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DEPARTMENT OF HEALTH
AND ENVIRONMENT

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Division of Environment

AIR EMISSION SOURCE CONSTRUCTION PERMIT

Source ID No.: 1250079

Effective Date: August 6, 2007

Source Name: Coffeyville Resources Nitrogen Fertilizer Facility

SIC Code: 2873; Nitrogenous Fertilizers

NAICS Code: 325311; Nitrogenous Fertilizer Manufacturing

Source Location: 701 East Martin Street
Coffeyville, KS 67337

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This permit is issued pursuant to K.S.A. 65-3008 as amended; and consists of the conditions contained herein, the permit application dated October 2005, the impacts analysis dated November 2005, and all revisions. In the event that any condition, requirement, or limitation contained herein is not in exact agreement with the permit application or any of its revisions, the conditions, requirements, and/or limitations contained herein shall control.

This permit supersedes the Air Emission Source Construction Permits/Approvals dated September 5, 1997, December 23, 1999, December 14, 2004, and June 17, 2005 and the Air Emission Source Modification of Permit Conditions dated October 9, 2006. These documents contain requirements that have been incorporated, modified, or found to be no longer appropriate.

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Description of Activity Subject to Air Pollution Control Regulations

Coffeyville Resources Nitrogen Fertilizers, LLC (CRNF) operates the Coffeyville Nitrogen Fertilizer Facility (Fertilizer Facility) located in Coffeyville, Montgomery County, Kansas. The Fertilizer Facility began construction in December 1997 and was initially started up in July 2000 by Farmland Industries. The “as-built” facility is a major source of several criteria pollutants [sulfur dioxide (SO₂), carbon monoxide (CO), and nitrogen oxides (NO_x)] and is subject to the requirements of 40 CFR 52.21, Prevention of Significant Deterioration (PSD) as adopted under K.A.R. 28-19-350.

In addition to SO₂, CO, and NO_x, facility-wide emissions of particulate matter with an aerodynamic diameter less than or equal 10 micrometers (PM₁₀), volatile organic compounds (VOC), and total reduced sulfur (TRS) are considered significant and were also evaluated for PSD review. The permitting process included a Best Available Control Technology (BACT) review and an ambient air quality impact analysis. The facility is equipped with BACT for all criteria and significant pollutants.

The Fertilizer Facility is an integrated process-manufacturing facility that utilizes feedstock of petroleum coke, air, and water to produce salable products of anhydrous ammonia and Urea-Ammonium Nitrate (UAN) solution. The facility consists of the following six major areas:

1. Petroleum Coke and Fluxant Storage and Handling Facilities;
2. Gasification/Hydrogen Unit;
3. Ammonia Synthesis Unit;
4. UAN Plant;
5. Product Storage and Loading; and
6. Utilities

The facility also has numerous storage tanks of various capacities and other minor sources.

Significant Applicable Air Pollution Control Regulations

The Fertilizer Facility is subject to Kansas Administrative Regulations, relating to air pollution control. The following state and federal regulations were determined to be applicable to this source:

1. K.A.R. 28-19-11 Exceptions Due to Breakdowns or Scheduled Maintenance [applied to State regulations K.A.R. 28-19-20, K.A.R. 28-19-30 through 32, and K.A.R. 28-19-650]
2. K.A.R. 28-19-20 Particulate Matter Emission Limitations
3. K.A.R. 28-19-31 Emission Limitations [The facility includes one indirect heating unit (EU-802)]
4. K.A.R. 28-19-300 Construction Permits and Approvals; Applicability
5. K. A.R. 28-19-350 Prevention of Significant Deterioration of Air Quality

6. K.A.R. 28-19-650(a)(3) Emissions Opacity Limits
7. K.A.R. 28-19-720 New Source Performance Standards, which adopts by reference *40 CFR Part 60 Subpart A, General Provisions*
8. K.A.R. 28-19-720 New Source Performance Standards, which adopts by reference *40 CFR Part 60 Subpart G, Standards of Performance for Nitric Acid Plants*
9. K.A.R. 28-19-720 New Source Performance Standards, which adopts by reference *40 CFR Part 60 Subpart VV, Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry* [The Urea Unit is an affected facility under this rule and meets the requirements of the “heavy liquid chemicals exemption” as specified in 40 CFR 60.480(d)(3); therefore, only recordkeeping requirements are applicable]
10. K.A.R. 28-19-735 National Emission Standards for Hazardous Air Pollutants, which adopts by reference *40 CFR Part 61 Subpart A, General Provisions*
11. K.A.R. 28-19-735 National Emission Standards for Hazardous Air Pollutants, which adopts by reference *40 CFR Part 61 Subpart FF, National Emission Standard for Benzene Waste Operations* [The facility’s total annual benzene (TAB) quantity from facility waste is less than 1 Mg/yr (1.1 ton/yr); therefore, minimal requirements are applicable]
12. K.A.R. 28-19-750 Hazardous Air Pollutants; Maximum Achievable Control Technology, which adopts by reference *40 CFR Part 63 Subpart A, General Provisions*
13. K.A.R. 28-19-750 Hazardous Air Pollutants; Maximum Achievable Control Technology, which adopts by reference *40 CFR Part 63 Subpart FFFF, National Emission Standards for Hazardous Air Pollutants for Miscellaneous Organic Chemical Manufacturing* [The facility is an existing source and includes only Group 2 continuous process vents as defined in 40 CFR 63.2540; therefore, minimal requirements are applicable]
14. K.A.R. 28-19-750 Hazardous Air Pollutants; Maximum Achievable Control Technology, which adopts by reference *40 CFR Part 63 Subpart ZZZZ, National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines* [The facility includes one existing engine (EU-901) that is used for emergency purposes as defined in 40 CFR 63.6675; therefore, the engine is not subject to the requirements of this subpart and of Subpart A of this part 63.6590(b)(3)]
15. K.A.R. 28-19-750 Hazardous Air Pollutants; Maximum Achievable Control Technology, which adopts by reference *40 CFR Part 63 Subpart DDDDD, National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters* [The facility includes existing large process heaters (EU-301, EU-401, EU-802) that combust gaseous fuels as defined in 40 CFR 63.7575; therefore, the heaters are not subject to the requirements of this subpart, and only the initial notification requirements of Subpart A of this part are applicable]

Air Emission Unit Technical Specifications

The construction of the Fertilizer Facility is approved. Nominal operating rates expressed in this section are not limitations on operation and may be lower than the units' maximum operating rates.

Petroleum Coke and Fluxant Storage and Handling Facilities

- The coke and fluxant storage and handling areas include storage piles, primary and secondary crushers, storage silos, rod mills, and associated vessels and conveyors.
- With the exception of the coke storage piles, all coke and fluxant storage and handling facilities are equipped with baghouses, full enclosures, and/or partial enclosures. Emission sources equipped with baghouses include:
 - Coke Crusher (EU-101);
 - Coke Storage Silo (EU-102);
 - Coke Belt Feeder (EU-103 A/B);
 - Fluxant Drag Conveyors (EU-104 A/B);
 - Rod Mill Conveyors North (EU-105 A/B); and
 - Grinding Feed Bin/Conveyor (EU-201 A/B)
- The nominal coke handling rate is 1,453 tons per day (tons/day) (dry) on an annual average basis.

Gasification/Hydrogen Unit

- The major equipment in the Gasification/Hydrogen Unit includes two gasifier reactors (EU-302, EU-402) and associated carbon scrubbers, shift reactors, acid gas removal, CO₂ purification, and pressure swing absorption (PSA) for hydrogen production.
- Two Standby Gasifier Burners (EU-301, EU-401), each with a total heat input rate of 16 million BTU per hour (MMBTU/hr) combusting purge gas and/or natural gas, are used to maintain spare equipment in a ready condition.
- One Gasification Unit Flare (CE-302) is equipped with pilot gas, sweep gas, and assist gas lines.
- There is one "CO₂ Vent" (SV-605) from the Selexol gas treatment system.
- Materials handling equipment is required to move byproduct coke slag in the slag storage area.
- Plant tankage includes a Selexol storage tank, coke slurry water storage tanks, recycle solids tank, various below-grade wastewater sumps, and a below-grade Selexol sump.
- The nominal fresh coke feed rates to the Gasification Unit are 1,453 tons/day (dry) on an annual average basis and 1,500 tons/day (dry) on a seven (7) day average basis.

- The nominal Hydrogen Unit production rates are 88 million standard cubic feet per day (MMSCF/day) on an annual average basis and 91 MMSCF/day on a 7-day average basis.

Ammonia Synthesis Unit

- The facility has one anhydrous ammonia synthesis unit consisting of a high-pressure synthesis loop and associated refrigeration system.
- One Startup Heater (EU-802) is for the start-up of the ammonia plant and the CO₂ Purifier. The heater combusts natural gas and has a heat input rating of 42 MMBTU/hr.
- One Ammonia Flare (CE-801) is equipped with pilot gas and assist gas lines.
- The nominal ammonia production rates are 1,280 tons/day on an annual average basis and 1,321 tons/day on a 7-day average basis.

UAN Plant

- The UAN Plant has one Urea production unit with a nominal production rate of 865 tons/day (100% urea) on both an annual average and a 7-day average basis.
- The UAN Plant has one Nitric Acid Unit equipped with an extended absorber and selective catalytic reduction (SCR) system on the tail gas stack.
- There is one Nitric Acid Surge Tank (TK-1001).
- The nominal nitric acid production rate is 1,318 tons/day (57% nitric acid) on both an annual average and a 7-day average basis.
- The UAN Plant has one Ammonium Nitrate Unit equipped with a Neutralizer (EU-1005). Emissions from the Neutralizer are collected via the Process Condensate Tank Scrubber (SV-1005) and returned to the process.
- The nominal ammonium nitrate production rate is 954 tons/day (100% ammonium nitrate) on both an annual average and a 7-day average basis.
- The UAN Plant has one UAN Flare (CE-1001) equipped with pilot gas and assist gas lines.
- The nominal UAN production rate is 2,146 tons/day of UAN solution on both an annual average and a 7-day average basis.

Loading and Storage

- Facilities are available for storage and loading of anhydrous ammonia and UAN.
- One Ammonia Storage Flare (CE-1101) is associated with the Ammonia Storage Tank (EU-101). The flare is equipped with pilot gas and sweep gas lines.

Utilities

- The Fertilizer Facility has one Cooling Tower (EU-902) with four sources of makeup water including small amounts of boiler blowdown, cold-lime softened water, municipal water, and reverse osmosis reject water.
- Emergency power is provided by an Emergency Diesel Generator (EU-901) with a brake horse power rating of 1,332 hp.
- One Lime Storage Silo is equipped with a baghouse (CE-905) that is used in plant water softening operations.

Air Emission Limitations

1. 40 CFR 60.72(a)(1) limits emissions of NO_x, expressed as NO₂, from the Nitric Acid Unit, to 1.5 kg per metric ton of acid produced (3.0 lb per ton), the production being expressed as 100 percent (%) nitric acid, except as provided in 40 CFR 60.8(c).
2. 40 CFR 60.72(a)(2) limits opacity of visible emissions from the Nitric Acid Unit to less than 10% opacity, except as provided in 40 CFR 60.11(c). Opacity observations shall be conducted in accordance with 40 CFR 60.11(b).
3. K.A.R. 28-19-20 limits the quantity of particulate matter emissions from processing equipment in proportion to the rate at which materials are processed (Table P-1) for those units which handle dry bulk materials.
4. K.A.R. 28-19-31(a) limits aggregated particulate matter emissions from indirect heating equipment to those specified in Table H1 or for equipment having intermediate heat input between 10(10⁶) BTU/hr and 10,000(10⁶) BTU/hr, the allowable emission rate may be determined as provided at K.A.R. 28-19-31(a).
5. K.A.R. 28-19-31(b)(2) limits opacity of visible emissions from indirect heating equipment to 20%, except as provided in K.A.R. 28-19-32(a). Opacity shall be determined using the method specified in K.A.R. 28-19-650(d) unless otherwise specified in the Title V Operating Permit.
6. K.A.R. 28-19-650(a)(3) limits opacity of visible emissions from all other equipment/operations to 20%, except as provided in K.A.R. 28-19-650(c). Opacity shall be determined using the method specified in K.A.R. 28-19-650(d) unless otherwise specified in the Title V Operating Permit.

Permit Conditions

A. Facility-Wide Emission Limits

1. In accordance with this section, the Fertilizer Facility-Wide emissions of SO₂, CO, NO_x, PM₁₀, VOC, and total reduced sulfur are limited to the annual (tons/year) and short-term (lbs/7-days) emission rates listed in Table 1. Both the annual and short-term emission rates shown include routine operations, including routine startup¹, shutdown, and maintenance activities for the specified periods. Table 2 includes a list of all emission sources at the facility that are included in these emission limits. The short-term emission limits shown in Table 1 are considered BACT for all emission sources listed in Table 2.

