VICTORY ENERGY OPERATIONS, LLC. · 10701 E 126th St. North
Collinsville, OK 74021
918.274.0023
Fax: 918.274.0059

Date: April 21, 2022
Reference: Darling Newark, NJ Package Boiler w/ SCR | VEO Job #16286
Subject: Emissions Guarantees

BOILER SYSTEM:

Victory Voyager Series 'O'-style, Model VSM-75 package boiler equipped with Peerless Model 701894-1000 SCR system using direct injection of urea.

BOILER HEAT INPUT RATE:

89.4 MM BTU/HR combusting natural gas

EMISSIONS GUARANTEE:

Victory Energy Operations, LLC guarantees the following emissions out of the stack for natural gas operation:

NOx:	< 0.010 lb/MMBtu
CO:	< 0.037 lb/MMBtu
VOC:	< 0.005 lb/MMBtu
NH4:	<10 ppm @ 3% O2 (0.4 lb/h)

PERFORMANCE GUARANTEE CONDITIONS:

The performance NOx guarantees specified herein will be extended from twenty-five (25) to one hundred (100) percent of boiler load.

We appreciate the opportunity to provide our boiler system. Please don't hesitate to contact the undersigned should you need any additional information.

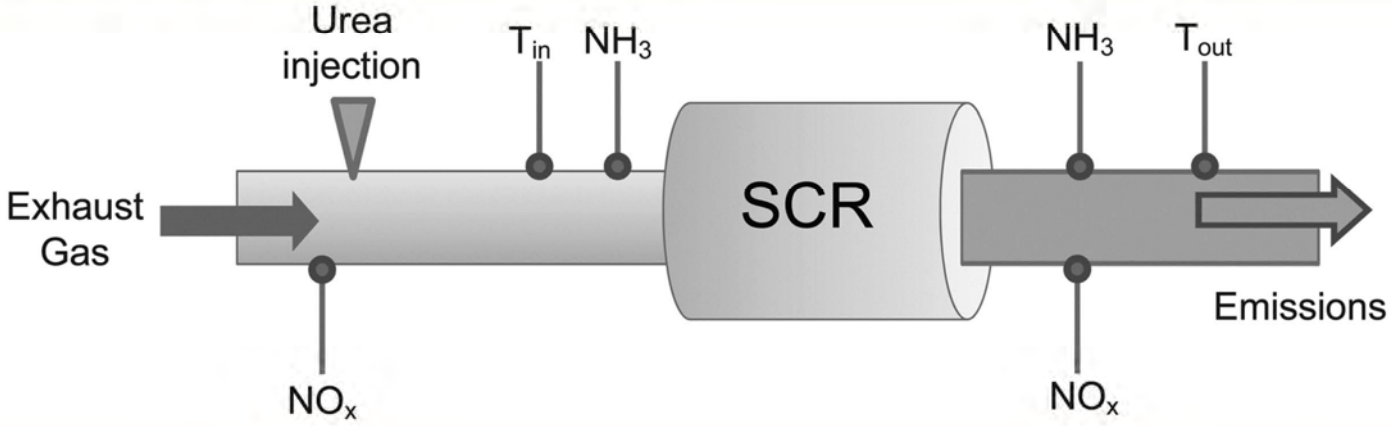
Aaron Anderson
Sr. Application Engineer
10701 East 126th Street North
Collinsville, OK 74021

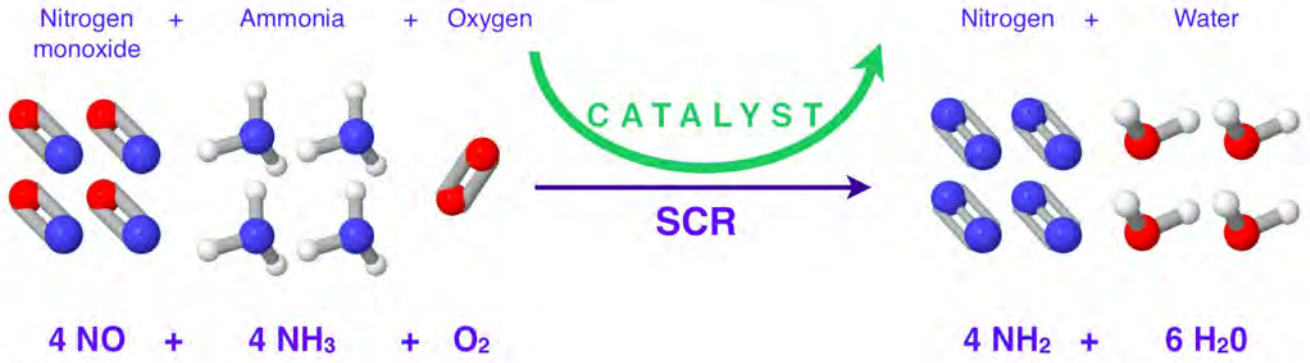
aanderson@victoryenergy.com
Desk: 918-382-4852
Mobile: 918-629-5029
Main: 918-274-0023

