

NDEE ID: 78323**Name of Source:** Trenton Agri Products LLC**Source Classification:** Minor New Source Review (NSR) Source
Area Source of Hazardous Air Pollutants (HAPs)

Regulatory changes may supersede information in this document. If the source should add or change equipment or change processes such that a NESHAP or NSPS subpart becomes an applicable requirement, it is the source's obligation to comply with that subpart and applicable requirements whether or not they are identified in the associated permitting action or Title 129. Also note that the NESHAP and NSPS subparts are subject to change. Detailed information related to NESHAP and NSPS subparts can be found on the NDWEE Air Toxics Notebook and NDWEE NSPS Notebook located on the NDWEE website (<http://dwee.nebraska.gov/>). The NDWEE website can also be used to find other permit related and facility specific information that is not identified in this fact sheet.

DESCRIPTION OF THE SOURCE OR ACTIVITY:

Trenton Agri Products LLC (TAP) is an existing anhydrous ethanol manufacturing plant (Standard Industrial Classification (SIC) code 2869: Industrial Organic Chemicals, Not Elsewhere Classified; North American Industrial Classification System (NAICS) code 325193: Ethyl Alcohol Manufacturing). The facility uses a dry-mill method with biomass (grain, mainly corn and milo) as the feedstock. The production rate is approximately 70 million gallons per year (MMgal/yr) of anhydrous ethanol, with final products of 73.5 MMgal/yr of denatured ethanol. This facility also produces distillers wet grains plus solubles (DWGS), distillers dried grains with solubles (DDGS), and corn distillers oil (CDO).

PERMIT HISTORY:

Date Issued	Number	Status
12/13/2002	CP02-0047	Not active; superseded by CP06-0039
04/25/2006	CP05-0027	Not active; superseded by CP06-0039
05/8/2008	CP08-018f	Not active; superseded by CP06-0039
02/26/2009	CP06-0039	Not active; Conditions III.(A), (B), (C), (D) superseded by CP10-045, Condition III.(J) removed by CP10-045, Condition III.(E) superseded by CP14-046, Conditions I, II and III.(F), (G), (H), (I), (K) superseded by CP17-051
02/24/2012	CP10-045	Not active; Condition III.(C) superseded by CP12-013, Condition III.(B) superseded by CP16-019. Conditions III.(A) and (D) superseded by CP17-051
08/3/2012	CP12-013	Not active; superseded by CP17-051
02/10/2015	CP14-046	Not active; superseded by CP17-051
10/11/2016	CP16-019	Not active; superseded by CP17-051
11/20/2017	CP17-051	Not active, superseded by CP19-016
11/26/2019	CP19-016	Not active; superseded by CP19-056
01/22/2020	CP19-056	Partially Active; Conditions I., II., and III.(B) superseded by CP23-034, Conditions III.(A), III.(C), III.(D), and III.(I) superseded by CP26-020
02/28/2024	CP23-034	Active
tbd	CP26-020	Active

PERMIT ACTION:

On June 18, 2026, the NDWEE received an air construction permit application (#26-020) from TAP for a significant permit revision (SPR) to permit CP19-056. In the application, TAP requested to increase grain throughput to 700,084 ton/yr, undenatured ethanol production to 70.0 MMgal/yr and denatured ethanol loadout to 73.5 MMgal/yr. TAP provided an estimated DDGS production of 7.36 ton/hr and an estimated WDGS production of 490,000 ton/yr. TAP specified that the capacities of the fermentation equipment (C40), the Thermal Oxidizer (C10), and the Cooling Cyclone (P70) are sufficient to handle the increased throughput. In 2024, a fifth fermenter was added to the facility, increasing the capacity for fermentation equipment (C40). TAP specified that this increase is sufficient to handle the increased throughput. The Thermal Oxidizer (C10) has a rated gas flow capacity of 125 MMBtu/hr. TAP estimates that the input flow rate for the Thermal Oxidizer (C10) with the increased throughput is 70.4 MMBtu/hr.

TAP also requested the installation of a new third hammermill (Hammermill #3) controlled by the Hammermill Baghouse (C30), increasing the milling capacity to 2,900 bu/hr for the milling equipment. Another revision includes upgrading the Hammermill Baghouse (C30) to have an air flow capacity of 17,000 cfm. The baghouse will be using filters with a grain loading rate of 0.002 gr/dscf. TAP also requested the installation of a fourth cooling tower cell to the Cooling Tower (S80), increasing the maximum circulation rate for the Cooling Tower (S80) to 1,257,000 gal/hr. TAP also requested the removal of BTS-6 from the Base Tricanter system.

On August 7, 2026, the NDWEE received an addendum to air construction permit application (#26-020) from TAP. In the addendum, TAP requested to change the PM/PM₁₀ emission limit for the Hammermill Baghouse (C30) from 0.51 lb/hr to 0.29 lb/hr, based on the upgraded baghouse at 17,000 cfm and 0.002 gr/dscf. TAP also requested to change the VOC limit for the Cooling Cyclone (P70) from 2.78 lb/hr to 0.97 lb/hr, based on a November 2024 stack test.

TYPE AND QUANTITY OF AIR CONTAMINANT EMISSIONS ANTICIPATED:

The change in emissions for this project, including fugitives, is shown in the potential-to-emit (PTE) table below:

Regulated Pollutant	Previous PTE ^[1] (ton/yr)	Current PTE (ton/yr)	Change in PTE (ton/yr)
Particulate Matter (PM)	69.58	74.36	4.77
PM smaller than or equal to 10 microns (PM ₁₀)	49.50	49.81	0.31
PM smaller than or equal to 2.5 microns (PM _{2.5})	44.58	43.97	-0.61
Sulfur Dioxide (SO ₂)	11.59	14.76	3.17
Oxides of Nitrogen (NO _x)	86.65	86.65	-
Carbon Monoxide (CO)	72.34	72.34	-
Volatile Organic Compounds (VOC)	94.04	94.59	0.55
Hazardous Air Pollutants (HAPs):			
Largest Individual HAP: Acetaldehyde	9.97	9.97	-1.95*10 ⁻⁴
Total HAPs	15.58	16.37	0.79

^[1]Previous PTE obtained from CP23-034, issued February 28, 2024.

SUPPLEMENTAL INFORMATION:

Title 129, Chapter 2 – Ambient Air Quality Standards

The change in potential emissions from this permitting action are below the threshold for which modeling is required as summarized below; therefore, the NDWEE is not requiring ambient air quality dispersion modeling to support this permitting action. The NDWEE generally follows these thresholds.

Pollutant	Project Potential Emissions Change (ton/year)	Emission Change Threshold (ton/year)
CO	-	100
NO ₂	-	40
SO ₂	3.17	40
PM ₁₀	-0.83	15
PM _{2.5}	-0.89	10

Title 129, Chapter 12 - New Source Performance Standards (NSPS)

The NDWEE has not identified any NSPS subparts applicable to this project. For a complete discussion of NSPS subparts applicable to TAP, please refer to the fact sheet discussions accompanying construction permits previously issued to TAP.

TAP must comply with all applicable NSPS requirements regardless of their inclusion in this permitting action or Title 129. These rules are subject to change. Additional and updated information on all NSPS is available on the NDWEE NSPS Notebook, which can be located by visiting the NDWEE website at <https://dwec.nebraska.gov/>, by first selecting “Menu” at the top of the page, then the “Air” dropdown menu tab, then the “NSPS Program” dropdown menu tab, and then “NSPS Notebook”.

Title 129, Chapter 13 - National Emission Standards for Hazardous Air Pollutants (NESHAP)

The NDWEE has not identified any NESHAP subparts applicable to this project. For a complete discussion of NESHAP applicability, please refer to the fact sheet discussions accompanying construction permits previously issued to TAP.

TAP must comply with all applicable NESHAP requirements regardless of their inclusion in this permitting action or Title 129. These rules are subject to change. Information regarding NESHAP is available on the NDWEE Air Toxics Notebook, which can be located by visiting the NDWEE website <https://dwec.nebraska.gov/>, by first selecting “Menu” at the top of the page, then the “Air” dropdown menu tab, then the “Air Toxics Program” dropdown menu tab, and then “Air Toxics Notebook”.

Title 129, Chapter 15, Section 001 - Particulate Emissions; Limitations and Standards

Process Weight Rate (Section 001.01)

Title 129, Chapter 15, Section 001.01, limits PM (filterable) emissions to the amounts shown in Table 15-1 during any one hour. These process weight rate limits, which are based on throughput of the emission units, vary as throughputs change. Since the potential to emit for each emission point is less than the process weight rate limitations, these PM limitations were not included in Condition III of this permit.

Particulate Emissions from Combustion Sources (Section 001.02)

All of the PM emission points subject to the Chapter 15, Section 001.02 limitations are in compliance with those limitations, as the PTE for each emission point is less than the limitations. Therefore, these PM limitations were not included in any Specific Condition of this permit.

Opacity Limitations from Emission Units (Section 001.04)

Specific Condition I.(J) specifies that no person shall cause or allow emissions, from any source, which has an opacity equal to or greater than twenty percent (20%). Opacity must be determined using an EPA-approved method or recorded by a continuous opacity monitoring system which has been operated and maintained pursuant to 40 CFR Part 60 Appendix B except as provided for in Chapter 15, Sections 001.05 and 001.06 (Title 129, Chapter 15, Section 001.04). Therefore, while not specifically stated in Condition III., this requirement is still applicable to all emission units at the source.

REVISED SPECIFIC PERMIT CONDITIONS:

Below is a mark-up that identifies all of the revisions to the original conditions. Additions are **bolded and underlined**, deletions are in ~~strike through~~, and NDWEE comments are in *italics*.

References to the “Nebraska Department of Environmental Quality” or “Nebraska Department of Environment and Energy” have been revised to “Nebraska Department of Water, Energy, and Environment” and references to “NDEQ” or “NDEE” have been revised to “NDWEE” to reflect the agency name change, effective July 01, 2025.