Emissions resulting from future new and/or modified sources at the facility are not included in the Facility-Wide Emission Limits listed in Table 1. These new emissions shall be evaluated on a project-by-project basis for PSD applicability purposes, and to determine if the facility must amend this PSD permit and/or obtain a KDHE construction permit or construction approval.

The emissions from future new and/or modified sources may be incorporated into the Facility-Wide Emission Limit(s) at the facility's request via a permit revision or amendment. Until such time as the applicable Facility-Wide Emission Limit(s) are updated to reflect the new and/or modified sources, CRNF will account for the new emissions separately [i.e., "outside" of the Facility-Wide Emission Limit(s)], according to the requirements and/or representations in any associated construction permit, construction approval, or file documentation associated with the new and/or modified sources.

Table 1 – Facility-Wide Emission Limits

Pollutant Type	Post Permit Annual Emission Limit (Tons/Year)	Post Permit Short-term Emission Limit (Lbs/7-days)
Sulfur Dioxide (SO ₂)	168.5	125,998
Carbon Monoxide (CO)	751	115,322
Nitrogen Oxides (NO _x)	206	34,082
Particulate Matter (PM ₁₀)	23	1,476
Volatile Organic Compounds (VOC)	60	3,152
Total Reduced Sulfur (H ₂ S & COS)	69	4,571

¹ A routine startup does not include a startup following a malfunction event.

Table 2 – Emission Sources Included in Facility-Wide Emission Limits

Emission Source	Control Equipment (CE)	Stack Vent (SV)	Description
Petroleum Coke and Fluxant Storage and Handling Facilities			
FS-100	-	-	Coke Storage Pad
FS-1100	-	-	Intermediate Storage Pile
FS-101	-	-	Coke Feeder Breaker Hopper
EU-101	CE-101	SV-101	Coke Crusher
FS-102	-	-	Coke Feeder Breaker Conveyor
EU-102	-	SV-102	Coke Storage Silo
FS-103	-	-	Coke Feeder Breaker
EU-103 A/B	-	SV-103 A/B	Coke Belt Feeder
EU-104 A/B	-	SV-103 A/B	Fluxant Belt Feeder
FS-105	-	-	Coke Crusher Conveyor
EU-105 A/B	-	SV-103 A/B	Rod Mill Conveyor North
FS-106	-	-	Coke Storage Silo Conveyor
FS-107	-	-	Rod Mill Conveyor South
FS-110	-	-	Fluxant Storage Building
FS-111	-	-	Fluxant Feed Hopper
EU-201 A/B	-	SV-201	Grinding Feed Bin/Conveyor
EU-202 A/B	-	SV-202 A/B	Rod Mill
Gasification/Hydrogen Plant			
EU-301/EU-401	-	SV-301	Standby Gasifier Burners
See Note 2	CE-302	SV-302	Gasification Unit Flare
EU-604/EU-605	-	SV-605	CO ₂ Vent
FS-300	-	-	Slag Pad
FS-301	-	-	Gasification Unit Fugitive Emissions
FS-501	-	-	CO ₂ Purification Area Fugitive Emissions
FS-601	-	-	Selexol Area Fugitive Emissions
FS-701	-	-	Recycle PSA Tailgas Area Fugitive Emissions

² EU-302, EU-304, EU-305, EU-306, EU-402, EU-601, EU-602, EU-603, EU-702, EU-803, EU-806, EU-811, EU-906, EU-907, EU-908

Table 2 (cont.) – Emission Sources Included in Facility-Wide Emission Limits

Emission Source	Control Equipment (CE)	Stack Vent (SV)	Description
Ammonia Synthesis Unit			
See Note 3	-	SV-801	Ammonia Flare
EU-802	-	SV-802	Startup Heater
FS-801	-	-	Ammonia Plant Fugitive Emissions
FS-1101	-	-	Product Storage Area Fugitive Emissions
UAN Plant			
See Note 4	-	SV-1001	UAN Flare
EU-1004	-	SV-1003	Nitric Acid Absorber Expander Vent
EU-1004	CE-1004	SV-1004	Nitric Acid Absorber Tail Gas Stack
EU-1005	-	SV-1005	Process Condensate Tank Scrubber
EU-1012	-	SV-1012	UAN Relief Pot
TK-1001	-	-	Nitric Acid Surge Tank
FS-1001	-	-	UAN Plant Fugitive Emissions
Utilities			
EU-901	-	SV-901	Emergency Diesel Generator
EU-902	-	SV-902	Cooling Tower
EU-905	CE-905	SV-905	Lime Silo
See Note 5	-	See Note 6	Steam System Vents
Product Storage and Loading			
See Note 7	-	SV-801	Ammonia Flare
See Note 8	-	SV-1101	Ammonia Storage Flare
FS-1101	-	-	Product Storage Area Fugitive Emissions

B. Individual Emission Source Limits

Petroleum Coke and Fluxant Storage and Handling Facilities

- Coke storage at the facility shall be limited to the following acreages in order to limit PM₁₀ emissions and ensure compliance with PM₁₀ ambient air quality standards:

- Coke Storage Pad (FS-100): 0.7 acres
- Intermediate Storage Pile (FS-1100): 3.7 acres

³ EU-701, EU-801, EU-803, EU-804, EU-805, EU-806, EU-811, EU-909, EU-910

⁴ EU-911, EU-912, EU-1001 A/B, EU-1002, EU-1009

⁵ EU-808, EU-809, EU-1002, EU-1006, EU-1007, EU-1008 and FS-901 are the sources of ammonia emissions from the process into the steam system.

⁶ SV-301, SV-303, SV-403, SV-810 A/B/C, SV-903 A/B, SV-904, SV-916, SV-917, SV-918, SV-1010

⁷ EU-1103, TK-1102, TK-1103, TK-1104

⁸ EU-913, EU-914, EU-1101, EU-1102 A/B

2. The Coke Crusher (EU-101) throughput shall be limited to no more than 5,200 tons of coke during each calendar day (dry), in order to limit PM₁₀ emissions and ensure compliance with PM₁₀ ambient air quality standards.
3. The Coke Crusher Baghouse (CE-101) shall be continuously operated whenever the coke crusher is in operation, except as specified in the Startup, Shutdown, and Malfunction (SSM) plan, in order to limit PM₁₀ emissions. Continuous operation of the baghouse during coke crusher operation is considered BACT for this source.
4. A Startup, Shutdown, and Malfunction (SSM) Plan for the operation of the Coke Crusher Baghouse (CE-101) shall be developed, implemented, and maintained. The plan shall detail operational procedures that will be followed during SSM events in order to minimize emissions.

Gasification/Hydrogen Unit

5. The owner or operator shall limit the sulfur feed rate to the Gasification Unit Flare (CE-302) to no more than 6,250 pounds/hour, in order to limit SO₂ emissions and ensure compliance with SO₂ ambient air quality standards.
6. The owner or operator shall limit SO₂ emissions from the Gasification Unit Flare (CE-302) to no more than 168 tons from routine operations, including routine startup, shutdown, and maintenance activities, excluding periods of malfunction, during each consecutive twelve (12) month period, calculated and updated monthly [i.e., the 12-month period calculated as required by condition B.7 of the Recordkeeping Requirements section irrespective of the operational status of the unit]. The annual SO₂ emission limit from the Gasification Unit Flare is considered BACT for this source.
7. Any excess PSA Tail Gas from the PSA Tail Gas Receiver (EU-702) that is not recycled back into the process shall be routed to the Gasification Unit Flare (CE-302) whenever the Gasification/Hydrogen Unit is in operation, in order to limit CO emissions. Control of the PSA Tail Gas with the Gasification Unit Flare is considered BACT for this source.
8. The Gasification Unit Flare (CE-302) shall be continuously operated whenever the Gasification/Hydrogen Unit is in operation, except as specified in the Startup, Shutdown, and Malfunction (SSM) plan, in order to limit TRS, VOC, and CO emissions. Continuous operation of the flare is considered BACT for TRS, VOC, and CO emissions from Gasification/Hydrogen Unit sources vented to the flare.
9. At all times, including periods of startup, shutdown, and malfunction, the Gasification/Hydrogen Unit, the Gasification Unit Flare (CE-302), and all associated upstream and downstream equipment shall, to the extent practicable, be maintained and operated in a manner consistent with good engineering practice for minimizing emissions.

10. A Startup, Shutdown, and Malfunction (SSM) Plan for the operation and maintenance of the Gasification/Hydrogen Unit, the Gasification Unit Flare (CE-302), and all associated upstream and downstream equipment shall be developed, implemented, and maintained. The plan shall detail operating and maintenance procedures necessary to (1) minimize the frequency of Gasification/Hydrogen Unit shutdowns (thereby reducing the number of startups); (2) prevent the occurrence of malfunctions; (3) prevent the flaring of acid gas or other reduced sulfur compounds; and (4) minimize the quantity of emissions of all pollutants at all times, including periods of startup, shutdown, and malfunction.

UAN Plant

11. The owner or operator shall limit NO_x emissions from the Nitric Acid Tail Gas Stack (EU-1004/CE-1004/SV-1004) to no more than 0.60 pounds of NO_x per ton of nitric acid produced (100% acid basis) averaged over all hours in which the nitric acid plant is in operation during each consecutive 365-day period, excluding periods of malfunction (365-day average). Operation of the SCR and extended nitric acid absorber to maintain this annual operating limit is considered BACT for this source.
12. The owner or operator shall limit NO_x emissions from the Nitric Acid Tail Gas Stack (EU-1004/CE-1004/SV-1004) to no more than 0.8624 pounds of NO_x per ton of nitric acid produced (100% acid basis) averaged over all hours in which the nitric acid plant is in operation during each consecutive 7-day period, excluding periods of startup, shutdown, and malfunction (7-day average). Operation of the SCR and extended nitric acid absorber to maintain this short-term operating limit is considered BACT for this source.
13. The owner or operator shall limit NO_x emissions from the Nitric Acid Tail Gas Stack (EU-1004/CE-1004/SV-1004) resulting from routine startup, shutdown, and maintenance activities to no more than 1,440 pounds during each consecutive 7-day period, calculated and updated weekly [i.e., the 7-day period calculated as required by condition B.11 of the Recordkeeping Requirements section irrespective of the operational status of the unit]. During routine startup, shutdown, and maintenance activities, operation of the extended nitric acid absorber to maintain this short-term operating limit is considered BACT for this source.
14. The control equipment (SCR system) on the Nitric Acid Absorber Tail Gas Stack (SV-1004) shall be continuously operated whenever the Nitric Acid Unit is in operation, except as specified in the Startup, Shutdown, and Malfunction (SSM) plan, in order to limit NO_x emissions. Operation of the SCR system in accordance with the SSM plan is considered BACT for this source.

15. At all times, including periods of startup, shutdown, and malfunction, the nitric acid plant, extended absorption system, SCR system (CE-1004), and all associated upstream and downstream equipment shall, to the extent practicable, be maintained and operated in a manner consistent with good engineering practice for minimizing emissions.
16. A Startup, Shutdown, and Malfunction (SSM) Plan for the operation and maintenance of the nitric acid plant, extended absorption system, SCR system (CE-1004), and all associated upstream and downstream equipment shall be developed, implemented, and maintained. The plan shall detail operating and maintenance procedures necessary to (1) minimize the frequency of nitric acid plant shutdowns (thereby reducing the number of startups); (2) prevent the occurrence of malfunctions; and (3) minimize the quantity of emissions of all pollutants at all times, including periods of startup, shutdown, and malfunction.
17. The ammonium nitrate concentration in the Process Condensate Tank Scrubber (EU-1005) shall be limited to no more than 1% on a 7-day rolling average, in order to limit PM₁₀ emissions. Control of the ammonium nitrate concentration and use of a high efficiency mist eliminator in the scrubber is considered BACT for this source.

General Plant

18. The operation of the Emergency Diesel Generator (EU-901) shall be limited to emergency situations and routine testing and maintenance, and shall be limited to no more than 300 hours during each consecutive 12-month period, in order to limit NO_x emissions.
19. The sum of the total dissolved solids (TDS) and total suspended solids (TSS) concentration of the Cooling Tower (EU-902) shall be limited to no more than 1,600 milligram per liter (mg/l) on a 7-day rolling average, in order to limit PM₁₀ emissions and ensure compliance with PM₁₀ ambient air quality standards. The use of a mist eliminator and the control of the TDS and TSS concentrations in the cooling tower to achieve this short-term limit are considered BACT for this source.
20. The Lime Silo Baghouse (CE-905) shall be continuously operated whenever lime is being loaded into the silo, in order to limit PM₁₀ emissions and ensure compliance with PM₁₀ ambient air quality standards. Operation of the baghouse during lime loading operations is considered BACT for this source.
21. A written air pollution control equipment operation and maintenance plan shall be developed, implemented, and maintained for each of the control equipment listed in Table 2. [K.A.R. 28-19-501(d)(2)]

22. For the purposes of this permit, the term “malfunction” shall mean any sudden, infrequent, and not reasonably preventable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner. Failures that are caused in part by poor maintenance or careless operation are not malfunctions.

