

IOWA DEPARTMENT OF NATURAL RESOURCES

LEADING IOWANS IN CARING FOR OUR NATURAL RESOURCES

Environmental Services Division Air Quality Bureau



**Prevention of Significant Deterioration (PSD) Permit Review
Technical Support Document for Issuance of Amended PSD Permits**

Project Number 20-093, Plant Number 97-01-030

**CF Industries Nitrogen, LLC – Port Neal Nitrogen Complex
1182 260th Street
Sergeant Bluff, IA 51054**

Table of Contents

PURPOSE OF THIS DOCUMENT	3
INTRODUCTION TO THE PROJECT	3
BACKGROUND ON CF INDUSTRIES NITROGEN, LLC:	3
DESCRIPTION OF PAST AIR QUALITY PROJECTS FOR THE EXPANSION:	5
PROJECT NUMBER 18-137 DESCRIPTION:	6
REGULATORY BACKGROUND:	111
PSD CONCEPTS:	121
Best Available Control Technology (BACT).....	132
Air Quality Impact Analysis	143
Additional Impact Analysis.....	143
Public Participation	143
GREENHOUSE GAS (GHG) EMISSIONS:.....	154
ANALYSIS OF THE APPLICATION	154
PREVENTION OF SIGNIFICANT DETERIORATION (PSD):.....	154
PSD Applicability	14
Best Available Control Technology (BACT).....	18
PSD Ambient Air Quality Analysis	19
Class I Area Impact Analysis.....	266
Additional Impact Analysis.....	266
Land Use and Soil Characterization:.....	29
Threatened and Endangered Species:.....	29
1Impact of Pollutants:	29
NEW SOURCE PERFORMANCE STANDARDS (NSPS):	322
NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAP):.....	322
OPERATING PERMITS (TITLE V):.....	322
IOWA ADMINISTRATIVE CODE (IAC):	333
CALCULATIONS	34
COMPLIANCE DEMONSTRATION(S)	34
CONFIDENTIALITY	34
PUBLIC NOTICE REQUIREMENTS	34
REOPENING OF PUBLIC COMMENT PERIOD	36
DEPARTMENT DETERMINATION	37
SUPPORTING REFERENCES TO THE ADMINISTRATIVE RECORD NOT FOOTNOTED IN OR	37

Contact Information

Contact information for the CF Industries Nitrogen – Port Neal Nitrogen Complex and the Department’s Air Quality Construction Permit Section can be found in Table 1 below:

Table 1 – Contact Information

CF Industries Contact	AQ Construction Permit Contact
Jeff Schultzen Environmental Superintendent	Gary Smith, PE Environmental Engineer Senior
1182 260 th Street Sergeant Bluff, IA 51504	502 E. 9 th St. Des Moines, IA 50319
Phone: (712) 233-6355 jschultzen@CFindustries.com	Phone: (515) 725-9563 Fax: (515) 725-9501 gary.smith@dnr.iowa.gov

Purpose of this Document

This document has been prepared to fulfill the public participation requirements of 567 Iowa Administrative Code (IAC) 22.2(2) and 567 IAC 33.17.

Introduction to the Project

Background on CF Industries Nitrogen, LLC:

The Central Farmers Fertilizer Company was founded in 1946 by a group of farm cooperatives. Over the years it grew into one of North America’s largest manufacturers and distributors of nitrogen and phosphate fertilizer. In 1970 the name changed from Central Farmers to CF Industries (CF). In 2010 CF acquired Terra Industries Inc. (Terra) making CF even stronger in the global fertilizer industry. CF completed a sale of its phosphate mining and manufacturing operations to the Mosaic Company in 2014. With the sale, CF became exclusively focused on nitrogen products.

CF is headquartered in Deerfield, IL (a suburb of Chicago). Through its subsidiaries it operates seven (7) nitrogen fertilizer manufacturing complexes in the central US and Canada and a network of fertilizer distribution terminals and warehouses.

One of the nitrogen fertilizer manufacturing facilities is the Port Neal Nitrogen Complex in Sergeant Bluff, Iowa. Sergeant Bluff is a city in Woodbury County, Iowa. It is located just south of Sioux City, Iowa and is part of the Sioux City, Iowa-Nebraska-South Dakota Metropolitan Statistical Area. Figure 1 shows a Google map of the area.

The Port Neal Nitrogen Complex contains an ammonia plant, two (2) liquid urea plants, two (2) nitric acid plants, and a urea ammonium nitrate (UAN) plant.

The ammonia plant was built in 1966 and 1967. It originally had a rated capacity of 600 tons of anhydrous ammonia per day. Two (2) major projects increased the capacity to 1,000 tons/day by 1992. The plant had to be rebuilt in 1995 due to an explosion and after the rebuild the capacity has been 1,200 tons/day.

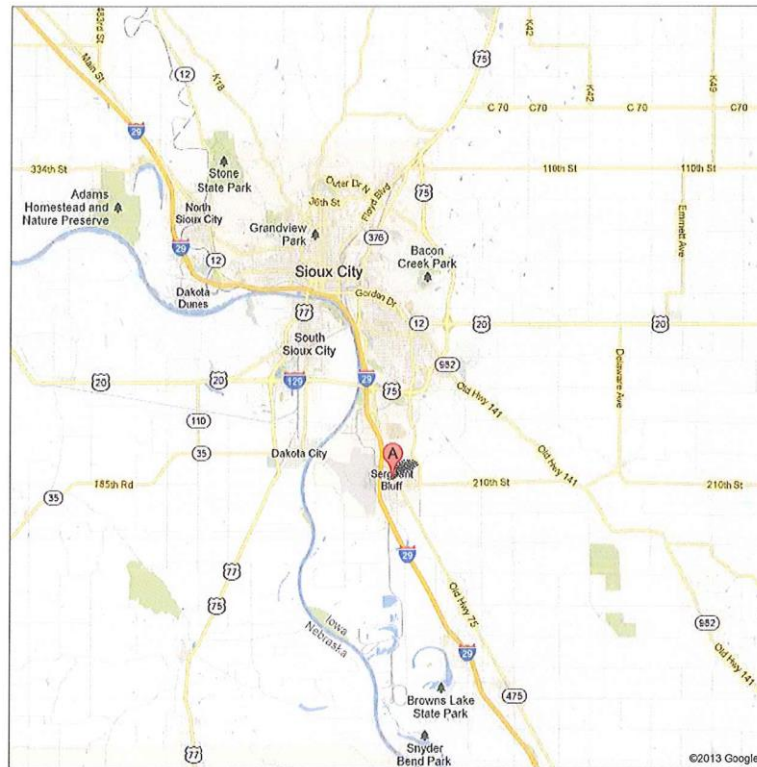


Figure 1 – Google Map of Sergeant Bluff Area

Port Neal’s Urea I and Urea II plants were built in 1967 and 1973, respectively. In 1978, work on the Urea II plant was completed which allowed the facility to produce urea liquor. Urea is used in various agricultural and industrial markets. Port Neal has the capacity to produce 1,075 tons of urea per day and 160 tons of urea liquor per day.

Port Neal’s Nitric Acid plants are called the Acid I and Acid II plants. They were built in 1967 and 1997. Nitric Acid is a commercial chemical that is used as a building block in the production of UAN solutions. Port Neal has the capacity to produce 840 tons per day of nitric acid. The Port Neal UAN plant was built in 1995 and can produce up to 2,400 tons of UAN per day.



Figure 2 – Aerial Photo of Existing Port Neal Nitrogen Complex¹

¹ From *Site Selection Magazine*; *The Midwest Makeover*; January 2013
<http://www.siteselection.com/issues/2013/jan/midwestern-states.cfm>.

Based on approximately 1,200 tons per day of ammonia production and a total energy usage of 34 MMBTU/ton, the total natural gas consumption when Port Neal is operating at capacity is nearly 40,000 MMBTU/day.

Most of the ammonia that Port Neal produces is upgraded into UAN solutions. UAN has been the fastest growing nitrogen product over the past decade because of the versatility it provides growers. UAN can be applied effectively in a variety of soil conditions and is especially useful in various conservation tillage practices. Due to lighter soil types and rolling terrain, the western Corn Belt is prime territory for such practices and therefore, the location of the Port Neal Nitrogen Complex and its UAN product line is ideal for growers in Iowa, Nebraska, South Dakota, Minnesota, and Missouri. The majority of the plant's output is marketed in this five (5) state region.²

Description of Past Air Quality Projects for the Expansion:

CF submitted an application on February 1, 2013 for a new 2,425 ton per day ammonia plant (nameplate capacity) and a new 3,860 ton per day urea plant (nameplate capacity) at the Port Neal Nitrogen Complex (Port Neal). In addition, as part of the project, CF proposed to add control equipment to the existing ammonia plant in order to net the project out of Prevention of Significant Deterioration (PSD) review for nitrogen oxides (NO_x). The application was assigned Project Number (PN) 13-037.

The new ammonia plant produces liquid ammonia that will feed the new granulated urea plant. According to the application for PN 13-037, the expansion project was not expected to affect operations of the existing ammonia plant, nitric acid plants, liquid urea plants, or urea ammonium nitrate (UAN) plant in any way that increases overall facility emissions.

The permits for PN 13-037 were issued on July 12, 2013. Commercial operation was expected to begin in 2016. CF issued a press release on December 28, 2016 stating the new ammonia and urea plants had been successfully commissioned and started up which marked the completion of the expansion project. The ammonia plant started operation in November 2016 and the urea plant started operation in December 2016.

On March 5, 2014 the Department received a request from CF to amend several of the permits from PN 13-037 to address the finalization of some of the engineering plans made during construction of the new ammonia and urea plants. This request was assigned Project Number 14-086 and the amended permits were issued on August 18, 2014. A description of the permit amendments is included in Appendix A.

On March 31, 2015 CF requested a permit amendment to the CO₂ Regenerator (EP 201; permit number 13-A-208-P) permit in order to relocate the stack to the new flare structure and increase the permitted stack height. In addition, CF requested a rescission of permits for the CO₂ vents (EPs 306, 307, and 308; permit numbers 13-A-220-P, 13-A-221-P, and 13-A-222-P, respectively). This request was assigned Project Number 15-126.

During the review of PN 15-126, officials from CF had discussions with the Department about other possible changes to the permits for the new ammonia and urea plants. The additional amendment requests were submitted in November 2015 and the amended permits were issued on March 15, 2016. A description of the permit amendments for PN 15-126 is included in Appendix A.

² From CF website (<https://www.CFindustries.com/>) and application for PN 13-037.

A typographical error was discovered in the permit for the North Admin Building Emergency Generator (EP 409; permit 15-A-582-P). CF submitted a request on May 12, 2016 to have the Best Available Control Technology (BACT) emission limit for carbon dioxide (CO₂) corrected from 0.083 lb/hp-hr to 0.832 lb/hp-hr. This request was assigned Project Number 16-194 and the amended permit was issued on May 31, 2016. Since this project was to correct a typographical error it was considered an “*administrative amendment*” per 567 Iowa Administrative Code (IAC) 33.3(21) and therefore did not have to go through a public comment period.