Nebraska Administrative Code - Title 129 was amended on June 28, 2026. As part of this permitting action, the NDWEE is updating “I. Standard Conditions” and “II. General Construction Permit Conditions” to reflect updated Title 129 Chapter citations. Additionally, as part of this permitting action, the NDWEE is also updating all citations in the applicable Specific Conditions to reflect updated Title 129 Chapter citations. Previously issued construction permits with active conditions are still subject to the Title 129 requirements as effective at the time of permit issuance.

III. SPECIFIC CONDITIONS FOR AFFECTED EMISSION UNITS

(A) Specific Conditions for Grain Receiving, Handling, Storage, and Hammermilling

- (1) Permitted Emission Points: The source is permitted to construct the emission points and associated emission units identified in the following table:

Emission Point ID#	Required Control Equipment ID# and Description	Emission Unit Description
C20	C20: Grain Handling Baghouse #1	Grain Receiving Station (Truck) – 15,000 bushels/hr
		One 119,000-bushel capacity Storage Bin (Bin #1)
		One 119,000-bushel capacity Storage Bin (Bin #2)
		Grain Elevators #1 & #2
		Associated conveyors and transfer points
C30	C30: Hammermill Baghouse	One 5,000-bushel capacity Grain Day Bin
		Hammermill #1
		Hammermill #2
		<u>Hammermill #3</u>
C25	C25: Grain Handling Baghouse #2	Associated conveyors and transfer points
		Grain Receiving Station (Truck) – 15,000 bushels/hr
		One 368,926-bushel capacity Grain Silo
		Associated conveyors and transfer points

- (2) Emission Limitations and Testing Requirements:

Pollutant emission rates from each emission point identified in the table below shall not exceed the permitted limits. Performance testing, if required, shall be conducted in accordance with Condition I.(M) and Condition II.(G).

Emission Point ID#	Pollutant	Permitted Limit	Averaging Period	Basis for Permit Limit	Performance Testing Required (Yes/No)
C20	PM/PM ₁₀ ^{[1] [2]}	0.87 lb/hr	Three 1-hr test runs or test method average	Chapter ~~17-3~~	No
C30	PM/PM ₁₀ ^{[1] [2]}	~~0.51~~ 0.29 lb/hr	Three 1-hr test runs or test method average	Chapter ~~17-3~~	~~No~~ Yes
C25	PM ^[1]	0.69 lb/hr	Three 1-hr test runs or test method average	Chapter ~~17-3~~	~~Yes~~ No ^[3]
	PM ₁₀ ^[2]	0.69 lb/hr			
	PM _{2.5} ^[2]	0.69 lb/hr			

^[1] PM is filterable only

^[2] PM₁₀ includes both filterable and condensable

^[3] **Initial performance testing was completed on July 28, 2020.**

(3) Operational and Monitoring Requirements and Limitations

- (a) The C20 baghouse dust collector shall be operated whenever the grain is received, elevated, conveyed into and out of the grain storage bins, moved by associated conveyors and transfer points. The grain unloading areas shall have a canopy or other collection device to capture particulate matter emissions. The C30 baghouse dust collector shall be operated whenever the grain is processed through the hammermills, and transported by associated conveyors and transfer points to the mixer (P50). (Chapters ~~4-2~~, ~~17-3~~, and ~~20-15~~)
- (b) The C25 baghouse dust collector shall be operated whenever the grain is received, elevated, conveyed into and out of the Grain Silo, moved by associated conveyors and transfer points. (Chapter ~~17-3~~)
- (c) Operation and maintenance of each baghouse (C20, C25, and C30) shall be in accordance with the following requirements: (Chapters ~~17-3~~ and ~~20-15~~)
 - (i) The baghouse shall be operated and be controlling emissions at all times when the associated emission units are in operation.
 - (ii) The baghouse shall be equipped with an operational pressure differential indicator. Pressure differential indicator readings shall be recorded at least once each day that the associated baghouse is operating.
 - (iii) Baghouse filter bags are to be inspected and/or replaced as often as necessary to ensure proper operation or more frequently as indicated by pressure differential indicator readings or other indication of bag failure.
 - (iv) Observations at least once each day during daylight hours of baghouse operation shall be conducted to determine whether there are visible emissions from the stack, leaks, noise, or other indications that corrective action is needed. If corrective action is required, it shall occur immediately.
 - (v) The owner or operator shall maintain an on-site inventory of spare bags of each type used to ensure rapid replacement in the event of bag failure.
- (d) Grain receiving shall not exceed ~~570,000~~ **700,084** tons in any period of twelve (12) consecutive calendar months. (Chapter ~~17-3~~)

(4) Applicable NSPS, NESHAP, and MACT Requirements:

The NDWEE has not identified any NSPS, NESHAP, or MACT requirements that apply to the emission points or emission units listed in Condition III.(A)(1).

(5) Reporting and Recordkeeping Requirements:

The source shall maintain the following:

- (a) Records documenting the date, time, and pressure differential reading for each day the associated baghouse is in operation.
- (b) Filter replacement records including the date the filter replacement occurred and the type of filter installed.
- (c) Records documenting the date, time, observations, and corrective actions taken for each day the associated baghouse is in operation.
- (d) The tons of grain received for each period of twelve (12) consecutive calendar months to demonstrate compliance with Condition III.(A)(3)(d).

III.(A)(1): Added Hammermill #3 to the list of emission units controlled by C30: Hammermill Baghouse.

III.(A)(2): Updated PM/PM10 emission limit for C30: Hammermill Baghouse, based on the increased flow rate capacity of 17,000 cfm and the new grain loading rate of 0.002 gr/dscf. Added testing requirements for C30: Hammermill Baghouse, based on the updated emission limit. Removed testing requirements for C25: Grain Handling Baghouse #2, because initial performance testing was completed on July 28, 2020.

III.(A)(3): Increased throughput limit for grain receiving from 570,000 tons to 700,084 tons in any period of twelve (12) consecutive calendar months.

(C) **Specific Conditions for Thermal Oxidizer Stack**

- (1) Permitted Emission Points: The source is permitted to construct the emission points and associated emission units identified in the following table at the capacities and using the fuel types listed:

Emission Point ID#	Required Control Equipment ID# and Description	Emission Unit (EU) / EP ID# and Description	Maximum Capacity	Permitted Fuel Type
S10	C10: Thermal Oxidizer	Pre-Fermentation Equipment: (Mixer, Slurry Tank, Receiver Tank, 2 Liquid Tanks, and 1 Yeast Tank)	-	-
		Distillation Equipment: (Beer Column, Side Stripper, Rectifier Column, Molecular Sieve, and 3 Condensers)	-	-
		P10: One DDGS Dryer	30.0 MMBtu/hr	Natural Gas
		All Centrifuges & Evaporators	-	-
		C10: Thermal oxidizer with a waste heat recovery boiler	99.0 MMBtu/hr	Natural Gas

- (2) Emission Limitations and Testing Requirements:

- (a) Pollutant emission rates from each emission point identified in the table below shall not exceed the permitted limits. Performance testing, if required, shall be conducted in accordance with Condition I.(M) and Condition II.(G).

Emission Point ID#	Pollutant	Permitted Limits	Averaging Period	Basis for Permit Limit	Performance Testing Required (Yes/No)
S10	PM/PM ₁₀ ^[1]	5.0 lb/hr	Three 1-hr test runs or test method average	Chapter 17	~~No~~ <u>Yes</u>
	CO	9.10 lb/hr	Three 1-hr test runs or test method average	Chapter 17	~~No~~ <u>Yes</u>
	VOC	1.82 lb/hr ^[2]	Three 1-hr test runs or test method average	Chapter 17	~~No~~ <u>Yes</u>
	HAP	-	Speciation and Quantification of HAP composition at outlet	Chapter 27	~~No~~ <u>Yes</u>
	Acetaldehyde	0.37 lb/hr ^[3]	Three 1-hr test runs or test method average	Chapter 17	Yes ^[4]

^[1] PM₁₀ includes both filterable and condensable

^[2] Expressed as weight of VOC

^[3] S10 and P70 have a combined acetaldehyde limitation of 0.37 lb/hr as prescribed in Condition IV.

^[4] Performance testing of the TO/HRSGs (EP-S10) and DDGS Cooler (EP-P70) shall be conducted every three (3) years, unless otherwise specified in the operating permit, and the testing must be conducted concurrently and in accordance with Conditions I.(M), III.(C)(2)(b) and III.(D)(2)(b).

- (b) A performance test must be conducted every three (3) years, unless otherwise specified in the operating permit, in order to demonstrate compliance with the emissions limitations listed in Condition III.(C)(2)(a): (Chapter 34 **15**)

- (i) Performance testing on S10 for Acetaldehyde required by this condition shall be conducted concurrently with Acetaldehyde testing required for emission point, P70. (Chapter ~~34~~ **15**).
- (c) In order to demonstrate compliance with Condition III.(C)(2)(a) and to verify the assumptions used in the permit application, the source shall conduct performance tests for VOC and HAP on S10 under two scenarios: (Chapters ~~17~~ **3** and ~~34~~ **15**)
 - (i) S10 operating with the DDGS Dryer (P10) off, and
 - (ii) S10 operating with the DDGS Dryer (P10) on
- (3) Operational and Monitoring Requirements and Limitations:
 - (a) Emission from the pre-fermentation equipment, distillation equipment, DDGS dryer, centrifuges, and evaporators are controlled by the thermal oxidizer (identified as C10). (Chapters ~~17~~ **3** and ~~27~~ **13**)
 - (b) Operation of the thermal oxidizer with a waste heat recovery boiler shall be in accordance with the following requirements (Chapters ~~17~~ **3** and ~~27~~ **13**):
 - (i) The thermal oxidation system shall control emissions at all times when the associated emission units are in operation.
 - (ii) The thermal oxidizer shall be equipped with a thermocouple or equivalent device capable of continuously monitoring the temperature inside the thermal oxidizer. The thermocouple shall be calibrated in accordance with manufacturer's instructions.
 - (iii) Routine observations (at least once each day when the thermal oxidizer is in operation) shall be conducted to determine whether there are visible emissions from the stack, atypical operating parameters, leaks or noise, or other indications, which may necessitate corrective action. Corrective action shall be taken immediately if necessary.
 - (iv) The one-hour average operating temperature of the thermal oxidation system shall be maintained at a minimum temperature of 1,400°F. Upon approval by the Director, the 1,400°F limitation may be replaced with an alternate minimum operating temperature limitation based on results of the most recent performance test that still demonstrate compliance with Condition III.(C)(2)(a).