Compliance and Monitoring Requirements

A. Facility-Wide Emission Limits

1. Shown on Table 3 are the Annual Significant Source (SS) Emission Units [emission units that contribute significantly to the Facility-Wide Emission Limit(s)]. Annual SS Emission Units are those emission sources that have individual pollutant emission values that exceed 10% of the pollutant’s Facility-Wide Emission Limit, or are greater than 9 tons per year, whichever is the lower of the two thresholds. Compliance with the annual Facility-Wide Emission Limits in Table 1 shall be demonstrated according to the following tiered approach:
 - a. Individual pollutant emissions from all Annual SS Emission Units (Table 3) shall be calculated and updated monthly, to obtain a total consecutive 12-month period emission rate for all pollutants [i.e., the 12-month period calculated as required by condition A.1 of the Recordkeeping Requirements section irrespective of the operational status of the unit].
 - b. If, at the end of any 12-month period, the total Annual SS Emission Unit emissions for an individual pollutant are greater than ninety percent (90%) of the Total Annual SS Threshold in Table 3, the facility shall calculate, for that period of time, the total emissions from ALL emission units listed in Table 2 that emit that pollutant for the purposes of demonstrating compliance with the annual Facility-Wide Emission Limit in Table 1.

Table 3 – Annual Significant Source (SS) Emission Units

SIGNIFICANT SOURCES	PM₁₀	SO₂⁹	CO	NO_x⁹	TRS	VOC
EU-302/304/402/601		X	X			
EU-305						
EU-306						
EU-602			X	X		
EU-603		X				
EU-604/605			X		X	X
EU-701				X		
EU-702			X	X		
EU-902	X					
EU-910			X			
EU-912			X			
EU-1004 (Tail Gas)				X		
EU-1005	X					
Total Annual SS Threshold (tons/yr)	18	90	720	151	65	59
% of Facility-Wide Emission Limit	78	53	96	73	94	98

2. Shown on Table 4 are the Short-term SS Emission Units [emission units that contribute significantly to the Facility-Wide Emission Limit(s)]. Short-term SS Emission Units are those emission sources that have individual pollutant emission values that exceed 10% of the pollutant's Facility-Wide Emission Limit, or are greater than 4,000 pounds per 7-day period, whichever is the lower of the two thresholds.

Compliance with the short-term Facility-Wide Emission Limits in Table 1 shall be demonstrated according to the following tiered approach:

- a. Individual pollutant emissions from all Short-term SS Emission Units (Table 4) shall be calculated and updated weekly, to obtain a total consecutive 7-day period emission rate for all pollutants [i.e., the 7-day period calculated as required by condition A.2 of the Recordkeeping Requirements section irrespective of the operational status of the unit].

⁹ To conservatively ensure compliance with the facility-wide emission limits, an analysis was performed for the criteria pollutants and TRS to determine the effect of the worst-case non-significant source scenarios on the significant source thresholds. As a result, the significant source thresholds for SO₂ (Table 3) and NO_x (Tables 3 and 4) have been reduced to accommodate worst-case non-significant source scenarios.

- b. If, at the end of any 7-day period, the total Short-term SS Emission Unit emissions for an individual pollutant are greater than ninety percent (90%) of the Total 7-day SS Threshold in Table 4, the facility shall calculate, for that period of time, the total emissions from ALL emission units listed in Table 2 that emit that pollutant, for the purposes of demonstrating compliance with the Short-term Facility-Wide Emission Limit in Table 1.

Table 4 - Short-term Significant Source (SS) Emission Units

SIGNIFICANT SOURCES	PM₁₀	SO₂	CO	NO_x⁹	TRS	VOC
EU-302/304/402/601		X	X		X	
EU-602	X ¹⁰		X	X		
EU-603		X				
EU-604/605			X		X	X
EU-701				X		
EU-702			X			
EU-901				X		
EU-902	X					
EU-910			X			
EU-1004 (Tail Gas)				X		
EU-1005	X					
Total 7-day SS Threshold (pounds/7-days)	988	120,368	110,372	21,500	4,068	2,858
% of Facility-Wide Emission Limit	67	96	96	63	89	91

- The annual (tons/yr) and short-term (lbs/7-days) emissions shall be determined using the general emission calculation methodologies presented in Appendix A.
- Detailed emission calculation methodologies of the annual and short-term emissions for all emission sources shall be maintained in the facility's Air Emissions Calculation Manual and made readily available upon request by authorized KDHE representatives.

B. Individual Emission Source Requirements

Gasification/Hydrogen Unit

- The owner or operator shall demonstrate compliance with the limit on the sulfur feed rate (6,250 pounds/hour) to the Gasification Unit Flare (CE-302) by using the gasifier coke slurry feed rate, coke concentration of the coke slurry, and sulfur content of the coke slurry.

¹⁰ EU-602 is not a PM₁₀ SS emission unit based on the criteria in A.2; however, CRNF considers this emission unit to be significant.

2. The owner or operator shall monitor the gasifier coke slurry feed rate continuously.
3. The owner or operator shall sample the coke slurry at least once per week to determine the sulfur content and coke concentration.
4. The owner or operator shall demonstrate compliance with the annual limit on SO₂ emissions (168 tons) from the Gasification Unit Flare (CE-302) by using the calculation methods referenced in conditions A.3 and A.4 of the Compliance and Monitoring Requirements section.

UAN Plant

5. The owner or operator shall calibrate, maintain, and operate a continuous monitoring system (CMS) for measuring NO_x from the Nitric Acid Absorber Tail Gas Stack (EU-1004/CE-1004/SV-1004). The CMS shall be installed, certified, calibrated, maintained, and operated in accordance with the applicable requirements of 40 CFR 60.11, 60.13, 60.73(a), Part 60 Appendix B Performance Specifications 2, and Part 60 Appendix F Procedure 1.
6. The owner or operator shall demonstrate continuous compliance with the Nitric Acid Absorber Tail Gas Stack (EU-1004/CE-1004/SV-1004) 365-day average NO_x limit by using the CMS. The CMS shall monitor and record the NO_x emission rate expressed as pounds per ton of nitric acid produced (100% acid basis) averaged over all hours in which the nitric acid plant is in operation during each consecutive 365-day period.
7. The owner or operator shall demonstrate continuous compliance with the Nitric Acid Absorber Tail Gas Stack (EU-1004/CE-1004/SV-1004) 7-day average NO_x limit by using the CMS. The CMS shall monitor and record the NO_x emission rate expressed as pounds per ton of nitric acid produced (100% acid basis) averaged over all hours in which the nitric acid plant is in operation during each consecutive 7-day period.
8. The owner or operator shall demonstrate compliance with the 7-day limit on NO_x emissions (1,440 pounds) associated with routine startup, shutdown, and maintenance activities from the Nitric Acid Absorber Tail Gas Stack (EU-1004/CE-1004/SV-1004) by using the calculation methods referenced in conditions A.3 and A.4 of the Compliance and Monitoring Requirements section.
9. The owner or operator shall determine the ammonium nitrate concentration in the Process Condensate Tank Scrubber (EU-1005) at least once per month.
10. The owner or operator shall perform a Relative Accuracy Test Audit (RATA) as specified in 40 CFR Part 60 Appendix F on the nitric acid unit CMS for measuring NO_x within ninety (90) days of issuance of this permit.

11. The owner or operator shall establish a conversion factor for the purpose of converting monitoring data into units of the applicable standard (kg/metric ton, lb/ton) and shall be established as specified in 40 CFR 60.73(b).
12. The owner or operator shall perform a RATA at least once every four calendar quarters on the nitric acid unit CMS and Cylinder Gas Audits (CGA) on the nitric acid unit CMS in each calendar quarter in which a RATA is not conducted in accordance with 40 CFR Part 60 Appendix F Procedure 1.

General Plant

13. The owner or operator shall determine the TDS and TSS concentration of the Cooling Tower (EU-902) at least once per month.

Recordkeeping Requirements

All records shall be maintained on-site for a minimum of two (2) years from the date of the record, unless otherwise noted.

A. Facility-Wide Emission Limits

1. The owner or operator shall maintain monthly records of individual pollutant emissions in accordance with the compliance demonstration approach specified in condition A.1 of the Compliance and Monitoring Requirements section. Records shall be updated monthly, no later than the last day of the month following the month to which the records relate. Records of emissions shall specify the date the record was updated and the amount of each pollutant emitted during the month and the consecutive 12-month period.
2. The owner or operator shall maintain weekly records of individual pollutant emissions, in accordance with the compliance demonstration approach specified in condition A.2 of the Compliance and Monitoring Requirements section. Records shall be updated weekly, no later than the last day of the week following the 7-day period to which the records relate. Records of emissions shall specify the date the record was updated and the amount of each pollutant emitted during the 7-day period.
3. The owner or operator shall review the emission calculation methodologies in the Air Emissions Calculation Manual annually and update, as necessary.

B. Individual Emission Source Requirements

Petroleum Coke and Fluxant Storage and Handling Facilities

1. The owner or operator shall maintain daily records of the coke throughput of the coke crusher (EU-101).
2. The owner or operator shall update, as necessary, the SSM plan for the Coke Crusher Baghouse (CE-101) and maintain a log showing the date the plan was updated and the types of changes made to the plan.

Gasification/Hydrogen Unit

3. The owner or operator shall maintain hourly records of the sulfur feed rate to the Gasification Unit Flare (CE-302).
4. The owner operator shall maintain records of the gasifier coke slurry feed rate.
5. The owner or operator shall maintain records of the coke concentration in the coke slurry.
6. The owner or operator shall maintain records of the sulfur content in the coke slurry.
7. The owner or operator shall maintain monthly records of the SO₂ emissions from the Gasification Unit Flare (CE-302). Records shall be updated monthly, no later than the last day of the month following the month to which the records relate. Records of SO₂ emissions shall specify the date the record was updated and the amount of SO₂ emitted during the month and the consecutive 12-month period.
8. The owner or operator shall maintain records of the date, duration, and mass quantity of emissions from the Gasification Unit Flare (CE-302) that results from each malfunction. These records shall be updated no later than 24 hours following the conclusion of each malfunction event.
9. The owner or operator shall update, as necessary, the SSM plan for the Gasification/Hydrogen Unit, the Gasification Unit Flare (CE-302), and all associated upstream and downstream equipment, and maintain a log showing the date the plan was updated and the types of changes made to the plan.

UAN Plant

10. The owner or operator shall maintain daily records of the 365-day average NO_x emissions (pounds of NO_x per ton of nitric acid produced (100% basis)) from the Nitric Acid Absorber Tail Gas Stack (EU-1004/CE-1004/SV-1004). These records shall be updated daily. Records of NO_x emissions shall specify the date the record was updated, the amount of NO_x emitted during the day, and the rolling 365-day average NO_x emission rate.
11. The owner or operator shall maintain daily records of the 7-day average NO_x emissions (pounds of NO_x per ton of nitric acid produced (100% basis)) from the Nitric Acid Absorber Tail Gas Stack (EU-1004/CE-1004/SV-1004). These records shall be updated daily. Records of NO_x emissions shall specify the date the record was updated and the 7-day average NO_x emission rate.
12. The owner or operator shall maintain weekly records of the 7-day NO_x emissions (pounds of NO_x) from the Nitric Acid Absorber Tail Gas Stack (EU-1004/CE-1004/SV-1004) resulting from routine startup, shutdown, and maintenance activities. Records shall be updated weekly, no later than the last day of the week following the 7-day period to which the records relate. Records of NO_x emissions shall specify the date the record was updated and the amount of NO_x emitted during the 7-day period.
13. The owner or operator shall maintain records of the date, duration, and mass quantity of emissions from the Nitric Acid Absorber Tail Gas Stack (EU-1004/CE-1004/SV-1004) that results from each malfunction. These records shall be updated no later than 24 hours following the conclusion of each malfunction event.
14. The owner or operator shall update, as necessary, the SSM plan for the nitric acid plant, extended absorption system, SCR system (CE-1004), and all associated upstream and downstream equipment, and maintain a log showing the date the plan was updated and the types of changes made to the plan.
15. In accordance with 40 CFR 60.73(c), the owner or operator shall maintain records of the daily production rate and hours of operation of the Nitric Acid Unit.
16. In accordance with 40 CFR 60.486(i)(2), a statement listing the feed or raw materials and products from the Urea Unit and an analysis demonstrating these chemicals are heavy liquids shall be recorded in a log that is kept in a readily accessible location.
17. The owner or operator shall maintain records of the accuracy results from the CGA.

