



INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

We Protect Hoosiers and Our Environment.

Mitchell E. Daniels Jr.
Governor

Thomas W. Easterly
Commissioner

100 North Senate Avenue
Indianapolis, Indiana 46204
(317) 232-8603
Toll Free (800) 451-6027
www.idem.IN.gov

TO: Interested Parties / Applicant

DATE: July 24, 2008

RE: CF Industries, Inc. / 023-26503-00044

FROM: Matthew Stuckey, Branch Chief
Permits Branch
Office of Air Quality

Notice of Decision: Approval - Registration

Please be advised that on behalf of the Commissioner of the Department of Environmental Management, I have issued a decision regarding the enclosed matter. Pursuant to IC 4-21.5-3-4(d) this order is effective when it is served. When served by U.S. mail, the order is effective three (3) calendar days from the mailing of this notice pursuant to IC 4-21.5-3-2(e).

If you wish to challenge this decision, IC 4-21.5-3-7 requires that you file a petition for administrative review. This petition may include a request for stay of effectiveness and must be submitted to the Office of Environmental Adjudication, 100 North Senate Avenue, Government Center North, Suite N 501E, Indianapolis, IN 46204, **within eighteen (18) calendar days of the mailing of this notice**. The filing of a petition for administrative review is complete on the earliest of the following dates that apply to the filing:

- (1) the date the document is delivered to the Office of Environmental Adjudication (OEA);
- (2) the date of the postmark on the envelope containing the document, if the document is mailed to OEA by U.S. mail; or
- (3) The date on which the document is deposited with a private carrier, as shown by receipt issued by the carrier, if the document is sent to the OEA by private carrier.

The petition must include facts demonstrating that you are either the applicant, a person aggrieved or adversely affected by the decision or otherwise entitled to review by law. Please identify the permit, decision, or other order for which you seek review by permit number, name of the applicant, location, date of this notice and all of the following:

- (1) the name and address of the person making the request;
- (2) the interest of the person making the request;
- (3) identification of any persons represented by the person making the request;
- (4) the reasons, with particularity, for the request;
- (5) the issues, with particularity, proposed for considerations at any hearing; and
- (6) identification of the terms and conditions which, in the judgment of the person making the request, would be appropriate in the case in question to satisfy the requirements of the law governing documents of the type issued by the Commissioner.

If you have technical questions regarding the enclosed documents, please contact the Office of Air Quality, Permits Branch at (317) 233-0178. Callers from within Indiana may call toll-free at 1-800-451-6027, ext. 3-0178.

Enclosures
FN-REGIS.dot 1/2/08



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REGISTRATION OFFICE OF AIR QUALITY

CF Industries, Inc.
6446 W. State Route 28
Frankfort, Indiana 46041-0606

Pursuant to 326 IAC 2-5.1 (Construction of New Sources: Registrations) and 326 IAC 2-5.5 (Registrations), (herein known as the Registrant) is hereby authorized to construct and operate subject to the conditions contained herein, the source described in Section A (Source Summary) of this registration.

Registration No. 023-26503-00044	
Issued by/Original Signed By: Alfred C. Dumauual, Ph. D., Section Chief Permits Branch Office of Air Quality	Issuance Date: July 24, 2008

SECTION A

SOURCE SUMMARY

This registration is based on information requested by the Indiana Department of Environmental Management (IDEM), Office of Air Quality (OAQ). The information describing the source contained in conditions A.1 and A.2 is descriptive information and does not constitute enforceable conditions. However, the Registrant should be aware that a physical change or a change in the method of operation that may render this descriptive information obsolete or inaccurate may trigger requirements for the Registrant to obtain additional permits pursuant to 326 IAC 2.

A.1 General Information

The Registrant owns and operates a stationary ammonia fertilizer storage and distribution facility.

Source Address:	6446 W. State Route 28, Frankfort, Indiana 46041-0606
Mailing Address:	4 Parkway North, Suite 400, Deerfield, Illinois 60015-2590
General Source Phone Number:	(847) 405-2400
SIC Code:	5191
County Location:	Clinton County
Source Location Status:	Attainment for all criteria pollutants
Source Status:	Registration

A.2 Emission Units and Pollution Control Equipment Summary

This stationary source consists of the following emission units and pollution control devices:

- (a) One (1) natural gas fired process heater, identified as PH1, constructed in 1972, with a maximum heat input rate of 29 MMBtu per hour, exhausting to stacks PH1-1 through PH1-4.
- (b) One (1) natural gas fired flare, identified as F1, constructed in 1990, with a maximum heat input rate of 0.01 MMBtu per hour to the flare pilot and 4.854 MMBtu per hour to the flare assist ring, exhausting to stack F1.

SECTION B

GENERAL CONDITIONS

B.1 Definitions [326 IAC 2-1.1-1]

Terms in this registration shall have the definition assigned to such terms in the referenced regulation. In the absence of definitions in the referenced regulation, the applicable definitions found in the statutes or regulations (IC 13-11, 326 IAC 1-2 and 326 IAC 2-1.1-1) shall prevail.

B.2 Effective Date of Registration [IC 13-15-5-3]

Pursuant to IC 13-15-5-3, this registration is effective immediately, unless a petition for stay of effectiveness is filed and granted according to IC 13-15-6-3, and may be revoked or modified in accordance with the provisions of IC 13-15-7-1.