(4) Applicable NSPS, NESHAP, and MACT Requirements:

The following standards apply to Thermal Oxidizer with Waste Heat Recovery Boiler (C10):

Applicable Standard	Title	Rule Citation
NSPS, Subpart A	General Provisions	Chapter ~~18~~ 12 , Sec. <u>001.01</u> 40 CFR 60.1
NSPS, Subpart Dc	Small Industrial, Commercial, Institutional Steam Generation Units	Chapter ~~18~~ 12 , Sec. <u>001.52</u> 40 CFR 60.40c

(5) Reporting and Recordkeeping Requirements:

The source shall maintain the following:

- (a) Records documenting when routine observations were performed with a description including thermocouple readings and any atypical observations.

- (b) Records documenting when routine maintenance and preventive actions were performed with a description of the maintenance and/or preventive action performed.
 - (c) Records documenting equipment failures, malfunctions, or other variations, including time of occurrence, remedial action taken, and when corrections were made.
 - (d) Notifications and recordkeeping as required by 40 CFR 60.7.
 - (e) Reporting and recordkeeping as required by 40 CFR 60.48c.
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III.(C): Added testing requirements for the Thermal Oxidizer Stack (S10), based on the increase in DDGS production from 5.75 ton/hr to 7.36 ton/hr.

(D) Specific Conditions for DDGS Cooling Cyclone

- (1) Permitted Emission Points: The source is permitted to construct the emission points and associated emission units identified in the following table:

Emission Point ID#	Required Control Equipment ID# and Description	Emission Unit (EU) / EP ID# and Description
P70	P70: Cooling Cyclone	DDGS Cooler
		DDGS Storage
		DDGS Loadout

- (2) Emission Limitations and Testing Requirements:

- (a) Pollutant emission rates from each emission point identified in the table below shall not exceed the permitted limits. Performance testing, if required, shall be conducted in accordance with Condition I.(M) and Condition II.(G).

Emission Point ID#	Pollutant	Permitted Limits	Averaging Period	Basis for Permit Limit	Performance Testing Required (Yes/No)
P70	PM/PM ₁₀ ^[1]	1.03 lb/hr	Three 1-hr test runs or test method average	Chapter ~~47~~ <u>3</u>	~~No~~ <u>Yes</u>
	VOC	~~2.78~~ <u>0.97</u> lb/hr ^[2]	Three 1-hr test runs or test method average	Chapter ~~47~~ <u>3</u>	~~No~~ <u>Yes</u>
	HAP	-	Speciation and Quantification of HAP composition at outlet	Chapter ~~27~~ <u>13</u>	~~No~~ <u>Yes</u>
	Acetaldehyde	0.37 lb/hr ^[3]	Three 1-hr test runs or test method average	Chapter ~~47~~ <u>3</u>	Yes ^[4]

^[1] PM₁₀ includes both filterable and condensable

^[2] Expressed as weight of VOC

^[3] P70 and S10 have a combined acetaldehyde limitation of 0.37 lb/hr as prescribed in Condition IV.

^[4] Performance testing of the TO/HRSGs (EP-S10) and DDGS Cooler (EP-P70) shall be conducted every three (3) years, unless otherwise specified in the operating permit, and the testing must be conducted concurrently and in accordance with Conditions I.(M), III.(C)(2)(b) and III.(D)(2)(b).

- (b) A performance test must be conducted every three (3) years, unless otherwise specified in the operating permit, in order to demonstrate compliance with the emissions limitations listed in Condition III.(D)(2)(a): (Chapter ~~34~~15)
- (i) Performance testing on P70 for Acetaldehyde required by this condition shall be conducted concurrently with Acetaldehyde testing required for emission point, S10. (Chapter ~~34~~15).

- (3) Operational and Monitoring Requirements and Limitations:

- (a) Emissions from the DDGS loadout shall be controlled by the DDGS Cooling Cyclone (P70). (Chapters ~~47~~3 and ~~27~~13)
- (b) Operation of the cyclone shall be in accordance with the following requirements (Chapter ~~47~~3)
- (i) The cyclone shall be operated and be controlling emissions at all times when DDGS is being produced or loaded out.

- (ii) Routine observations (at least once each day when any of the cyclone dust collectors are in operation) shall be conducted to determine whether there are visible emissions from the stack, leaks or noise, atypical operating parameter, or other indications, which may necessitate corrective action. Corrective action shall be taken immediately if necessary.
 - (iii) Collected waste material from the cyclone shall be handled, transported, and stored in a manner that ensures compliance with General Condition I.(L).
- (4) Applicable NSPS, NESHAP, and MACT Requirements:

The NDWEE has not identified any NSPS, NESHAP, or MACT requirements that apply to the emission points or emission units listed in Condition III.(D)(1).
- (5) Reporting and Recordkeeping Requirements:

The source shall maintain the following:

 - (a) Records documenting when routine observations were performed with a description including readings of operating parameters and any atypical observations.
 - (b) Records documenting when routine maintenance and preventive actions were performed with a description of the maintenance and/or preventive action performed.
 - (c) Records documenting equipment failures, malfunctions, or other variations, including time of occurrence, remedial action taken, and when corrections were made.

III.(D): Updated VOC emission limit for P70: Cooling Cyclone, based on a November 2024 stack test. Added testing requirements for the Thermal Oxidizer Stack (S10), based on the increase in DDGS production from 5.75 ton/hr to 7.36 ton/hr.

(I) **Specific Conditions for Cooling Tower**

- (1) Permitted Emission Points: The source is permitted to construct the emission points and associated emission units identified in the following table with the number of cooling tower cells and at the circulation rate listed:

Emission Unit Description	Maximum Circulation Rate (gal/hr)
Cooling Tower	~~1,200,000~~ <u>1,257,600</u>

- (2) Emission Limitations and Testing Requirements:

The cooling tower identified above is not subject to any emissions limitations. Testing shall be conducted to ensure compliance with the TDS limitation established and is discussed below.

- (3) Operational and Monitoring Requirements and Limitations:

- (a) Drift loss from each cooling tower shall be limited to 0.005 percent. Verification of drift loss shall be by manufacturer's guarantee. Manufacturer's drift loss guarantee shall be kept on site and readily available to NDWEE representatives, upon request, for the life of the unit. (Chapter ~~17~~**3**)
- (b) TDS concentration of the cooling water in each cooling tower shall not exceed 2,500 ppm and shall not exceed an average of 2,000 ppm. A representative TDS sample shall be collected and tested from each cooling tower a minimum of once per calendar month. The test method used to determine TDS concentration shall be in accordance with an EPA approved method and be documented. (Chapter ~~17~~**3**)

- (4) Applicable NSPS, NESHAP, and MACT Requirements:

The NDWEE has not identified any NSPS, NESHAP, or MACT requirements that apply to the emission points or emission units listed in Condition III.(I)(1).

- (5) Reporting and Recordkeeping Requirements:

- (a) The rate of cooling water circulated in the cooling tower for each calendar month and for each period of twelve (12) consecutive calendar months. (Condition III.(I)(1))
- (b) Total dissolved solids (TDS) concentration in cooling water for each sampling event month and for each period of twelve (12) consecutive calendar months. (Condition III.(I)(3)(b))

III.(I): Updated maximum circulation rate for the Cooling Tower from 1,200,000 gal/hr to 1,257,600 gal/hr, based on the installation of a fourth cooling tower cell.

No other terms or conditions of CP19-056 are being revised as part of this permitting action.

Fact Sheet Attachment

Source-Wide Potential to Emit

Production Basis:

Denatured Ethanol: 73,500,000 gallons per year^[1]

Annual Throughput of grain: 700,084 tons per year^[1]

^[1] Throughput values obtained from the application for CP26-020.

Process Description	Pollutant (ton/yr)								
	PM	PM ₁₀	PM _{2.5}	SO _x	NO _x	CO	VOC	Acetaldehyde ^[1]	Total HAPs
Grain Handling/Milling Baghouses	8.11	8.11	8.11	-	-	-	-	-	-
Fugitives from Grain Handling	1.63	0.49	0.08	-	-	-	-	-	-
Fermentation Scrubber	3.94	3.94	3.94	-	-	-	30.66	8.31	8.51
TO/HRSG and DDGS Dryer	21.90	21.90	21.90	14.51	56.50	39.86	7.97	1.62	3.40
DDGS Cooling	4.51	4.51	4.51	-	-	-	4.24		0.60
Fugitives from DDGS Storage-Loadout	0.11	0.03	0.03	-	-	-	-	-	-
Storage Tanks	-	-	-	-	-	-	2.68	2.82E-04	0.27
Liquid Loadout	1.80E-03	1.80E-03	1.80E-03	1.42E-04	2.20	9.93	33.75	3.49E-03	3.04
Equipment Leaks	-	-	-	-	-	-	8.98	1.80E-03	5.39E-03
Fugitives from Haul Roads	27.45	5.49	1.35	-	-	-	-	-	-
Cooling Tower	4.59	3.22	1.93	-	-	-	-	-	-
Emergency Engine	0.10	0.10	0.10	0.10	1.47	0.32	0.12	2.55E-04	1.29E-03
Process Vents	-	-	-	-	-	-	3.26	0.03	0.04
WDGS Storage and Loadout ^[2]	-	-	-	-	-	-	-	-	-
Auxiliary Boiler	2.01	2.01	2.01	0.16	26.47	22.24	1.46	-	0.50
Base Tricanter System	-	-	-	-	-	-	1.48	-	-
Total	74.36	49.81	43.97	14.76	86.65	72.34	94.59	9.97	16.37
Total (Excluding Fugitives)^[4]	45.17	43.80	42.51	14.76	86.65	72.34	94.59	9.97	16.37
Previous Total ^[3]	69.58	49.50	44.58	11.59	86.65	72.34	94.04	9.97	15.58
Previous Total^[3] (Excluding Fugitives)^[4]	45.94	44.63	43.40	11.59	86.65	72.34	94.04	9.97	15.58
Change in Emissions	4.77	0.31	-0.61	3.17	-	-	0.55	-1.95E-04	0.79
Change in Emissions (Excluding Fugitives)	-0.77	-0.83	-0.89	3.17	-	-	0.55	-1.95E-04	0.79

^[1] Highest Individual HAP. Acetaldehyde and Total HAP's have a 10 ton/yr and 25 ton/yr emission limit, respectively.