General Plant

18. The owner or operator shall maintain monthly records of the hours of operation of the Emergency Diesel Generator (EU-901). Records shall be updated monthly, no later than the last day of the month following the month to which the records relate.
19. The owner or operator shall maintain records of the TDS and TSS concentration of the Cooling Tower (EU-902).
20. For all air pollution control equipment listed in Table 2, the owner or operator shall maintain a log showing the date of all routine or other maintenance, malfunction or repair of the control equipment, the nature of the action taken on such date, and any corrective action or preventative measures taken. [K.A.R. 28-19-501(d)(3)]
21. The owner or operator shall maintain records that identify each applicable waste stream at the facility and indicate whether or not the waste stream is controlled for benzene emissions, and shall maintain any other applicable records specified in 40 CFR 61.356(b).
22. The owner or operator shall maintain any applicable records as specified in 40 CFR 63.2525. [Subpart FFFF, Miscellaneous Organic Chemical Manufacturing]

Reporting Requirements

UAN Plant

1. The owner or operator shall submit excess emissions reports as required under 40 CFR 60.7(c). In accordance with 40 CFR 60.73(e), periods of excess emissions that shall be reported are defined as any 3-hour period during which the average NO_x emissions (arithmetic average of three contiguous 1-hour periods) as measured by a CMS exceed the standard under 40 CFR 60.72(a).
2. The owner or operator shall include the results of the CGA for the NO_x CMS with the quarterly excess emissions report.

General Plant

3. Deviations which result in emissions exceeding the limits specified in the permit during routine operations, including routine startup, shutdown, and maintenance activities, shall be verbally reported to KDHE no later than the next business day following the discovery of the deviation, with follow-up written notice to KDHE within five business days following discovery of the deviation. The written report shall include the probable cause of the deviation and any corrective actions or preventive measures taken.

4. The owner or operator shall notify KDHE by telephone, facsimile, or electronic mail transmission within two (2) working days following the discovery of any failure of air pollution control equipment, process equipment, or failure of any process to operate in a normal manner which results in emissions exceeding the limits specified in the permit. In addition, the owner or operator shall notify KDHE in writing within ten (10) days of any such failure. The written notification shall include a description of the malfunctioning equipment or abnormal operation, the date the malfunction occurred, the period of time over which emissions increased due to the failure, the cause of the failure, the estimated resultant emissions in excess of the limits, and the methods utilized to mitigate emissions and restore normal operations.
5. Verbal notifications may be made to the Air Program Field Staff at the Southeast District Office in Chanute or to the KDHE Central Office in Topeka. Written notifications shall be made to the KDHE Central Office in Topeka, with a copy to the Air Program Field Staff at the Southeast District Office in Chanute.
6. In accordance with 40 CFR 61.357(b), the owner or operator shall submit to the KDHE a report that updates the information listed in 40 CFR 61.357(a)(1) through (a)(3) whenever there is a change in the process generating the waste stream that could cause the TAB quantity from facility waste to increase to 1 Mg/yr (1.1 ton/yr) or more.
7. The owner or operator shall submit a notification of compliance status report (no later than 150 days after the compliance date) and shall include the information specified in 40 CFR 63.2520(d). [Subpart FFFF, Miscellaneous Organic Chemical Manufacturing]
8. The owner or operator shall submit semiannual compliance reports as specified in 40 CFR 63.2520(b) and shall include the information specified in 40 CFR 63.2520(e). [Subpart FFFF, Miscellaneous Organic Chemical Manufacturing]

Notification

1. The owner or operator shall notify the Air Program Field Staff at the Southeast District Office in Chanute at (620) 431-2390 within sixty (60) days of issuance of this permit so that an evaluation can be conducted to verify compliance with the conditions and recordkeeping requirements in the permit.

General Provisions

1. A construction permit or approval must be issued by KDHE prior to commencing any construction or modification of equipment or processes which results in potential-to-emit increases equal to or greater than the thresholds specified at K.A.R. 28-19-300.

2. Upon presentation of credentials and other documents as may be required by law, representatives of the KDHE (including authorized contractors of the KDHE) shall be allowed to:
 - a. enter upon the premises where a regulated facility or activity is located or conducted or where records must be kept under conditions of this document;
 - b. have access to and copy, at reasonable times, any records that must be kept under conditions of this document;
 - c. inspect at reasonable times, any facilities, equipment (including monitoring and control equipment), practices or operations regulated or required under this document; and
 - d. sample or monitor, at reasonable times, for the purposes of assuring compliance with this document or as otherwise authorized by the Secretary of the KDHE, any substances or parameters at any location.
3. The emission unit or stationary source that is the subject of this document shall be operated in compliance with all applicable requirements of the Kansas Air Quality Act and the federal Clean Air Act.
4. This document is subject to periodic review and amendment as deemed necessary to fulfill the intent and purpose of the Kansas Air Quality Statutes and Regulations.
5. This document does not relieve the permittee of the obligation to obtain other approvals, permits, licenses or documents of sanction that may be required by other federal, state or local agencies.
6. Issuance of this document does not relieve the owner or operator of any requirement to obtain an air quality operating permit under any applicable provision of K.A.R. 28-19-500.

Permit Engineer

Rasha S. Allen
Engineering Associate
Air Permitting Section

RSA:saw
c: Doug Cole, SEDO
C-6543

Date Signed

Appendix A

General Emission Calculation Equations for Monitoring Compliance (Significant Sources – Annual and Short-Term)

The general emission calculation equations presented in this appendix are to be used to determine emission totals as required by items A.1.a and A.2.a of the Compliance and Monitoring Requirements section of the permit. The equations in this Appendix are based on the emission estimation methodologies included in the October 25, 2005 PSD permit application and all of its revisions. Specific representations in the permit application and revisions that are referenced as limitations in the permit are considered federally enforceable conditions or limits. All other representations in the application and revisions are intended for illustration purposes only and are not federally enforceable conditions or limits. They are only an example of how facility-wide emissions can be established for a given pollutant.

I. Methods for Annual Calculations

A. SO₂ Significant Source Calculation Method:

- 1. Gasifier Flare (SV-302)** – The Gasifier Flare receives process gas from several sources for destruction. Some of these gas streams contain sulfur compounds that are combusted to SO₂. On an annual basis, the Gasifier Flare is a Significant Source for SO₂.

1-1. EU-302/304/402/601 (Gasifier/Sour Gas System)

Assumptions:

- a. SO₂ is generated from destruction of H₂S and COS.
- b. H₂S and COS are converted to an H₂S equivalent for calculations.
- c. Flare destruction efficiency from vendor.
- d. Flare is BACT for H₂S/SO₂.
- e. Process gas sulfur rate is based on coke sulfur analysis and plant material balances.

Monthly

EU-302/304/402/601 SO₂ (tons/month) = Process gas sulfur rate (as H₂S) to flare
x flare destruction efficiency x venting hours x MW of SO₂ / MW of H₂S

Annual

EU-302/304/402/601 SO₂ (tons/year) = Sum of current calendar month SO₂
emissions total + total SO₂ emissions from preceding 11 calendar months

1-2. EU-603 Flash Gas Compressor Vent

Assumptions:

- SO₂ is generated from destruction of H₂S and COS.
- H₂S and COS are converted to an H₂S equivalent for calculations.
- Flare destruction efficiency is from vendor.
- Flare is BACT for H₂S/SO₂.
- Process gas sulfur rate is based on coke sulfur analysis and plant material balances.

Monthly

EU-603 SO₂ (tons/month) = Process gas sulfur rate (as H₂S) to flare x flare destruction efficiency x venting hours x MW of SO₂ / MW of H₂S

Annual

EU-603 SO₂ (tons/year) = Sum of current calendar month SO₂ emissions total + total SO₂ emissions from preceding 11 calendar months

SO₂ Significant Source Annual Total

Annual Total SO₂ from Gasifier Flare (SV-302) = Annual Total SO₂ from EU-302/304/402/601 + Annual Total SO₂ from EU-603

B. CO Significant Source Calculation Method:

- 1. Gasifier Flare (SV-302)** – The Gasifier Flare receives process gas from several sources for destruction. Some streams contain a large volume of CO. Small amounts of the CO are not completely combusted in the flare. On an annual basis, the Gasifier Flare is a Significant Source for CO.

1-1. EU-302/304/402/601 (Gasifier/Sour Gas System)

Assumptions:

- Flare destruction efficiency is from vendor.
- Flare is BACT for CO.
- Process gas carbon monoxide rate is based on plant mass balance.

Monthly

EU-302/304/402/601 CO (tons/month) = Process gas carbon monoxide rate to flare x CO slip at flare (1 – flare destruction efficiency) x venting hours

Annual

EU-302/304/402/601 CO (tons/year) = Sum of current calendar month CO total + total CO from preceding 11 calendar months

1-2. EU-602 CO₂ Absorber Overhead Vent (Raw Hydrogen)

Assumptions:

- Flare destruction efficiency is from vendor.
- Flare is BACT for CO.
- Process gas carbon monoxide rate is based on plant mass balance.

Monthly

EU-602 CO (tons/month) = Process gas carbon monoxide rate to flare x CO slip at flare (1 – flare destruction efficiency) x venting hours

Annual

EU-602 CO (tons/year) = Sum of current calendar month CO total + total CO from preceding 11 calendar months

1-3. EU-702 PSA Tail Gas Vent

Assumptions:

- A portion of the PSA tail gas is purged to the Gasifier Flare to remove inerts from the tail gas recycle stream.
- Flare destruction efficiency is from vendor.
- Flare is BACT for CO.

Monthly

EU-702 CO (tons/month) = Process gas carbon monoxide rate to flare x CO slip at flare (1 – flare destruction efficiency) x venting hours

Annual

EU-702 CO (tons/year) = Sum of current calendar month CO total not burned + total CO not burned from preceding 11 calendar months

Annual Total unburned CO from Gasifier Flare (SV-302) = Annual Total CO from EU-302/304/402/601 + Annual Total from EU-602 + Annual Total CO from EU-702

2. CO₂ Vent (EU-604/605) – The CO₂ Vent is part of the Selexol Acid Gas Removal System. After H₂S and CO₂ have been removed from the process gas, small quantities of the remaining contaminants and CO are vented through the CO₂ Vent to the atmosphere. On an annual basis, the CO₂ Vent is a Significant Source of CO.

2-1. EU-604/605 CO₂ Vent

Assumptions:

- Material Balance Emission Factor derived from dry coke feed rate.

Monthly

EU-604/605 CO (tons/month) = EU-605 Material Balance Emission Factor x monthly hours of operation + EU-604 Material Balance Emission Factor x monthly maintenance hours

Annual

EU-604/605 CO (tons/year) = Sum of current calendar month CO total for **EU-605** + total CO for **EU-605** from preceding 11 calendar months + Sum of current calendar month CO total for **EU-604** + total CO for **EU-604** from preceding 11 calendar months

- 3. Ammonia Flare (SV-801)** – When process gas from the ammonia plant is sent to the Ammonia Flare, additional natural gas is added (startup assist natural gas) to the process gas stream to ensure sufficient heat value for efficient destruction in the flare. On an annual basis, the CO generated from the combined process gas and startup assist natural gas is considered to be an annual Significant Source.

3-1. EU-910 Startup Assist Natural Gas

Assumptions:

- a. CO Emission Factor.

Monthly

EU-910 CO (tons/month) = Monthly natural gas heat input x monthly hours using assist gas x CO emission factor

Annual

EU-910 CO (tons/year) = Sum of current calendar month CO emissions total + total CO emissions from preceding 11 calendar months

- 4. UAN Flare (SV-1001)** – When process gas from the UAN plant is sent to the UAN Flare, additional natural gas is added (startup assist natural gas) to the process gas stream to ensure sufficient heat value for efficient destruction in the flare. On an annual basis, the CO generated from the combined process gas and startup assist natural gas is considered to be an annual Significant Source.

4-1. EU-912 Startup Assist Natural Gas

Assumptions:

- a. CO Emission Factor.