APPENDIX D

SCR Process

SCR Process





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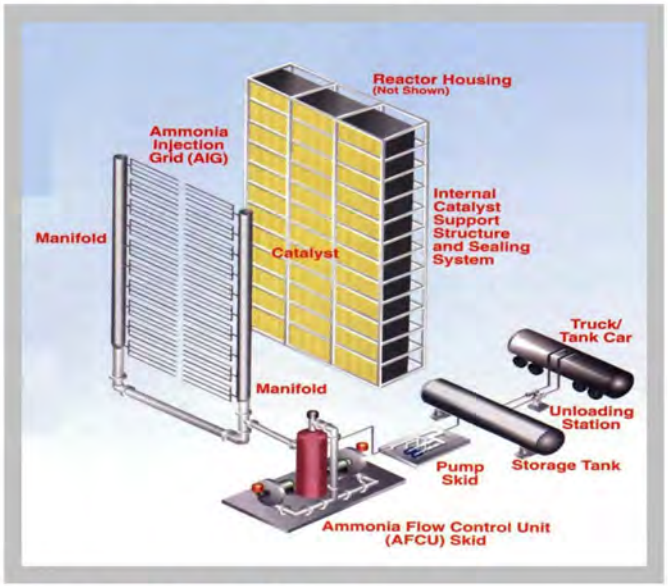
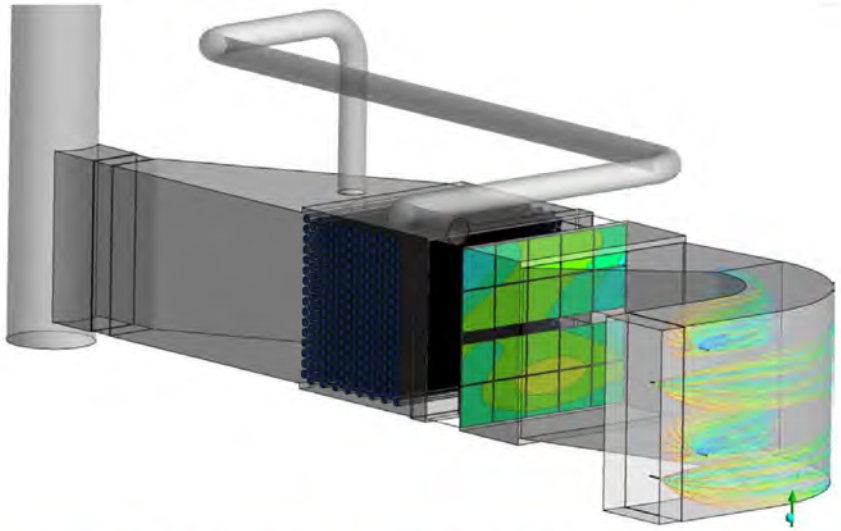
AIG Based SCR System vs. Direct Inject SCR System



- Requires Less Mixing Space
  - Reduces Duct Length from injection point to Catalyst Face
- Allows for complete NH3 mixing, resulting in lowest possible NOx and NH3 Slip emissions



- Injection of Reagent Directly into the Flue Gas Ducting with Specialty Lances
- Lower Capitol and Operating Costs
- Ease of Operation / Installation
- Still capable of achieving >90% NOx Reduction

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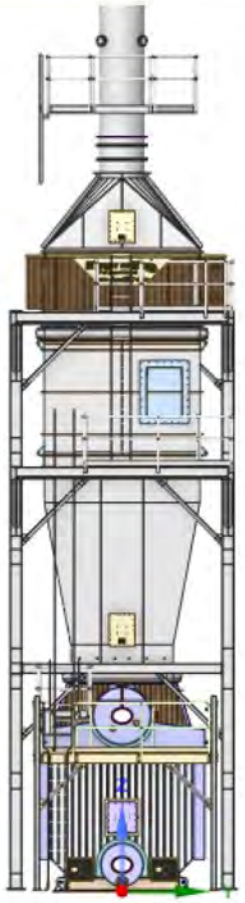
Direct Injection – Operational Benefits

- **Less Equipment**
  - Direct Injection does not require the use of dilution air blowers and electric heaters typically associated with vaporizer systems
    - Reduces capital cost
    - Reduces operation cost
- **Reduces operational maintenance**
  - No maintenance associated with blowers and heaters
- **Ease of operation**
  - Fewer "moving parts" means reduced operation learning curve for site personnel