^[2] The worst-case between production of DDGS (TO/HRSG stack + DDGS Cooling/Storage/Loadout) versus WDGS (WDGS Storage/Loadout) is DDGS. Therefore, the PTE for WDGS Storage & Loadout is not included in the table above.

^[3] Previous PTE totals obtained from CP23-034, issued February 28, 2024.

^[4] HAP fugitives cannot be excluded from applicability determinations.

Fact Sheet Attachment

Grain Handling and Hammermilling: C20, C30, and C25

Density		56	lb/bu grain
Design rate	Grain Receiving Equipment	15,000	bu/hr
		840,000	lb/hr
		420	ton/hr
	Milling Equipment	2,900	bu/hr
		162,400	lb/hr
		81.2	ton/hr
Annual Grain Throughput		700,084	ton/yr

Grain Receiving and Milling Baghouse Emission Estimates						
Equipment description	EP ID#	Grain Loading gr/dscf ^[1]	Air Flow dscf/min ^[1]	Operating Hours hr/yr	Potential Emissions ^[2]	
					lb/hr	ton/yr
Grain receiving baghouse	C20	0.007	14,500	8,760	0.87	3.81
Hammermill baghouse	C30	0.002	17,000	8,760	0.29	1.28
Grain receiving baghouse 2	C25	0.007	11,500	8,760	0.69	3.02

^[1] The grain loading and air flow rates are from the OP application and manufacturer specs for C25 and C30.

^[2] Hourly PTE = $(\frac{gr}{dscf}) * (\frac{lb}{7,000 \text{ grains}}) * (dscf/min) * (60 \text{ min/hr})$

Annual PTE = $(\frac{gr}{dscf}) * (\frac{lb}{7,000 \text{ grains}}) * (dscf/min) * (60 \text{ min/hr}) * (8,760 \text{ hr/yr}) \div (2,000 \text{ lb/ton})$

Fugitive Emissions from Grain Receiving										
Emission Point	Emission Point Description	Throughput		Pollutant ^[2]	Emission Factor ^[3] lb/ton	Uncontrolled Emissions		Control Efficiency ^[4] %	Potential Emissions	
		ton/hr	ton/yr			lb/hr	ton/yr		lb/hr	ton/yr
C20FUG / C25FUG	Hopper Trucks ^[1]	252	420,050	PM (filterable)	0.035	8.820	7.351	95	0.44	0.37
				PM ₁₀	0.0078	1.966	1.638	95	0.10	0.08
				PM _{2.5}	0.0013	0.328	0.273	95	0.02	1.37E-02
	Straight Trucks ^[1]	168	280,034	PM (filterable)	0.18	30.240	25.203	95	1.51	1.26
				PM ₁₀	0.059	9.912	8.261	95	0.50	0.41
				PM _{2.5}	0.01	1.680	1.400	95	0.08	7.00E-02

^[1] Hopper trucks comprise of 60% of trucks received while straight trucks comprise the remaining 40% of trucks received.

^[2] Fugitive PM/PM₁₀/PM_{2.5} account for the portion of emissions not captured in the respective grain receiving baghouse (C20 or C25). Fugitive PM/PM₁₀/PM_{2.5} from grain receiving are controlled by a partial enclosure and using a choked flow system.

^[3] Obtained from AP-42, Section 9.9.1 (03/2003), Table 9.9.1-1 for grain receiving from hopper and straight trucks.

^[4] A 95% capture/control efficiency has been assessed for the grain receiving. The fugitive emissions are the emissions that are emitted through the openings of the enclosure.

Fact Sheet Attachment

Fermentation Operations: EP-C40

Anhydrous ethanol production	70,000,000	gal/yr
	70.00	MMgal/yr
Operating hours	8,760	hr/yr
Density of anhydrous ethanol	6.58	lb/gal

Controlled Hourly PTE (lb/hr) = Annual Production Rate (MMgal/yr) * Emission Factor (lb/(MMgal)) $\div$ (8,760 hr/yr)

Controlled Annual PTE (ton/yr) = Annual Production Rate (MMgal/yr) * Emission Factor (lb/(MMgal)) $\div$ (2,000 lb/ton)

Fermentation Emissions Summary			
Pollutant	Emission Factor lb/MMgal	Potential Emissions	
		lb/hr	ton/yr
PM (filterable) ^[1]	-	0.90	3.942
PM ₁₀ ^[1]	-	0.90	3.942
PM _{2.5} ^[1]	-	0.90	3.942
VOC ^[2]	-	7.00	30.66
Individual HAPs			
Acetaldehyde ^[2]	-	1.90	8.31
Acrolein ^[3]	-	0.026	0.114
Formaldehyde ^[3]	-	0.0066	0.029
Methanol ^[3]	-	0.014	0.061
Total HAPs ^[2]	-	1.944	8.513
Greenhouse Gases			
Carbon Dioxide (CO ₂) ^[4]	6.29	50,294	220,287

^[1] PM, PM₁₀ and PM_{2.5} emission rates were submitted in the 2013 OP application.

^[2] VOC is the permitted limit in Condition III.(B)(2). Acetaldehyde is limited to 8.31 ton/yr from the fermentation scrubber listed in Condition III.(B)(2), while the other individual HAPs' lb/hr rates are based on testing results.

^[3] HAP emission rates for acrolein, formaldehyde, and methanol are worst case lb/hr emission rates from the September 22-23, 2015 stack test of the CO₂ scrubber.

^[4] CO₂ emissions have been estimated using the chemical process equation. This equation indicates that for each mole of ethanol produced one mole of CO₂ is also produced (1 lbmol Ethanol = 46 lb, 1 lbmol CO₂ = 44 lb). To obtain the mass of CO₂ produced multiply the gallons of anhydrous ethanol produced by 6.29 lb/gal (44 / 46 x 6.58 [density of ethanol]). See Section 4 of "Greenhouse Gas Emissions Estimation Methodologies for Biogenic Emissions from Selected Source Categories: Solid Waste Disposal Wastewater Treatment Ethanol Fermentation - DRAFT", from December 14, 2010.

Fact Sheet Attachment

TO/HRSG (EU-S10) and DDGS Dryer (EU-P10)

Parameter	Dryer	Thermal Oxidizer	Unit
Total design rate	30	99	MMBtu/hr
Operating hours	8,760	8,760	hr/yr
Heat content of natural gas	1,000	1,000	MMBtu/MMscf
Potential throughput	0.030	0.099	MMscf/hr
Potential throughput	262.80	867.24	MMscf/yr

Natural Gas Combustion Emissions					
Pollutant	Emission Factor ^[1]	Dryer		Thermal Oxidizer	
		Potential Emissions ^[2]		Potential Emissions ^[2]	
		lb/MMscf	ton/yr	lb/hr	ton/yr
NO _x	100	3.00	13.14	9.90	43.36
Individual HAPs					
Arsenic Compounds	0.0002	6.00E-06	2.63E-05	1.98E-05	8.67E-05
Benzene	0.0021	6.30E-05	2.76E-04	2.08E-04	9.11E-04
Beryllium Compounds	0.000012	3.60E-07	1.58E-06	1.19E-06	5.20E-06
Cadmium Compounds	0.0011	3.30E-05	1.45E-04	1.09E-04	4.77E-04
Chromium Compounds	0.0014	4.20E-05	1.84E-04	1.39E-04	6.07E-04
Cobalt Compounds	0.000084	2.52E-06	1.10E-05	8.32E-06	3.64E-05
Dichlorobenzene	0.0012	3.60E-05	1.58E-04	1.19E-04	5.20E-04
Formaldehyde	0.075	2.25E-03	9.86E-03	7.43E-03	3.25E-02
n-Hexane	1.8	0.054	0.23652	0.18	0.78
Lead Compounds	0.0005	1.50E-05	6.57E-05	4.95E-05	2.17E-04
Manganese Compounds	0.00038	1.14E-05	4.99E-05	3.76E-05	1.65E-04
Mercury Compounds	0.00026	7.80E-06	3.42E-05	2.57E-05	1.13E-04
Naphthalene	0.00061	1.83E-05	8.02E-05	6.04E-05	2.65E-04
Nickel Compounds	0.0021	6.30E-05	2.76E-04	2.08E-04	9.11E-04
Polycyclic Organic Matter	0.0000882	2.65E-06	1.16E-05	8.73E-06	3.82E-05
Selenium Compounds	0.000024	7.20E-07	3.15E-06	2.38E-06	1.04E-05
Toluene	0.0034	1.02E-04	4.47E-04	3.37E-04	1.47E-03
Total HAPs		5.67E-02	0.25	0.19	0.82
Greenhouse Gases	kg/MMBtu^[4]	lb/hr^[5]	ton/yr	lb/hr^[5]	ton/yr^[3]
CO ₂	53.06	3,509.34	15,370.89	11,580.81	50,723.95
CH ₄	0.001	0.07	1.31E-04	0.22	9.56E-01
N ₂ O	0.0001	6.61E-03	1.31E-05	0.02	9.56E-02
Total GHGs (mass basis)		3,509.41	15,370.89	11,581.05	50,725.00
Total GHGs (tons CO₂e/yr)^[6]		3,512.94	15,370.90	11,592.71	50,776.05

^[1] The emission factors for NO_x and HAPs are from AP-42 (4/2026), Tables 1.4-1, 1.4-2, 1.4-3 and 1.4-4 for uncontrolled units smaller than 100 MMBTU/hr. CO, VOC, PM, PM10, and PM2.5 are included in the thermal oxidizer process emissions.