B.3 Registration Revocation [326 IAC 2-1.1-9]

Pursuant to 326 IAC 2-1.1-9 (Revocation), this registration to operate may be revoked for any of the following causes:

- (a) Violation of any conditions of this registration.
- (b) Failure to disclose all the relevant facts, or misrepresentation in obtaining this registration.
- (c) Changes in regulatory requirements that mandate either a temporary or permanent reduction of discharge of contaminants. However, the amendment of appropriate sections of this registration shall not require revocation of this registration.
- (d) For any cause which establishes in the judgment of IDEM, the fact that continuance of this registration is not consistent with purposes of this article.

B.4 Prior Permits Superseded [326 IAC 2-1.1-9.5]

- (a) All terms and conditions of permits established prior to Registration No. 023-26503-00044 and issued pursuant to permitting programs approved into the state implementation plan have been either:
 - (1) incorporated as originally stated,
 - (2) revised, or
 - (3) deleted.
- (b) All previous registrations and permits are superseded by this registration.

B.5 Annual Notification [326 IAC 2-5.1-2(f)(3)] [326 IAC 2-5.5-4(a)(3)]

Pursuant to 326 IAC 2-5.1-2(f)(3) and 326 IAC 2-5.5-4(a)(3):

- (a) An annual notification shall be submitted by an authorized individual to the Office of Air Quality stating whether or not the source is in operation and in compliance with the terms and conditions contained in this registration.
- (b) The annual notice shall be submitted in the format attached no later than March 1 of each year to:

Indiana Department of Environmental Management
Compliance Branch, Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, IN 46204-2251

- (c) The notification shall be considered timely if the date postmarked on the envelope or certified mail receipt, or affixed by the shipper on the private shipping receipt, is on or before the date it is due. If the document is submitted by any other means, it shall be considered timely if received by IDEM, OAQ on or before the date it is due.

B.6 Source Modification Requirement [326 IAC 2-5.5-6(a)]

Pursuant to 326 IAC 2-5.5-6(a), an application or notification shall be submitted in accordance with 326 IAC 2 to the Office of Air Quality (OAQ) if the source proposes to construct new emission units, modify existing emission units, or otherwise modify the source.

B.7 Registrations [326 IAC 2-5.1-2(i)]

Pursuant to 326 IAC 2-5.1-2(i), this registration does not limit the source's potential to emit.

SECTION C

SOURCE OPERATION CONDITIONS

Entire Source

Emission Limitations and Standards [326 IAC 2-5.1-2(g)] [326 IAC 2-5.5-4(b)]

C.1 Opacity [326 IAC 5-1]

Pursuant to 326 IAC 5-1-2 (Opacity Limitations), except as provided in 326 IAC 5-1-3 (Temporary Alternative Opacity Limitations), opacity shall meet the following, unless otherwise stated in this registration:

- (a) Opacity shall not exceed an average of forty percent (40%) in any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.
- (b) Opacity shall not exceed sixty percent (60%) for more than a cumulative total of fifteen (15) minutes (sixty (60) readings as measured according to 40 CFR 60, Appendix A, Method 9 or fifteen (15) one (1) minute nonoverlapping integrated averages for a continuous opacity monitor) in a six (6) hour period.

C.2 Fugitive Dust Emissions [326 IAC 6-4]

The Registrant shall not allow fugitive dust to escape beyond the property line or boundaries of the property, right-of-way, or easement on which the source is located, in a manner that would violate 326 IAC 6-4 (Fugitive Dust Emissions).

**INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR QUALITY
COMPLIANCE BRANCH**

**REGISTRATION
ANNUAL NOTIFICATION**

This form should be used to comply with the notification requirements under 326 IAC 2-5.1-2(f)(3) and 326 IAC 2-5.5-4(a)(3).

Company Name:	CF Industries, Inc.
Address:	6446 W. State Route 28
City:	Frankfort, Indiana 46041-0606
Phone Number:	(847) 405-2400
Registration No.:	023-26503-00044

I hereby certify that CF Industries, Inc. is :

still in operation.

I hereby certify that CF Industries, Inc. is :

no longer in operation.

in compliance with the requirements of Registration No. 023-26503-00044.

not in compliance with the requirements of Registration No. 023-26503-00044.

Authorized Individual (typed):
Title:
Signature:
Phone Number:
Date:

If there are any conditions or requirements for which the source is not in compliance, provide a narrative description of how the source did or will achieve compliance and the date compliance was, or will be achieved.

Noncompliance:

Indiana Department of Environmental Management
Office of Air Quality
 Technical Support Document (TSD) for a Registration

Source Description and Location

Source Name: CF Industries, Inc.
Source Location: 6446 W. State Route 28, Frankfort, Indiana 46041-0606
County: Clinton County
SIC Code: 5191
Registration No.: 023-26503-00044
Permit Reviewer: Timothy R. Pettifor

On May 8, 2008, the Office of Air Quality (OAQ) received an application from CF Industries, Inc. related to the operation of an existing ammonia fertilizer storage and distribution facility.

Existing Approvals

There have been no previous approvals issued to this source.

County Attainment Status

The source is located in Clinton County.

Pollutant	Designation
SO ₂	Better than national standards.
CO	Unclassifiable or attainment effective November 15, 1990.
O ₃	Unclassifiable or attainment effective June 15, 2004, for the 8-hour ozone standard. ¹
PM ₁₀	Unclassifiable effective November 15, 1990.
NO ₂	Cannot be classified or better than national standards.
Pb	Not designated.
¹ Unclassifiable or attainment effective October 18, 2000, for the 1-hour ozone standard which was revoked effective June 15, 2005. Unclassifiable or attainment effective April 5, 2005, for PM2.5.	