On December 22, 2016, CF requested an amendment to the permit for VOC Emissions from Equipment Leaks (EP 302; permit number 13-A-229-P). Specifically, CF asked to increase the BACT VOC limit from 1.1 tons/yr to 3.4 tons/yr in order to reflect the final UF-85 resin system design which increased the component counts and added open ended lines. This request was assigned Project Number 16-498.

CF was also preparing its Title V Operating Permit modification for the expansion of the facility. As part of the Title V application preparation CF discovered some potential minor changes to four (4) other permits that were part of the ammonia and urea plant expansions. CF decided to address these minor changes in addition to the VOC Equipment Leaks BACT limit since PN 16-498 was an open project. The permits for PN 16-498 were issued on April 13, 2017. A description of the permit amendments for PN 16-498 is included in Appendix A.

Project Number 17-230 Description:

The Department received a request from CF on May 30, 2017 to request changes to the limits in several permits. Specifically, CF requested:

- An increase of the Best Available Control Technology (BACT) carbon dioxide (CO₂) and carbon dioxide equivalents (CO₂e) permit limits for Boilers A (EU/EP 400) and B (EU/EP 401) because the carbon (C) content of the natural gas used is higher than the average carbon (C) content used to establish the AP-42 emission factor,
- An increase to the short-term National Ambient Air Quality Standards (NAAQS) NO_x limits for the Primary Reformer (EU/EP 200), Boiler A (EU/EP 400), and Boiler B (EU/EP 401), and
- A decrease in the required minimum ammonia injection rate for the Selective Catalytic Reduction (SCR) control system for Boilers A (EU/EP 400) and B (EU/EP 401).

On July 14, 2017, CF requested to amend the permit for the Primary Reformer (EU/EP 200) to request an adjustment to the calculation to determine the particulate matter lb/MMBTU rate. This basis for this request was CF uses a significant amount of process gas in the Primary Reformer so the standard natural gas factor used results in skewing the particulate matter rate high. CF proposed the actual heat input rate from the process gas to determine emissions.

On August 7, 2017, CF submitted a request to amend five (5) additional permits because of the natural gas carbon (C) content being higher than that used to develop EPA’s AP-42 emission factor. The five (5) permits to be amended were for the Carbon Dioxide (CO₂) Regenerator (EU/EP 201), the Startup Heater (EU/EP 205), the Granulation Air Heater (EU 300b; EP 300), the LP Offgases Absorber Vent (EU305; EP 300), and the North Administration Emergency Generator (EU/EP 409).

Also on August 7, 2017, CF sent an email with the compliance report for their paved and unpaved haul roads (EUs/EPs 29a, 29b, and 29c). CF requested to discuss Condition 14.A. of permit 15-A-581-P (Inner Plant Haul Road; EU/EP 29c). Their consultant suggested the typical limits for unpaved haul roads were stated as a silt content limit (i.e. % silt) and not as a silt loading limit (i.e. g/m²). CF eventually requested to have the silt limit changed from 0.8 g/m² to silt content limit of 1.6%.

Finally, the Department received a request from CF to make additional changes based on a change in the capacity of the plant. Based on operating knowledge of the new plant, CF determined the Ammonia 2 operations could be operated for sustained periods of time at a capacity higher than previously listed rated capacity without any modifications to equipment. The permitted capacity was 2,668 tons/day (111.15 tons/hr) and the new requested capacity is 3,200 tons/day (133.33 tons/day). Therefore, CF requested the following permit amendments:

- Update the ammonia throughput limit on the permits for the Primary Reformer (EU/EP 200), CO₂ Regenerator (EU/EP 201), Condensate Steam Stripper (EU/EP 202), and Hydrogen Recovery Unit (EU/EP 204),
- Increase the annual BACT limit for PM, PM₁₀, PM_{2.5}, VOC, and CO_{2e} on the Primary Reformer (EU/EP 200).
- Increase the short-term NAAQS limit for PM₁₀ and PM_{2.5} for the Primary Reformer (EU/EP 200), and
- Increase the annual BACT limits for VOC and CO_{2e} on the CO₂ Regenerator (EU/EP 201).

In addition to these permit amendment requests, CF had a couple of stack testing issues it wanted reviewed as part of the permitting process. Both issues were related to the Primary Reformer (EU/EP 200; permit 13-A-2017-P2).

(1) Heat Input:

CF conducted stack testing for compliance on the Primary Reformer between April 4 – 6, 2017. The primary reformer is allowed to use natural gas and process gases. The short-term BACT limits in the permit are in the form a “lb/MMBTU” standard. These limits were based on the heat input being from mostly natural gas.

After receiving the test reports it was discovered a large amount of the heat input actually comes from process gas. Default values were used to determine the heat input which showed noncompliance with some of the BACT limits. However, CF calculates the actual heat input rate of the process gas used. When the actual heat input rate is used, the tests demonstrate compliance with the BACT emission limits. Therefore, CF requested the use of actual heat rate data be addressed in the permit. Additional language was added to the permit which will be discussed later in this document.

(2) Compliance Testing Letter of January 12, 2018:

The Compliance Section sent a letter to CF on January 12, 2018 stating the Primary Reformer was running at about 90.4% of the permitted capacity during testing and linear extrapolation of the stack test results showed a possibility of an exceedance of the PM/PM₁₀/PM_{2.5} BACT lb/MMBTU limits.

CF sent an email on January 18, 2018 with the results of an engineering test that was conducted almost two (2) months after the initial compliance test. The results were lower than the previous results at a higher production capacity. According to correspondence, CF did not change anything with the Primary Reformer between the stack test and the engineering test. They have since tuned the burners.

The big difference between the stack test and the engineering test was the length of the testing time. The stack test was conducted with the run times being the minimum two (2) hour length. The engineering test was done with the runs being four (4) hours long. CF felt the longer run times provided a more representative sample. The Compliance Section and the Construction Permitting Section have reviewed the data from both sets of tests and it is our professional opinion the Primary Reformer has demonstrated compliance with its emission limits at this time.

The Compliance Section is okay with CF using longer run times and CF intends to use four (4) hour runs on all future particulate tests for natural gas combustion emission units. This is not being added to the permit since it is voluntary. CF will include the longer run times in any testing protocols it submits in the future.

Project 17-230 amendments. The following amendments were made to the listed construction permits:

- Primary Reformer (EU/EP 200; draft permit 13-A-207-P3):
 - The maximum rated capacity (MRC) was increased from 111.15 tons of ammonia/hr to 133.33 tons of ammonia/hr.
 - The ton/yr BACT limits for PM, PM₁₀, PM_{2.5}, and VOC were increased based on the new MRC.
 - The short-term BACT limit for CO₂ was increased from 117 lb/MMBTU to 127 lb/MMBTU. The 117 lb/MMBTU was based on AP-42 which is an EPA emission factor developed by averaging data. CF discovered the natural gas it receives has a higher carbon (C) content. The 127 lb/MMBTU is based on an analysis of the natural gas received by CF.
 - The ton/yr BACT limit for CO₂ was increased from 545,674 tons/yr to 781,455 tons/yr. This is the result of both the CO₂ emission factor increasing and the MRC of the Primary Reformer increasing.
 - The NAAQS based limits for PM₁₀ and PM_{2.5} were increased from 2.55 lb/hr to 3.75 lb/hr. The facility-wide dispersion model was reviewed with the new rates. The rates were based on the change in the MRC of the Primary Reformer.
 - The NAAQS based limit for NO_x was increased from 16.70 lb/hr to 200 lb/hr to account for periods of startup, shutdown, and malfunction (SSM). The facility-wide dispersion model was reviewed with the new rate.
 - Condition 2 (Compliance Demonstrations) of the permit was updated to detail the required procedures for calculating the actual heat input rate, average heat input rate, and emissions for future particulate matter emissions testing.
- Carbon Dioxide (CO₂) Regenerator (EU/EP 201; draft permit 13-A-208-P2):
 - The maximum rated capacity (MRC) was increased from 111.15 tons of ammonia/hr to 133.33 tons of ammonia/hr.
 - The VOC ton/yr BACT limit was increased from 51.6 tons/yr to 61.9 tons/yr due to the change in the MRC.
 - The short-term CO₂ BACT limit was increased from 1.26 tons/ton of ammonia produced to 1.33 tons/ton of ammonia produced due to the higher carbon content of the natural gas received by CF.
 - The CO_{2e} ton/yr BACT limit was increased from 1,226,814 tons/yr to 1,553,440 tons/yr due to the higher carbon content of the natural gas and the increase in the MRC.
- Condensate Steam Stripper (EU/EP 202; draft permit 13-A-209-P1):
 - The maximum rated capacity (MRC) was increased from 111.15 tons of ammonia/hr to 133.33 tons of ammonia/hr.
- Hydrogen Recovery Unit (EU/EP 204; draft permit 13-A-210-P2):
 - The maximum rated capacity (MRC) was increased from 111.15 tons of ammonia/hr to 133.33 tons of ammonia/hr.

- Startup Heater (EU/EP 205; draft permit 13-A-211-P2):
 - The short-term BACT limit for CO₂ was increased from 117 lb/MMBTU to 127 lb/MMBTU. The 117 lb/MMBTU was based on AP-42 which is an EPA emission factor developed by averaging data. CF discovered the natural gas it receives has a higher carbon (C) content. The 127 lb/MMBTU is based on an analysis of the natural gas received by CF.
 - The CO₂e ton/yr BACT limit was increased from 345 tons/yr to 374 tons/yr due to the higher carbon content of the natural gas received by CF.

- Urea Granulator, Granulation Air Heater, and LP Offgases Absorber (EUs 300a, 300b, and 305, respectively; EP 300; draft permit 13-A-215-P2):
 - The methane (CH₄) lb/MMBTU BACT limit was increased as CF determined the original application did not account for methane from the LP Offgases Absorber. According to CF, this exhaust stream normally routes through EP 300, but can exhaust through its own stack (EP 305) when EP 300 is unavailable.
 - The short-term BACT limit for CO₂ was increased to account for the higher carbon content in the natural gas received by CF. There is CO₂ from both the Granulation Air Heater and the LP Offgases Absorber. A lb/MMBTU standard works for the Granulation Air Heater, but not for the LP Offgases Absorber. Therefore, the form of the limit was changed from lb/MMBTU to lb/hr.
 - The CO₂e ton/yr BACT limit was increased from 2,902 tons/yr to 23,475 tons/yr to account for the increased limits in methane and CO₂.