^[2] Controlled Hourly PTE (lb/hr) = Hourly Production Rate (ton/hr) * Emission Factor (lb/ton)

^[3] Controlled Annual PTE (ton/yr) = Hourly Production Rate (ton/hr) * Emission Factor (lb/ton) * 8,760 hr/yr ÷ 2,000 lb/ton

^[4] All emission factors for Greenhouse Gases (GHG) are default values from 40 CFR 98 Tables C-1 and C-2. This PTE summary follows the methodologies prescribed in 40 CFR Part 98.

^[5] GHG Emissions (lb/hr) = Emission Factor (kg/MMBtu) * Engine Rating (MMBtu/hr) * ton/907.18 kg * 2,000 lb/ton

^[6] tons CO₂e per year = [(ton/yr CO₂)*1] or [(ton/yr CH₄)*25] or [(ton/yr N₂O)*298]; CO₂e are found in 40 CFR Part 98 Subpart A Table A-1 Global Warming Potentials published on April 25, 2024. The CO₂e for CO₂ = 1, for CH₄ = 28, and for N₂O = 265.

Fact Sheet Attachment

TO/HRSG (EU-S10) and DDGS Dryer (EU-P10)

DDGS Produced: 7.36 ton/hr

The weight of the WDGS sent through the DDGS Dryer (P10) is approximately 2.5 times the amount of DDGS produced.

Operating hours: 8,760 hr/yr of DDGS dryer and distillation operations

Controlled Hourly PTE $\left(\frac{\text{lb}}{\text{hr}}\right) = \text{Hourly Production Rate} \left(\frac{\text{ton}}{\text{hr}}\right) * \text{Emission Factor} \left(\frac{\text{lb}}{\text{ton}}\right)$

Controlled Annual PTE $\left(\frac{\text{ton}}{\text{yr}}\right) = \text{Hourly Production Rate} \left(\frac{\text{ton}}{\text{hr}}\right) * \text{Emission Factor} \left(\frac{\text{lb}}{\text{ton}}\right) * 8,760 \text{ hr/yr} \div 2,000 \text{ lb/ton}$

Thermal Oxidizer - Process Emissions					
Pollutant	Emission Factor lb/ton	Potential Controlled Emissions		Permitted Emissions ^[1]	
		lb/hr	ton/yr	lb/hr	ton/yr
PM ^[2]		5.00	21.90	-	-
PM ₁₀ ^[2]		5.00	21.90	-	-
PM _{2.5} ^{[2], [3]}		5.00	21.90	-	-
SO ₂ ^[4]	0.45	3.31	14.51	-	-
CO ^[5]		9.10	39.86	-	-
VOC ^[5]		1.82	7.97	-	-
Individual HAPs^[6]					
Acetaldehyde		0.33	1.45	0.37	1.62
Acrolein		0.08	0.33	-	-
Formaldehyde		0.05	0.22	-	-
Methanol		0.04	0.16	-	-
Total HAP		0.45	2.16	-	-

^[1] Shared permitted emission limit with the DDGS Cooling Stack (P70).

^[2] PM, PM₁₀ and PM_{2.5} emission rates (lb/hr) are from permit limits from Construction Permit CP12-013 issued August 3, 2012 for the thermal oxidizer. The PM, PM₁₀, and PM_{2.5} include emissions (controlled) from the pre-fermentation equipment, distillation equipment, DDGS dryers' process emissions, and natural gas combustion from the DDGS dryer and thermal oxidizer.

^[3] PM_{2.5} is conservatively assumed to equal PM₁₀.

^[4] SO₂ emission factor is from engineering estimates submitted by the source.

^[5] CO and VOC emission rates (lb/hr) are permitted limits based on stack testing performed at the facility. The CO and VOC emissions factors include emissions (controlled) from the pre-fermentation equipment, distillation equipment, DDGS dryers' process emissions, and natural gas combustion from the DDGS dryer and thermal oxidizer.

^[6] Process HAPs emission rates (lb/hr) are from the 10/20/2004 stack test of the thermal oxidizer plus a 25% safety factor. The Process HAP emission rates include emissions (controlled) from the pre-fermentation equipment, distillation equipment, and DDGS dryers' process emissions. These emission rates for PTE were established in Construction Permit CP06-0039.

Fact Sheet Attachment

TO/HRSG (EU-S10) and DDGS Dryer (EU-P10)

Total Emissions = Dryer Emissions (combustion) + TO/HRSG Emissions (combustion + process)

Total Emissions from TO/HRSG Stack				
Pollutant	Potential Emissions		Permitted Emissions ^[1]	
	lb/hr	ton/yr	lb/hr	ton/yr
PM	5.00	21.90	-	-
PM ₁₀	5.00	21.90	-	-
PM _{2.5}	5.00	21.90	-	-
SO ₂	3.31	14.51	-	-
NO _x	12.90	56.50	-	-
CO	9.10	39.86	-	-
VOC	1.82	7.97	-	-
Individual HAPs				
Acetaldehyde	0.33	1.45	0.37	1.62
Acrolein	0.08	0.33	-	-
Arsenic Compounds	2.58E-05	1.13E-04	-	-
Benzene	2.71E-04	1.19E-03	-	-
Beryllium Compounds	1.55E-06	6.78E-06	-	-
Cadmium Compounds	1.42E-04	6.22E-04	-	-
Chromium Compounds	1.81E-04	7.91E-04	-	-
Cobalt Compounds	1.08E-05	4.75E-05	-	-
Dichlorobenzene	1.55E-04	6.78E-04	-	-
Formaldehyde	5.97E-02	0.26	-	-
n-Hexane	0.23	1.02	-	-
Lead Compounds	6.45E-05	2.83E-04	-	-
Manganese Compounds	4.90E-05	2.15E-04	-	-
Mercury Compounds	3.35E-05	1.47E-04	-	-
Methanol	3.75E-02	0.16	-	-
Naphthalene	7.87E-05	3.45E-04	-	-
Nickel Compounds	2.71E-04	1.19E-03	-	-
Polycyclic Organic Matter	1.14E-05	4.98E-05	-	-
Selenium Compounds	3.10E-06	1.36E-05	-	-
Toluene	4.39E-04	1.92E-03	-	-
Total HAPs	0.74	3.22	-	-
Greenhouse Gases				
CO ₂	15,090.15	66,094.85	-	-
CH ₄	2.84E-01	9.56E-01	-	-
N ₂ O	2.84E-02	9.56E-02	-	-
Total GHGs (mass basis)	15,090.46	66,095.90	-	-
Total GHGs (tons CO₂e/yr)	15,105.65	66,146.95	-	-

^[1] Shared permitted emission limit with DDGS Cooling Stack (P70)

Fact Sheet Attachment

DDGS Cooling: EP-P70

Design rate of cooling cyclone: 7.36 ton/hr DDGS cooled

Operating Hours: 8,760 hr/yr

Controlled Hourly PTE $\left(\frac{\text{lb}}{\text{hr}}\right) = \text{Hourly Production Rate} \left(\frac{\text{ton}}{\text{hr}}\right) * \text{Emission Factor} \left(\frac{\text{lb}}{\text{ton}}\right)$

Controlled Annual PTE $\left(\frac{\text{ton}}{\text{yr}}\right) = \text{Hourly Production Rate} \left(\frac{\text{ton}}{\text{hr}}\right) * \text{Emission Factor} \left(\frac{\text{lb}}{\text{ton}}\right) * 8,760 \text{ hr/yr} \div 2,000 \text{ lb/ton}$

DDGS Cooling Cyclone Emission Summary					
Pollutant	Emission Factor lb/ton	Potential Controlled Emissions		Permitted Emissions ^[1]	
		lb/hr	ton/yr	lb/hr	ton/yr
PM	^[2]	1.03	4.51	-	-
PM ₁₀	^[2]	1.03	4.51	-	-
PM _{2.5}	^[2]	1.03	4.51	-	-
VOC ^[3]	0.1316	0.97	4.24	-	-
Individual HAPs^[3]					
Acetaldehyde		0.04	0.18	0.37	1.62
Acrolein		0.10	0.44	-	-
Formaldehyde		0.01	0.05	-	-
Methanol		0.03	0.11	-	-
Total HAPs		0.18	0.78	-	-

^[1] Shared permitted emission limit with the TO/HRSG Stack (EP-S10).

^[2] PM emissions assume that all PM = PM₁₀ = PM_{2.5}, and are permitted limits based on an air flow rate of 24,000 cfm and grain loading rate of 0.005 gr/scf; PM/PM₁₀ emission factors (lb/hr) are based on the permitted emission rate requested from the facility during the 4/2006 CP modification.

^[3] VOC emission factor is based on the Nov 2024 stack test with a safety factor of 25% added. HAP emission rates are based on the 10/21/2004 stack testing of the cooling cyclone plus a 25% safety factor except acrolein (2004 test: 0.03 lbs/hr acetaldehyde, 0.04 lbs/hr acrolein, 0.01 lbs/hr formaldehyde, and 0.02 lbs/hr methanol). In the OP application, the source requested an acrolein emission rate of 0.10 lb/hr.

Fact Sheet Attachment

P70FUG - Fugitives from DDGS Storage and Loadout

Density: 62 lb/bu DDGS

Design rate of DDGS loading equipment: 7,000 bu/hr = 434,000 lb/hr = 217 ton/hr

Fugitive Emissions from DDGS Loading

Fugitive PM/PM₁₀/PM_{2.5} account for the portion of emissions not captured in the DDGS Cooling Cyclone.

The fugitive emissions are the emissions that are emitted through the openings of the enclosure.

The DDGS loading fugitive emission factors are for animal feed shipping as specified in AP-42, Section 9.9.1 (3/2003), Table 9.9.1-2. PM_{2.5} is assumed to be equal to PM₁₀.