- (a) **Ozone Standards**
 Volatile organic compounds (VOC) and Nitrogen Oxides (NOx) are regulated under the Clean Air Act (CAA) for the purposes of attaining and maintaining the National Ambient Air Quality Standards (NAAQS) for ozone. Therefore, VOC and NOx emissions are considered when evaluating the rule applicability relating to ozone. Clinton County has been designated as attainment or unclassifiable for ozone. Therefore, VOC and NOx emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2.
- (b) **PM2.5**
 Clinton County has been classified as attainment for PM2.5. U.S. EPA has not yet established the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2 for PM2.5 emissions. Therefore, until the U.S. EPA adopts specific provisions for PSD review for PM2.5 emissions, it has directed states to regulate PM10 emissions as a surrogate for PM2.5 emissions.

- (c) Other Criteria Pollutants
 Clinton County has been classified as attainment or unclassifiable in Indiana for all other criteria pollutants. Therefore, these emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2.

Fugitive Emissions

The fugitive emissions of criteria pollutants and hazardous air pollutants are counted toward the determination of 326 IAC 2-5.1-2 (Registrations) applicability.

Unpermitted Emission Units and Pollution Control Equipment

The source consists of the following unpermitted emission units:

- (a) One (1) natural gas fired process heater, identified as PH1, constructed in 1972, with a maximum heat input rate of 29 MMBtu per hour, exhausting to stacks PH1-1 through PH1-4.
- (b) One (1) natural gas fired flare, identified as F1, constructed in 1990, with a maximum heat input rate of 0.01 MMBtu per hour to the flare pilot and 4.854 MMBtu per hour to the flare assist ring, exhausting to stack F1.

Enforcement Issues

IDEM is aware that equipment has been constructed and operated prior to receipt of the proper permit. IDEM is reviewing this matter and will take the appropriate action. This proposed approval is intended to satisfy the requirements of the construction permit rules.

Emission Calculations

See Appendix A of this TSD for detailed emission calculations (pages 1-11).

Permit Level Determination – Registration

The following table reflects the unlimited potential to emit (PTE) of the entire source before controls. Control equipment is not considered federally enforceable until it has been required in a federally enforceable permit.

Process/Emission Unit	Potential To Emit of the Entire Source (tons/year)								
	PM	PM10 *	SO ₂	NO _x	VOC	CO	NH ₃	Total HAPs	Worst Single HAP
Process Heater	0.20	1.00	0.10	12.70	0.70	10.70	0.4	0.24	0.23 (Hexane)
Process Flare (Pilot)	negl.	negl.	negl.	negl.	negl.	negl.	negl.	negl.	negl.
Process Flare (Assist Ring)	negl.	negl.	negl.	0.018	negl.	0.015	negl.	negl.	negl.
Process Flare (Fuel-Bound and Thermal NO _x)	—	—	—	0.39	—	—	—	—	—
Fugitive Emissions, Paved Roads	2.92	0.57	—	—	—	—	—	—	—

Process/Emission Unit	Potential To Emit of the Entire Source (tons/year)								
	PM	PM10 *	SO ₂	NO _x	VOC	CO	NH ₃	Total HAPs	Worst Single HAP
Fugitive Emissions Unpaved Roads	17.39	4.43	—	—	—	—	—	—	—
Truck Loading	—	—	—	—	—	—	0.075	—	—
Total PTE of Entire Source	20.51	6.00	0.10	13.11	0.70	10.72	0.48	0.24	0.23
Exemptions Levels	5	5	10	10	5 or 10	25	—	25	10
Registration Levels	25	25	25	25	25	100	—	25	10

negl. = negligible

* Under the Part 70 Permit program (40 CFR 70), particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM10), not particulate matter (PM), is considered as a "regulated air pollutant". US EPA has directed states to regulate PM10 emissions as surrogate for PM2.5 emissions.

Note: The anhydrous ammonia handled at this plant is a regulated pollutant under Section 112(r)(3) of the Clean Air Act.

- (a) The potential to emit (PTE) (as defined in 326 IAC 2-1.1-1(16)) of PM, PM₁₀, and NO_x are within the ranges listed in 326 IAC 2-5.1-2(a)(1). The PTE of all other regulated criteria pollutants are less than the ranges listed in 326 IAC 2-5.1-2(a)(1). Therefore, the source is subject to the provisions of 326 IAC 2-5.1-2 (Registrations). A Registration will be issued.
- (b) The potential to emit (PTE) (as defined in 326 IAC 2-1.1-1(16)) of any single HAP is less than ten (10) tons per year and the PTE of a combination of HAPs is less than twenty-five (25) tons per year. Therefore, this source is an area source under Section 112 of the Clean Air Act (CAA) and not subject to the provisions of 326 IAC 2-7.

Federal Rule Applicability Determination

New Source Performance Standards (NSPS)

- (a) There are no New Source Performance Standards (NSPS)(40 CFR Part 60) included in the permit.

National Emission Standards for Hazardous Air Pollutants (NESHAP)

- (b) There are no National Emission Standards for Hazardous Air Pollutants (NESHAPs) (326 IAC 14, 326 IAC 20 and 40 CFR Part 63) included in the permit.

Compliance Assurance Monitoring (CAM)

- (c) Pursuant to 40 CFR 64.2, Compliance Assurance Monitoring (CAM) is not included in the permit, because the unlimited potential to emit of the source is less than the Title V major source thresholds and the source is not required to obtain a Part 70 or Part 71 permit.