Monthly

EU-912 CO (tons/month) = Monthly natural gas heat input x monthly hours using assist gas x CO emission factor

Annual

EU-912 CO (tons/year) = Sum of current calendar month CO emissions total + total CO emissions from preceding 11 calendar months

CO Significant Source Annual Total

Annual Total CO from All Significant Sources = Annual Total CO from SV-302 + Annual Total from EU-604/605 + Annual Total from EU-910 + Annual Total from EU-912

C. NO_x Significant Source Calculation Method:

1. **Gasifier Flare (SV-302)** – The Gasifier Flare receives process gas from several sources for destruction. PSA Tail Gas (EU-702) vents to the flare on a continuous basis to remove remaining impurities. During some plant conditions, raw hydrogen may be routed through the CO₂ Absorber Overhead Vent (EU-602) to the Gasifier Flare for disposal. During disposal in the flare, thermal NO_x is generated. On an annual basis, the Gasifier Flare is considered to be a Significant Source for NO_x from the raw hydrogen disposal and PSA Tail Gas Vents.

1-1. EU-602 CO₂ Absorber Overhead Vent (Raw Hydrogen)

Assumptions:

- a. Flare destruction efficiency is from vendor.
- b. Flare is BACT for NO_x.
- c. Thermal NO_x Emission Factor.

Monthly

EU-602 NO_x (tons/month) = Monthly hydrogen heat input x hydrogen venting hours per month x thermal NO_x emission factor

Annual

EU-602 NO_x (tons/year) = Sum of current calendar month NO_x emissions total + total NO_x emissions from preceding 11 calendar months

1-2. EU-702 PSA Tail Gas Vent

Assumptions:

- a. Flare destruction efficiency is from vendor.
- b. Flare is BACT for NO_x.
- c. Thermal NO_x Emission Factor.

Monthly

EU-702 NO_x (tons/month) = Daily PSA tail gas heat input x venting hours per month x thermal NO_x emission factor

Annual

EU-702 NO_x (tons/year) = Sum of current calendar month NO_x emissions total + total NO_x emissions from preceding 11 calendar months

Annual Total NO_x from SV-302 = Annual Total NO_x from EU-602 + Annual Total NO_x from EU-702

2. **Ammonia Flare (SV-801)** – During certain plant conditions, hydrogen from the PSA system (EU-701) may be sent to the Ammonia Flare for destruction in the flare. During disposal in the flare, thermal NO_x is generated. On an annual basis, the Ammonia Flare is considered to be a Significant Source for NO_x from the hydrogen disposal.

2-1. EU-701 PSA Hydrogen

Assumptions:

- a. Thermal NO_x Emission Factor.

Monthly

EU-701 NO_x (tons/month) = Monthly hydrogen heat input x hydrogen venting hours per month x thermal NO_x emission factor

Annual

EU-701 NO_x (tons/year) = Sum of current calendar month NO_x emission total + total NO_x emissions from preceding 11 calendar months

- 3. Nitric Acid Absorber Tail Gas Stack (SV-1004)** – In the production of Nitric Acid, NO_x is generated and then converted to acid. Any remaining NO_x in the Absorber Tail Gas Stream is removed by a Selective Catalytic Reduction (SCR) prior to venting to the atmosphere. On an annual basis the Absorber Tail Gas stream exiting the SCR is a Significant Source of NO_x.

3-1. EU-1004 Nitric Acid Absorber Tail Gas Stack

Assumptions:

- a. NO_x consists entirely of NO₂ (versus NO) to obtain maximum potential emissions.
- b. Nitric acid absorber stack is equipped with selective catalytic reduction (SCR) to reduce NO_x emissions.
- c. The SCR and extended nitric acid absorber are BACT for NO_x.
- d. SCR efficiency is based on catalyst at end-of-life.
- e. NO_x CEM available on exit of SCR.

Monthly

EU-1004 NO_x (ton/month) = Nitric acid production rate x NO_x factor x NO_x concentration (CEM)

Annual

EU-1004 NO_x (tons/year) = Sum of current calendar month NO_x emissions total + total NO_x emissions from preceding 11 calendar months

NO_x Significant Source Annual Total

Annual Total NO_x from All Significant Sources = Annual Total NO_x from SV-302 + Annual Total NO_x from EU-701 + Annual Total NO_x from SV-1004

D. PM₁₀ Significant Source Calculation Method:

- 1. Cooling Tower (SV-902)** – Recirculated cooling water is used in various process areas. Evaporation from the cooling tower potentially generates particulate matter. The cooling tower is considered to be a Significant Source of PM₁₀ on an annual basis.

1-1. EU-902 Cooling Tower

Assumptions:

- a. Rated cooling water circulation rate and drift factor specified by the cooling tower vendor.

Monthly

EU-902 PM₁₀ (tons/month) = Cooling Tower water circulation rate x drift factor x (Cooling Water Total Dissolved Solids + Cooling Water Total Suspended Solids) x monthly hours of operation

Annual

EU-902 PM₁₀ (tons/year) = Sum of current calendar month PM₁₀ emissions total + total PM₁₀ emissions from preceding 11 calendar months

- 2. Process Condensate Tank Scrubber (SV-1005)** – Water vapor containing a small amount of ammonium nitrate that is generated in the ammonium nitrate production process is sent through the Process Condensate Tank Scrubber (EU-1005) where nearly all of the ammonium nitrate is removed from the stream before the remaining water vapor is vented to the atmosphere. On an annual basis, the ammonium nitrate remaining in the vented stream is considered to be a Significant Source of PM₁₀.

2-1. EU-1005 Process Condensate Tank Scrubber

Assumptions:

- a. Drift factor is an engineering estimate.
- b. Control efficiency based on vendor design information.
- c. PM₁₀ emission factor based on vendor information.

Monthly

EU-1005 PM₁₀ (tons/month) = Monthly ammonium nitrate production rate x drift factor x PM₁₀ emission factor

Annual

EU-1005 PM₁₀ (tons/year) = Sum of current calendar month PM₁₀ emissions total + total PM₁₀ emissions from preceding 11 calendar months

PM₁₀ Significant Source Annual Total

Annual Total PM₁₀ from All Significant Sources = Annual Total PM₁₀ from SV-902 + Annual Total PM₁₀ from SV-1005

E. Total Reduced Sulfur (TRS) Significant Source Calculation Method:

- 1. CO₂ Vent (EU-604/605)** – The CO₂ Vent is part of the Selexol Acid Gas Removal System. Total Reduced Sulfur (TRS) compounds consist of H₂S (hydrogen sulfide) and COS (carbonyl sulfide). After H₂S and COS have been removed from the process gas, small quantities of the contaminants that remain in the stream are vented through the CO₂ Vent to the atmosphere. On an annual basis, the CO₂ Vent is considered to be a Significant Source of TRS.

Assumptions:

- a. Annual and short-term COS and H₂S material balance factors are based on average sulfur content in coke.
- b. Material Balance Emission Factor derived from dry coke feed rate.

1-1. Monthly COS

EU-604/605 COS (tons/month) = EU-605 COS Material Balance Emission Factor x monthly hours of operation + EU-604 COS Material Balance Emission Factor x monthly maintenance hours

1-2. Monthly H₂S

EU-604/605 H₂S (tons/month) = EU-605 H₂S Material Balance Emission Factor x monthly hours of operation + EU-604 H₂S Material Balance Emission Factor x monthly maintenance hours

Monthly TRS

EU-604/605 TRS (tons/month) = Monthly COS (tons/month) from EU-604/605 + Monthly H₂S (tons/month) from EU-604/605

Annual TRS

EU-604/605 TRS (tons/year) = Sum of current calendar month TRS emissions total + total TRS emissions from preceding 11 calendar months

TRS Significant Source Annual Total

Annual Total TRS from all Significant Sources (tons/year) = Annual total TRS from EU-604/605

F. Volatile Organic Compound (VOC) Significant Source Calculation Method:

- 1. CO₂ Vent (EU-604/605)** – The CO₂ Vent is part of the Selexol Acid Gas Removal System. Total Reduced Sulfur (TRS) compounds consist of H₂S (hydrogen sulfide) and COS (carbonyl sulfide). After H₂S and COS have been removed from the process gas, small quantities of the contaminants that remain in the stream are vented through the CO₂ Vent to the atmosphere. COS is considered to be a VOC and is the only hazardous air pollutant (HAP) emitted in significant quantity. On an annual basis, the CO₂ Vent is considered to be a Significant Source of COS.

Assumptions:

- a. Annual and short-term COS and H₂S material balance factors are based on average sulfur content in coke.
- b. Material Balance Emission Factor derived from dry coke feed rate.

Monthly COS

EU-604/605 COS (tons/month) = EU-605 Material Balance Emission Factor x monthly hours of operation + EU-604 Material Balance Emission Factor x monthly maintenance hours

Annual COS

EU-604/605 COS (tons/year) = Sum of current calendar month COS emissions total + total COS emissions from preceding 11 calendar months

VOC Significant Source Annual Total

Annual Total VOC (COS) from all Significant Sources (tons/year) = Annual total COS from EU-604/605

II. Methods for Short-Term (7-day) Calculations

A. **SO₂ Significant Source Calculation Method:**

1. **Gasifier Flare (SV-302)** – The Gasifier Flare receives process gas from several sources for destruction. Some of these gas streams contain sulfur compounds that are combusted to SO₂. On a short-term basis (7-day), the Gasifier Flare is a Significant Source for SO₂.

1-1. EU-302/304/402/601 (Gasifier/Sour Gas System)

Assumptions:

- a. SO₂ is generated from destruction of H₂S and COS.
- b. H₂S and COS are converted to an H₂S equivalent for calculations.
- c. Flare destruction efficiency is from vendor.
- d. Flare is BACT for H₂S/SO₂.
- e. Process gas sulfur rate is based on coke sulfur analysis and plant material balances.

Short Term (7-day) EU-302/304/402/601 SO₂ (lbs/7-days) = Process gas sulfur rate (as H₂S) to flare x flare destruction efficiency x venting hours during 7-days x MW of SO₂ / MW of H₂S

1-2. EU-603 Flash Gas Compressor Vent

Assumptions:

- a. SO₂ is generated from destruction of H₂S and COS.
- b. H₂S and COS are converted to an H₂S equivalent for calculations.
- c. Flare destruction efficiency is from vendor.
- d. Flare is BACT for H₂S/SO₂.
- e. Process gas sulfur rate is based on coke sulfur analysis and plant material balances.

Short Term (7-day) EU-603 SO₂ (lbs/7-days) = Process gas sulfur rate (as H₂S) to flare x flare destruction efficiency x venting hours during 7-days x MW of SO₂ / MW of H₂S

SO₂ Significant Source Short-Term Total

Short Term (7-day) SO₂ from All Significant Sources = 7-Day Total SO₂ from EU-302/304/402/601 + 7-Day Total SO₂ from EU-603

B. CO Significant Source Calculations:

1. **Gasifier Flare (SV-302)** – The Gasifier Flare receives process gas from several sources for destruction. Some streams contain a large volume of CO. Small amounts of the CO are not completely combusted in the flare. On a short-term basis (7-day), the Gasifier Flare is a Significant Source for CO.

1-1. EU-302/304/402/601 (Gasifier/Sour Gas System)

Assumptions:

- a. Flare destruction efficiency is from vendor.
- b. Flare is BACT for CO.
- c. Process gas carbon monoxide rate is based on plant mass balance.

Short Term (7-day) EU-302/304/402/601 CO (lbs/7-days) = Process gas carbon monoxide rate to flare x CO slip at flare (1 – flare destruction efficiency) x venting hours during 7-days

1-2. EU-602 CO₂ Absorber Overhead Vent (Raw Hydrogen)

Assumptions:

- a. Flare destruction efficiency is from vendor.
- b. Flare is BACT for CO.
- c. Process gas carbon monoxide rate is based on plant mass balance.

Short Term (7-day) EU-602 CO (lbs/7-days) = Process gas carbon monoxide rate to flare x CO slip at flare (1 – flare destruction efficiency) x venting hours during 7-days

1-3. EU-702 PSA Tail Gas Vent

Assumptions:

- a. A portion of the PSA tail gas is continuously purged to the Gasifier Flare to remove inerts from the tail gas recycle stream.
- b. Flare destruction efficiency is from vendor.
- c. Flare is BACT for CO.

Short Term (7-day) EU-702 CO (lbs/7-days) = Process gas carbon monoxide rate to flare x CO slip at flare (1 – flare destruction efficiency) x venting hours during 7-days

Total Short Term (7-day) CO from SV-302 = 7-Day Total CO from EU-302/304/402/601 + 7-Day Total CO from EU-602 + 7-Day Total CO from EU-702

2. **CO₂ Vent (EU-604/605)** – The CO₂ Vent is part of the Selexol Acid Gas Removal System. After H₂S and CO₂ have been removed from the process gas, small quantities of the remaining contaminants and CO are vented through the CO₂ Vent to the atmosphere. On a short-term basis (7-day), the CO₂ Vent is a Significant Source of CO.