- Boiler A (EU/EP 400; draft permit 13-A-234-P3):
 - The short-term BACT limit for CO₂ was increased from 117 lb/MMBTU to 127 lb/MMBTU. The 117 lb/MMBTU was based on AP-42 which is an EPA emission factor developed by averaging data. CF discovered the natural gas it receives has a higher carbon (C) content. The 127 lb/MMBTU is based on an analysis of the natural gas received by CF.
 - The CO₂e ton/yr BACT limit was increased from 235,195 tons/yr to 255,256 tons/yr due to the higher carbon content of the natural gas received by CF.
 - The NAAQS based limit for NO_x was increased from 4.5 lb/hr to 80 lb/hr to account for periods of startup, shutdown, and malfunction (SSM). The facility-wide dispersion model was reviewed with the new rate.
 - The minimum ammonia (NH₃) injection rate of the Selective Catalytic Reduction (SCR) was decreased from 5 lb/hr to 1 lb/hr as requested. CF is required to operate the SCR at all times when the temperature is 560 °F or greater and it must inject the necessary amount of ammonia to meet the NO_x emission limits. The minimum injection rate is in the permit to ensure the control equipment is being operated when the minimum temperature is being achieved. It should be noted that 567 Iowa Administrative Code (IAC) 24.1(1)“a” requires the owner or operator to maintain and operate its equipment and control equipment at all times in a manner consistent with good practice to minimize emissions.

- Boiler B (EU/EP 401; draft permit 13-A-235-P3):
 - The short-term BACT limit for CO₂ was increased from 117 lb/MMBTU to 127 lb/MMBTU. The 117 lb/MMBTU was based on AP-42 which is an EPA emission factor developed by averaging data. CF discovered the natural gas it receives has a higher carbon (C) content. The 127 lb/MMBTU is based on an analysis of the natural gas received by CF.
 - The CO₂e ton/yr BACT limit was increased from 235,195 tons/yr to 255,256 tons/yr due to the higher carbon content of the natural gas received by CF.

- The NAAQS based limit for NO_x was increased from 4.5 lb/hr to 80 lb/hr to account for periods of startup, shutdown, and malfunction (SSM). The facility-wide dispersion model was reviewed with the new rate.
- The minimum ammonia (NH₃) injection rate of the Selective Catalytic Reduction (SCR) was decreased from 5 lb/hr to 1 lb/hr as requested. CF is required to operate the SCR at all times when the temperature is 560 °F or greater and it must inject the necessary amount of ammonia to meet the NO_x emission limits. The minimum injection rate is in the permit to ensure the control equipment is being operated when the minimum temperature is being achieved. It should be noted that 567 Iowa Administrative Code (IAC) 24.1(1)“a” requires the owner or operator to maintain and operate its equipment and control equipment at all times in a manner consistent with good practice to minimize emissions.
- Emergency Generator 1 (EU/EP 403; draft permit 13-A-238-P2):
 - During the review of another ancillary equipment permit it was discovered footnote 3 in Condition 1c. (Other Emission Limits) incorrectly stated the limit was based on dispersion modeling against the NAAQS. Instead it was modeling to show no significant impact from the ancillary sources of emissions in the project. Therefore, the footnote has been corrected.
- Emergency Generator 2 (EU/EP 404; draft permit 13-A-239-P2):
 - During the review of another ancillary equipment permit it was discovered footnote 3 in Condition 1c. (Other Emission Limits) incorrectly stated the limit was based on dispersion modeling against the NAAQS. Instead it was modeling to show no significant impact from the ancillary sources of emissions in the project. Therefore, the footnote has been corrected.
- Inner Plant Road (EU/EP 29c; draft permit 15-A-581-P1):
 - Since this road is an unpaved road the form of the limit was changed from “silt content” to “% silt.” To limit remained effectively the same, but it changed from a silt loading limit of 0.8 g/m² to a silt content limit of 1.6%.
- North Administration Building Emergency Generator (EU/EP 409; draft permit 15-A-582-P2):
 - The short-term BACT limit for CO₂ was increased based on the higher carbon (C) content of the natural gas received by CF. The new CO₂ BACT limit of 0.90 lb/hp-hr was based on an analysis of the natural gas received by CF.
 - The CO_{2e} ton/yr BACT limit was increased from 9.0 tons/yr to 10.0 tons/yr due to the higher carbon content of the natural gas received by CF.
 - It was discovered footnote 3 in Condition 1c. (Other Emission Limits) incorrectly stated the limit was based on dispersion modeling against the NAAQS. Instead it was modeling to show no significant impact from the ancillary sources of emissions in the project. Therefore, the footnote has been corrected.
- Fire Pump #1 (EU/EP 410; draft permit 15-A-583-P1):
 - During the review of another ancillary equipment permit it was discovered footnote 3 in Condition 1c. (Other Emission Limits) incorrectly stated the limit was based on dispersion modeling against the NAAQS. Instead it was modeling to show no significant impact from the ancillary sources of emissions in the project. Therefore, the footnote has been corrected.
- Fire Pump #2 (EU/EP 411; draft permit 15-A-584-P1):
 - During the review of another ancillary equipment permit it was discovered footnote 3 in Condition 1c. (Other Emission Limits) incorrectly stated the limit was based on dispersion modeling against the NAAQS. Instead it was modeling to show no significant impact from the ancillary sources of emissions in the project. Therefore, the footnote has been corrected.

In addition, all permits were converted to the most recent permit format. No other changes are being proposed to the permits.

Project 18-137:

CF Industries proposed to pave the Inner Plant Road, EU29c. This will take place in phases over the next three years. The paved roads will have the same work practice requirements as the other paved roads at the facility. This will decrease the actual emissions. No other changes made.

Project Number 18-328:

On August 13, 2018 the Department received an application package from CF dated August 6, 2018. Based on operating knowledge, the plant could be operated for sustained periods at rates higher than the nameplate rate without any physical modifications to any emission units.

CF requested to increase the urea production capacity of Urea 3 from 4,235 tons/day (176.46 tons/hr) to 4,620 tons/day (192.50 tons/hr). In addition, the associated UF resin usage would increase from 216.5 gal/hr to 355.2 gal/hr. Based on the changes to production capacities, CF requested the following permit amendments:

- Update the maximum rated capacity (MRC) on three (3) permits and
- Increase the PM, PM₁₀, PM_{2.5}, VOC, CO, CO₂, CH₄, N₂O, and CO_{2e} emission limits for the Granulator Stack (EP 300).

In addition, in a previous project CF had indicated it would like to add alternative monitoring language to its flare permits. During the startup of the expansion CF discovered the thermocouples on the flares were not working. The devices were indicating there was no pilot flame even though staff could visually see a flame.

However, the alternative monitoring language was forgotten about in previous projects so it was not added. On October 11, 2018, the Department asked CF if would still like to pursue the alternative monitoring language. CF replied on October 15, 2018 and stated it would like to add the alternative visual observation language.

Finally, while writing this document it was discovered the Startup Heater (EU 205) was incorrectly classified for NSPS previously. The Startup Heater should have been considered a “*process heater*” by definition under NSPS Subpart Dc since it promotes a chemical reaction by heating syngas. This means the Startup Heater is not subject to NSPS Subpart Dc and CF requested to have the permit updated to reflect the correction.

The permits for Project Number 18-328 were issued on March 6, 2019.

Introduction to New Source Review (NSR) and Prevention of Significant Deterioration (PSD)

Regulatory Background:

On August 7, 1977 Congress substantially amended the Clean Air Act (CAA or the Act). These amendments added detailed PSD and nonattainment area (NAA) programs. On June 19, 1978 the United States Environmental Protection Agency (USEPA or EPA) revised the PSD regulations to comply with the 1977 amendments. The June 1978 regulations were challenged in court and as a result of the judicial review on August 7, 1980 EPA extensively revised both the PSD (for attainment areas) and NAA (for nonattainment areas) regulations. Five sets of regulations resulted from those revisions. These regulations, subsequent modifications, EPA guidance documents, interpretations, and policies represent the current NSR regulatory requirements.

The first set of regulations, 40 CFR §51.166, specifies the minimum requirements that a PSD air quality permit program under Part C of the Act must contain in order to obtain approval by EPA as a revision to a

State Implementation Plan (SIP). The second set, 40 CFR §52.21, delineates the federal PSD permit program which currently applies as part of the SIP for States that have not submitted a PSD program meeting the requirements of 40 CFR §51.166. Roughly two thirds of the States are implementing their own PSD programs which have been approved by EPA under 40 CFR §51.166. Iowa is implementing its own PSD program [see 567 Iowa Administrative Code (IAC) Chapter 33]. 40 CFR §52.21 applies in the remaining States. The remainder of the five (5) regulations applies to the NAA program.

PSD Concepts:

The PSD permitting program is for new and modified major sources of air pollution that emit a pollutant subject to regulation under the CAA. PSD applies to all pollutants that do not exceed the National Ambient Air Quality Standards (NAAQS) in an area. The NAAQS establish the maximum pollution concentration levels to protect public health and welfare from harmful levels of pollutants. Pollutants covered by the NAAQS are nitrogen oxides (NO_x), volatile organic compounds (VOC) which are precursors to ground-level ozone, sulfur dioxide (SO₂), fine particulate (PM₁₀ and PM_{2.5}), carbon monoxide (CO), and lead (Pb). These pollutants are called criteria pollutants.

PSD also applies to other pollutants that do not have a NAAQS. These non-criteria pollutants are listed in the regulations and include fluorides, sulfuric acid mist, total reduced sulfur, and certain contaminants from municipal solid waste plants.

PSD does **not** prevent sources of air pollution from increasing emissions. Instead, the PSD regulations are designed to achieve the following:

- 1) to ensure that economic growth will occur in harmony with the preservation of existing clean air resources
- 2) to protect the public health and welfare from any adverse effects which might occur even though air pollution concentrations are below the National Ambient Air Quality Standards (NAAQS)
- 3) to preserve, protect, and enhance the air quality in areas of special natural recreational, scenic, or historic value, such as national parks and wilderness areas
- 4) to provide the opportunity for public comment on proposed applications

The PSD program applies to a new stationary source that will have a “major” and “significant” amount of any air pollutant subject to regulation under the CAA. It also applies to an existing major stationary source that plans to modify its operations in such a way that would lead to an increase of air pollution that would be “major” or “significant”. The stationary source must be in an area considered in attainment or unclassifiable with the National Ambient Air Quality Standards (NAAQS) for the pollutant being increased in a significant amount.

All PSD thresholds are based upon "potential-to-emit (PTE)." For PSD applicability purposes only, this is the maximum design capacity of a stationary source to emit a pollutant under its physical and operational design after the application of air pollution control equipment and after considering all "federally enforceable" limitations restricting the potential-to-emit of the source.

Therefore, a "major stationary source" is defined in Section 169 of the CAA as:

“Any one of 28 types of sources with the potential-to-emit 100 tons per year or more of any pollutant regulated in the CAA or any other type of source with the potential to emit regulated pollutants in amounts equal to or greater than 250 tons per year.”