State Rule Applicability Determination

The following state rules are applicable to the source:

- (a) 326 IAC 2-5.1-2 (Registrations)
Registration applicability is discussed under the Permit Level Determination – Registration section above.
- (b) 326 IAC 2-4.1 (Major Sources of Hazardous Air Pollutants (HAP))
The potential to emit of any single HAP is less than ten (10) tons per year and the potential to emit of a combination of HAPs is less than twenty-five (25) tons per year. Therefore, this source is an area source under Section 112 of the Clean Air Act (CAA) and not subject to the provisions of 326 IAC 2-4.1.
- (c) 326 IAC 2-6 (Emission Reporting)
Pursuant to 326 IAC 2-6-1, this source is not subject to this rule, because it is not required to have an operating permit under 326 IAC 2-7 (Part 70), it is not located in Lake, Porter, or LaPorte County, and it does not emit lead into the ambient air at levels equal to or greater than 5 tons per year. Therefore, 326 IAC 2-6 does not apply.
- (d) 326 IAC 5-1 (Opacity Limitations)
Pursuant to 326 IAC 5-1-2 (Opacity Limitations), except as provided in 326 IAC 5-1-3 (Temporary Alternative Opacity Limitations), opacity shall meet the following, unless otherwise stated in this permit:
 - (1) Opacity shall not exceed an average of forty percent (40%) in any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.
 - (2) Opacity shall not exceed sixty percent (60%) for more than a cumulative total of fifteen (15) minutes (sixty (60) readings as measured according to 40 CFR 60, Appendix A, Method 9 or fifteen (15) one (1) minute nonoverlapping integrated averages for a continuous opacity monitor) in a six (6) hour period.
- (e) 326 IAC 6-3-2 (Particulate Emission Limitations for Manufacturing Processes)
Pursuant to 326 IAC 6-3-1(b)(14), the units at this source are exempt from 326 IAC 6-3-2 because they have the potential to generate less than 0.551 pounds of particulate matter per hour. In addition, the process heater and flare are exempt from 326 IAC 6-3-2 since liquid fuels are not considered part of the process weight rate and these units are not considered manufacturing processes.
- (f) 326 IAC 6-4 (Fugitive Dust Emissions Limitations)
Pursuant to 326 IAC 6-4 (Fugitive Dust Emissions Limitations), the source shall not allow fugitive dust to escape beyond the property line or boundaries of the property, right-of-way, or easement on which the source is located, in a manner that would violate 326 IAC 6-4.
- (g) 326 IAC 6-5 (Fugitive Particulate Matter Emission Limitations)
The source is not subject to the requirements of 326 IAC 6-5, because the source does not have potential fugitive particulate emissions greater than 25 tons per year. Therefore, 326 IAC 6-5 does not apply.
- (h) 326 IAC 8-1-6 (VOC Rules: General Reduction Requirements for New Facilities)
Each of the emission units at this source is not subject to the requirements of 326 IAC 8-1-6, since the unlimited VOC potential emissions from each emission unit is less than twenty-five (25) tons per year.
- (i) 326 IAC 12 (New Source Performance Standards)
See Federal Rule Applicability Section of this TSD.

- (j) 326 IAC 20 (Hazardous Air Pollutants)
See Federal Rule Applicability Section of this TSD.

Conclusion and Recommendation

Unless otherwise stated, information used in this review was derived from the application and additional information submitted by the applicant. An application for the purposes of this review was received on May 8, 2008.

The operation of this source shall be subject to the conditions of the attached proposed Registration No. 023-26503-00044. The staff recommends to the Commissioner that this Registration be approved.

IDEM Contact

- (a) Questions regarding this proposed permit can be directed to Timothy R. Pettifor at the Indiana Department Environmental Management, Office of Air Quality, Permits Branch, 100 North Senate Avenue, MC 61-53 IGCN 1003, Indianapolis, Indiana 46204-2251 or by telephone at (317) 234-5300 or toll free at 1-800-451-6027 extension 4-5300.
- (b) A copy of the findings is available on the Internet at: <http://www.in.gov/ai/appfiles/idem-caats/>
- (c) For additional information about air permits and how the public and interested parties can participate, refer to the IDEM's Guide for Citizen Participation and Permit Guide on the Internet at: www.idem.in.gov

**Appendix A: Emission Summary
Potential to Emit (tons/yr)**

Company Name: CF Industries, Inc.

Address: 6446 W. State Route 28, Frankfort, Indiana 46041-0606

Registration #: 023-26503-00044

Reviewer: Timothy R. Pettifor

Date: 10-Jul-08

Uncontrolled Potential to Emit (tons/year)																		
Process/ Emission Unit	PM	PM10	SO2	NOx	VOC	CO	NH ₃	Pb	Ben- zene	Dichloro- Benzene	Form- aldehyde	Hexane	Toluene	Cd	Cr	Mn	Ni	Total HAP's
Process Heater	0.20	1.00	0.10	12.70	0.70	10.70	0.4	6.35E-05	2.67E-04	1.52E-04	9.53E-03	2.29E-01	4.32E-04	1.40E-04	1.78E-04	4.83E-05	2.67E-04	2.40E-01
Process Flare (Pilot)	8.32E-05	3.33E-04	2.63E-05	4.38E-03	2.41E-04	3.68E-03	1.402E-04	2.19E-08	9.20E-08	5.26E-08	3.29E-06	7.88E-05	1.49E-07	4.82E-08	6.13E-08	1.66E-08	9.20E-08	8.27E-05
Process Flare (Assist Ring)	3.32E-04	1.33E-03	1.05E-04	1.75E-02	9.61E-04	1.47E-02	5.59E-04	8.74E-08	3.67E-07	2.10E-07	1.31E-05	3.15E-04	5.94E-07	1.92E-07	2.45E-07	6.64E-08	3.67E-07	3.30E-04
Process Flare Fuel-Bound and Thermal Nox	—	—	—	0.39	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Fugitive Dust Paved Roads	2.92	0.57	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Fugitive Dust Unpaved Roads	17.39	4.43	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Truck Loading	—	—	—	—	—	—	0.075	—	—	—	—	—	—	—	—	—	—	—
Total	20.51	6.00	0.10	13.11	0.70	10.72	0.48	6.36E-05	2.67E-04	1.53E-04	9.54E-03	2.29E-01	4.33E-04	1.40E-04	1.78E-04	4.84E-05	2.67E-04	0.24