2-1. EU-604/605 CO₂ Vent

Assumptions:

- a. Material Balance Emission Factor derived from dry coke feed rate.

Short Term (7-day) EU-604/605 CO (lbs/7-days) = EU-605 Material Balance Emission Factor x 7-day hours of operation + EU-604 Material Balance Emission Factor x 7-day maintenance hours

3. **Ammonia Flare (SV-801)** – When process gas from the ammonia plant is sent to the Ammonia Flare, additional natural gas is added (startup assist natural gas) to the process gas stream to ensure sufficient heat value for efficient destruction in the flare. On a short-term basis (7-day), the CO generated from the combined process gas and startup assist natural gas is considered to be a Significant Source.

3-1. EU-910 Startup Assist Natural Gas

Assumptions:

- a. CO Emission Factor.

Short Term (7-day)

EU-910 CO (lbs/7-days) = Natural gas heat input x hours using assist gas during 7-days x CO emission factor

CO Significant Source Short-Term Total

Short Term (7-day) CO from All Significant Sources = Total Short Term CO from SV-302 + Total Short Term from EU-604/605 + Total Short Term from EU-910

C. NO_x Significant Source Calculation Method:

1. **Gasifier Flare (SV-302)** – The Gasifier Flare receives process gas from several sources for destruction. During some plant conditions, raw hydrogen may be routed through the CO₂ Absorber Overhead Vent (EU-602) to the Gasifier Flare for disposal. During disposal in the flare, thermal NO_x is generated. On a short term basis (7-day), the Gasifier Flare is considered to be a Significant Source for NO_x from the raw hydrogen disposal.

1-1. EU-602 CO₂ Absorber Overhead Vent (Raw Hydrogen)

Assumptions:

- a. Flare destruction efficiency is from vendor.
b. Flare is BACT for NO_x.

- c. Thermal NO_x Emission Factor.

Short Term (7-day) EU-602 NO_x (lbs/7-days) = Hydrogen heat input x hydrogen venting hours per 7-days x thermal NO_x emission factor

- 2. Ammonia Flare (SV-801)** – During certain plant conditions, hydrogen from the PSA system (EU-701) may be sent to the Ammonia Flare for destruction in the flare. During disposal in the flare, thermal NO_x is generated. On a short term basis (7-day), the Ammonia Flare is considered to be a Significant Source for NO_x from the hydrogen disposal.

2-1. EU-701 PSA Hydrogen

Assumptions:

- a. Thermal NO_x Emission Factor

Short Term (7-day) EU-701 NO_x (lbs/7-days) = Hydrogen heat input x hydrogen venting hours per 7-days x thermal NO_x emission factor

- 3. Emergency Diesel Generator (EU-901)** – The diesel generator is maintained for emergency operations. When in operation, the diesel generator is considered to be a short term Significant Source of NO_x.

Assumptions:

- a. Emergency generator combusts diesel fuel only.
b. Emission factor based on performance data supplied by the vendor.

Short Term (7-day) EU-901 NO_x (lb/7-days) = Diesel fuel heat input x venting hours per 7-days x NO_x emission factor

- 4. Nitric Acid Absorber Tail Gas Stack (SV-1004)** – In the production of Nitric Acid, NO_x is generated and then converted to acid. Any remaining NO_x in the Absorber Tail Gas Stream is removed by a Selective Catalytic Reduction (SCR) prior to venting to the atmosphere. On a short-term basis (7-day), the Absorber Tail Gas stream exiting the SCR is a Significant Source of NO_x.

4-1. EU-1004 Nitric Acid Absorber Tail Gas Stack

Assumptions:

- a. NO_x consists entirely of NO₂ (versus NO) to obtain maximum potential emissions.
b. Nitric acid absorber stack is equipped with selective catalytic reduction (SCR) to reduce NO_x emissions.
c. The SCR and extended nitric acid absorber are BACT for NO_x.
d. SCR efficiency is based on catalyst at end-of-life.
e. NO_x CEM available on exit of SCR.

Short Term (7-day)

EU-1004 NO_x (lbs/7-days) = Nitric Acid production rate x NO_x factor x NO_x concentration (CEM)

NO_x Significant Source Short-Term Total

Total Short Term (7-day) NO_x from All Significant Sources = Total Short Term NO_x from SV-302 (EU-602) + Total Short Term NO_x from SV-801 (EU-701) + Total Short Term NO_x from EU-901 + Total Short Term NO_x from EU-1004

D. PM₁₀ Significant Source Calculation Method:

1. **Gasifier Flare (SV-302)** – The Gasifier Flare receives process gas from several sources for destruction. During some plant conditions, raw hydrogen may routed through the CO₂ Absorber Overhead Vent (EU-602) to the Gasifier Flare for disposal. During disposal in the flare, PM₁₀ is generated. On short term (7-day) basis, the Gasifier Flare is considered to be a Significant Source for PM₁₀ from the raw hydrogen disposal and PSA Tail Gas Vents.

1-1. EU-602 CO₂ Absorber Overhead Vent (Raw Hydrogen)

Assumptions:

- a. Flare destruction efficiency is from vendor.
- b. PM₁₀ emission factor provided by vendor.
- c. Stream contains no hydrocarbons beyond methane that could form soot.
- d. PM₁₀ from natural gas is calculated separately.

Short Term (7-day)

EU-602 PM₁₀ (lb/7-days) = Hydrogen heat input x hydrogen venting hours per 7-days x PM₁₀ emission factor

2. **Cooling Tower (SV-902)** – Recirculated cooling water is used in various process areas. Evaporation from the cooling tower potentially generates particulate matter. The cooling tower is considered to be a Significant Source of PM₁₀ on a short term (7-day) basis.

Assumptions:

- a. Rated cooling water circulation rate and drift factor specified by the cooling tower vendor.

Short Term (7-day) PM₁₀ (lbs/day) = Cooling Tower water circulation rate x drift factor x (Cooling Water Total Dissolved Solids + Cooling Water Total Suspended Solids) x hours of operation during 7-days

3. **Process Condensate Tank Scrubber (SV-1005)** – Water vapor containing a small amount of ammonium nitrate that is generated in the ammonium nitrate production process is sent through the Process Condensate Tank Scrubber (EU-1005) where nearly all of the ammonium nitrate is removed from the stream before the remaining water vapor is vented to the atmosphere. On a short-term (7-day) basis, the ammonium nitrate remaining in the vented stream is considered to be a Significant Source of PM₁₀.

3-1. EU-1005 Process Condensate Tank Scrubber

Assumptions:

- Drift factor is an engineering estimate.
- Control efficiency based on vendor design information.
- PM₁₀ emission factor based on vendor information.

Short Term (7-day) EU-1005 PM₁₀ (lbs/7-days) = Daily ammonium nitrate production rate for 7-days x drift factor x PM₁₀ emission factor

PM₁₀ Significant Source Short-Term Total

Total Short Term (7-day) PM₁₀ from All Significant Sources = Total Short Term PM₁₀ from SV-302 (EU-602) + Total Short Term PM₁₀ from EU-902 + Total Short Term PM₁₀ from 1005

E. TRS Significant Source Calculation Method:

1. **Gasifier Flare (SV-302)** – The Gasifier Flare receives process gas from several sources for destruction. Some of these gas streams contain sulfur compounds that are combusted to SO₂. Some sulfur-containing compounds (H₂S and COS) are not completely combusted in the gasifier flare and are discharged to the atmosphere. Total Reduced Sulfur (TRS) compounds consist of H₂S (hydrogen sulfide) and COS (carbonyl sulfide). On a short-term basis (7-day), the Gasifier Flare is a Significant Source for TRS.

1-1. EU-302/304/402/601 (Gasifier/Sour Gas System)

Assumptions:

- H₂S and COS are components of the Gasifier/Sour Gas System.
- Flare destruction efficiency is from vendor.
- Flare is BACT for H₂S/COS.
- Process gas sulfur rate is based on coke sulfur analysis and plant material balances.

1-1. Short Term (7-day) COS

EU-302/304/402/601 COS (lbs/7-days) = EU-302/304/402/601 Process gas COS rate to flare x COS slip at flare (1 – flare destruction efficiency) x 7-day venting hours

1-2. Short Term (7-day) H₂S

EU-302/304/402/601 H₂S (lbs/7-days) = EU-302/304/402/601 Process gas H₂S rate to flare x H₂S slip at flare (1 – flare destruction efficiency) x 7-day venting hours

Short Term (7-day) TRS

EU-302/304/402/601 TRS (lbs/7-days) = **Short Term (7-day) COS** (lb/7-days) from **EU-302/304/402/601** + **Short Term (7-day) H₂S** (lb/7-days) from **EU-302/304/402/601**

- 2. CO₂ Vent (EU-604/605)** – The CO₂ Vent is part of the Selexol Acid Gas Removal System. Total Reduced Sulfur (TRS) compounds consist of H₂S (hydrogen sulfide) and COS (carbonyl sulfide). After H₂S and COS have been removed from the process gas, small quantities of the contaminants that remain in the stream are vented through the CO₂ Vent to the atmosphere. On a short-term (7-day) basis, the CO₂ Vent is considered to be a Significant Source of TRS.

Assumptions:

- Annual and short-term COS and H₂S material balance factors are based on average sulfur content in coke.
- Material Balance Emission Factor derived from dry coke feed rate.

2-1. Short Term (7-day) COS

EU-604/605 COS (lbs/7-days) = EU-605 Material Balance Emission Factor x 7-day hours of operation + EU-604 Material Balance Emission Factor x 7-day maintenance hours

2-2. Short Term (7-day) H₂S

EU-604/605 H₂S (lbs/7-days) = EU-605 Material Balance Emission Factor x 7-day hours of operation + EU-604 Material Balance Emission Factor x 7-day maintenance hours

Short Term (7-day) TRS

EU-604/605 TRS (lbs/7-days) = **Short Term (7-day) COS** (lb/7-days) from **EU-604/605** + **Short Term (7-day) H₂S** (lb/7-days) from **EU-604/605**

TRS Significant Source Short-Term Total

Short-Term Total TRS for all Significant Sources (lbs/7-days) = Sum of Daily TRS emissions from EU-302/304/402/601 for the previous seven calendar days + EU-604/605 for the previous seven calendar days

F. Volatile Organic Compound (VOC) Significant Source Calculation Method:

- 1. CO₂ Vent (EU-604/605)** – The CO₂ Vent is part of the Selexol Acid Gas Removal System. Total Reduced Sulfur (TRS) compounds consist of H₂S (hydrogen sulfide) and COS (carbonyl sulfide). After H₂S and COS have been removed from the process gas, small quantities of the contaminants that remain in the stream are vented through the CO₂ Vent to the atmosphere. COS is considered to be a VOC and is the only hazardous air pollutant (HAP) emitted in significant quantity. On short term basis (7-day), the CO₂ Vent is considered to be a Significant Source of COS.

Assumptions:

- a. Annual and short-term COS and H₂S material balance factors are based on average sulfur content in coke.
- b. Material Balance Emission Factor derived from dry coke feed rate.

Short Term (7-day) COS

EU-604/605 VOC (COS) (lbs/7-days) = EU-605 Material Balance Short-term Emission Factor x 7-day hours of operation + EU-604 Material Balance Short-term Emission Factor x 7-day maintenance hours

VOC (COS) Significant Source Short-Term Total

*Short-Term Total VOC (COS) from all Significant Sources (lbs/7-days) = Sum of Daily COS emissions from **EU-604/605** for the previous seven calendar days*

PREVENTION OF SIGNIFICANT DETERIORATION (PSD)

PERMIT SUMMARY SHEET

Permit No.: 1250079

Source Name: Coffeyville Resources Nitrogen Fertilizer Facility

Source Location: 701 East Martin, Coffeyville, KS 67337

Area Designation

K.A.R. 28-19-350, Prevention of Significant Deterioration of Air Quality, is a set of regulations that apply to new major stationary sources and major modifications of major stationary sources located in areas of the state designated as “attainment” or “unclassifiable” under section 107 of the Clean Air Act (CAA) for any criteria pollutant. The State of Kansas, including the Coffeyville area where the facility is located, is classified as “attainment” for the National Ambient Air Quality Standards (NAAQS) for all the criteria pollutants.

Project description

Coffeyville Resources Nitrogen Fertilizers, LLC (CRNF), operates the Coffeyville Nitrogen Fertilizer Facility (Fertilizer Facility) located in Coffeyville, Montgomery County, Kansas. The Fertilizer Facility began construction in December 1997 and was initially started up in July 2000 by Farmland Industries. The “as-built” facility was, and has been, a major source.

The Fertilizer Facility is an integrated process-manufacturing facility that utilizes feedstock of petroleum coke, air, and water to produce salable products of anhydrous ammonia and Urea Ammonium Nitrate (UAN) solution.