Per 567 IAC 33.3(1), a regulated pollutant is defined as:

1. *Any pollutant for which a national ambient air quality standard has been promulgated and any constituents or precursors for such pollutants identified by the Administrator (e.g., volatile organic compounds and NO_x are precursors for ozone);*
2. *Any pollutant that is subject to any standard promulgated under Section 111 of the Act;*
3. *Any Class I or Class II substance subject to a standard promulgated under or established by Title VI of the Act; or*
4. *Any pollutant that otherwise is subject to regulation under the Act; except that any or all hazardous air pollutants either listed in Section 112 of the Act or added to the list pursuant to Section 112(b)(2) of the Act, which have not been delisted pursuant to Section 112(b)(3) of the Act, are not regulated NSR pollutants unless the listed hazardous air pollutant is also regulated as a constituent or precursor of a general pollutant listed under Section 108 of the Act.*

The term “*significant*” refers to the thresholds assigned to each criteria pollutant and certain non-criteria pollutants. For example, the significant threshold is 40 tpy for NO_x and 15 tpy for PM₁₀.

Before a new major stationary source constructs or an existing major stationary source makes a significant modification, the source is required to obtain a PSD permit. A PSD permit is a legal document that limits the amount of air pollution that may be released by the source. The permit will also specify things such as the construction that is allowed, all emission limits (both state and federal), compliance testing requirements, operating monitoring, recordkeeping, and the type of pollution controls.

In order to obtain a PSD permit the source must meet the following requirements of the PSD program:

- ***Best Available Control Technology (BACT)***
BACT is defined as an emission limit (including a visible emissions standard) based on the maximum degree of reduction for each regulated NSR pollutant which would be emitted from any proposed major stationary source or major modification. BACT is determined on a case-by-case analysis that takes into account energy, environmental, and economic impacts. BACT can be add-on control equipment or it can be modification to the production processes/methods.

- ***Air Quality Impact Analysis***

The main purpose of the air quality analysis is to demonstrate that new air pollution from the proposed major stationary source or major modification in conjunction with other applicable emissions increases and decreases from existing sources will not cause or contribute to a violation of any applicable NAAQS or PSD increment.

PSD increment is the amount of pollution an area is allowed to increase. PSD increments prevent the air quality in clean areas from deteriorating to the level set by the NAAQS. PSD regions are defined as Class I through Class III. Area classifications affect the maximum allowable increase in the PSD ambient air increments with Class I areas allowed the least increase and Class III areas allowed the most. Each class is described below:

- Class I areas are international parks, national wilderness areas and national memorial parks greater than 5,000 acres in size and national parks which exceed 6,000 acres in size.
- Class II areas include all areas not designated as Class I or Class III.
- Class III areas are planning areas set aside for industrial growth.

All of the State of Iowa is classified as a Class II area. All planning areas were initially designated either Class I or Class II. States must request and receive approval from the Environmental Protection Agency (EPA) for Class III areas. No Class III areas have been approved in the United States and therefore none exist at this time.

Generally, the air quality analysis will involve:

- (1) An assessment of existing air quality, which may include ambient monitoring data (i.e. preconstruction monitoring) and air quality dispersion modeling results, and
- (2) Prediction, using dispersion modeling, of the ambient concentrations that will result from the applicant's proposed project and future growth associated with the project. This result is compared against both the NAAQS and PSD increment.

- ***Additional Impact Analysis***

The additional impacts analysis assesses the impacts of air, ground, and water pollution on soils, vegetation, and visibility caused by any increase in emissions of any regulated pollutant from the source or modification under review and from associated growth. Associated growth is industrial, commercial, and residential growth that will occur in the area due to the new source or modification.

This review also includes a demonstration that the impacts of the project will not adversely impact a Class I area.

- ***Public Participation***

Public participation is citizens being involved in the permitting process. The public is required to be notified and given the opportunity to submit comments on the permit(s) or request a public hearing, if one has not been scheduled, during the public comment period in order to provide comments in person.

Greenhouse Gas (GHG) Emissions:

On June 3, 2010 the US EPA issued the Greenhouse Gas “*Tailoring Rule*” which was EPA’s way of phasing in GHG permitting requirements through the PSD program. On June 23, 2014 the US Supreme Court ruled:

“...EPA exceeded its statutory authority when it interpreted the Clean Air Act to require PSD and Title V permitting for stationary sources based on their greenhouse gas emissions. Specifically, the Agency may not treat greenhouse gases as a pollutant for purposes of defining a “major emitting facility” (or a “modification” thereof) in the PSD context or a “major source” in the Title V context. To the extent its regulations purport to do so they are invalid.”

This means the GHG “*Tailoring Rule*” is no longer valid as of June 23, 2014. However, in the same decision the US Supreme Court also ruled:

“EPA may, however, continue to treat greenhouse gases as a “pollutant subject to regulation under this chapter” for purposes of requiring BACT for “anyway” sources.”

“*Anyway sources*” are those that are subject due to another pollutant such as particulate matter or sulfur dioxide. Based on a recent memo, EPA is currently using the 75,000 ton of CO₂e/yr as the de minimus threshold as a trigger for a BACT review for an “*anyway source*.”

The original project (PN 13-037) was considered an “*anyway source*” so GHG BACT limits were established in that and future related projects.

Analysis of the Application

A. Prevention of Significant Deterioration (PSD):

- **PSD Applicability**

The PSD rules lists a group of twenty-eight (28) source categories that have a more stringent PSD applicability threshold. If a source falls under one of the listed source categories it is classified as a “*major stationary source*” for PSD purposes if it has potential emissions greater than 100 tons per year of any one of the pollutants regulated by the CAA. In addition, fugitive emissions, to the extent quantifiable, are considered in any subsequent PSD analysis.

If a source is not one of listed source categories, then it is classified as a “*major stationary source*” for PSD purposes if it has potential emissions greater than 250 tons per year of any one of the pollutants regulated by the CAA. In addition, fugitive emissions are not considered in subsequent PSD analyses.

Nitrogenous fertilizer manufacturing facilities have a two (2) digit Standard Industrial Classification Code (SIC) of 28. Although there is no definition under the PSD rules for a “*chemical process plant*” there are catalysts being used and chemical reactions occurring in order to make ammonia, urea, and nitric acid. In addition, as far back as December 12, 1980, EPA has considered a “*chemical process plant*” to be any establishment under Major Group 28 (Chemicals and Allied Products Establishments) of the SIC Manual. EPA’s reasoning is that the SIC Manual states:

“This major group includes establishments producing basic chemicals, and establishments manufacturing products by predominantly chemical processes. Establishments in this major group manufacture three general classes of products: (1) basic chemicals, such as acids, alkalis, salts, and organic chemicals; (2) chemical products to be used in further manufacture, such as synthetic fibers, plastic materials, dry colors, and pigments; and (3) finished chemical products to be used for ultimate consumption, such as drugs, cosmetics, and explosives.”

Therefore, the CF facility in Sergeant Bluff is considered a “*chemical process plant*” under the PSD regulations. Its detailed SIC code, North American Industry Classification System (NAICS) code, and county of operation are:

SIC Code: 2873 (Nitrogenous Fertilizers)

NAICS Code: 325311

County: Woodbury

The potential emissions of PM, NO_x, and CO are all over 100 tons per year (tons/yr) for this facility. Therefore, the existing plant was considered to be a “*major stationary source*” for the purposes of PSD.

Project 20-093: CF is planning three simultaneous projects to increase reliability, standardize design and decrease fuel usage.

Primary reformer convection section coil replacement. New design will increase heat transfer and reduce pressure drop.

Primary reformer reharp.

Primary reformer tunnel section replacement. This is a replacement of brick in the tunnel. It should improve flame patterns.

CF performed an analysis to show the combination of these projects does not trigger PSD review. CF used the PAE – BAE method for emissions from the reformer. Increased emissions from associated equipment were estimated using the difference between baseline production rate (398,015 ton/yr) and the projected rate (438,000 ton/yr). Associated equipment seeing a possible increase are the CO₂ regenerator and the haul roads. Other equipment at the facility including the nitric acid plants, urea plants, UAN plant and ammonia 2 plant are either already at maximum capacity or unaffected.

Table 2 – Potential Emissions for existing Primary Reformer and Auxiliary Boiler³

Pollutant	Potential Emissions (tons/yr)
Total Particulate Matter (PM)	40.04
PM ₁₀	40.04
PM _{2.5}	40.04
Sulfur dioxide (SO ₂)	1.60
Nitrogen oxides (NO_x)	262.30
Carbon monoxide (CO)	97.20
Volatile organic compounds (VOC)	7.10
Lead (Pb)	0.00129
Sulfuric acid mist (SAM; H ₂ SO ₄)	0.0
Total reduced sulfur (TRS)	0.0
Fluoride (F) as hydrogen fluoride (HF)	0.0
CO _{2e}	311,032

NOTES:

- 1) Total PM includes both filterable and condensable PM emissions

As stated earlier, fugitive emissions, to the extent quantifiable, are considered in any subsequent PSD applicability analysis since the Port Neal facility is one of the 28 listed source categories. Table 3 shows the potential emissions for the project after BACT has been applied and the additional VOC emissions from equipment leaks being proposed. This shows that even after BACT is applied PM, PM₁₀, PM_{2.5}, CO, VOC, and CO_{2e} are still all over their respective PSD significant increase levels. The potential emissions are not changing due to this project.

Table 3 – Net Emission Increases for Project 20-093

Pollutant	Emissions Increase (tons/yr)	PSD Significant Increase Level (tons/yr)
PM	7.39	25
PM₁₀	7.31	15
PM_{2.5}	7.29	10
SO₂	0.2	40
NO_x	0	40
CO	56.89	100
VOC	1.31	40
Pb	0.0002	0.6
CO_{2e}⁴	62,664	75,000
H₂SO₄	0.0	10
TRS	0.0	10
F	0.0	3

³ The listed potential emissions were submitted by CF and its consultant and have not been verified by the Department.

⁴ CO_{2e} = carbon dioxide equivalent = (mass of GHG) x (individual GWP).

PSD is not required for this project.

- **Best Available Control Technology (BACT)**

BACT is defined as:

“an emissions limitation, including a visible emissions standard, based on the maximum degree of reduction for each regulated NSR pollutant which would be emitted from any proposed major stationary source or major modification which the reviewing authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combination techniques for control of such pollutant. In no event shall application of best available control technology result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard under

567—subrules 23.1(2) through 23.1(5) (standards for new stationary sources, federal standards for hazardous air pollutants, and federal emissions guidelines), or federal regulations as set forth in 40 CFR Parts 60, 61 and 63 but not yet adopted by the state. If the department determines that technological or economic limitations on the application of measurement methodology to a particular emissions unit would make the imposition of an emissions standard infeasible, a design, equipment, work practice, operational standard or combination thereof may be prescribed instead to satisfy the requirement for the application of best available control technology. Such standard shall, to the degree possible, set forth the emissions reduction achievable by implementation of such design, equipment, work practice or operation and shall provide for compliance by means which achieve equivalent results.”
[567 IAC 33.3(1)]

Each BACT analysis is conducted on a case-by-case basis. The economic analysis is conducted using costs that are valid for that area in which the source is located. No technology may be approved which is less stringent than the NSPS found in 40 CFR Part 60 [See also 567 IAC 23.1(2)] or any of the NESHAPS found in 40 CFR Part 61 [See also 567 IAC 23.1(3)] and 40 CFR Part 63 [See also 567 IAC 23.1(4)].