**Appendix A: Emissions Calculations
Process Heater
Natural Gas Combustion Only
MM BTU/HR <100**

Company Name: CF Industries, Inc.
Address City IN Zip: 6446 W. State Route 28, Frankfort, Indiana 46041-0606
Registration Number: 023-26503-00044
Reviewer: Timothy R. Pettifor
Date: 30-Jun-08

Heat Input Capacity
MMBtu/hr

Potential Throughput
MMCF/yr

29.0

254.0

Emission Factor in lb/MMCF	Pollutant						
	PM*	PM10*	SO2	NOx	VOC	CO	NH ₃
	1.9	7.6	0.6	100.0	5.5	84.0	3.2
				**see below			
Potential Emission in tons/yr	0.2	1.0	0.1	12.7	0.7	10.7	0.4

*PM emission factor is filterable PM only. PM10 emission factor is filterable and condensable PM10 combined.

**Emission Factors for NOx: Uncontrolled = 100, Low NOx Burner = 50, Low NOx Burners/Flue gas recirculation = 32

Methodology

All emission factors are based on normal firing.

MMBtu = 1,000,000 Btu

MMCF = 1,000,000 Cubic Feet of Gas

Potential Throughput (MMCF) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1 MMCF/1,000 MMBtu

Emission Factors are from AP 42, Chapter 1.4, Tables 1.4-1, 1.4-2, 1.4-3, SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-03-006-03 (SUPPLEMENT D 3/98) except for NH₃. NH₃ emission factor is from WebFIRE Database (4-2006).

Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton

See page 3 for HAPs emissions calculations.

Appendix A: Emissions Calculations

**Process Heater
Natural Gas Combustion Only
MM BTU/HR <100
HAPs Emissions**

Company Name: CF Industries, Inc.
Address City IN Zip: 6446 W. State Route 28, Frankfort, Indiana 46041-0606
Registration Number: 023-26503-00044
Reviewer: Timothy R. Pettifor
Date: 30-Jun-08

HAPs - Organics					
Emission Factor in lb/MMcf	Benzene 2.1E-03	Dichlorobenzen 1.2E-03	Formaldehyde 7.5E-02	Hexane 1.8E+00	Toluene 3.4E-03
Potential Emission in tons/yr	2.667E-04	1.524E-04	9.527E-03	2.286E-01	4.319E-04

HAPs - Metals					
Emission Factor in lb/MMcf	Lead 5.0E-04	Cadmium 1.1E-03	Chromium 1.4E-03	Manganese 3.8E-04	Nickel 2.1E-03
Potential Emission in tons/yr	6.351E-05	1.397E-04	1.778E-04	4.827E-05	2.667E-04

Methodology is the same as page 2.

The five highest organic and metal HAPs emission factors are provided above.
 Additional HAPs emission factors are available in AP-42, Chapter 1.4.

**Appendix A: Emissions Calculations
Process Flare (Pilot)
Natural Gas Combustion Only
MM BTU/HR <100**

Company Name: CF Industries, Inc.
Address City IN Zip: 6446 W. State Route 28, Frankfort, Indiana 46041-0606
Registration Number: 023-26503-00044
Reviewer: Timothy R. Pettifor
Date: 3-Jun-08

Heat Input Capacity
MMBtu/hr

Potential Throughput
MMCF/yr

0.01

0.1

Emission Factor in lb/MMCF	Pollutant						
	PM*	PM10*	SO2	NOx	VOC	CO	NH ₃
	1.9	7.6	0.6	100.0	5.5	84.0	3.2
				**see below			
Potential Emission in tons/yr	8.322E-05	3.329E-04	2.628E-05	4.380E-03	2.409E-04	3.679E-03	1.402E-04

*PM emission factor is filterable PM only. PM10 emission factor is filterable and condensable PM10 combined.

**Emission Factors for NOx: Uncontrolled = 100, Low NOx Burner = 50, Low NOx Burners/Flue gas recirculation = 32

Methodology

All emission factors are based on normal firing.

MMBtu = 1,000,000 Btu

MMCF = 1,000,000 Cubic Feet of Gas

Potential Throughput (MMCF) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1 MMCF/1,000 MMBtu

Emission Factors are from AP 42, Chapter 1.4, Tables 1.4-1, 1.4-2, 1.4-3, SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-03-006-03 (SUPPLEMENT D 3/98) except for NH3. NH3 emission factor is from WebFIRE Database (4-2006).

Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton

See page 5 for HAPs emissions calculations.