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Direct Injection for SCR System Components

Reactor Housing

Injection Skid

Urea/Ammonia Injector

Reagent Bulk Tank

Catalyst Module

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SCR Reagent – Urea vs Ammonia

Anhydrous Ammonia

- Concentrated Ammonia (NH_3) with a Purity Level of 99.95%
- Stored as a Liquid Under Pressure
- **Major Safety Concerns**

Aqueous Ammonia

- Mixture of Ammonia with Water
- Stored Under Low Pressure
- Typically 19% to 29% Ammonia by Weight
- **Safety Concerns**

Aqueous Urea

- Mixture of Urea Prills / Powder with Water
- Stored in Atmospheric Tank
- Available in 32%, 40% and 50% solutions
- Less Transportation and Permitting Risk
- **No Safety Concerns**

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SCR Reagent – Urea

Corrosion

- Urea is a corrosive substance
- Store in stainless steel or fiberglass reinforced plastic (FRP) tanks
  - Carbon Steel tanks will corrode
- All piping and tubing should be stainless steel
- Verify seals compatibility
  - Viton and EPDM are standard

Temperature

- Urea will crystallize at low temperatures
  - 32% = 14 deg F; 40% = 35 deg F; 50% = 65 deg F
- Urea tanks must be located in temperature-controlled area or be heated and insulated

Capacity

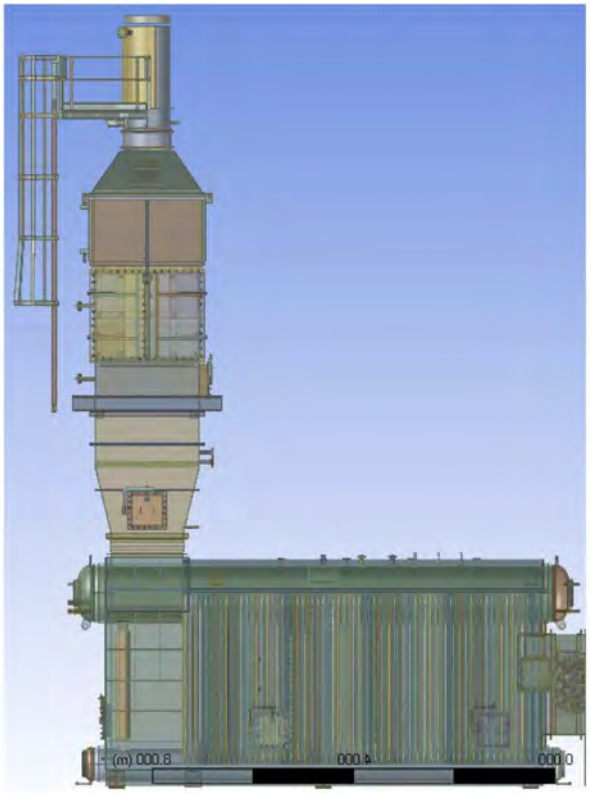
- How many days of storage are required?
- Typical urea truck delivery is 6000 gallons

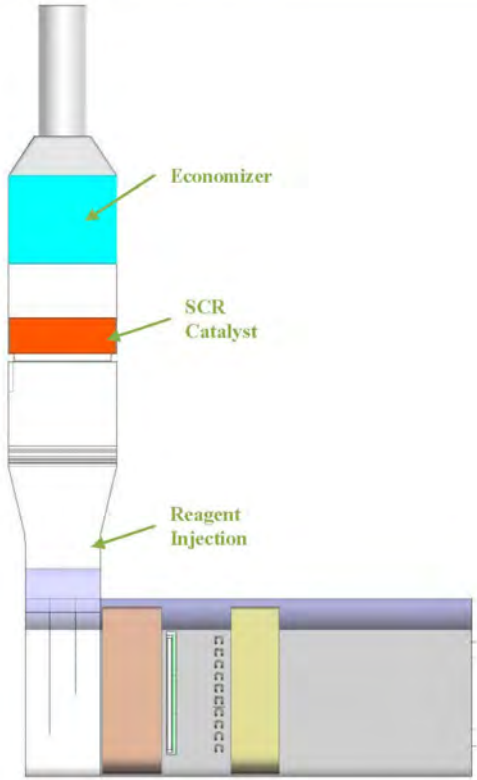
Storage Options

- Double wall FRP tanks available for self containment
  - Eliminates need for containment area
  - Double wall tanks available up to 8,500 gallons
- 250 gallon totes available as low cost / temporary storage
- Larger SS or Plastic tanks could store urea for multiple units
  - Number of units and desired storage times to be considered when choosing storage options

VICTORY ENERGY

75 KPPH Boiler SCR – Vertical Arrangement





VICTORY ENERGY