Fugitive Emissions from DDGS Loading								
Pollutant	Throughput		Emission Factor	Uncontrolled Emissions		Control Efficiency	Potential Emissions	
	ton/hr	ton/yr		lb/hr	ton/yr		lb/hr	ton/yr
PM	217	64,474	0.0033	0.716	0.106	0	0.72	0.11
PM ₁₀	217	64,474	0.0008	0.174	0.026	0	0.17	0.03
PM _{2.5}	217	64,474	0.0008	0.174	0.026	0	0.17	0.03

Fact Sheet Attachment

Storage Tanks: T61, T62, T63, T64, T65 and T66

Storage Tanks VOC Emission Summary					
Tank ID	Product Stored	Throughput gal/yr	VOC ^[1] lb/yr	Ethanol VOC lb/yr	Denaturant VOC lb/yr
T61	Ethanol	36,750,000	396.02	396.02	-
T62	Ethanol	36,750,000	396.02	396.02	-
T63	200 proof ethanol	70,000,000	794.47	794.47	-
T64	100% natural gasoline	3,500,000	2,431.47	-	2,431.47
T65	190 proof ethanol	70,000,000	800.79	800.79	-
TCI	Corrosion Inhibitor	26,000	4.395	-	-
T66	Ethanol	36,750,000	430.25	430.25	-
T-GAS	Unleaded gasoline		106.87	-	-
Total VOC emissions (lb/yr)			5,360.29	2,817.55	2,431.47
Total VOC emissions (ton/yr)			2.6801	1.41	1.22

^[1] VOC emissions obtained from TANKS 5.3.

Storage Tanks HAP Emission Summary				
Product	Hazardous Air Pollutant	HAP Fraction	HAP Emissions ^[1]	
			lb/yr	ton/yr
Anhydrous ethanol	Acetaldehyde	0.0002	0.56	2.82E-04
	Acrolein	0.0001	0.28	1.41E-04
	Formaldehyde	0.0001	0.28	1.41E-04
	Methanol	0.0002	0.56	2.82E-04
Denaturant	Benzene	0.025	60.79	3.04E-02
	n-Hexane	0.075	182.36	9.12E-02
	Naphthalene	0.002	4.86	2.43E-03
	Toluene	0.055	133.73	6.69E-02
	Xylenes	0.065	158.05	7.90E-02
Corrosion Inhibitor	Xylenes		4.40	2.20E-03
Unleaded Gasoline	Benzene	0.01	1.07	5.34E-04
Total			546.95	0.27

^[1] HAP Emissions(lb/yr) = VOC Emissions from chemical (lb/yr) * HAP Fraction

Fact Sheet Attachment

Ethanol Loadout: EP-S50 and EP-F50

Loadout VOC Emission Calculations

Anhydrous ethanol loading rate:	70.00	MMgal/yr
Denaturant loading rate:	3.50	MMgal/yr
Denatured ethanol loading rate:	73.50	MMgal/yr

Loading rates based on worst case ethanol and denaturant loadout.

Truck loadout is assumed to be non-dedicated trucks, which the previous load in the truck was unleaded gasoline.

The gasoline vapors are assumed to be displaced by the ethanol, for worst-case assumption.

Rail loadout is assumed to be in dedicated railcars, which the previous load in the railcar was denatured ethanol.

VOC emission factor equation from AP-42, Section 5.2.2 - Loading Losses (6/2008)

HAP emission factors are a percentage of the VOC emission factor.

Component VOC Emission Factor $\left(\frac{\text{lb}}{\text{Mgal}}\right) = 12.46 * S * P * M/T * \left(1 - \text{eff}/100\right) * X$

where:

$S_{\text{normal dedicated, submerged loading}}$	0.6	Saturation factor
$S_{\text{clean cargo, submerged loading}}$	0.5	Saturation factor

VOC Emission Factor Variables					
Physical Data	Variable	Unit	Material		
			Gasoline	Ethanol	Denaturant
Molecular weight	M	lb/lb-mol	66	46	62
Temperature ^[1]	T	°R	530	530	530
Vapor pressure ^[2]	P	psia	4.2486	0.77	7.57
Liquid molecular weight	ML		66	46	92
Density	D	lb/gal	5.6	6.6	5.6
Liquid Mole Fraction ^[3]	X		NA	0.9515	0.0485

^[1] T_{gasoline} is annual average ambient temperature from Tank 4.0 for site location. Denatured ethanol loaded out at elevated temperature.

^[2] Assume worst-case based on RVP 13 gasoline.

^[3] Liquid Mole Fraction (X) is from Tanks reports for Tanks T61 and T62 (denatured ethanol), and was calculated as follows, where V = loading rate:

$$X = \frac{\left(\frac{D+V}{ML}\right)}{\left(\frac{D_{\text{ethanol}}+V_{\text{ethanol}}}{ML_{\text{ethanol}}}\right) + \left(\frac{D_{\text{denaturant}}+V_{\text{denaturant}}}{ML_{\text{denaturant}}}\right)}$$

Control Equipment: Vapor Recovery System with Flare		
	Truck loadout	Rail loadout
Capture efficiency:	100.0%	0.0%
Control efficiency:	90.0%	0.0%
Overall control efficiency:	90.0%	0.0%

Fact Sheet Attachment

Ethanol Loadout: EP-S50 and EP-F50

$$E_{\text{VOC,uncontrolled trucks}} = E_{\text{gasoline}} + E_{\text{ethanol}} + E_{\text{denaturant}}$$

$$E_{\text{VOC,uncontrolled railcars}} = E_{\text{ethanol}} + E_{\text{denaturant}}$$

where:

$$E_{\text{VOC,uncontrolled trucks}} = \text{total uncontrolled emissions of VOC from loading of ethanol into trucks previously carrying gasoline}$$

$$E_{\text{VOC,uncontrolled railcars}} = \text{total uncontrolled emissions of VOC from loading of ethanol into railcars previously carrying denatured ethanol}$$

$$E_{\text{gasoline}} = \text{emissions of gasoline vapor remaining from the previous load that will be expelled during loading of denatured ethanol}$$

$$E_{\text{ethanol}} = \text{emissions of ethanol vapor that will be generated and expelled during loading of denatured ethanol (ethanol portion only)}$$

$$E_{\text{denaturant}} = \text{emissions of the denaturant vapor that will be generated and expelled during loading of denatured ethanol (denaturant portion only)}$$

$$E_{\text{VOC, controlled}} = E_{\text{VOC,uncontrolled}} * (1 - \text{overall control efficiency})$$

VOC Emission Factors for Denatured Ethanol Loadout				
	Truck Loadout		Rail Loadout	
	Uncontrolled lb/Mgal	Controlled lb/Mgal	Uncontrolled lb/Mgal	Controlled lb/Mgal
$E_{\text{gasoline}}^{[1]}$	0.659	0.066	-	-
E_{ethanol}	0.396	0.040	0.475	NA
$E_{\text{denaturant}}$	0.268	0.027	0.321	NA

^[1] E_{gasoline} emission factors assumes $S = S_{\text{normal}} - S_{\text{clean cargo}}$ and do not use the Liquid Mole Fraction (X) in the equations.

$$\text{VOC Emissions} = EF \left(\frac{\text{lb}}{\text{Mgal}} \right) * \text{Loading Rate} \left(\frac{\text{Mgal}}{\text{yr}} \right) * 1,000 \frac{\text{Mgal}}{\text{MMgal}} * \frac{\text{ton}}{2,000 \text{ lb}}$$

VOC Emissions for Liquid Loadout				
	Gasoline ton/yr	Ethanol ton/yr	Denaturant ton/yr	Total ton/yr
Rail loadout	-	17.47	11.80	29.27
Truck loadout	2.42	1.46	0.98	4.86
Max. VOC emissions - Denatured ethanol:				29.27

Fact Sheet Attachment

Ethanol Loadout: EP-S50 and EP-F50

Loadout HAP Calculations

HAP Weight Fraction ^[1]			
Individual HAP	Wt Fraction of VOC Emissions		
	Gasoline	Ethanol ^[2]	Denaturant ^[2]
Acetaldehyde	-	0.0002	-
Acrolein	-	0.0001	-
Benzene	0.0245	-	0.05
Cumene	0.01	-	-
Ethyl benzene	0.02	-	-
Formaldehyde	-	0.0001	-
n-Hexane	-	-	0.1
Methanol	-	0.0002	-
Naphthalene	-	-	0.002
Toluene	0.15	-	0.03
Xylene	0.12	-	0.065
Total HAPs	0.3245	0.0006	0.247

^[1] The weight fractions were for the composition of the chemicals in the loadout were submitted.

^[2] The weight fraction of HAPs for ethanol and denaturant are the same as the weight fractions listed in TANKS emission calculations.

HAP emissions = (lbs/Mgal)((MMgal/yr)*(1000 Mgal/MMgal)*(HAP weight fraction)/(2000 lbs/ton)

HAP Emissions from Denatured Ethanol Loadout						
Pollutant	Gasoline	Ethanol		Denaturant		Worst-Case HAP ^[1]
	Truck Loadout	Truck Loadout	Rail Loadout	Truck Loadout	Rail Loadout	ton/yr
	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	
Acetaldehyde	-	2.91E-04	3.49E-03	-	-	3.49E-03
Acrolein	-	1.46E-04	1.75E-03	-	-	1.75E-03
Benzene	5.94E-02	-	-	4.92E-02	0.59	0.59
Cumene	2.42E-02	-	-	-	-	2.42E-02
Ethyl benzene	4.85E-02	-	-	-	-	4.85E-02
Formaldehyde	-	1.46E-04	1.75E-03	-	-	1.75E-03
n-Hexane	-	-	-	9.83E-02	1.18	1.18
Methanol	-	2.91E-04	3.49E-03	-	-	3.49E-03
Naphthalene	-	-	-	1.97E-03	2.36E-02	2.36E-02
Toluene	0.36	-	-	2.95E-02	0.35	0.39
Xylene	0.29	-	-	6.39E-02	0.77	0.77
Total HAPs	0.79	8.74E-04	1.05E-02	0.24	2.91	2.93

^[1] Worst-case emissions are the highest emissions from denatured ethanol loadout. Denatured ethanol emissions are the highest of the following categories: (1) 100% truck loadout or (2) 100% rail loadout.