Appendix A: Emissions Calculations
Process Flare (Pilot)
Natural Gas Combustion Only
MM BTU/HR <100
HAPs Emissions

Company Name: CF Industries, Inc.
Address City IN Zip: 6446 W. State Route 28, Frankfort, Indiana 46041-0606
Registration Number: 023-26503-00044
Reviewer: Timothy R. Pettifor
Date: 30-Jun-08

HAPs - Organics					
	Benzene	Dichlorobenze	Formaldehyde	Hexane	Toluene
Emission Factor in lb/MMcf	2.1E-03	1.2E-03	7.5E-02	1.8E+00	3.4E-03
Potential Emission in tons/yr	9.198E-08	5.256E-08	3.285E-06	7.884E-05	1.489E-07

HAPs - Metals					
	Lead	Cadmium	Chromium	Manganese	Nickel
Emission Factor in lb/MMcf	5.0E-04	1.1E-03	1.4E-03	3.8E-04	2.1E-03
Potential Emission in tons/yr	2.190E-08	4.818E-08	6.132E-08	1.664E-08	9.198E-08

Methodology is the same as page 4.

The five highest organic and metal HAPs emission factors are provided above.
 Additional HAPs emission factors are available in AP-42, Chapter 1.4.

**Appendix A: Emissions Calculations
Process Flare (Assist Ring)
Natural Gas Combustion Only
MM BTU/HR <100**

Company Name: CF Industries, Inc.
Address City IN Zip: 6446 W. State Route 28, Frankfort, Indiana 46041-0606
Registration Number: 023-26503-00044
Reviewer: Timothy R. Pettifor
Date: 30-Jun-08

Heat Input Capacity
MMBtu/hr

Potential Throughput
MMCF/yr

4.854

0.3

Emission Factor in lb/MMCF	Pollutant						
	PM*	PM10*	SO2	NOx 100.0 **see below	VOC	CO	NH ₃
Potential Emission in tons/yr	3.320E-04	1.328E-03	1.048E-04	1.747E-02	9.611E-04	1.468E-02	5.592E-04

*PM emission factor is filterable PM only. PM10 emission factor is filterable and condensable PM10 combined.

**Emission Factors for NOx: Uncontrolled = 100, Low NOx Burner = 50, Low NOx Burners/Flue gas recirculation = 32

Methodology

All emission factors are based on normal firing.

MMBtu = 1,000,000 Btu

MMCF = 1,000,000 Cubic Feet of Gas

Potential Throughput (MMCF) = Heat Input Capacity (MMBtu/hr) x 72 hrs/yr x 1 MMCF/1,000 MMBtu (Flare Assist Ring only operates during operational upsets and emergencies. Historical data indicates a maximum of only 3 days assist flare would combust).

Emission Factors are from AP 42, Chapter 1.4, Tables 1.4-1, 1.4-2, 1.4-3, SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-03-006-03 (SUPPLEMENT D 3/98) except for NH3. NH3 emission factor is from WebFIRE Database (4-2006).

Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton

See page 7 for HAPs emissions calculations.

**Appendix A: Emissions Calculations
 Process Flame (Assist Ring)
 Natural Gas Combustion Only
 MM BTU/HR <100
 HAPs Emissions**

Company Name: CF Industries, Inc.
Address City IN Zip: 6446 W. State Route 28, Frankfort, Indiana 46041-0606
Registration Number: 023-26503-00044
Reviewer: Timothy R. Pettifor
Date: 30-Jun-08

	HAPs - Organics				
Emission Factor in lb/MMcf	Benzene 2.1E-03	Dichlorobenzen 1.2E-03	Formaldehyde 7.5E-02	Hexane 1.8E+00	Toluene 3.4E-03
Potential Emission in tons/yr	3.670E-07	2.097E-07	1.311E-05	3.145E-04	5.941E-07

	HAPs - Metals				
Emission Factor in lb/MMcf	Lead 5.0E-04	Cadmium 1.1E-03	Chromium 1.4E-03	Manganese 3.8E-04	Nickel 2.1E-03
Potential Emission in tons/yr	8.737E-08	1.922E-07	2.446E-07	6.640E-08	3.670E-07

Methodology is the same as page 6.

The five highest organic and metal HAPs emission factors are provided above.
 Additional HAPs emission factors are available in AP-42, Chapter 1.4.

Company Name: CF Industries, Inc.

Address: 6446 W. State Route 28, Frankfort, Indiana 46041-0606

Registration #: 023-26503-00044

Reviewer: Timothy R. Pettifor

Date: 12-Jun-08

Process Flare Fuel-Bound and Thermal NOx

Ammonia Vapor Flaring Rate:	48,000 lbs/day
*Fuel-bound NOx Rate:	0.5 % ammonia vapor
*Thermal Nox Rate:	0.06 lbs NOx/MMBTu
Ammonia Heating Value	8037 Btu/lb ammonia vapor
Fuel-bound NOx Emissions:	
48,000 lbs/day x 0.5 % ammonia vapor x 3 days/yr** x 1 ton/2000lbs =	0.36 tons/yr
Thermal NOx Emissions:	
48,000 lbs/day x 8037 Btu/lb x 1MMBTu/10 ⁶ Btu x 0.06 lbs NOx/MMBTu x 3 days/yr** x 1ton/2000 lbs =	0.03 tons/yr
Fuel-bound Nox Emissions + Thermal Nox Emissions:	0.39 tons/yr

*Values were provided by the flare vendor and are consistent with values found in "Air Permit Technical Guidance for Chemical Sources: Flares and Oxidizers" from the Texas Natural Resources Conservation Commission (October 2000, RG-109 draft).