PN 20-093 does not trigger PSD review so no BACT analysis was performed.

- **PSD Ambient Air Quality Analysis**

Note: This project (PN 20-093) does not require any additional modeling analysis. Previous modeling analysis is included for reference only.

Applicants for a PSD permit are required to conduct an air quality analysis of the ambient impacts associated with the construction and operation of the proposed new source or modification. The main purpose of the air quality analysis is to demonstrate that the new emissions emitted from a proposed project in conjunction with other applicable emissions from existing sources (including secondary emissions from growth associated with the new project) will not cause or contribute to a violation of any applicable NAAQS or PSD increment. This review is required for both criteria and non-criteria pollutants.

A separate air quality analysis is required for each regulated pollutant that will be emitted in a net significant amount. Each air quality analysis is unique due to the variety of sources and meteorological and topographical conditions that may be involved. Nevertheless, the air quality analysis must be accomplished in a manner consistent with the requirements in 567 IAC 33.3(11)

through 567 IAC 33.3(16) which adopted 40 CFR §51.21(k) through 40 CFR §51.21(o) by reference. Generally, the analysis involves

- An assessment of existing air quality, which may include ambient monitoring data and air quality dispersion modeling results.
- Predictions, using air dispersion modeling, of ambient concentrations that will result from the applicant's proposed project and future growth associated with the project.

There are two (2) distinct phases for the ambient air assessment:

- 1) *Preliminary analysis:* This analysis models only the significant increase in potential emissions of a pollutant from the proposed project. The results of this preliminary analysis determine whether the applicant must perform a full impact analysis involving the estimation of background pollutant concentrations resulting from existing sources and growth associated with the proposed project. Specifically it:
 - Determines whether the applicant can forgo further air quality analysis for a particular pollutant;
 - May allow the applicant to be exempted from the ambient monitoring data requirements; and
 - Is used to define the impact area within which a full impact analysis must be carried out.

Historically, the Department has not required a full impact analysis for a particular pollutant when the emissions of that pollutant from a proposed project would not increase ambient concentrations by more than the prescribed significant ambient impact levels.

- 2) *Full impact analysis:* This analysis is required for any pollutant for which the proposed project's estimated ambient pollutant concentrations exceed prescribed significant ambient impact levels. This analysis expands the preliminary analysis in that it considers emissions from the proposed project, existing sources, and residential, commercial, and industrial growth associated with the new project.

PSD Ambient Air Monitoring (Pre- and Post-Construction):

567 IAC 33.3(13) adopted 40 CFR §52.21(m) by reference. 40 CFR §52.21(m) requires preconstruction ambient air monitoring for any pollutant in which the applicant proposes to emit in significant amounts. In the past EPA allowed companies to use dispersion modeling along with significant monitoring concentrations (SMCs) to demonstrate a major modification did not need to conduct additional monitoring.

In January 2013 the U.S. Court of Appeals for the D.C. Circuit vacated the use of SMCs for PM_{2.5} as it determined EPA lacked authority to issue an SMC under the Clean Air Act (CAA). The decision required applicants requesting a federal PSD permit to either collect and submit ambient PM_{2.5} monitoring data or submit PM_{2.5} ambient data collected from existing monitors that were representative of the project area.

CF proposed to use the PM_{2.5} air quality monitor located in Sioux City (Site ID 191930019) to satisfy the pre-construction monitoring requirement in Project Number 13-037 since the SMCs for PM_{2.5} were no longer valid. The Sioux City monitor is approximately twenty-one kilometers (21 km) from the Port Neal facility and in PN 13-037 CF deemed the monitor representative of the air quality in the area of concern based on a letter submitted by the facility on April 19, 2013. The SMCs for other pollutants were still used and can be found Table 4. CF updated its dispersion modeling analysis for all pollutants as part of PN 15-126. The only modeled PSD pollutants affected by the current project (PN 17-230) are PM₁₀ and PM_{2.5}. Therefore, the previous decisions CO were not reevaluated.

Table 4 – Monitoring Significance Levels⁵

Pollutant	Averaging Period	Maximum Modeled Concentration ($\mu\text{g}/\text{m}^3$)	Monitoring de minimis Level ($\mu\text{g}/\text{m}^3$)
PM ₁₀	24-hr	4.13	10
CO	1-hr	32.0	---
	8-hr	25.0	575

Ozone (O₃) is considered a regional pollutant. In 2013, the representative regional monitors in the Sergeant Bluff area (Pisgah, Iowa and Emmetsburg, Iowa) had actual ozone concentrations in the low to mid 60 ppb range. The NAAQS for ozone was 75 ppb at that time. The 103 ton/yr increase for the new ammonia and urea plants was not expected to have a very large impact on ambient ozone concentrations. Therefore, ozone monitoring was not required in the original project (PN 13-037).

Project Number 16-498 was permitted to allow a 2.3 tons/yr increase in VOC emissions and with the change in MRC to the Primary Reformer in this project (PN 17-230), the total VOC increase for this project is 107.8 tons/yr. In 2015, EPA revised the primary and secondary ozone standards to 70 ppb and retained the indicators (O₃), forms [fourth-highest daily maximum, averaged across three (3) consecutive years], and averaging times [eight (8) hours]. The monitors in the Sergeant Bluff area (Pisgah, Iowa and Emmetsburg, Iowa) are still reading actual ozone concentrations in the low to mid 60 ppb range (i.e. 60 – 65 ppb). The revised potential VOC emissions of 107.8 tons/yr from the new ammonia and urea plants is still not expected to have much of an impact on ambient ozone concentrations. Therefore, the decision to not require ozone monitoring preconstruction monitoring did not change due to PN 17-230. Project 20-093 does not increase any emissions so no additional modeling was required.

National Ambient Air Quality Standards (NAAQS):

The NAAQS are maximum concentration “ceilings” measured in terms of the total concentration of a pollutant in the atmosphere. They are health and welfare based standards established by EPA. For a new project, compliance with any NAAQS is based upon the total estimated air quality. This is the sum of the ambient estimates resulting from existing sources of air pollution (modeled source impacts plus measured background concentrations) and the modeled ambient impact caused by the proposed project and its associated growth.

⁵ No *de minimus* air quality level is provided for ozone. However, any net emissions increase of 100 tons per year or more of volatile organic compounds or nitrogen oxides subject to PSD would be required to perform an ambient impact analysis, including the gathering of ambient air quality data.

As stated earlier, a separate air quality analysis is required for each regulated pollutant if the applicant proposes to emit the pollutant in a significant amount from a new major stationary source, or proposes to cause a significant net emissions increase from a major modification. A new or modified source is determined to contribute to a violation of the NAAQS if it is expected to increase the ambient concentration by the PSD "significant amount" at the location of a violation of an ambient standard. Any contribution to a violation is considered "significant" according to PSD if it exceeds the values listed in Table 5:

Table 5 – PSD Significant Impact Concentrations

Pollutant	Annual	24-hr	8-hr	3-hr	1-hr
PM₁₀	1 ug/m ³	5 ug/m ³	--	--	--
PM_{2.5}	0.3 µg/m ³	1.2 µg/m ³	--	--	--
NO_x	1 ug/m ³	--	--	--	7.5
SO₂	1 ug/m ³	5 ug/m ³	--	25 ug/m ³	7.8
CO	--	--	500 ug/m ³	--	2,000 ug/m ³
Ozone	--	--	See Note 1	--	--

- NOTES:** 1) There is no significant ambient impact concentration established. Instead, any net emissions increase of 100 tons per year of VOC subject to PSD would be required to perform an ambient impact analysis.
 2) The 1-hr concentrations for NO_x and SO₂ are interim limits.
 3) There is no significant impact level for Pb.

As can be seen by comparing the values in Tables 4 and 5, PM₁₀ and CO are below their respective SILs for the new ammonia and urea plants. Therefore, a full impact analysis was not required for either pollutant.

As stated earlier, the Court vacated and remanded the SMCs. In that same decision the court also vacated and remanded the significant impact levels (SILs) for PM_{2.5}. However, the court decision does not preclude the use of SILs for PM_{2.5}. Instead it requires the EPA to correct the error in the two SIL regulations listed above. EPA has provided guidance regarding the application of SILs for PM_{2.5} in the document *Draft Guidance for PM_{2.5} Permit Modeling* (Guidance) issued March 4, 2013.

EPA's draft PM_{2.5} Guidance states that if the difference between the PM_{2.5} NAAQS and the monitored PM_{2.5} representative background concentrations in the area is greater than the PM_{2.5} SIL, a source with a modeled impact below the PM_{2.5} SIL value should not cause or contribute to a violation of the NAAQS and therefore a full impact analysis would not be required.

In PN 13-037 the average monitor concentrations from the Sioux City monitor were used in Table 6, as well as the difference between the monitor values and the PM_{2.5} NAAQS. As can be seen in Tables 5 and 6, the results indicated the addition of the new ammonia and urea plants would not cause or contribute to a NAAQS violation using the methodology provided by EPA in its March 4, 2013 guidance. Therefore, a full impact analysis was not required in 2013. As stated earlier in this document the only change in emissions was for PN 16-498 is to VOC. Since there was no change in PM_{2.5} emissions in the current project the previous PM_{2.5} NAAQS significant impact analysis was not reevaluated.

Table 6 – PM_{2.5} Significant Impact Analysis

Averaging Period	Predicted Concentration (µg/m ³)	Average Monitored Concentration (µg/m ³)*	Difference Between NAAQS and Monitored Concentration (µg/m ³)**
24-hr	1.06	27	8
Annual	0.16	9.9	2.1

* The Annual PM_{2.5} monitored value is based on a 3-year average (2010-2012) of the annual average PM_{2.5} concentrations; the daily PM_{2.5} monitored value is based on the 3-year average (2010-2012) of the 98th percentile 24-hour average PM_{2.5} concentrations. The 8-hour CO monitored value is based on a 3-year average (2010-2012) of the second maximum 8-hour CO concentrations.

** The PM_{2.5} NAAQS used to determine values above are 12 µg/m³ (Annual) and 35 µg/m³ (24-hour).

Since the one hour (1-hr) standard for ozone was rescinded there was no acceptable method to evaluate the eight hour (8-hr) ozone standard at the time of PN 13-037. Therefore, no ambient air evaluation of ozone was required for the addition of the new ammonia and urea plants at that time. EPA has since provided guidance on how to determine ozone impacts.