Significant Applicable Air Emission Regulations

This Fertilizer Facility is subject to Kansas Administrative Regulations, relating to air pollution control. The application for this permit was reviewed and will be evaluated for compliance with the following applicable regulations:

1. K.A.R. 28-19-300 Construction Permits and Approvals; Applicability. “Any person who proposes to construct or modify a stationary source or emissions unit shall obtain a construction permit before commencing such construction or modification.”

2. K.A.R. 28-19-350 Prevention of Significant Deterioration of Air Quality. “The provisions of this regulation shall apply to the construction of major stationary sources and major modifications of stationary sources in areas of the state designated as attainment areas or unclassified areas for any pollutant under the procedures prescribed by section 107(d) of the federal clean air act [42 U.S.C. 7407 (d)].”
3. K.A.R. 28-19-720 New Source Performance Standards. The Nitric Acid Unit is subject to 40 CFR Part 60 Subpart G, Standards of Performance for Nitric Acid Plants and Subpart VV, Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry (recordkeeping requirements for heavy liquid chemicals exemption).
4. K.A.R. 28-19-735 National Emission Standards for Hazardous Air Pollutants. The facility is subject to 40 CFR Part 61 Subpart FF, National Emission Standard for Benzene Waste Operations (minimal requirements)
5. The facility is subject to 40 CFR Part 63 Subpart FFFF, National Emission Standards for Hazardous Air Pollutants from Miscellaneous Organic Chemical Manufacturing (minimal requirements)

Definitions

1. “Major stationary source” means any of the stationary sources of air pollutants, listed in 40 CFR 52.21, which emits or has the potential-to-emit, 100 tons per year or more of any pollutant subject to the regulation under the federal Clean Air Act, or any other source type which emits or has the potential-to-emit 250 tons per year or more of any air pollutant subject to regulations under the federal Clean Air Act.
2. “Major modification” means any physical change or change in the method of operation of a major stationary source that would result in a significant net emissions increase of any pollutant subject to regulation under the federal Clean Air Act.
3. “Potential-to-emit” means the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is federally enforceable. Secondary emissions shall not be considered in determining the potential-to-emit of a stationary source.

Air Emissions from the Facility

The potential-to-emit of one or more of PSD regulated pollutants from the “as-built” Fertilizer Facility, a listed source category under 40 CFR 52.21, exceeds 100 tons per year. Therefore, the Fertilizer Facility was, and is a major stationary source under the provisions of K.A.R. 28-19-350, which requires the use of best available control technology, an ambient air quality analysis, and an analysis of additional impacts, if any, upon soils, vegetation and visibility.

The Fertilizer Facility is a major source of several criteria pollutants: sulfur dioxide (SO₂), nitrogen oxides (NO_x), and carbon monoxide (CO). Emissions of particulate matter with an aerodynamic diameter less than or equal to 10 micrometers (PM₁₀), volatile organic compounds (VOC), and total reduced sulfur (TRS) are considered significant.

An emission estimate of air pollutants from the Fertilizer Facility is shown in Table 1-2 of Section 1.3 of the permit application. Emissions have been estimated using vendor supplied data, process data, emission factors from the U.S. Environmental Protection Agency document “AP-42, Compilation of Air Pollutant Emission Factors”, and factors from the Texas Commission on Environmental Quality guidance documents.

The facility’s processes and operations are explained in Section 2.0 of the permit application and a detailed explanation of the emission estimates is provided in Section 3.0 of the permit application.

Best Available Control Technology (BACT)

The BACT requirement applies to each new or modified affected emission unit and pollutant emitting activity. In addition, individual BACT determinations are performed for each pollutant emitted from the same emission unit. Consequently, the BACT determination must separately address, for each regulated pollutant with a significant emission increase at the source, air pollution controls necessary for each emission unit or pollutant emitting activity subject to review. CRNF was required to conduct a BACT analysis in accordance with the top-down process described in Attachment A.

KDHE has reviewed the BACT analyses and concurs with CRNF that the Fertilizer Facility is equipped with BACT. KDHE’s evaluation of the BACT analyses is presented in Attachment B.

Ambient Air Impact Analysis

The owner or operator of a proposed major source or modification to a major source must demonstrate that the emissions or emission increase(s) from the proposed operations, in conjunction with all other applicable emission increases or reductions, will not cause or contribute to air pollution in violation of:

- 1) any national ambient air quality standard (NAAQS) in any air quality control region; or
- 2) any applicable maximum allowable increase over the baseline concentration in any area.

CRNF used EPA approved guideline dispersion modeling procedures to predict the ambient air impacts. CRNF submitted a modeling protocol for the Fertilizer Facility on October 29, 2004 and later revised and submitted protocols on July 7, 2005 and July 27, 2005. KDHE sent a letter to CRNF approving the July 27, 2005 modeling protocol.

The AERMOD dispersion model was used to determine the ambient concentrations for each pollutant and applicable averaging periods.

Tables 5-1 through 5-9 of the application contain the screening model results for CO, NO_x, PM₁₀, and SO₂ compared to the modeling significance levels.

For the CO screening analysis, the maximum predicted concentrations were found to be 1024.93 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) and 433.07 $\mu\text{g}/\text{m}^3$ for the 1-hour and 8-hour averaging periods, respectively. The modeling significance levels are 2000 $\mu\text{g}/\text{m}^3$ and 500 $\mu\text{g}/\text{m}^3$ for the 1-hour and 8-hour averaging periods, respectively. Therefore, the maximum concentrations did not exceed the modeling significance levels for the 1-hour and 8-hour averaging periods. The modeling analysis indicates that potential CO emissions from the Fertilizer Facility are not expected to cause a significant deterioration of air quality in the Coffeyville, Kansas area.

For the NO_x screening analysis, the maximum predicted annual concentration was found to be 11.40 $\mu\text{g}/\text{m}^3$ (only an annual average concentration level has been established for NO_x). The annual modeling significance level is 1.0 $\mu\text{g}/\text{m}^3$. Therefore, the maximum concentration exceeded the modeling significance level. The modeling analysis indicates that additional air quality analysis is required to determine whether potential NO_x emissions from the Fertilizer Facility are expected to cause a significant deterioration of air quality in the Coffeyville, Kansas area.

For the PM₁₀ screening analysis, the maximum predicted concentrations were found to be 27.94 µg/m³ and 7.49 µg/m³ for the 24-hour and annual averaging periods, respectively. The modeling significance levels are 5.0 µg/m³ and 1.0 µg/m³ for the 24-hour and annual averaging periods, respectively. Therefore, the maximum concentrations exceeded the modeling significance levels. The modeling analysis indicates that additional air quality analysis is required to determine whether potential PM₁₀ emissions from the Fertilizer Facility are expected to cause a significant deterioration of air quality in the Coffeyville, Kansas area.

For the SO₂ screening analysis, the maximum predicted concentrations were found to be 430.68 µg/m³, 63.45 µg/m³, and 8.35 µg/m³ for the 3-hour, 24-hour, and annual averaging periods, respectively. The modeling significance levels are 25.0 µg/m³, 5.0 µg/m³, and 1.0 µg/m³ for the 3-hour, 24-hour, and annual averaging periods, respectively. Therefore, the maximum concentrations exceeded the modeling significance levels. The modeling analysis indicates that additional air quality analysis is required to determine whether potential SO₂ emissions from the Fertilizer Facility are expected to cause a significant deterioration of air quality in the Coffeyville, Kansas area.

NAAQS Modeling Compliance Demonstration

Tables 7-1 through 7-6 of the application contain the NAAQS analysis modeling results for NO_x, PM₁₀, and SO₂. All results, when added to the background concentrations, were below the NAAQS.

For the NO_x NAAQS analysis, the maximum predicted annual concentration was found to be 16.36 µg/m³. The background concentration of NO_x is 16.7 µg/m³. Therefore, the total maximum concentration was below the annual NO_x NAAQS concentration of 100.0 µg/m³. Therefore, the results of the additional NO_x modeling indicate that no threat to the NAAQS for NO_x is expected to occur within the area of significant impact for the Fertilizer Facility.

For the PM₁₀ NAAQS analysis, the maximum predicted concentrations were found to be 67.06 µg/m³ and 7.00 µg/m³ for the 24-hour and annual averaging periods, respectively. The background concentrations of PM₁₀ are 66.30 µg/m³ and 21.8 µg/m³ for the 24-hour and annual averaging periods, respectively. Therefore, the total maximum concentrations were below the PM₁₀ NAAQS concentrations of 150 µg/m³ and 50 µg/m³. Therefore, the results of the additional PM₁₀ modeling indicate that no threat to the NAAQS for PM₁₀ is expected to occur within the area of significant impact for the Fertilizer Facility.

For the SO₂ NAAQS analysis, the maximum predicted concentrations were found to be 496.64 µg/m³, 188.19 µg/m³, and 32.79 µg/m³ for the 3-hour, 24-hour, and annual averaging periods, respectively. The background concentrations of SO₂ are 291.9 µg/m³, 115.7 µg/m³, and 14.3 µg/m³ for the 3-hour, 24-hour, and annual averaging periods, respectively. Therefore, the total maximum concentrations were below the SO₂ NAAQS concentrations of 1,300 µg/m³, 365 µg/m³, and 80 µg/m³. Therefore, the results of the additional SO₂ modeling indicate that no threat to the NAAQS for SO₂ is expected to occur within the area of significant impact for the Fertilizer Facility.

Class II Increment Modeling Compliance Demonstration

The minor source baseline date for SO₂ and PM in Montgomery County is December 1, 1977. For NO_x, CRNF used a minor source baseline date of August 16, 1994.

Tables 6-1 through 6-7 of the application contain the PSD Class II (the whole state of Kansas is designated as a Class II area) increment analysis modeling results for NO_x, PM₁₀, and SO₂.

For the NO_x PSD increment analysis, the maximum predicted annual concentration was found to be 13.18 µg/m³. The annual NO_x PSD increment is 25.0 µg/m³. Therefore, the maximum concentration was below the annual NO_x PSD increment concentration.

For the PM₁₀ PSD increment analysis, the maximum predicted concentrations were found to be 54.89 µg/m³ and 7.25 µg/m³ for the 24-hour and annual averaging periods, respectively. The PM₁₀ PSD increments are 30.0 µg/m³ and 17.0 µg/m³ for the 24-hour and annual averaging periods, respectively. The annual maximum concentration was below the annual PM₁₀ PSD increment concentration. However, the 24-hour PSD increment concentration was exceeded; therefore, CRNF reviewed the PSD increment exceedances to determine if the Fertilizer Facility had a significant impact at the area where the PSD increment exceedances occurred. This further evaluation passed the 24-hour PM₁₀ PSD increment analysis.

For the SO₂ PSD increment analysis, the maximum predicted concentrations were found to be 398.39 µg/m³, 69.96 µg/m³, and 7.70 µg/m³ for the 3-hour, 24-hour, and annual averaging periods, respectively. The SO₂ PSD increments are 512 µg/m³, 91.0 µg/m³, and 20.0 µg/m³ for the 3-hour, 24-hour, and annual averaging periods, respectively. Therefore, the maximum concentrations were below the SO₂ PSD increment concentrations.

Additional Impact Analysis

CRNF was required to conduct additional analyses to determine if there would be any potential for impairment to visibility and impacts on soils and vegetation as a result of the emissions from the Fertilizer Facility. In addition, an analysis was required to determine to what extent the emissions from the Fertilizer Facility impacts the growth of the general commercial, residential, and industrial sectors, and any other growth impacts that may affect the local area. A summary of these analyses is presented

Visibility Impairment Analysis

CRNF conducted a visibility degradation analysis for NO_x, particulate matter, and SO₂ emissions from the Fertilizer Facility. CRNF performed a Level-1 screening analysis, as described in the "Workbook for Plume Visual Impact Screening and Analysis" (EPA 454/R-92-023) and the EPA VISCREEN model. A visibility analysis is performed for Class I (visibility-sensitive) areas located within 100 kilometers of a proposed facility. There are no Class I areas in Kansas. The analysis was performed at the nearest PSD Class I area, Hercules Glade Wilderness Area, which is located in South Missouri, 251 kilometers to the east-southeast of the Fertilizer Facility. The results indicated that the plume impacts did not exceed the Level-1 screening criteria either inside or outside the Class I area.

Soils and Vegetation Impact

Table 8-1 shows the screening concentrations for impact on soils and vegetation for SO₂, NO_x, and CO. The maximum impacts from the Fertilizer Facility are well below the soil and vegetation screening concentrations. Table 8-2 shows the vegetation impacts of SO₂ on sensitive plants. The highest 3-hour and 24-hour impacts are well below the concentrations which produce 5% injury in sensitive plants, such as cottons and grains.