**Historical data indicates the flare would only combust 3 days out of the year.

**Appendix A: Emission Calculations
Fugitive Dust Emissions - Paved Roads**

Company Name: CF Industries, Inc. - Frankfort, IN
Address City IN Zip: 6446 W. State Road 28, Frankfort, Indiana 46041-0606
Registration Number: 023-26503-00044
Reviewer: Timothy R. Pettifor
Date: 19-Jun-08

Paved Roads at Industrial Site

The following calculations determine the amount of emissions created by paved roads, based on 8,760 hours of use and AP-42, Ch 13.2.1 (12/2003).

Vehicle Information (provided by source)

Type	Maximum trips per day (trip/day)	Maximum Weight Loaded (tons/trip)	Total Weight driven per day (ton/day)	Maximum one-way distance (feet/trip)	Maximum one-way distance (mi/trip)	Maximum one-way miles (miles/day)	Maximum one-way miles (miles/yr)
Ammonia Trucks (unloaded, entering plant) (one-way trip)	160.0	19.5	3120.0	273.0	0.052	8.3	3019.5
Ammonia Trucks (loaded, leaving plant) (one-way trip)	160.0	40.0	6400.0	273.0	0.052	8.3	3019.5
Employee Vehicles (one-way trip) - in	10.0	2.0	20.0	215.0	0.041	0.4	148.6
Employee Vehicles (one-way trip) - out	10.0	2.0	20.0	215.0	0.041	0.4	148.6
Contractor/Visitor Vehicles (one-way trip) - in	20.0	2.0	40.0	215.0	0.041	0.8	297.3
Contractor/Visitor Vehicles (one-way trip) - out	20.0	2.0	40.0	215.0	0.041	0.8	297.3
Total	380.0		9640.0			19.0	6930.9

Average Vehicle Weight Per Trip = tons/trip
 Average Miles Per Trip = miles/trip

Unmitigated Emission Factor, $E_f = [k * (sL/2)^{0.65} * (W/3)^{1.5} - C]$ (Equation 1 from AP-42 13.2.1)

	PM	PM10	
where k =	0.082	0.016	lb/mi = particle size multiplier (AP-42 Table 13.2.1-1)
W =	25.4	25.4	tons = average vehicle weight (provided by source)
C =	0.00047	0.00047	lb/mi = emission factor for vehicle exhaust, brake wear, and tire wear (AP-42 Table 13.2.1-2)
sL =	0.6	0.6	g/m ² = Ubiquitous Baseline Silt Loading Values of paved roads (Table 13.2.1-3 for summer months)

Taking natural mitigation due to precipitation into consideration, Mitigated Emission Factor, $E_{ext} = E * [1 - (p/4N)]$

Mitigated Emission Factor, $E_{ext} = E_f * [1 - (p/4N)]$
 where p = days of rain greater than or equal to 0.01 inches (see Fig. 13.2.1-2)
 N = days per year

	PM	PM10	
Unmitigated Emission Factor, $E_f =$	0.92	0.18	lb/mile
Mitigated Emission Factor, $E_{ext} =$	0.84	0.16	lb/mile

Process	Unmitigated PTE of PM (tons/yr)	Unmitigated PTE of PM10 (tons/yr)	Mitigated PTE of PM (tons/yr)	Mitigated PTE of PM10 (tons/yr)
Ammonia Trucks (unloaded, entering plant) (one-way trip)	1.39	0.27	1.27	0.25
Ammonia Trucks (loaded, leaving plant) (one-way trip)	1.39	0.27	1.27	0.25
Employee Vehicles (one-way trip) - in	0.07	0.01	0.06	0.01
Employee Vehicles (one-way trip) - out	0.07	0.01	0.06	0.01
Contractor/Visitor Vehicles (one-way trip) - in	0.14	0.03	0.13	0.02
Contractor/Visitor Vehicles (one-way trip) - out	0.14	0.03	0.13	0.02
	3.19	0.62	2.92	0.57

Methodology

Total Weight driven per day (ton/day) = [Maximum Weight Loaded (tons/trip)] * [Maximum trips per day (trip/day)]
 Maximum one-way distance (mi/trip) = [Maximum one-way distance (feet/trip)] / [5280 ft/mile]
 Maximum one-way miles (miles/day) = [Maximum trips per year (trip/day)] * [Maximum one-way distance (mi/trip)]
 Average Vehicle Weight Per Trip (ton/trip) = SUM[Total Weight driven per day (ton/day)] / SUM[Maximum trips per day (trip/day)]
 Average Miles Per Trip (miles/trip) = SUM[Maximum one-way miles (miles/day)] / SUM[Maximum trips per year (trip/day)]
 Unmitigated PTE (tons/yr) = [Maximum one-way miles (miles/yr)] * [Unmitigated Emission Factor (lb/mile)] * (ton/2000 lbs)
 Mitigated PTE (tons/yr) = [Maximum one-way miles (miles/yr)] * [Mitigated Emission Factor (lb/mile)] * (ton/2000 lbs)

Abbreviations

PM = Particulate Matter
 PM10 = Particulate Matter (<10 um)
 PTE = Potential to Emit

**Appendix A: Emission Calculations
Fugitive Dust Emissions - Unpaved Roads**

Company Name: CF Industries, Inc.
Address City IN Zip: 6446 W. State Route 28, Frankfort, Indiana 46041-0606
Registration Number: 023-26503-00044
Reviewer: Timothy R. Pettifor
Date: 19-Jun-08

Unpaved Roads at Industrial Site

The following calculations determine the amount of emissions created by unpaved roads, based on 8,760 hours of use and AP-42, Ch 13.2.2 (12/2003).