Ozone emissions are related to direct emissions of VOC and NO_x. In addition, secondary PM_{2.5} emissions are due to direct emissions of SO₂ and NO_x. EPA has provided guidance to evaluate whether the facility's emissions will significantly impact the production of these secondary pollutants. The first step is a Tier 1 method to determine the significant impact.

Significance is determined by comparing emission levels from the facility with levels that would cause concentrations to exceed an applicable critical air quality threshold. That emission level (measured in tons/yr) is the Modeled Emission Rate for Precursors (MERPs). The following values have been established for the Central United States:

Table 7 – Modeled Emission Rate for Precursors (MERPs) for the Central United States

Precursor	8- hr Ozone (tpy)	24-hr PM _{2.5} (tpy)	Annual PM _{2.5} (tpy)
NO _x	126	1,693	5,496
SO _x	---	238	839
VOC	948	---	---

The precursors that were triggered for the project were evaluated against the MERPs by summing the ratios of the emission rates (in tpy) of the applicable pollutants to the applicable MERPs.

○ **Secondary ozone impact:**

The calculation for secondary ozone is:

$$\frac{\text{NO}_x \text{ tpy project increase}}{\text{NO}_x \text{ MERP}} + \frac{\text{VOC tpy project increase}}{\text{VOC MERP}}$$

For the project this results in a value of:

$$\frac{0 \text{ tpy}}{126 \text{ tpy}} + \frac{120.2 \text{ tpy}}{948 \text{ tpy}} = 0.13 = 13\% < 100\%$$

Therefore, the emissions from this project will not significantly impact secondary formation of ozone.

○ **Secondary 24-hr PM_{2.5} impact:**

For determining whether impacts of PM_{2.5} are significant, the same analysis is performed.

However, since an AERMOD SIL analysis for direct PM_{2.5} was also performed, the highest result at any receptor is required to be ratioed to the applicable SIL and added to the summation.

Therefore, the calculation is:

$$\frac{\text{NO}_x \text{ tpy project increase}}{\text{NO}_x \text{ MERP}} + \frac{\text{SO}_2 \text{ tpy project increase}}{\text{SO}_2 \text{ MERP}} + \frac{\text{PM}_{2.5} \text{ modeled impact } (\frac{\text{ug}}{\text{m}^3})}{\text{PM}_{2.5} \text{ SIL } (\frac{\text{ug}}{\text{m}^3})}$$

For the project this results in a value of:

$$\frac{0 \text{ tpy}}{1,693 \text{ tpy}} + \frac{0 \text{ tpy}}{238 \text{ tpy}} + \frac{1.06 (\frac{\text{ug}}{\text{m}^3})}{1.2 (\frac{\text{ug}}{\text{m}^3})} = 0.88 = 88\% < 100\%$$

Therefore, the emissions from this project will not significantly impact secondary formation of PM_{2.5} on a 24-hr basis.

○ **Secondary annual PM_{2.5} impact:**

The annual value for PM_{2.5} is:

$$\frac{0 \text{ tpy}}{5,496 \text{ tpy}} + \frac{0 \text{ tpy}}{839 \text{ tpy}} + \frac{0.16 (\frac{\text{ug}}{\text{m}^3})}{0.3 (\frac{\text{ug}}{\text{m}^3})} = 0.53 = 53\% < 100\%$$

Therefore, the emissions from this project will not significantly impact secondary formation of PM_{2.5} on an annual basis.

Finally, the addition of the new ammonia and urea plants did not trigger PSD for NO_x since CF added control to the existing plant's primary reformer (EP 04; permit 95-A-460-P4) to attain creditable emission decreases. A non-PSD dispersion modeling analysis was still required as part of PN 13-037 and was updated as part of project 17-230.

Table 8 – NO_x Significant Impact Analysis

Averaging Period	Predicted Concentration (µg/m ³)
1-hr	157.8
Annual	16.1

As can be seen in Table 8, the results of the analysis indicated the predicted concentrations from the new ammonia and urea plants exceeded the SIL for the 1-hr and annual NO_x averaging period which triggered a facility-wide, non-PSD NAAQS analysis for both averaging periods. The Department required CF to include the NO_x emissions and buildings from the adjacent MidAmerican Energy George Neal North facility in the NAAQS analysis.

As is shown in Table 9, the results predicted concentrations that are below the NAAQS with the shutdown of two (2) George Neal boilers. Therefore, a contribution analysis was not required for the addition of the new ammonia and urea plants.

Table 9 – NO_x NAAQS Analysis

Averaging Period	Predicted Concentration (µg/m ³)*	Background Concentration (µg/m ³)	Total Concentration (µg/m ³)	NAAQS (µg/m ³)
1-hr	157.8	Rural: 18	176	188
Annual	16.1	Rural: 4	20	100

* Results were obtained using a Tier 2 ARM analysis. The 1-hr concentration is the highest eighth high (H8H) daily maximum multiplied by the default ambient NO₂/NO_x ratio of 0.80, averaged over five (5) years. The annual concentration is the highest predicted value multiplied by the default ambient NO₂/NO_x ratio of 0.75.

PSD Increment:

The PSD increment is the maximum allowable increase in ambient concentrations that is allowed to occur above a baseline concentration for a given pollutant. The baseline concentration is defined for each pollutant and its related averaging period(s). In general, the baseline concentration is the ambient concentration existing at the time the first complete PSD permit application affecting the area is submitted.

Therefore, the submittal date of the first complete PSD application for a given pollutant in an area is the “*baseline date*” for that pollutant. On or before this date most emissions are considered to be part of the baseline concentration and emission changes which occur after that date affect the amount of available increment. However, to fully understand how and when increment is consumed or expanded one must understand three (3) different dates related to baseline:

- *Major source baseline date:* This is the date after which actual emissions associated with construction at a major stationary source affect the available increment. Other changes in actual emissions occurring at any source after the major source baseline date do not affect the increment, but instead contribute to the baseline concentration until after the minor source baseline date is established.
- *Trigger date:* This is the date after which the minor source baseline date may be established. Both the major source baseline date and the trigger date are fixed dates as shown in Table 10.

Table 10 – Major Source Baseline and Trigger Dates for PM, SO₂, and NO_x

Pollutant	Major Source Baseline Date	Trigger Date
PM & SO ₂	January 6, 1975	August 7, 1977
NO _x	February 8, 1988	February 8, 1988
PM _{2.5}	October 20, 2010	October 20, 2011

- Minor source baseline date:* This is the earliest date after the trigger date on which a complete PSD application is received by the permit agency. If the application that established the minor source baseline date is ultimately denied or is voluntarily withdrawn by the applicant the minor source baseline date remains in effect because the date marks the point in time after which actual emissions changes from all sources affect the available increment. This is often referred to as the “baseline date”. The minor source baseline date for a particular pollutant is triggered by a PSD applicant only if the proposed increase in emissions of that pollutant is significant. So the minor source baseline date for different pollutants could be different in the same area.

The area where the minor source baseline date is established by a PSD permit application is known as the baseline area. It is limited to intrastate areas and may include one or more areas designated as attainment or unclassified under Section 107 of the CAA.

The baseline area is to include all portions of the attainment or unclassifiable area in which the PSD applicant would propose to locate and any attainment or unclassifiable area in which the proposed emissions would have a significant impact. In this case significant impact is defined as at least a 1 µg/m³ annual increase in the average annual concentration of the applicable pollutant.

The amount of PSD increment consumed in an area is determined from the emission increases and decreases that have occurred from sources since the applicable baseline date. It should be noted that increment consumption calculations reflect only the ambient pollutant concentration change attributable to increment affecting emissions.

Emission increases that consume a portion of the applicable increment are usually all those not accounted for in the baseline concentration and specifically include:

- actual emissions increases occurring after the major source baseline date which are associated with physical changes or changes in the method of operation at a major stationary source and
 - actual emissions increases at any stationary source, area source, or mobile source occurring after the minor source baseline date.

The amount of available increment may be expanded in two ways. The main way is through the reduction of actual emissions from any source after the minor source baseline date. Any such emissions reduction would increase the amount of available increment to the extent that the ambient concentrations would be reduced.

Increment expansion can also result from the reduction of actual emissions after the major source baseline date, but before the minor source baseline date if the reduction results from a physical change or a change in the method of operation at a major stationary source. The reduction will only add to the increment if the reduction is made enforceable through a permit or State Implementation Plan (SIP) provision.

Significant deterioration is considered to have occurred when the amount of new air pollution would exceed the applicable PSD increment. It should be noted that even if not all of the increment is consumed in an area the air quality cannot deteriorate to the point where it exceeds the applicable NAAQS.

Finally, only those pollutants that exceed the PSD significant impact levels are reviewed for increment consumption. An increment analysis was not performed since none of the pollutants that were major for PSD exceeded their respective SIL.

- **Class I Area Impact Analysis**

Class I areas are places of special national or regional value from a natural, scenic, recreational, or historic perspective. The PSD regulations provide special protection for these areas. There are three (3) types of Class I areas:

- *Mandatory Federal Class I areas:* These are specified as Class I by the CAA on August 7, 1977 and include:
 - International parks,
 - National wilderness areas including certain national wildlife refuges, national monuments, and national seashores which exceed 5,000 acres in size, and
 - National parks which exceed 6,000 acres in sizeThese Class I areas cannot be reclassified to Class II or Class III. They are managed by the Forest Service, National Park Service, or the Fish and Wildlife Service.
- *Federal Class I areas:* These are Federal lands in which a State has redesignated as a Class I area. They are managed by the Forest Service, National Park Service, or the Fish and Wildlife Service.
- *Non-Federal Class I areas:* These are State or Indian lands reclassified as Class I.

PSD projects that propose to locate within 100 kilometers (km) of a Class I area and PSD projects that propose to locate at a distance greater than 100 km that have an impact on a Class I area are required to conduct a Class I area impact analysis. There is currently no Class I area located within 100 km of Iowa's borders (see map in Appendix B). The closest Class I area is the Badlands National Park which is over 600 km from the Port Neal facility.

No Class I impact analysis was conducted since the Port Neal facility is more than 100 km from a Class I area and the expansion of the facility will not have an impact on a Class I area.

- **Additional Impact Analysis**

All PSD permit applicants are required to prepare an additional impact analysis for each pollutant subject to regulation under the CAA which will be emitted by the proposed project. This analysis assesses the impacts on air, ground, and water pollution to soils, vegetation, and visibility caused by any increase in emissions of any regulated pollutant from the project and its associated growth.

Other impact analysis requirements can also be imposed on the applicant under local, State, or Federal laws which are outside of the PSD permitting process. For example, two (2) Federal laws which may apply on occasion are the Endangered Species Act and the National Historic Preservation Act. Even though not required as part of the PSD permit, such legislation may require additional analysis if any federally listed rare or endangered species or any sites that are included (or are eligible to be included) in the National Register of Historic Sites are identified in the source's impact area.