Fact Sheet Attachment

Ethanol Loadout: EP-S50 and EP-F50

Loadout Flare Emissions

Design rate of flare: 7.3 MMBtu/hr
 Heating value: 850 Btu/scf (methane/VOC combustion)
 Total operating hours: 8,760 hr/yr

Flaring Emission Summary				
Pollutant	Emission Factor ^[1]		Potential Emissions	
	lb/MMBtu		lb/hr ^[2]	ton/yr ^[3]
NO _x	0.068		0.50	2.17
CO	0.31		2.26	9.91
VOC	0.14		1.02	4.48
Greenhouse Gases	Ethanol ^[4]	Natural Gas ^[4]	Potential Emissions	
	kg/MMBtu	kg/MMBtu	lb/hr ^[5]	ton/yr ^[3]
CO ₂	68.44	66.83	1,100.17	4,818.73
CH ₄	1.10E-03	3.00E-03	1.92E-02	0.08
N ₂ O	1.10E-04	6.00E-04	2.16E-03	9.48E-03
Total GHGs (mass basis)			1,100.19	4,818.82
Total GHGs (ton CO ₂ e/yr) ^[6]			1,101.28	4,823.60

^[1] Emission factors from AP-42, Chapter 13.5 (4/2015), Tables 13.5-1 and 13.5-2.

^[2] Hourly Emissions (lb/hr) = Emission Factor (lb/MMBtu) * Design Rate (MMBtu/hr)

^[3] Annual Emissions (ton/yr) = Emission Factor (lb/MMBtu) * Design Rate (MMBtu/hr) * 8,760 hr/yr ÷ 2,000 lb/ton

^[4] All emission factors are default values from 40 CFR 98 Tables C-1 and C-2 -assumes 95% ethanol and 5% gasoline as being combusted. This PTE summary follows the methodologies prescribed in 40 CFR Part 98.

^[5] GHG Emissions (lb/hr) = Emission Factor (kg/MMBtu) * Design Rate (MMBtu/hr) ÷ 907.18 kg/ton ÷ 2,000 lb/ton

^[6] tons CO₂e per year = [(ton/yr CO₂)*1] or [(ton/yr CH₄)*25] or [(ton/yr N₂O)*298]; CO₂e are found in 40 CFR Part 98 Subpart A Table A-1 Global Warming Potentials published on April 25, 2024. The CO₂e for CO₂ = 1, for CH₄ = 28, and for N₂O = 265.

Fact Sheet Attachment

Ethanol Loadout: EP-S50 and EP-F50

Natural gas combustion of pilot

Design rate of pilot for flare: 0.054 MMBtu/hr 0.0001 MMscf/hr
 Heating value: 1,000 Btu/scf (natural gas combustion)

Pilot Emission Summary			
Pollutant	Emission Factor ^[2] lb/MMscf	Potential Emissions ^[3]	
		lb/hr	ton/yr
PM	7.6	4.10E-04	1.80E-03
PM ₁₀	7.6	4.10E-04	1.80E-03
PM _{2.5} ^[1]	7.6	4.10E-04	1.80E-03
SO ₂	0.6	3.24E-05	1.42E-04
NO _x	100	5.40E-03	2.37E-02
CO	84	4.54E-03	1.99E-02
VOC	5.5	2.97E-04	1.30E-03
Individual HAPs			
Arsenic Compounds	0.0002	1.08E-08	4.73E-08
Benzene	0.0021	1.13E-07	4.97E-07
Beryllium Compounds	0.000012	6.48E-10	2.84E-09
Cadmium Compounds	0.0011	5.94E-08	2.60E-07
Chromium Compounds	0.0014	7.56E-08	3.31E-07
Cobalt Compounds	0.000084	4.54E-09	1.99E-08
Dichlorobenzene	0.0012	6.48E-08	2.84E-07
Formaldehyde	0.075	4.05E-06	1.77E-05
n-Hexane	1.8	9.72E-05	4.26E-04
Lead Compounds	0.0005	2.70E-08	1.18E-07
Manganese Compounds	0.00038	2.05E-08	8.99E-08
Mercury Compounds	0.00026	1.40E-08	6.15E-08
Naphthalene	0.00061	3.29E-08	1.44E-07
Nickel Compounds	0.0021	1.13E-07	4.97E-07
Polycyclic Organic Matter	0.0000882	4.76E-09	2.09E-08
Selenium Compounds	0.000024	1.30E-09	5.68E-09
Toluene	0.0034	1.84E-07	8.04E-07
Total HAPs		1.02E-04	4.47E-04
Greenhouse Gases			
	kg/MMBtu ^[5]	lb/hr ^[6]	ton/yr ^[4]
CO ₂	53.02	6.31	27.65
CH ₄	0.001	1.19E-04	5.21E-04
N ₂ O	0.0001	1.19E-05	5.21E-05
Total GHGs (mass basis)		6.31	27.65
Total GHGs (ton CO₂e/yr)^[7]		6.32	27.68

^[1] All PM is assumed to be PM_{2.5}

^[2] Natural gas combustion AP-42 emission factors came from AP-42, Section 1.4 (7/1998), Tables 1.4-1 and 1.4-2.

^[3] Hourly Emissions (lb/hr) = Emission Factor (lb/MMBtu) * Design Rate (MMBtu/hr)

^[4] Annual Emissions (ton/yr) = Emission Factor (lb/MMBtu) * Design Rate (MMBtu/hr) * 8,760 hr/yr ÷ 2,000 lb/ton

^[5] All emission factors are default values from 40 CFR 98 Tables C-1 and C-2 and methodologies are prescribed in 40 CFR Part 98.

^[6] GHG Emissions (lb/hr) = Emission Factor (kg/MMBtu) * Design Rate (MMBtu/hr) ÷ 907.18 kg/ton ÷ 2,000 lb/ton

^[7] tons CO₂e per year = [(ton/yr CO₂)*1] or [(ton/yr CH₄)*25] or [(ton/yr N₂O)*298]; CO₂e are found in 40 CFR Part 98 Subpart A Table A-1 Global Warming Potentials published on April 25, 2024. The CO₂e for CO₂ = 1, for CH₄ = 28, and for N₂O = 265.

Fact Sheet Attachment

Ethanol Loadout: EP-S50 and EP-F50

Total Emissions

Pollutant	Loadout ton/yr	Flaring ton/yr	Pilot ton/yr	Total Emissions ton/yr
PM			1.80E-03	1.80E-03
PM ₁₀			1.80E-03	1.80E-03
PM _{2.5}			1.80E-03	1.80E-03
SO ₂			1.42E-04	1.42E-04
NO _x		2.17	2.37E-02	2.20
CO		9.91	1.99E-02	9.93
VOC	29.27	4.48	1.30E-03	33.75
Individual HAPs				
Acetaldehyde	3.49E-03			3.49E-03
Acrolein	1.75E-03			1.75E-03
Arsenic Compounds			4.73E-08	4.73E-08
Benzene	0.59		4.97E-07	0.59
Beryllium Compounds			2.84E-09	2.84E-09
Cadmium Compounds			2.60E-07	2.60E-07
Chromium Compounds			3.31E-07	3.31E-07
Cobalt Compounds			1.99E-08	1.99E-08
Cumene	2.42E-02			2.42E-02
Dichlorobenzene			2.84E-07	2.84E-07
Ethyl Benzene	4.85E-02			4.85E-02
Formaldehyde	1.75E-03		1.77E-05	1.76E-03
n-Hexane	1.18		4.26E-04	1.18
Lead Compounds			1.18E-07	1.18E-07
Manganese Compounds			8.99E-08	8.99E-08
Mercury Compounds			6.15E-08	6.15E-08
Methanol	3.49E-03			3.49E-03
Naphthalene	2.36E-02		1.44E-07	2.36E-02
Nickel Compounds			4.97E-07	4.97E-07
Polycyclic Organic Matter			2.09E-08	2.09E-08
Selenium Compounds			5.68E-09	5.68E-09
Toluene	0.39		8.04E-07	0.39
Xylenes	0.77			0.77
Total HAPs	2.93		4.47E-04	3.04
Greenhouse Gases				
CO ₂		4,818.73	27.65	4,846.37
CH ₄		0.08	5.21E-04	0.08
N ₂ O		9.48E-03	5.21E-05	9.53E-03
Total GHGs (mass basis)		4,818.82	27.65	4,846.47
Total GHGs (tons CO₂e/yr)		4,823.60	27.68	4,851.27

Fact Sheet Attachment

Equipment Leaks

Components in vacuum service are not inventoried and not to be inspected due to leak free nature.

Components with >20% VOC by volume or >10% by weight will be part of the LDAR program.

Except for valves and pumps, non-welded components and fittings treated as "flanges" for LDAR.

Equipment Leaks Emission Summary							
Type of Component	# of Components	Emission Factor ^[1] kg/hr/source	Uncontrolled VOC Emissions		LDAR CE ^[1] %	Controlled VOC Emissions	
			lb/hr ^[2]	ton/yr ^[3]		lb/hr ^[4]	ton/yr ^[5]
Light liquid valves ^[6]	590	0.00403	5.25	23.02	84%	0.84	3.68
Light liquid pumps ^[7]	28	0.0199	1.23	5.39	69%	0.38	1.67
Light liquid check valves ^[6]	10	0.00403	0.09	0.39	84%	1.43E-02	0.06
Light liquid control valves ^[6]	70	0.00403	0.62	2.73	84%	0.10	0.44
Pressure relief valves	17	0.104	3.91	17.11	87%	0.51	2.22
Flow meters	7	0.00403	0.06	0.27	84%	9.98E-03	0.04
Mixers	4	0.0199	0.18	0.77	69%	0.05	0.24
Flanges (Connectors)	250	0.00183	1.01	4.43	86%	0.14	0.62
Total VOC Emissions:			12.36	54.12	-	2.05	8.98

^[1] VOC Emissions are calculated from *Protocol for Leak Emission Estimates*, EPA-453/R-95-017, November 1995.

^[2] Uncontrolled VOC Emissions (lb/hr) = # of Components * Emission Factor (kg/hr/source) * 2.21 lb/kg

^[3] Uncontrolled VOC Emissions (ton/yr) = # of Components * Emission Factor (kg/hr/source) * 2.21 lb/kg * 8,760 hr/yr ÷ 2,000 lb/ton

^[4] Controlled VOC Emissions (lb/hr) = Uncontrolled VOC Emissions (lb/hr) * [1 - LDAR CE (%)]

^[5] Controlled VOC Emissions (ton/yr) = Uncontrolled VOC Emissions (ton/yr) * [1 - LDAR CE (%)]

^[6] TAP has 638 valves but requested 670 to be used in PTE calculations as a safety buffer.