Vehicle Information (provided by source)

Type	Maximum trips per day (trip/day)	Maximum Weight Loaded (tons/trip)	Total Weight driven per day (ton/day)	Maximum one-way distance (feet/trip)	Maximum one-way distance (mi/trip)	Maximum one-way miles (miles/day)	Maximum one-way miles (miles/yr)
Ammonia Truck (unloaded, entering plant) (one-way trip)	160.0	19.5	3120.0	520	0.098	15.8	5751.5
Ammonia Truck (loaded, leaving plant) (one-way trip)	160.0	40.0	6400.0	140	0.027	4.2	1548.5
Employee Vehicles (one-way trip) - in	0.0	2.0	0.0	0	0.000	0.0	0.0
Employee Vehicles (one-way trip) - out	0.0	2.0	0.0	0	0.000	0.0	0.0
Contractor/Visitor Vehicles (one-way trip) - in	0.0	2.0	0.0	0	0.000	0.0	0.0
Contractor/Visitor Vehicles (one-way trip) - out	0.0	2.0	0.0	0	0.000	0.0	0.0
Total	320.0		9520.0			20.0	7300.0

Average Vehicle Weight Per Trip =

29.8	tons/trip
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Average Miles Per Trip =

0.06	miles/trip
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Unmitigated Emission Factor, $E_f = k \left[\left(\frac{s}{12} \right)^a \right] \left[\frac{W}{3} \right]^b$ (Equation 1a from AP-42 13.2.2)

	PM	PM10	
where k =	4.9	1.5	lb/mi = particle size multiplier (AP-42 Table 13.2.2-2 for Industrial Roads)
s =	4.8	4.8	% = mean % silt content of unpaved roads (AP-42 Table 13.2.2-3 Sand/Gravel Processing Plant Road)
a =	0.7	0.9	= constant (AP-42 Table 13.2.2-2)
W =	29.8	29.8	tons = average vehicle weight (provided by source)
b =	0.45	0.45	= constant (AP-42 Table 13.2.2-2)

Taking natural mitigation due to precipitation into consideration, Mitigated Emission Factor, $E_{ext} = E_f \left[\frac{365 - P}{365} \right]$
Mitigated Emission Factor, $E_{ext} = E_f \left[\frac{365 - P}{365} \right]$
where P =

125

 days of rain greater than or equal to 0.01 inches (see Fig. 13.2.2-1)

	PM	PM10	
Unmitigated Emission Factor, E_f =	7.24	1.85	lb/mile
Mitigated Emission Factor, E_{ext} =	4.76	1.21	lb/mile

Process	Unmitigated PTE of PM (tons/yr)	Unmitigated PTE of PM10 (tons/yr)	Mitigated PTE of PM (tons/yr)	Mitigated PTE of PM10 (tons/yr)
Ammonia Truck (unloaded, entering plant) (one-way trip)	20.83	5.31	13.70	3.49
Ammonia Truck (loaded, leaving plant) (one-way trip)	5.61	1.43	3.69	0.94
Employee Vehicles (one-way trip) - in	0.00	0.00	0.00	0.00
Employee Vehicles (one-way trip) - out	0.00	0.00	0.00	0.00
Contractor/Visitor Vehicles (one-way trip) - in	0.00	0.00	0.00	0.00
Contractor/Visitor Vehicles (one-way trip) - out	0.00	0.00	0.00	0.00
	26.44	6.74	17.39	4.43

Methodology

Total Weight driven per day (ton/day) = [Maximum Weight Loaded (tons/trip)] * [Maximum trips per day (trip/day)]
Maximum one-way distance (mi/trip) = [Maximum one-way distance (feet/trip)] / [5280 ft/mile]
Maximum one-way miles (miles/day) = [Maximum trips per year (trip/day)] * [Maximum one-way distance (mi/trip)]
Average Vehicle Weight Per Trip (ton/trip) = SUM[Total Weight driven per day (ton/day)] / SUM[Maximum trips per day (trip/day)]
Average Miles Per Trip (miles/trip) = SUM[Maximum one-way miles (miles/day)] / SUM[Maximum trips per year (trip/day)]
Unmitigated PTE (tons/yr) = (Maximum one-way miles (miles/yr)) * (Unmitigated Emission Factor (lb/mile)) * (ton/2000 lbs)
Mitigated PTE (tons/yr) = (Maximum one-way miles (miles/yr)) * (Mitigated Emission Factor (lb/mile)) * (ton/2000 lbs)

Abbreviations

PM = Particulate Matter
PM10 = Particulate Matter (<10 um)
PTE = Potential to Emit

Appendix A: Emission Calculations
NH₃ Emissions from Truck Loading

Company Name: CF Industries, Inc.
Address: 6446 W. State Route 28, Frankfort, Indiana 46041-0606
Registration #: 023-26503-00044
Reviewer: Timothy R. Pettifor
Date: 10-Jul-08

Maximum Number of trucks loaded:	160	trucks/day
Pipe Length (distance between valves after clearing liquid):	2	feet
Pipe Diameter:	0.1667	feet
Pipe Volume:	0.04	cubic feet
Density of ammonia vapor at 1 atm:	0.05848	pounds/cubic feet
Ammonia Emissions:	0.075	tons/year

Methodology:

Pipe Volume = $(\text{Pipe Diameter}^2/4 \times \text{pie}) \times \text{pipe length}$

Ammonia Emissions = $\text{Pipe Volume (ft}^3\text{)} \times \text{Ammonia Density (lbs/ft}^3\text{)} \times 160 \text{ (trucks/day)} \times 365 \text{ (days/yr)} \times (1 \text{ ton}/2000\text{lbs)}$