The depth of the additional impact analysis will generally depend on the existing air quality, the quantity of emissions, and the sensitivity of the local soils, vegetation, and visibility in the source's impact area. It is important that the analysis fully document all sources of information, assumptions made, and any agreements reached with any government agencies (i.e. EPA, State, US Forest Service, etc.).

The additional impact analysis usually has four parts:

- *Growth:* The purpose of the growth analysis is to predict how much new growth is likely to occur to support the new project and then estimate the emissions that will result from that growth. This analysis includes:
 - A projection of associated industrial, commercial, and residential growth that will occur in the area due to the project, and
 - An estimate of the air emissions generated by the above associated industrial, commercial, and residential growth.

First the applicant needs to assess the amount of residential growth that the proposed project will bring to the area. This will depend on the size of the available work force, the number of new employees, and the availability of housing in the area.

Associated commercial and industrial growth consists of new businesses providing goods and services to the new employees and to the proposed project. Other growth is all growth that is not covered by the preceding, including construction related activities and mobile sources (permanent and temporary).

Next the applicant is required to develop an estimate of the air pollution which would likely result from this associated growth.

- *Ambient air quality impact analysis:* This analysis projects the air quality which will exist in the area of the proposed project during construction and after the project begins operation.

The applicant combines the air pollutant emissions estimates for the associated growth with the estimates of emissions from the proposed project. Next, the projected emissions from other sources in the area which have been permitted, but are not yet in operation are included in the modeling analysis.

The applicant then models the combined emissions estimate and adds the modeling analysis results to the background air quality to arrive at an estimate of the total ground level concentration of pollutants which can be anticipated as a result of the construction and operation of the proposed project.

- *Soils & vegetation impacts:* The analysis of soils & vegetation air pollution impacts are based on an inventory of the soils & vegetation types found in the impact area. This inventory includes all vegetation with any commercial or recreational value. The inventory may be available from conservation groups, State agencies, and universities.

In most cases, ambient concentrations of criteria pollutants below the secondary NAAQS will not result in harmful effects to soils & vegetation. However, there are sensitive vegetation species such as soybeans and alfalfa which may be harmed by long term exposure to low ambient air concentrations of regulated pollutants for which there are no NAAQS.

- *Visibility impairment:* This analysis is different than the Class I visibility analysis requirement. In this analysis the applicant is to review the impacts that occur within the impact area of the proposed project. EPA's suggested components of a good visibility analysis are:
 - A determination of the visual quality in the area,
 - An initial screening of emission sources to assess the possibility of visibility impairment, and
 - If warranted, a more in-depth analysis involving computer models.

EPA's "Workbook for Plume Visual Impact Screening and Analysis (Revised)", October 1992 (EPA-450/4-88-015) is used to conduct a visibility impairments analysis. The workbook outlines a screening procedure designed to expedite the analysis of emissions impacts on the visual quality of an area. Although it is designed for Class I area impacts, the procedures are also generally applicable to other areas.

Growth:

The previous determination on growth impacts will not change as a result of this project (PN 20-093). The determination has been repeated below for convenience:

The Port Neal facility is located in Woodbury County. The nearest cities to the site are Salix with a population of 365 which is located about five (5) miles to the east and Sergeant Bluff with a population of 4,240 which is located about five (5) miles to the north. The Sioux City Metropolitan Statistical Area (MSA) consists of Woodbury County in Iowa, Dakota and Dixon counties in Nebraska, and Union County in South Dakota.

During peak construction about 1,500 workers will commute to the site. CF assumes that many of the construction workers live in Sioux City/Sergeant Bluff or one of the other smaller communities in the vicinity for the duration of the construction period and may commute as much as thirty (30) miles one way.

There will be some growth associated with the project with an additional 100 full-time long term jobs estimated to result directly from the expansion. Workers currently in the Sioux City metropolitan area will fill the majority of the permanent positions generated by the expansion of the plant. It is also likely that employees relocating to the vicinity of the plant will fill some permanent positions. The proposed facility expansion is not expected to cause an appreciable increase in population.

Within thirty (30) miles of the site there are numerous houses for sale or rent, both single and multi-family. Therefore, the ability to absorb a slight population increase should result in minimal effects on housing. Service industry jobs may increase during construction. However, the increase in employment for permanent workers will be relatively minimal given the population of the Sioux City metropolitan area. Due to this ability to absorb the project related growth, no additional infrastructure or housing related expansion is anticipated. Based on these factors there will be no perceptible, negative growth impacts resulting from the project.

Soils & Vegetation:

The previous determinations on soils and vegetation impacts will not change as a result of this project (PN 20-093). Those determinations have been repeated below for convenience:

- **Land Use and Soil Characterization:**

The CF facility is located in the floodplain of the Missouri River. Within one (1) miles of the facility, the vegetation is primarily corn, soybeans, and wetland grasses with small areas of deciduous forest on the slopes leading down to the Missouri River that are too steep to farm. The CF facility, MidAmerican Energy George Neal North generating station, and a large substation occupy a substantial portion of this area. Water (Missouri River and oxbow lakes), deciduous forest, grassland, roads, and a Union Pacific railroad spur also occupy the area.

Virtually the entire area has alluvial soil types with four soil series predominating:

- *Sarpy,*
- *Percival,*
- *Albaton, and*
- *Haynie.*

The Sarpy series consists of somewhat poorly drained loamy fine sand in flat areas on flood plains; it has an average depth to the wet zone of one to six feet. The Percival series is an excessively drained clayey soil in flat, occasionally flooded areas with an average depth to the wet zone of five feet. Albaton soils are poorly drained silty clay in flat areas that are rarely flooded with an average depth to the wet zone of zero to six feet. Haynie soils are a moderately well drained silt loam in flat areas found in the rarely flooded areas with an average depth to the wet zone of five feet.

The Dakota County, Nebraska soil survey shows that soils on the Nebraska side of the Missouri River across from the facility are of the Haynie-Albaton-Onawa soil association. This soil association consists of moderately to poorly drained, nearly level, silty and clayey soils on low bottomlands adjacent to the Missouri River.

- **Threatened and Endangered Species:**

The United States Fish and Wildlife Service (US FWS) web site and the IDNR database list five (5) species as endangered or threatened that are found in Woodbury County. These species are not necessarily found in the immediate area of CF.

For the two vegetative species, prairie bush clover and western prairie fringed orchid, the primary cause of these threatened or endangered listings are both due to loss of habitat from conversion to cropland, competition with introduced plants, filling of wetlands, and in some cases, pesticides that kill insect species needed for pollination. The pallid sturgeon is listed as threatened because of channelization of rivers. The two bird species, the least tern and piping plover are both listed as endangered. The principal reasons for the listings are loss of nesting habitat due to development of commercial, residential, and recreational uses, as well as nest disturbances. The CF ammonia and urea plant expansion would not likely affect the least tern and piping plover, as their nesting habitats are primarily sandbars, sand and gravel pits, or reservoir shorelines, and small creeks or wetlands, respectively.

Dakota and Thurston Counties in Nebraska have eight species included on the threatened and endangered species list. Five (5) of the species are the same as the Iowa threatened and endangered list. American Ginseng is also listed as a threatened species by Nebraska. In general, this species has been depleted by over collecting for commercial purposes. The other two species listed as threatened or endangered in Nebraska are the lake sturgeon and sturgeon chub. The lake sturgeon and sturgeon chub are listed because of loss of habitat due to channelization of rivers.

Based on this information, construction of the urea and ammonia plants will not adversely affect any federal or state listed species.

- **Impact of Pollutants:**

- CO:

Carbon monoxide does not poison vegetation since it is rapidly oxidized to carbon dioxide which is used for photosynthesis. However, extremely high concentrations can reduce the photosynthetic rate. According to EPA's "A Screening Procedure for the Impacts of Air Pollution Sources on Plant, Soils, and Animals," a CO concentration of 1,800,000 $\mu\text{g}/\text{m}^3$ (1 week averaging period) could potentially reduce the photosynthetic rate for the most sensitive vegetation.

As is listed in Table 4, the predicted maximum CO impact is 32.0 $\mu\text{g}/\text{m}^3$ (1-hr average) which is significantly lower than the screening level. Therefore, no adverse impacts to vegetation are expected from CO emissions due to this project.

- VOC:

Ozone (O_3) impacts plants by destroying chlorophyll and in particular chlorophyll b. Acute symptoms of ozone damage are necrosis, chlorosis, and water marks. Ozone causes noticeable leaf damage in many crop and tree species. Certain varieties of soybeans, clover, onions, spinach, muskmelon, and alfalfa are especially susceptible. Trees such as lilac, aspen, and ash are also sensitive to ozone.

Ozone is not directly emitted from the processes in this project. It is formed in a reaction between carbon dioxide (CO_2), nitrogen oxides (NO_x), volatile organic compounds (VOC), and ultra violet (UV) light from the sun.

According to “*The Response of Native, Herbaceous Species to Ozone: Growth and Fluorescence Screening*”⁶ a reduction in the growth rate was found in certain plants after being fumigated with 139.7 $\mu\text{g}/\text{m}^3$ of ozone for two (2) weeks.

The increase in ozone formation due to the NO_x and VOC emissions from the project was estimated using the “VOC/ NO_x Point Source Screening Tables” developed by Scheffe. The estimated impact from this project was less than 0.014 ppm (27.44 $\mu\text{g}/\text{m}^3$) on an hourly basis.

Since VOC emissions can be made of several different compounds a review of the impact(s) of the individual species on soils and vegetation was done. The main VOC emissions from this project are hexane from combustion sources and methanol from the CO_2 Regenerator.

Internet research did not find any information regarding adverse effects on any plant species for hexane. In regards to methanol, several studies indicate that methanol can actually enhance the growth of many plants including agricultural crops.

The effects on soils would be minor as methanol is water soluble and would be transported out of the soil and into water sources quickly.

○ Particulate Matter (PM, PM_{10} , and $\text{PM}_{2.5}$):

The effects of particulate matter will vary greatly depending upon the particular mix of particles. Any particulate deposited on above ground plant parts can potentially exert physical or chemical effects. The effects of inert particulate are mainly physical where the effects of toxic particles are both chemical and physical.

Deposition of inert particulate on above ground plant organs sufficient to coat them with a layer of dust may result in changes in radiation received, a rise in leaf temperature, and the blockage of stomata. The main factor leading to plant injury is normally the chemical composition and more specifically the alkalinity of the applied dust.

Uptake of available metals in the ground can also result in metabolic effects in above ground tissues. Trace metals with a density greater than 6 g/cm^3 are referred to as “heavy metals” and are of particular interest because of their potential toxicity to both plants and animals. Some trace metals are essential for vegetative and animal health, but they are all toxic in large quantities.

No adverse impacts to vegetation around the CF facility are anticipated from the particulate emissions due to this project since almost none of particulates are metals.

⁶ “*The Response of Native, Herbaceous, Species to Ozone: Growth and Fluorescence Screening*,” New Phytologist, Volume 120, Issue 1, 1992, pages 29 – 37.