Growth Analysis

The construction of the Fertilizer Facility began between 1997 and 2000. The population in the Coffeyville area has continued to decline since the early 1980's. Several grandfathered facilities have shutdown since 1977, including the Sherwin Williams facility and several small local foundries.

Attachment A

KEY STEPS IN THE "TOP-DOWN" BACT ANALYSIS

STEP 1: IDENTIFY ALL POTENTIAL AVAILABLE CONTROL TECHNOLOGIES

The first step in a "Top-Down" analysis is to identify, for the emission unit in question, "all available" control options. Available control options are those air pollution control technologies or techniques with a PRACTICAL POTENTIAL FOR APPLICATION to the emissions unit and the regulated pollutant under review. This includes technologies employed outside of the United States. Air pollution control technologies and techniques include the application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of the affected pollutant.

STEP 2: ELIMINATE TECHNICALLY INFEASIBLE OPTIONS

The technical feasibility of the control options identified in Step 1 is evaluated with respect to the source-specific (or emission unit specific) factors. In general, a demonstration of technical infeasibility should be clearly documented and should show, based on physical, chemical, and engineering principles, that difficulties would preclude the successful use of the control option on the emission unit under review. Technically infeasible control options are then eliminated from further consideration in the BACT analysis.

STEP 3: RANK REMAINING CONTROL TECHNOLOGIES BY CONTROL EFFECTIVENESS

All remaining control alternatives not eliminated in Step 2 are ranked and then listed in order of over-all control effectiveness for the pollutant under review, with the most effective control alternative at the top. A list should be prepared for each pollutant and for each emissions unit subject to a BACT analysis. The list should present the array of control technology alternatives and should include the following types of information:

- 1) control efficiencies;
- 2) expected emission rate;
- 3) expected emission reduction;
- 4) environmental impacts;
- 5) energy impacts; and
- 6) economic impacts

STEP 4: EVALUATE MOST EFFECTIVE CONTROLS AND DOCUMENT RESULTS

The applicant presents the analysis of the associated impacts of the control option in the listing. For each option, the applicant is responsible for presenting an objective evaluation of each impact. Both beneficial and adverse impacts should be discussed and, where possible, quantified. In general, the BACT analysis should focus on the direct impact of the control alternative. The applicant proceeds to consider whether impacts of unregulated air pollutants or impacts in other media would justify selection of an alternative control option. In the event the top candidate is shown to be inappropriate, due to energy, environmental, or economic impacts, the rationale for this finding should be fully documented for the public record. Then the next most stringent alternative in the listing becomes the new control candidate and is similarly evaluated. This process continues until the technology cannot be eliminated.

STEP 5: SELECT BACT

The most effective control option not eliminated in Step 4 is proposed as BACT for the emission unit to control the pollutant under review.

Attachment B

KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT'S EVALUATION OF CRNF's PROPOSED BACT OPTIONS

CRNF conducted BACT analyses which indicated that the existing process equipment technologies, emission controls, operational procedures, and operational practices represent BACT for the processes employed at the Fertilizer Facility and that no additional or different emission control equipment is necessary. Please refer to Section 4 of the application for a more detailed evaluation of the BACT analyses.

SO₂ BACT for the Gasifier Area

Only one significant source of SO₂ emissions exists for the Fertilizer Facility, the Gasifier Flare. SO₂ emissions from the Gasifier Flare come from a variety of process equipment sources within the gasifier area, all combusted in the Gasifier Flare. Approximately 90% of the sulfur emissions occur during startup, shutdown, or maintenance events. All other sulfur emissions are continuous or routine. Section 4.1 explains the basis of the BACT analysis and the distribution of the SO₂ emissions between the gasifier vent sources. The annual SO₂ emissions from the Gasifier Flare will not exceed 168 tons per year resulting from routine operations, including routine startup, shutdown, and maintenance activities, and excluding periods of malfunction. CRNF has evaluated each of the following BACT SO₂ control technologies, using U.S. EPA Region 7's proposed cost benefit threshold of \$10,000/ton emission reduction:

H₂S Scavengers/Chemical Oxidants (Sulfur-Rite)

The Sulfur-Rite process, as described by the manufacturer, is a cost-effective solution for continuous H₂S removal for smaller operations with a maximum H₂S load of 400 lb/day (16.7 lb/hr). The process is selective to H₂S and mercaptans and is especially effective where removal of other gas components, such as CO₂, is not required. The manufacturer recommends a maximum flow rate of 2,500 SCFM. The Sulfur-Rite adsorbent media is primarily designed to sweeten anaerobic gas streams and ventilation air containing low levels of H₂S or mercaptans. Instead of adsorbing H₂S, the Sulfur-Rite system chemically changes H₂S into a safe and stable compound: iron pyrite.

This control technology is not technically feasible because CRNF's operating and flow rates are not consistent with the manufacturer's recommendations. Another operating issue is the potential for coke fines to plug or blind the Sulfur-Rite adsorbent material. An economic analysis was performed and it was determined that this control technology is not economically feasible.

Liquid Reduction Oxidation (LO-CAT)

The LO-CAT process is a liquid redox system that uses a chelated iron solution to convert H₂S to elemental sulfur. Per the manufacturer, due to short intermittent durations and frequencies of the Fertilizer Facility's startup process, this control option is not technically feasible for the Gasifier startup SO₂ emissions.

Amine Treating

An Amine Treating Unit removes CO₂ and H₂S from sour gas streams in the Amine Absorber in order to control SO₂ emissions from the Gasifier startup. Per Black and Veatch, the original plant design firm, a single absorber/stripper amine system could potentially start up quicker than the existing Selexol system; however, the system would not be adequate to selectively remove the CO₂ from the H₂S stream. Therefore, the stream would not be suitable for transfer to TKI. An amine system capable of separating H₂S and CO₂ would resemble the existing Selexol system but would not be effective as the Selexol system. The startup time would be similar to the existing Selexol system; therefore, there would not be a reduction in SO₂ emissions.

Wet Gas Scrubber

In a wet scrubber system, flue gas from a process gas burner is ducted to a spray tower where an aqueous slurry of sorbent (limestone or lime) is injected into the flue gas. SO₂ dissolves into the slurry droplets where it reacts with the alkaline particulates. Because the vent streams to the Gasifier Flare do not contain SO₂ but rather H₂S and COS, the vent streams must first be combusted to produce SO₂.

Four separate cases (different streams) were evaluated and it was determined that this control technology is not economically feasible for all cases.

Compressor to Selexol

A compressor would be installed to collect and route the Gasifier vent streams generated during startup to the Selexol Unit. The Selexol Unit operates under a high operating pressure and is not operating when the Gasifier is started up. The gasifier pressure is safely raised from the initial startup pressure to the minimum operating pressure of the Selexol Unit. The compressor would provide a gradual pressure increase instead of letting the process build pressure. Operations and engineering personnel do not believe this type of design could operate safely or reliably under most Gasifier Area SSM conditions. In addition, during startup, the Carbon Scrubber vent routinely contains solids resulting from entrainment. Compressors require clean streams to operate without damage to the compressor system. Therefore, this control option is not technically feasible.

Compressor to Refinery Fuel Gas System

This control option is similar to the previous technology except that the startup gases would be routed to the adjacent CRRM Refinery Fuel Gas system. The refinery personnel indicated that the refinery cannot handle the volume of gases generated by the Fertilizer Facility during startup.

In addition, the refinery fuel system has a sulfur limit that is significantly less than the Fertilizer Facility startup stream content. Even if the smaller volume, higher concentration streams were compressed to the refinery, the refinery could not handle the additional H₂S load. The refinery has a certain H₂S load that is being handled by TKI and the design H₂S load from the Fertilizer Facility startup vent stream has a higher sulfur load.

Low Sulfur Coke during Startup

CRNF evaluated using low sulfur petroleum coke during Gasifier Area SSM events. During normal operation, the Selexol Unit and the adjacent TKI facility control the sulfur-containing gases. CRNF evaluated three cases of low sulfur petroleum coke use for startups and it was determined that this control option is not economically feasible for all cases.

Other Operational Modifications

CRNF evaluated using low sulfur coal instead of low sulfur petroleum coke. Coal characteristics, such as metals, grinding ability, etc., are different from petroleum coke and the same costs required to separate the coal from the coke as presented in the previous control option would also be incurred. Therefore, this control option is not technically or economically feasible.

The Fertilizer Facility's historical SO₂ emissions have decreased by over 50% since the first year of operation. The facility has pursued implementation of operational and instrumentation controls and minor equipment modifications, reducing SO₂ emissions significantly.

Flare

CRNF evaluated installing a flare to control SO₂ emissions. The Fertilizer Facility uses a flare to control the Gasifier startup emissions.

PM₁₀ BACT

The following evaluations were conducted for the largest PM₁₀ emission sources (> 1.0 ton/yr):

Cooling Tower

The cooling tower at the Fertilizer Facility is a high-efficiency cooling tower (induced draft). It is designed for a drift factor of 0.005% (0.42 lb/1000 gal), a reduction of 75% of EPA's AP-42 default factor of 0.02% (1.70 lb/1000 gal). In addition, AP-42 uses a default TDS concentration of 12,000 ppm for induced draft cooling towers. The Fertilizer Facility's PM₁₀ emissions are based on a TDS + TSS concentration of 1,400 ppm, an 88.3% reduction from the AP-42 default concentration. Therefore, the current high-efficiency design and low concentration are BACT for the cooling tower.

Neutralizing Scrubber

The existing mist eliminator (95% efficient) was replaced with a 99% efficient mist eliminator (99%) in December 2005. The analysis for this high efficiency mist eliminator showed a cost-effectiveness of \$214 per ton of PM₁₀ removed.

Intermediate Coke Storage Pile

CRNF evaluated the installation of a water spray system to reduce both the active and inactive storage pile particulate emissions. This control option is not economically feasible.

CO BACT

The following evaluations were conducted for CO emission sources that are not the result of combustion:

Fugitives

CRNF evaluated a leak detection and repair program, to reduce CO by 75%. CRNF also evaluated installing special non-leak valves or welded flange connections. Both of these control options are not economically feasible.

CO₂ Vent

CRNF evaluated installing a catalytic incinerator to destroy CO and other combustibles. A catalytic incinerator would be more cost-effective than a thermal oxidizer because less natural gas would be consumed. Nevertheless, a large amount of natural gas would have to be added to the CO₂ vent stream to raise the temperature of the vent stream to 500 °F in order to catalytically react the CO. In addition, the increased natural gas combustion would generate NO_x and CO emissions. Based on the cost analysis, this control option is not economically feasible.

NO_x BACT

The following evaluation was conducted for the largest source of NO_x emissions. Minor sources of NO_x emissions, combustion sources, cannot be controlled cost-effectively.

Nitric Acid Absorber Tail Gas Stack

This stream (600 ppm_v) is controlled by a selective catalytic reduction (SCR) system (60 ppm_v or less, +90% control efficiency). Per EPA document “Air Pollution Control Fact Sheet – Selective Catalytic Reduction” (EPA-452/F-03-032), a SCR is capable of NO_x reduction efficiencies in the range of 70-90% and higher reductions are possible but generally not cost-effective. The RACT/BACT/LAER Clearinghouse was reviewed and found two higher SCR NO_x control efficiencies at fertilizer facilities in Washington and Oklahoma.

Washington: The inlet NO_x concentration was above 4,000 ppm_v, making it much easier to achieve a greater recovery percentage. Oklahoma: After the state agency reviewed the source, it was determined that an incorrect NO_x control efficiency was entered and the true efficiency was 80%.

The Fertilizer Facility will limit the following:

- 1) NO_x emissions from the Nitric Acid Tail Gas Stack to no more than 0.60 lb of NO_x per ton of nitric acid produced (100% basis) averaged over all hours in which the nitric acid plant is in operation during each consecutive 365-day period, excluding periods of malfunction
- 2) NO_x emissions from the Nitric Acid Tail Gas Stack to no more than 0.8624 lb of NO_x per ton of nitric acid produced (100% basis) averaged over all hours in which the nitric acid plant is in operation during each consecutive 7-day period, excluding periods of startup, shutdown, and malfunction
- 3) NO_x emissions from the Nitric Acid Tail Gas Stack to no more than 1,440 lb during each consecutive 7-day period, resulting from routine startup, shutdown, and maintenance activities

TRS BACT

H₂S and carbonyl sulfide (COS) are reduced sulfur compounds. COS is also a VOC and a HAP. The Fertilizer Facility is subject to the MON MACT. The only non-controlled continuous process vent of HAPs is the CO₂ vent. This stream is considered a Group 2 continuous process vent and does not require controls. The only other process vent with TRS (H₂S and COS) is the Gasifier Flare which already controls these process streams.