^[7] TAP has 27 pumps but requested 28 to be used in PTE calculations as a safety buffer.

Equipment Leaks HAP Emission Summary			
HAP	Mass Fraction	HAP Emissions	
		lb/hr	ton/yr ^[1]
Acetaldehyde	0.0002	4.10E-04	1.80E-03
Acrolein	0.0001	2.05E-04	8.98E-04
Formaldehyde	0.0001	2.05E-04	8.98E-04
Methanol	0.0002	4.10E-04	1.80E-03
Total HAP:		1.23E-03	5.39E-03

^[1] HAP Emissions = Total VOC Emissions * HAP Mass Fraction

Fact Sheet Attachment

Haul Roads

Paved roads {AP-42 Chapter 13.2.1 (1/11)}

Equation (2): $E = k \times (sL)^{0.91} \times (W)^{1.02} \times \left(1 - \frac{P}{4-365}\right)$
(modified)

	<i>k</i>
PM	0.011
PM ₁₀	0.0022
PM _{2.5}	0.0005

Haul Road / Traffic Parameters												
Activity / Road Description	Road Type / Silt Value		Roundtrip Length (feet)		Truck Weight (ton)			Ave. Speed (mph)	Unrestricted Maximum Throughput (units/yr)	Ave. Truck Capacity (units/truck)	Annual VMT	
			empty	full	empty	full	Ave.					
Denatured Ethanol	p	3.00	2,746	3,062	15	40	28.2	15	73,500,000 gal/yr	7,500 gal	10,780	
Denaturant Receiving	p	3.00	3,062	2,746	15	40	26.8	15	3,500,000 gal/yr	7,500 gal	513	
Grain Receiving	p	3.00	2,587	3,221	15	40	28.9	15	700,084 tons/yr	25 ton	30,804	
DDGS Shipping	p	3.00	3,221	2,587	15	40	26.1	15	64,474 tons/yr	25 ton	2,837	
WDGS Shipping	p	3.00	3,010	2,798	15	40	27.0	15	490,000 tons/yr	25 ton	21,560	
WDGS Loading	p	3.00	10	10	1	3	2.0	15	490,000 tons/yr	3 ton	619	
CDO Shipping ^[1]	p	3.00										

Emission Calculations

	Emission Factors (lb/VMT)			Potential Emissions (ton/yr)		
	PM	PM ₁₀	PM _{2.5}	PM	PM ₁₀	PM _{2.5}
Denatured Ethanol	0.85	0.17	0.04	4.59	0.92	0.23
Denaturant Receiving	0.81	0.16	0.04	0.21	0.04	0.01
Grain Receiving	0.87	0.17	0.04	13.43	2.69	0.66
DDGS Shipping	0.79	0.16	0.04	1.12	0.22	0.05
WDGS Shipping	0.82	0.16	0.04	8.80	1.76	0.43
WDGS Loading	0.06	1.1E-02	2.8E-03	0.02	4E-03	8.7E-04
CDO Shipping ^[1]				0.40	0.08	0.02
Total Annual Emissions ^[2] :				27.45	5.49	1.35

Description of Constants/Variables

E : haul road emissions (lb/VMT)
k, *d* : dimensionless constants from Draft AP-42 Chapter 13.IV (paved)
sL : silt loading (g/m²) of paved road surface
W : average vehicle weight (tons)
P : days/yr with at least 0.01" of precipitation
 $P = \boxed{80}$ default = 90
S : mean vehicle speed on road (mph)
 default = 30, minimum = 15
 VMT: vehicle miles traveled

^[1] CDO Shipping throughput is confidential. Since the throughput can be determined by using the emission factor and potential emissions, only the potential emissions are shown.

^[2] Total emissions only include the maximum of DDGS and WDGS activities. Also, total emissions assumes no rail service for shipping or receiving.

Fact Sheet Attachment

Cooling Tower: S80

Circulation rate:	1,257,600	gal/hr	11,016,576	Mgal/yr (based on 8,760 hr/yr)
Drift loss percent:	0.005			
Water density:	8.34	lb/gal		
TDS concentration:	2,000	ppm single sample event		
	2,000	ppm average annual rate		

$$\text{PM/PM}_{10} \text{ emission factor} = \left(\frac{\text{ppm TDS}}{1,000,000 \text{ lb water}} \right) \left(\frac{8.34 \text{ lb water}}{\text{gal}} \right) \left(\frac{1,000 \text{ gal}}{\text{Mgal}} \right) \left(\frac{0.005}{100} \text{ driftloss} \right)$$

0.000834 lb/Mgal single sample event (highest hourly rate)

0.000834 lb/Mgal average annual rate

Hourly Emissions = Single Sample Event $\left(\frac{\text{lb}}{\text{Mgal}} \right) * \text{Hourly Throughput} \left(\frac{\text{gal}}{\text{hr}} \right) * \left(\frac{\text{Mgal}}{1,000 \text{ gal}} \right)$

Annual Emissions = Average Annual Rate $\left(\frac{\text{lb}}{\text{Mgal}} \right) * \text{Annual Throughput} \left(\frac{\text{Mgal}}{\text{yr}} \right) * \left(\frac{\text{ton}}{2,000 \text{ lb}} \right)$

Cooling Tower Emission Summary		
Pollutant	Potential Emissions	
	lb/hr	ton/yr
PM	1.05	4.59
PM ₁₀ ^[1]	0.73	3.22
PM _{2.5} ^[1]	0.44	1.93

Equation from AP-42, Section 13.4-2, (1/1995).

^[1] PM₁₀ and PM_{2.5} fractions from "Final Methodology to Calculate PM₁₀ and PM_{2.5} Significance Thresholds, Appendix A: Updated CEIDARS Table with PM_{2.5} Fractions"

Fact Sheet Attachment

WDGS Storage and Loadout

VOC and HAP calculations are not included in facility wide PTE calculations because worst case VOC and HAP emissions occur when all DGS is dried.

WDGS Production rate	47.1	lb WDGS/bu corn
WDGS (as product)	490,000	ton/yr (maximum amount of WDGS produced)
	55.94	ton/hr (average, based on 8,760 hr/yr)

Emissions calculated based on Stack Test data from similar facility (Diversified Energy Co (DENCO), Morris, MN, November 2, 2004 stack test)

Production rate for DENCO = 18 ton/hr

Emissions from WDGS Storage and Loadout				
Pollutant	DENCO Results lb/hr	Emission Factor ^[1] lb/ton WDGS	Potential Emissions	
			lb/hr	ton/yr
VOC	0.15	8.33E-03	0.47	2.04
Acetaldehyde		1.29E-03	7.23E-02	0.32
Acrolein		3.75E-05	2.10E-03	9.19E-03
Formaldehyde		1.41E-06	7.88E-05	3.45E-04
Methanol		1.25E-04	6.99E-03	3.06E-02
Total HAPs			0.08	0.36

^[1] HAP Emission Factors based on HAP mass fraction of VOC

Fact Sheet Attachment

Base Tricanter System

All of the emissions associated with the Base Tricanter System, except haul road emissions, are as follows.
The Base Tricanter System does not emit HAPs.

BTS-1: Equipment Leaks

Equipment Leaks Emission Summary							
Type of Component	# of Components	Emission Factor ^[1] kg/hr/source	Uncontrolled VOC		LDAR CE ^[1] %	Controlled VOC ^[4]	
			lb/hr ^[2]	ton/yr ^[3]		lb/hr	ton/yr
Light liquid valves	20	0.00403	0.18	0.78	84.00	0.03	0.12
Light liquid pumps	10	0.0199	0.44	1.93	69.00	0.14	0.60
Gas Valves	0	0.00597	-	-	87.00	-	-
Flanges (Connectors)	25	0.00183	0.10	0.44	87.00	1.31E-02	0.06
Total VOC Emissions			0.72	3.15		0.18	0.78

^[1] VOC Emissions are calculated from *Protocol for Leak Emission Estimates*, EPA-453/R-95-017, November 1995.

^[2] VOC(lbs/hr) = (# of components)(emission factor kg/hr/source)(2.21 lbs/kg)

^[3] VOC uncontrolled (tons/yr) = (VOC in lbs/hr)(8,760 hrs/year)/(2,000 lbs/ton)

^[4] VOC controlled (tons/yr) = (VOC uncontrolled in tons/yr)(1-{% value/100})

BTS-2 through BTS-7: Storage Tanks

Storage Tanks VOC Emission Summary	
Tank ID	VOC Emissions ^[1] lb/yr
BTS-2	252.75
BTS-3	186.47
BTS-4	194.82
BTS-5	194.82
BTS-7	543.21
Total VOC emissions (lb/yr)	1,372.08
Total VOC emissions (ton/yr)	0.69

^[1] VOC Emissions obtained from TANKS 5.3.

BTS-7: Product Loadout

VOC emission factor equation from AP-42, Section 5.2.2 - Loading Losses (1/1995)

$$\text{VOC} = 12.46 * S * P * M / T$$

where:

Saturation factor (S)	0.6	submerged
Vapor pressure (P, psia)		{see discussion below}
Molecular weight (M, lbs/lbs-mole)		{see discussion below}
Temperature (T, deg R)	530	

VOC Emission Factor: 0.000 lb/1000 gal

CDO Loadout Rate: gal/yr

VOC Emissions: 23.98 lb/yr
0.012 ton/yr

CDO Loadout's Rate is confidential. Since the rate can be determined by using the emission factor and potential emissions, the vapor pressure and molecular weight values (used to calculate emission factor) along with the loadout rate are not shown in this document.

Total Emissions for Base Tricanter System

	VOC ton/yr
Equipment Leaks	0.78
Tanks	0.69
Product Loadout	0.012
Total Emissions	1.48

Note: The haul roads emissions from the Base Tricanter System are calculated with the rest of the haul road emissions.