Visibility:

The visibility determination from PN 15-126 will not change as a result of this project (PN 20-093). The PN 15-126 determination has been repeated below for convenience:

In the original 2013 project the Department requested a visibility analysis to be conducted for Browns Lake State Park and the Sioux City airport. A Level-2 VISCREEN analysis was conducted for the 2013 project and the results of the analysis indicated there would be no change in the number of days with a visible plume at Browns Lake State Park (< 2% of the time) and no change in the number of days with a visible plume at the Sioux City airport (< 1% of the time).

As part of Project Number 15-126, VISCREEN was updated to reflect the current facility-wide potential emission changes for the Sioux City Airport and Browns Lake State Park. Per Department guidelines, the pre-project facility and post-project facility scenarios were modeled for different dispersion conditions (wind speed and stability classes) until the default screening criteria were not exceeded in the area of interest. The results of the analysis were in Table 13-6 of the November 12, 2015 submittal. Based on the analysis, no additional days of visibility impairments are expected for either site as a result of the changes.

B. New Source Performance Standards (NSPS):

The following NSPS subparts are applicable to the emission units in this project:

None of the units in this project are subject to an NSPS subpart at this time.

C. National Emission Standards for Hazardous Air Pollutants (NESHAP):

A major source of hazardous air pollutant (HAP) emissions is one that has the potential to emit any single HAP at a rate of 10 tons/yr or more or total HAP at a rate of 25 tons/yr or more. The CF Port Neal facility is considered a major source of hazardous air pollutant (HAP) emissions since it meets both of these criteria. The following NESHAP standards apply to the CF Port Neal facility (plant number 97-01-030):

For information only: This emission unit is of the source category affected by the following federal regulation: *National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters* [40 CFR Part 63, Subpart DDDDD].

D. Operating Permits (Title V):

Operating permits are legally enforceable documents that permitting authorities issue to air pollution sources after the facility has begun to operate. The Operating Permit program is often referred to as “Title V (TV)” since the authority comes from Title V of the Clean Air Act Amendments (CAAA) of 1990. The permits are also referred to as “Part 70 permits” since the federal rules for TV can be found in Part 70 of the Code of Federal Regulations (40 CFR Part 70). Most TV permits are issued by the states and local permitting authorities. However, EPA also issues TV permits to sources on Indian lands and in other situations as needed. EPA-issued permits are called Part 71 permits.

The Title V program mostly affects the largest emitters, but does impact some smaller sources of air pollution. The program has several benefits which include:

- Enables the facility, State, EPA, and the public to better understand the requirements to which the facility is subject,
- Aids in determining whether the facility is meeting those requirements,
- Increases accountability of the facility which results in better enforcement,
- Provides a basis for better emission inventories,

- Provides a ready vehicle for States to administer significant parts of the substantially-revised Federal air toxics program and the Acid Rain program,
- Plays a significant role in ensuring compliance with the Acid Rain regulations promulgated under Title IV of the Clean Air Act (CAA), and
- Requires fees that:
 - Creates an incentive for companies to reduce emissions, and
 - Ensures States have the resources necessary to develop and administer the program effectively.

567 IAC 22.101(1) defines the types of sources that need to obtain a Title V permit. EPA provides a very good breakdown of this requirement at <http://www.epa.gov/oaqps001/permits/obtain.html>. Some of the main categories required to obtain a TV permit are:

- “Affected Sources” under the Acid Rain rules (Title IV of the CAA) regardless of size
- Any source with a major source permit under NSR or PSD
- Any source (including non-major sources) subject to a requirement under Section 111 (NSPS) of the CAA
- Any “major stationary source” as defined under the Title V program. For sources in attainment areas, major source status is defined as:
 - A potential-to-emit (PTE) equal to or greater than 100 tons/yr of any criteria pollutant,
 - A PTE equal to or greater than 10 tons/yr of any individual “hazardous air pollutant (HAP)” listed in Section 112 of the Act, or
 - A PTE greater than or equal to 25 tons/yr of total HAP emissions

CF was required to obtain a Title V permit since it met several of the above requirements prior to the expansion project which included:

- It was defined as a “major stationary source” under Title V since as the potential emissions of NO_x and CO were over 100 tons per year (tons/yr),
- CF had potential individual HAP emissions greater than 10 tons/yr, and
- CF had potential total HAP emissions greater than 25 tons/yr.

The current Title V permit for CF is 99-TV-024-R3 which expires on November 16, 2020.

E. Iowa Administrative Code (IAC):

The following sections of the IAC apply to the units in this project (PN 20-093):

1. 567 IAC 21.5: Evidence used in establishing that a violation has or is occurring.
2. 567 IAC 22.1(1): Permit required. Requirement for new or modified equipment to obtain a construction permit.
3. 567 IAC 23.3(2)“b”: *PM emissions.* 0.6 lb/mmBtu
4. 567 IAC 23.3(2)“d”: *Visible emissions.* 40% state standard.
5. 567 IAC 23.3(3)“e”: Other processes emitting sulfur dioxide. 500 ppm standard for other processes emitting SO₂ (example: units that combust natural gas).
6. 567 IAC Chapter 33: Special regulations and construction permit requirements for major stationary sources – Prevention of Significant Deterioration (PSD) of air quality. State adoption of the PSD regulations.

Calculations

CF included calculations to show that the modifications do not trigger PSD review. A copy of their submitted calculations is included in the application.

Compliance Demonstration(s)

Compliance can be demonstrated several ways. It can be done through emission stack testing, continuous monitoring systems (CMS), or monitoring & recordkeeping. Those compliance demonstrations are:

- Primary Reformer (EP 04):
The facility is required to conduct stack testing for CO after the proposed changes are made. Compliance with the NOx limits will be demonstrated by CEMs.

Confidentiality

CF did not request confidentiality any part of the application or project.

Public Notice Requirements

All new and most amended PSD permits are required to go through a public comment period. The Department will make the following documents available to the public:

- The draft permit,
- The Technical Support Document or Fact Sheet prepared by the Department,
- A copy of the application,
- All materials submitted by the applicant as part of the project, and
- All correspondence related to the project.

These materials will be available at the following locations:

- The Air Quality Bureau (AQB) physical location
(502 E. 9th St., Des Moines, IA 50319)
- The AQB website
(<https://programs.iowadnr.gov/airqualityconstructionpermits/Pages/PublicComment/Search.aspx>)
- The Wilbur Aalfs (Main) Library
(529 Pierce Street, Sioux City, IA 51101)
- EPA Region VII
(11201 Renner Boulevard, Lenexa, KS 66219)

The Department will publish a notification in the Department’s EcoNewsWire with a public notice published on the Air Quality Bureau website (see link above). The notification will include a notice of the application to amend the PSD permit, the determination, and the opportunity for both oral and written comments.

All persons that have comments regarding the proposed issuance of the draft permit are encouraged to submit their comments. Since this project is proposing to amend portions of a PSD permit, only comments related to the planned amendments will be accepted. A list of the intended changes can be found on page 12 of this document.

A public comment meeting will be held for the purpose of receiving written and oral comments if there is interest in having one. Requests for a public comment meeting must be received by the Department in writing either by email or as hard copy through the mail by May 11, 2020.

All comments not received at a public hearing shall be submitted in writing either as a hard copy through the mail or by email and must be submitted before 4:30 PM on the last day of the public comment period which will run from April 23, 2020 to May 26, 2020. Written and signed comments shall be directed to:

By hard copy through the mail:	Gary Smith Environmental Engineer Senior Air Quality Bureau Iowa Department of Natural Resources 502 E. 9th St. Des Moines, IA 50319
By e-mail:	gary.smith@dnr.iowa.gov

Any materials related to comments submitted by the public shall be included in full and not be incorporated by reference unless the material is already part of the administrative record or consists of State or Federal statutes and regulations, EPA documents of general applicability, or other available reference materials.

Upon a final decision on the project, all comments, Department responses, and the final documents will be available for public inspection at the Department address listed above and on the Air Quality Bureau website (<https://programs.iowadnr.gov/airqualityconstructionpermits/Pages/PSD/PSDSearch.aspx>). In addition, all comments, Department responses, and the final documents will be available at EPA Region VII and The Wilbur Aalfs (Main) Library for thirty (30) days after the final decision.

Table 11 – List of Important Dates for PN 18-137

Activity	Date
Application Received	March 23, 2020
Completed Application	March 23, 2020
Start of Public Comment Period	April 23, 2020
Deadline to Request Public Meeting	May 11, 2020
End of Public Comment Period	May 26, 2020

Reopening of Public Comment Period

If information or comments submitted to the Department during the public comment period appear to raise substantial questions concerning the draft permit, then the Department may prepare revised draft permit, a revised or supplemental technical support document, and reopen or extend the public comment period. Any reopening or extension of the public comment period would be limited to those changes.

Department Determination

The Department determines that the applicant has met all of the requirements for issuance of amended Prevention of Significant Deterioration (PSD) construction permits for the proposed project under 567 IAC 22.3 and is proposing to issue the following amended construction permits:

Table 12 – Proposed Amended Permits

Permit Number	EP ID	EU Description	EU ID
95-A-460-P5	04	Primary Reformer and Auxiliary Boiler	04

The permit being amended is a PSD permit so this project (PN 20-093) is required to go through the public comment process. The comments during the public comment period are limited to the proposed amendments detailed on page 12 of this document.

**Supporting References to the Administrative Record Not Footnoted in or
Attached to the Technical Support Document**

The references below are additional documents used by the Department in its decision making process. They are the basis for the Iowa PSD program and may not be cited directly in either the permits or the technical support document.

1. The Clean Air Act as Amended through 1990.
2. US EPA Federal Register; <http://www.epa.gov/fedrgstr/index.html>.
3. New Source Performance Standards (NSPS); 40 CFR 60.
4. National Emission Standards for Hazardous Air Pollutants (NESHAP); 40 CFR 61 & 40 CFR 63.
5. Prevention of Significant Air Quality Deterioration (PSD) Regulations; 40 CFR 51.166, 40 CFR 52.21 & 567 IAC 33.
6. Iowa Code; Chapter 455B.
7. The Iowa Administrative Code; 567 IAC 20-34.
8. Compilation of Air Pollutant Emission Factors; 5th Edition and Revisions, AP-42; U.S. EPA.
9. New Source Review Workshop Manual; EPA-450/2-80-081, October 1990.
10. RACT/BACT/LAER Clearinghouse: A Compilation of Control Technology Determinations; <http://cfpub1.epa.gov/RBLC/>.
11. OAQPS Control Cost Manual; Fourth Edition; USEPA, Office of Air Quality Planning and Standards; Research Triangle Park, NC; EPA 450/3-90-006; January 1990 and subsequent additions; <http://www.epa.gov/ttn/catc/products.html>.
12. 40 CFR Part 51, Appendix W.
13. Aermod Modeling System; http://www3.epa.gov/ttn/scram/dispersion_prefrec.htm.

